



“IRHC improving the healthcare of those who live and work in rural, remote and extreme environments”

IRHC Remote Healthcare for Energy and associated Maritime activities©

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List of Abbreviations

AED	Automated external defibrillator
ALS	Advanced life support
BLS	Basic life support
BLS	Basic life support
DFA	Designated first aiders
EAP	Employee assistance program
FTW	Fitness to work
HRA	Health risk assessment
IRHC	Institute of Remote Healthcare
MER	Medical emergency response
MERP	Medical emergency response plan
MSDS	Material safety data sheet
RHC	Remote healthcare
RHCP	Remote healthcare practitioner
SMS	Short messaging service
VOIP	Voice over internet protocol
WHPP	Workplace health promotion program

Introduction

Recognising the growth of work in remote locations in the energy industry and its associated maritime activities, the Institute of Remote Healthcare (IRHC) and its partners jointly organized the Remote Healthcare Workshop 2013 held between 14 - 15th Jan 2013, at Radisson Blu Royal Hotel, Bergen, Norway. The workshop was attended by 88 professionals and subject matter experts from around the world representing health, HSE, energy, maritime industries, academic institutions, technology and emergency medical providers.

The key questions discussed were:

1. What are the health challenges of working in remote locations in the energy and its associated maritime operations, and what are the common ways of overcoming these challenges?
2. What are the competency requirements for a Health Professionals working at these remote locations?
3. What are the communication technologies, tele-health and telemedicine capabilities required to deliver health in these settings?
4. What medical equipment and medical supplies are required to support health delivery in these locations?
5. What preventive controls and planning considerations are needed to optimize health and minimise injuries and illnesses in these locations?

Purpose

This document serves as a guidance text to assist remote healthcare practitioners implement health support in remote locations within the energy and its associated marine operations. This document represents the collective views and discussion points during the Remote Healthcare (RHC) Consensus Workshop 2013, Bergen, Norway.

It is not a detailed reference point for making clinical decisions in the medical management of patients, as there are comprehensive text on this elsewhere. This document does not attempt to prescribe a single, standardized protocol for the industry, as the exact protocols and procedures will be shaped by the prevailing risks and situation specific to the workplace, company and country. It does however; offer a structured approach, describing the risk assessment and control options.

Who is this document for?

This document is aimed at professionals working in the energy and its associated maritime operations, including:

- Managers
- Supervisors
- Health professionals
- Health, safety and environment (HSE) professionals
- Emergency response team members and service providers

Disclaimer

This document is based on the workshop participants' individual views, derived from their involvement in providing healthcare in remote locations in the energy industry and its associated maritime activities. The views presented in this document do not necessarily represent the views of the participants' organisations. Please check that anything you take from this document meets local regulatory or business requirements, and is appropriate for your particular location, activities and risks. The training providers identified in Appendix B are not endorsed by the IRHC except for The Robert Gordon University who have successfully attained TraC™ (Training Assurance Certificate)

What are Remote Locations?

Remote locations (RL) are those where the medical evacuation of an injured or ill person to a hospital cannot be guaranteed to be achieved within 4 hours in foreseeable circumstances (e.g. inclement weather).

A common example in the oil and gas industry is the offshore production platform. Whilst most platforms can be reached within 4 hours by helicopter, this transportation time is not guaranteed in the event of adverse weather, aircraft availability, or at night. Examples in marine operations include vessels sailing within 4 hours of a nearest port, or vessels with a helipad sailing within 4 hours of flying time to a hospital.

Several factors affect evacuation time (and thus the "remoteness" of a location). These include geographical distances, available transportation options, transportation infrastructure, communication, weather, and security (e.g. hostilities).

Workers in remote locations commonly work on a rotational basis, being on-site for a period of time (usually between 2 weeks to 2 months), before departing home for leave (usually between 1 week to 1 month).

Extreme Remote Locations (EXRL) are sites where medical evacuation to a hospital can never be achieved within 4 hours, even in the best of circumstances. Examples include vessels operating hundreds of nautical miles from shore, or those

operating from bases which are themselves remote (e.g. the Arctic). These sites may be out of most rotary wing aircraft flying range, and evacuation times may sometimes exceed 24 hours.

In the energy industry, the need to develop additional energy sources, often from remote, less accessible places, will continue to grow in the future. Similarly, the increase in trade and commerce between continents is likely to continue to grow and drive maritime operations. Although operating in these locations present a multitude of technical and health challenges, they are necessary in order to secure the energy and commercial interests of nations.

What are the challenges of working in remote locations?

Remote locations present many challenges to the health of employees who work in them. In the event of an illness or injury, an evacuation would take a much longer time than can be expected in an urban setting. During this period, the patient's condition may deteriorate leading to disability, or even death. Remote locations are also associated with higher risks (e.g. hot or cold extremes in deserts or polar regions, or infectious diseases in tropical areas), limited access to basic necessities (e.g. clean water), and limited supplies (due to logistical challenges of re-supply). Remote locations are also often associated with limited communication options (e.g. the lack of telephone lines, mobile network, satellite communications or internet). This means a higher likelihood of harm to health (unless appropriate preventive controls are put in place). It also means that when people do get ill or injured, the likelihood of developing a complication or the condition worsening is high, unless mitigations are put in place.

What is Remote Healthcare?

Remote healthcare (RHC) encompasses the health activities involved with the prevention, diagnosis, and treatment targeted at those working in remote locations. It represents a set of controls and mitigations that minimises the health risks of workers in these locations. It builds on the existing controls already in place in the energy and its associated maritime activities in such a way that enhances their effectiveness. These controls include fitness to work, health risk assessment, medical emergency response, food safety, health promotion, competence, and communications. By augmenting the existing controls, we ensure that health support is available where and when it is needed, and that risks are as low as reasonably practicable.

Planning and Prevention. Appropriate planning and prevention steps prior to mobilisation to a remote location are essential. They include:

- Health risk assessment
- Medical emergency response planning
- Fitness to work
- Health promotion
- Food and drinking water safety

People and Competence. Remote locations (and especially extreme remote locations) present the need to provide medical support for an extended period whilst waiting for evacuation. It also presents the need to conduct treatment above that of a typical site clinic. Health professionals working in these locations thus require a number of competencies, including managing medical emergencies, advanced life support, emergency transportation, communications and the use of medical technology. These remote healthcare practitioners (RHCP) will also require some basic understanding of a number of specialist area of knowledge, such as diving medicine, aviation medicine, toxicology and public health.

Topside and Telemedicine. Topside support and telemedicine are tools that enhance remote healthcare. They save lives in critical care and emergency situations by bringing the hospital to the patient (rather than the other way around). In addition to facilitating diagnosis and treatment, telemedicine connection to a competent topside has been shown to reduce delays in medical evacuations (e.g. through faster diagnosis) and reduce unnecessary evacuations (e.g. through accurate specialist assessments). Telemedicine has also been successful in facilitating continuous medical education to the RHCP, support the preventive programs, and monitor employees' health in remote locations.

Medical Equipment and Supplies. Recent developments in medicine have allowed for the introduction of advanced and novel equipment that has shown its usefulness in the field (e.g. in recent military conflicts). Whilst these equipment adds costs and training time for health professionals, their value in saving lives and improving health outcomes of illnesses and injuries have been demonstrated in remote locations.

Our belief:

We believe that it is possible that work in remote locations can be done without causing harm to people. We are certain that the health of workers in remote locations can be protected in the same way as (or even better than) their non-remote counterparts.

What are the Opportunities?

Minimising Unnecessary Medical Evacuations

Whilst all evacuations are pursued with the aim of saving lives and limbs, the evacuations themselves can be a risk – both to the patients and to those performing the medical evacuations. In emergency situations, flying may be pursued in less than ideal conditions. This includes flying at night, or flying in less than ideal weather. Medical care during the transfer is difficult due to movement, noise, and limited monitoring capability. Patient transfer from platform to boat, or from aircraft to ambulance may also pose a risk for additional injuries. With enhanced competency, medical equipment, medical supplies and access to specialist advice via telemedicine, many conditions can be treated on site, before pursuing medical evacuation (if indeed necessary). Examples include:

- Simple small fractures (e.g. fingers) can be diagnosed using x-ray equipment on site. Using telemedicine, an orthopaedic specialist located far from the worksite can view the films, examine the affected limb, clarify the history and symptoms, and prescribe the appropriate treatment.
- Similarly, using enhanced communications technology in telemedicine, dental specialists can diagnose, discuss, and help treat dental conditions which would otherwise necessitate a medical evacuation.

Optimising Care Before and During Transfer

Care optimisation can take several forms. Improved accuracy in diagnosis allows treatment to be started early, before an evacuation. It also expedites decision-making leading to early evacuation where it is indicated. Both reduces the risks of complications and increases the likelihood of an early recovery. Examples include:

- A competent remote healthcare practitioner (RHCP) equipped with an ultrasound scan and supported by specialist topside via telemedicine allows early diagnosis (e.g. appendicitis or venous thrombosis), and early treatment before evacuation.
- Point of care testing (POCT) allows blood tests to be done on site (instead of sending samples to a laboratory), with almost immediate results. It enhances the accuracy of early diagnosis of many conditions, including a heart attack, malaria, kidney failure, meningitis, deep vein thrombosis, and many others.
- Immediate access to an electrocardiogram, a cardiologist, and drugs means that during a heart attack, thrombolytic therapy (dissolving blood clots in the vessels using an injection) may be started early. This significantly reduces the risks of complications or death – comparable to that of being in a hospital when the illness happens.

Preventing Health Complications

Chronic illnesses may give rise to medical emergencies (e.g. a heart attack) or injuries (e.g. from an epileptic seizure) during work at a remote location. The risks can significantly be lowered through the application of fitness to work assessments and on-site health promotion programs. Properly applied, these proactive measures have been shown to significantly reduce the number of health incidents and medical evacuations.

Planning and Prevention

Planning and prevention prior to mobilisation are essential to the success of the energy or maritime activity. The following controls are common to all energy and marine operations:

- Health Risk Assessment
- Medical Emergency Response Planning
- Fitness to Work
- Health Promotion
- Food and drinking water safety

In addition, success in the provision of healthcare in remote location requires a certain mindset, different to one commonly adopted in a hospital or an urban health facility.

Health Risk Assessment (HRA)

The Health Risk Assessment (HRA) process aims to identify health hazards present at the remote location, evaluate their risks to health and determine appropriate control and recovery measures.

To accurately assess risk, use reliable data to derive:

- The likelihood of the hazard occurring (e.g. frequency of a particular type of injury occurring at the location, in the business, or in the industry) and
- The severity of the outcome (e.g. whether the hazard will cause minor health effects, major health effects, or deaths).

Factors that affect the likelihood and severity of the injury/illness include:

- The nature of work activities performed at the site
- Number of people on site
- Project duration
- Transportation options and availability
- Transportation infrastructure
- Geography
- Climate
- Security
- Characteristics of the working population (e.g. age profile, gender mix, migrant status, etc)

An example of a (simplified) Health Risk Assessment for a remote location is shown below. Please note that each location is unique and that the appropriate controls for one location will not be same for another. For detailed guidance on Health Risk Assessments, please refer to the Reference section.

Hazard	Health Effects	Risk Assessment			Controls Needed
		Likelihood	Severity	Risk	
1. Major injuries, with delay to treatment	Permanent injury or death	High (twice last year)	High	High	<ul style="list-style-type: none"> • Medical Emergency Response Planning (MERP) • On-site Tier 2 MER support (i.e. site clinic and on-site health professional) • Enhanced MER competency of on-site RHCP • Topside support and telemedicine
2. Food poisoning outbreak	Acute gastroenteritis	Medium	Medium	Medium	<ul style="list-style-type: none"> • Food safety management system
3. Heat	Heat exhaustion, heat stroke	Low	High	Medium	<ul style="list-style-type: none"> • Work-rest regime when working outdoors • Worker awareness program • Fitness to work (FTW) assessment • Facilities for hydration
4. Dental emergencies	Dental abscess	Medium	Low	Medium	<ul style="list-style-type: none"> • Dental assessment as part of FTW assessment • Dental competency of remote healthcare practitioner
5. Cardiac incident (e.g. MI)	Permanent injury or death	Medium	High	High	<ul style="list-style-type: none"> • FTW • Worksite Health Promotion • On-site Tier 2 with cardiology capabilities (e.g. thrombolysis)
6. Psychological hazards and stress	Stress symptoms, anxiety, depression	Low	Medium	Low	<ul style="list-style-type: none"> • Limited assignment schedules • Facilities to allow communication with family • Confidential psychological counselling (where indicated) via telephone or tele-presence as part of an Employee Assistance Program (EAP)
7. Etc					

Table 1. An example of a (simplified) health risk assessment (HRA) summary

Medical Emergency Response Planning

Remote locations present challenges in terms of medical emergency response (MER) because of distance and travel time to secondary or tertiary medical care. In addition, the likelihood of poor weather may delay any attempts for a medical evacuation. To effectively manage medical emergencies in remote locations, a site-specific medical emergency response plan (MERP) needs to be developed prior to mobilisation. The MERP needs to take into account the potential for individual and multiple casualties, describing the response to various medical emergency scenarios based on the health risk assessment, and utilizing available resources. The MERP should consider specific needs of the work activities and the general situation of the country in which these activities are carried out, as well as any collaboration with local authorities.

MER Standard

In order to design an effective MER Plan, it is important to first determine the expected standard of care during medical emergencies. Various standards exist, most utilising a time-based tiered approach. A typical example of an MER Standard is as follows:

Medical Emergency Response Standard	
•	Tier 1: Provide first aid treatment, including defibrillation, by a Designated First Aider within 4 minutes of any injury or illness.
•	Tier 2: Provide assessment and stabilisation by a health professional within 1 hour of any injury or illness that requires it.
•	Tier 3: Provide admission to and care at the nearest Local Hospital within 4 hours of any injury or illness that requires it.
•	ALARP: When response times or requirements above cannot reasonably be met , perform a risk assessment and provide medical emergency response risk mitigation measures to ensure that the risks are kept as low as reasonably practicable (ALARP) .

Table 2. An example of a medical emergency response standard.

The tier times chosen are commonly based on what is reasonably practicable in a company's operations, i.e. a balance between unreasonable cost (in terms of time, money and effort), versus unreasonable risk (in terms of likelihood and severity of outcomes). The standards vary between companies and locations, but the above example is typical for the energy sector.

Resources

Resources required for the successful implementation of a MERP include:

- Competent MER Team members (e.g. First Aiders, Doctor, Nurse, Paramedic)
- Effective means of communications
- Adequate means of transportation (ground, water, air)
- Local health facilities with adequate medical structures (primary, secondary and tertiary health-care units), equipment and supplies

Tier		by	at	time	Equipment / Transport requirements	Training requirements	Skills Maintenance
Tier 0	Initiation	Bystander	Incident site	Immediate	-	• Call for help, make area safe, do's and don'ts	• Annually (1 hour)
Tier 1	First aid and defibrillation	Designated First Aider (DFA)	Incident site	4 minutes	• First Aid Box • Automated External Defibrillator (AED)	• DFA training (usually 40 hours)	• DFA skills refresher every 3 months
Tier 2	Medical stabilisation	Remote healthcare practitioner (Medic/ Nurse/ Doctor)	Incident site / Site Clinic	1 hour	• Trauma Bag • Ambulance Equipment • Site Clinic Equipment and Supplies	• Professional training • Advanced Life Support (ALS) training	• ALS training every 3 years
Tier 3	Hospital admission and care	Emergency Physician	Hospital	4 hours	• Transportation (private or public)	-	-

Table 3. An example of medical emergency response (MER) resource requirements based on a tiered response.

Medical Emergency Response Plan (MERP)

An MER Plan ensures that medical emergencies are managed as effectively as practicable, through the establishment of a set system of managing medical emergencies, and by ensuring that it is followed. Please note that each location is unique and that the MERP for one location will not be same for another. As such, MER Plans must be based on the HRA. An example of a simplified MERP is shown below:

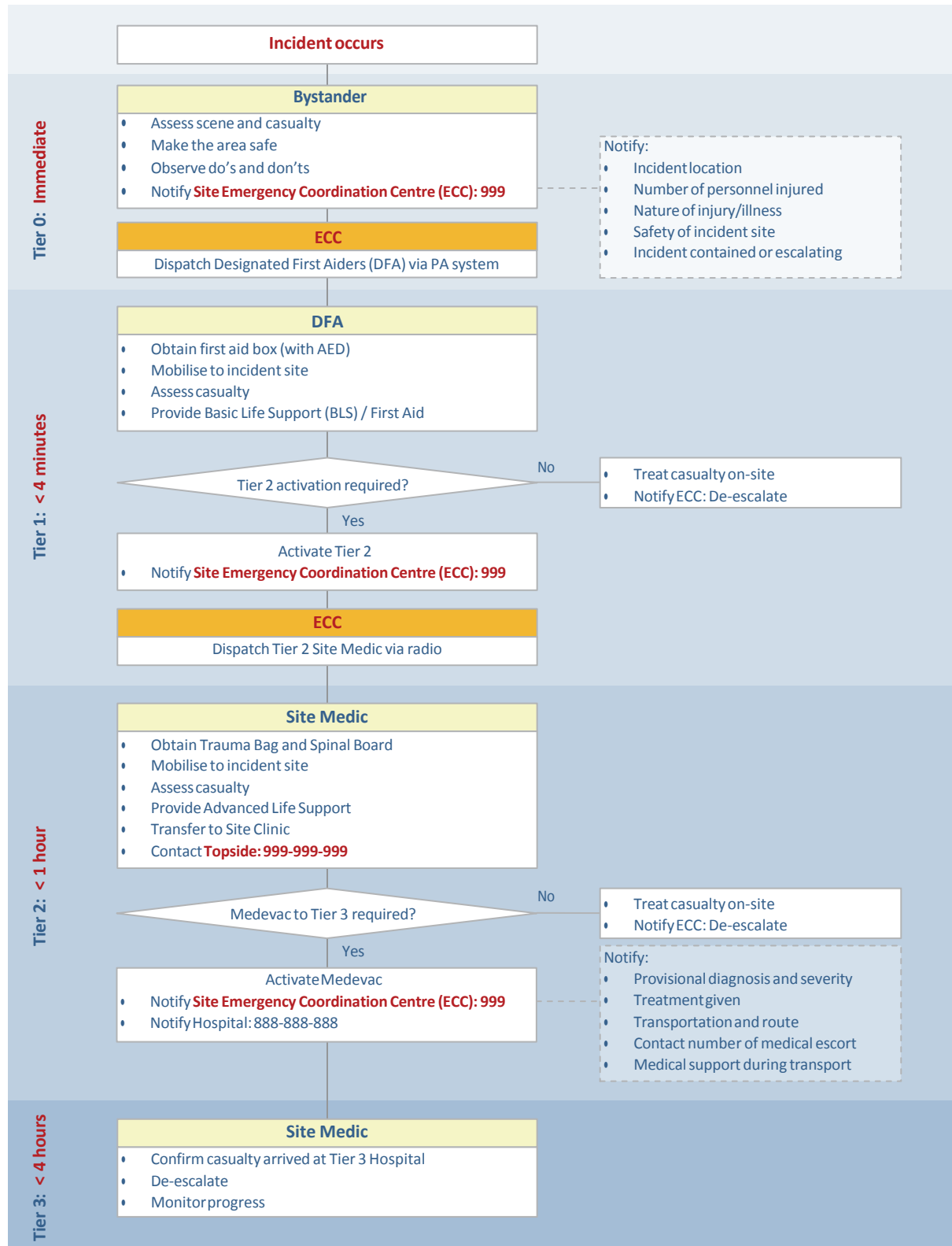


Figure 1. An example of a Medical Emergency Response Plan (MERP).

MERP in Extreme Remote Locations

In extreme remote locations, a medical evacuation to a nearest hospital may never be achieved within 4 hours, even in the best of circumstances. In order to minimise the health impact of this unavoidable delay, the Tier 2 support (stabilisation by a remote healthcare practitioner, RHCP) may need to be enhanced. The enhancements may include:

1. Improved ability to diagnose cases on site (which would otherwise require a medevac).
2. Improved ability to treat cases on site (which would otherwise require a medevac).
3. Improved ability to support difficult cases on site for an extended period (up to 36 hours), whilst awaiting or pending a medical evacuation.

In order to achieve those enhancements, consider the following:

1. Enhance the level of Tier 2 competency (e.g. professional skills, and professional experience).
2. Additional number of Tier 2 remote healthcare practitioners available on site.
3. Additional medical equipment and supplies available for use on site (e.g. advanced life support equipment and supplies, trauma kits, patient transfer equipment, point of care testing devices, tele-radiology etc.)
4. Direct communication access between the on-site Tier 2 professional and specialist physicians (e.g. orthopaedic surgeon, cardiologist, surgeon, etc).
5. The use of communications technology to enhance medical support to the remote location (i.e. Telemedicine).

Sites with Low Exposure (e.g. small numbers of personnel)

Some sites have very small number of personnel on site (e.g. 25 people or less), or it may operate within a very limited time period (e.g. one month or less). In these circumstances, placing an on-site clinic, a health professional or a dedicated air transport may sometimes be impractical. This is common in marine operations. Where the response times or requirements above cannot reasonably be met, perform a risk assessment and provide measures to ensure that the risks are as low as reasonably practicable (ALARP). Examples of these measures are described below.

Demonstrating ALARP (Risks are Kept as Low as Reasonably Practicable)

Where tier response times cannot reasonably be met, ALARP can be demonstrated as follows:

How Risks are kept ALARP	Examples
1. Limited exposure	<ul style="list-style-type: none"> • Very short operations (e.g. starting and ending within 4 weeks) • Small number of workers (e.g. <25 people)
2. Low risk	<ul style="list-style-type: none"> • Sites where the likelihood or typical impact of an injury is low, e.g. office work
3. Additional health resources and capability	<ul style="list-style-type: none"> • Increased number of Designated First Aiders • Increased number of RHCP • Increased competency • Additional medical equipment • Shortening of tier response times, etc
4. Enhanced communication capabilities	<ul style="list-style-type: none"> • Redundant communication systems • Telemedicine • Vessel tracking • Video observation, etc
5. Improved transportation and shortening evacuation times	<ul style="list-style-type: none"> • Faster transportation • Transportation on standby • Redundant transportation • All-weather transportation

Table 4. Examples of ways in which risks are kept as low as reasonably practicable (ALARP) when Tier Response Times cannot reasonably be met.

Fitness to Work (FTW)

Illnesses which are easily managed in the urban setting may result in a crisis when it occurs at the remote location (e.g. an asthmatic attack). Operations may be interrupted (e.g. food poisoning outbreak), and the co-workers' health may be placed at risk (e.g. chickenpox).

Due to an ageing working population, a significant proportion of workers in remote operations may have chronic illnesses. They include (but are not limited to) hypertension, diabetes mellitus, and hypercholesterolaemia. Whilst in other settings these would not normally limit a worker's ability to complete his/her task, they represent a significant challenge in the remote location. An emergency arising from a complication of these chronic illnesses (e.g. a myocardial infarction) whilst in a remote location will result in significant delays to treatment, which in turn may result in permanent disability or death.

In order to ensure that an individual can indeed complete his assigned tasks safely and without unacceptable risk to themselves and others, it is important that the fitness to work assessments are designed in such a way that takes into account the remote location itself. This includes a consideration on how the remote site impacts the worker's health, and how health complications impact the individual, the site's safety and business continuity. Other considerations include the prevailing site-specific risks (e.g. temperature extremes), evacuation delays and available on-site health support.

A generic, non-risk-based medical assessment may not sufficiently identify those who are at risk. In some cases it may also unnecessarily prevent those who can safely perform work from doing so.

Existing FTW Protocols in use for Remote Locations

The Oil and Gas UK (OGUK) FTW recommendations¹ for offshore work are widely used in the energy industry. Although it was not originally designed for use outside of the UK North Sea operations, it has been successfully utilised by energy operators around the world. The protocols and standards within it have been applied in a multitude of remote settings (including land-based), with minimal or no modifications. It is generally agreed that the OGUK guidelines contains robust protocols and health standards, such that it is suitable for use in most remote locations, with minimal or no modifications.

Country-specific regulatory requirements for remote locations vary. Some countries prescribe protocols and standards (e.g. Norway and the Netherlands, whilst most do not.

Seafarers are required to hold a statutory certificate of fitness. This will be issued by a doctor approved by the maritime authority, normally that of either the seafarer's home state or the flag state of the vessel they are joining. National standards are followed by approved doctors and need to be in accord with the requirements of relevant international conventions². There are associated guidelines which specify criteria in more detail; their aim is both to reduce incidents at sea secondary to health related impairment and to reduce the risk of ill health³. These are, in essence, minimum standards and ship operators or their insurers may choose to enhance these, with the aim of reducing risks, in particular the financial and personal risks arising from medevac, treatment while under contract and repatriation.

However, it should be noted that each remote location is unique, and any FTW assessment protocols adopted needs to be based on the site's Health Risk Assessment (HRA).

FTW Protocols for Extreme Remote Locations

In extreme remote locations, delay to hospital treatment may be as long as 36 hours or more. This, together with an understanding of the increased risks of these locations, must be considered when conducting the FTW assessments for extreme remote locations.

It is generally agreed that the existing FTW protocols and standards in use for remote locations (e.g. OGUK published guidance) would not be suitable for use in extreme remote locations in their current unmodified form.

Possible enhancements to the existing FTW protocol and standards for use in extreme remote locations include:

1. Increasing the frequency of periodic assessments (e.g. to annually for all age groups)
2. The inclusion of dental assessment/ certification in the FTW protocol.
3. The inclusion of a simple psychological assessment in the FTW protocol.
4. Defining the health standards, including those that relates to:
 - a. Pregnancy
 - b. Insulin dependent diabetes mellitus
 - c. Asthma
 - d. Epilepsy
 - e. Cardiovascular disease
 - f. The use of certain medications
 - g. History of significant mental illness

A more detailed guidance on the FTW protocols and standards for extreme remote locations is highly desirable, but it is not within the scope of this document. It is hoped that future collaboration and dialogue in remote healthcare will address this gap.

Health Promotion

Difficulties in managing chronic illnesses in remote locations and its high costs have made workplace health promotion programs (WHPP) a very attractive proposition. Anecdotal evidence from energy operators piloting WHPP at remote locations suggests significant reduction in cardiovascular risk, and the optimisation of several health parameters. Program uptake has also been high due to the captive population in remote locations.

It is generally accepted that WHPP needs to be an integral component in the site's RHC design, rather than a "once off" isolated program.

Cardiovascular Risk

Although published data is limited, there is anecdotal evidence that workers in select pilot locations showed reduced cardiac risk, obtained a more optimum weight, stopped smoking, improved diet, improved fitness and enhanced morale. In

¹ Oil & Gas UK (2008). Medical Aspects of Fitness for Offshore Work: Guidance for Examining Physicians. Issue 6, March 2008. ISBN 1903003374.

² ILO Maritime Labour Convention 2006, IMO STCW Convention Manila amendments 2012.

³ ILO/IMO Guidelines on seafarer medical examinations 2012.

turn this has resulted in significantly lower medical costs (including those related to evacuations), as well as increased productivity, lower absenteeism, and lower turnover.

Resilience

A preliminary result from individuals and working teams who underwent workplace resilience training has shown promise in improving mental health, increasing productivity, and decreasing stress-related illness. Although its application in remote locations has not been piloted, it is a promising proposition due to the remote locations' higher psychosocial risks, and its captive population.

Culture and Mindset

Mindset

Providing health in a remote location is very different from that of an urban medical facility. To be effective, the remote healthcare practitioner (RHCP) needs to adopt the following mindset:

- **Accountability.** The RHCP is the only person responsible for delivering health to the individuals on site. Together with the site manager, he/she is accountable for any health impact to the site's operational readiness, business continuity, reputation and legal liability.
- **Breadth.** Being the only health professional on-site, the remote health practitioner needs a broad approach, knowledge and skill relating to health. In addition to the broad range of the usual branches of medicine and surgery, the RHC practitioner will also need to utilise his knowledge and skills in areas such as pharmacy, dentistry, mental health, public health, occupational health, health management and operational medicine. In addition to health, the remote healthcare practitioner will also need to understand safety and engineering issues relevant to the work location, amongst others.
- **Flexibility.** There are many factors inherent to working in remote locations which require adaptability, flexibility and resilience on the part of the RHC practitioner. This includes a fast-changing operational tempo, sudden crises, extreme environments (e.g. heat, cold, security, altitude), and limited supplies and support.
- **Leadership.** Whilst RHCPs are sometimes relatively junior members of the health profession (e.g. nurse or paramedic), he/she is often the only health "lead" on-site. To deliver health, it is essential that he/she is able to influence others to act or change in a way that facilitates his/her delivery of health.
- **Collaboration.** Delivering health in remote locations require the support from those coming from different backgrounds, expertise, and accountabilities. A collaborative mindset ensures that the support is secured.
- **Curiosity.** A mindset of curiosity encourages risk identification, exploration of opportunities and problem solving.
- **Courage.** RHCPs often need to make difficult medical decisions in difficult circumstances, where there are limited options and limited access to information. In addition, RHCPs may often need to hold difficult conversations with employees, supervisors and the management.

This mindset is often a result of significant working experience in remote locations. However, it can also be introduced and instilled early through formal RHC training.

Culture of Health

Worksite cultures vary. Some worksites see health requirements as an inconvenient regulatory necessity, and an imposition to efficient working. Other worksites are intrinsically motivated for health, seeing health controls as the normal way of doing business. It has been observed that sites with a culture of health deliver significantly better, more sustainable health outcomes compared to others. Instilling a health culture takes time, and is only possible with leadership from the remote healthcare practitioner and commitment from the management.

People and Competence

Healthcare in remote locations is usually delivered by Designated First Aiders (DFA) and site health professionals. Their competence is crucial to the site's health delivery.

Currently, few organisations provide training that is specifically aimed towards the remote healthcare practitioner (RHCP). Across these providers, the training content, duration, proficiency levels and method of assurance varies. There is currently no universally accepted "standard" training, or accreditation schemes for remote healthcare practitioners. Current known organisations providing training specific to RHCP are listed in **Appendix B**.

Tier 1: Designated First Aider (DFA)

Designated first aiders (DFA) are usually the first medical emergency response team (MER) team member providing support at a scene of an incident. Their competence is thus crucial in ensuring an effective MER. Competency is commonly acquired through an initial training, and maintained through regular refresher training.

Initial DFA Training

The timeframe of such training varies, but it is generally accepted that the theory, practical sessions and an exit assessment will (generally) take around 40 hours. The recommended content and proficiency levels are outlined in Table 5 below. Other than an additional module on medical evacuations, the First Aid Training for those working in remote locations does not differ significantly from those recommended for other work locations within the energy and its associated marine operations.

Module	Proficiency ⁴	
	Remote Locations	Extreme Remote Locations
1. Introduction: Principles of First Aid	Working Knowledge	Working Knowledge
2. Provision of Basic Life Support (BLS)	Working Knowledge	Working Knowledge
3. Automated External Defibrillator (AED)	Working Knowledge	Working Knowledge
4. Vital Signs	Working Knowledge	Working Knowledge
5. Management of Specific Emergencies	Working Knowledge	Working Knowledge
6. Dressings, Bandages and Slings	Working Knowledge	Working Knowledge
7. Patient Transfer	Working Knowledge	Working Knowledge
8. Workplace First Aid		
a. Role and Responsibilities	Working Knowledge	Working Knowledge
b. Workplace First Aid Kit	Working Knowledge	Working Knowledge
c. Medical Evacuations	Awareness	Awareness
d. Medical Communication	Working Knowledge	Working Knowledge
e. Material Safety Data Sheet (MSDS)	Working Knowledge	Working Knowledge
f. Triage and Multiple Casualty Situations	Awareness	Awareness
g. Legal Aspects of First Aid	Awareness	Awareness

Table 5. Designated First Aider competency requirements.

Deck officers on ships are required to have advanced training beyond the level of the first aider. This covers, in addition to the immediate management of injuries, responding to medical emergencies, treatment of ill-health in accord with official medical guides that all ships must carry⁵, contact with telemedical advisory services, and nursing care for the ill and injured. The minimum requirement is for training prior to obtaining a certificate of competence as an officer, but some countries and companies require additional refresher training.

DFA Skills Maintenance

Skills are maintained through 3-monthly skills training. These are commonly informal practical sessions at the workplace, facilitated by a senior first aider or a remote healthcare practitioner. Skills commonly covered during these sessions include Basic Life Support, defibrillation, immobilisation, patient transfer and communication. Each session generally lasts 1-2 hours.

⁴ Proficiency levels:

- **Awareness (A):** Able to describe the main elements of the area of expertise and their importance to the business.
- **Working Knowledge (WK):** Able to correctly use the terminology (vocabulary) of the area of expertise, to interpret and evaluate information and to hold an informed debate in the area of expertise.
- **Skill (S):** Able to translate guidelines and standards for the Area of Expertise into practical actions, to carry out consistently the activities to the required standard and to solve imaginatively common technical/operational problems in the area of expertise.
- **Mastery (M):** Able to diagnose and resolve significant, complex, unusual problems and to successfully adapt external practices into the area of expertise for substantial improvements.

⁵ International Medical Guide for Ships (3rd edition), WHO (2007)

Tier 2: On-site Health Professionals

Site health professionals in remote locations are usually nurses, paramedics, nurse practitioners, physician's assistants, and sometimes physicians. These remote healthcare practitioners (RHCP) are responsible for providing assessment and stabilisation of ill or injured workers. In addition, they are also responsible for the provision of primary healthcare and preventive care. In some settings, the remote healthcare practitioners may also be responsible for non-medical tasks (e.g. as the radio operator, or helicopter landing officer)⁶.

Delivering health in remote locations means working without the level of medical support that most health professionals are used to having at their disposal. As such, the RHC practitioner requires a number of competencies from a wide range of specialties, including emergency/critical care medicine, primary care, public health, occupational health, diving medicine, aviation medicine, health management, leadership and interpersonal skills.

Tier 2 (Remote healthcare practitioner) Competency

Subject	Topic	ProficiencyLevel ⁷	
		Remote Locations	Extreme Remote Locations
1. Acute/Emergency Medicine	• Advanced Life Support (or equivalent)	WK	WK
	• ECG	Awareness	WK
	• Thrombolysis	Awareness	WK
	• Mass casualty management	WK	WK
	• Triage	Skill	Skill
2. Surgery	• First aid (including training provision)	Skill	Skill
	• Suturing, i.v. access, fracture immobilisation,	Skill	Skill
	• Osteo infusion, nasogastric tube, laryngeal tube,	WK	WK
	• BASICS	Skill	Skill
	• Pain Management	WK	WK
	• Incision and drainage, thorax decompression	Awareness	WK
3. Primary Care	• Appendectomy, burr hole	-	Awareness
	• Chest drain insertion, cricothyroidectomy,	WK	Skill
	• Management of chronic illnesses	WK	Skill
4. Orthopaedics	• Pain Management	WK	Skill
	• Common orthopaedic emergencies	Skill	Skill
5. Pharmacy	• Administration, access, safekeeping and monitoring	Skill	Skill
	• Prescribing	Skill	Skill
	• Pharmacology	WK	Skill
6. Dentistry	• Acute dental emergencies	Skill	Skill
	• Dental trauma	Skill	Skill
	• Non-emergency dental pain	WK	Skill
7. Mental Health	• Management of common psychiatric emergencies, chronic illnessmanagement	WK	Skill
8. Eye/ENT	• Removal of foreign body, common eye emergencies	Skill	Skill
9. Public Health	• Food and drinking water safety	WK	Skill
	• Communicable diseases	WK	WK
10. Occupational Health	• Fitness to work, medical surveillance, drug and alcohol, incident investigation and reporting	WK	WK
	• Health risk assessment	Awareness	WK
	• Health impact assessment, human factors engineering, industrial hygiene, toxicology	Awareness	Awareness
11. Health Management	• Clinical governance, audit, recordkeeping	Awareness	Awareness
	• Leadership, communication, interpersonal skills	WK	WK
12. Operational Medicine	• Tropical medicine, travel medicine, diving medicine, aviation medicine	Awareness	Awareness

Table 6. Competency areas and proficiency levels for Tier 2 professionals.

⁶ In the exceptional circumstances where Site Health professionals are utilised to perform non-medical tasks, ensure that this does not interfere or conflict with her ability to carry out and complete her primary medical role (e.g. performing helicopter landing officer duties during a helicopter medevac).

⁷ Proficiency levels:

- **Awareness (A):** Able to describe the main elements of the area of expertise and their importance to the business.
- **Working Knowledge (WK):** Able to correctly use the terminology (vocabulary) of the area of expertise, to interpret and evaluate information and to hold an informed debate in the area of expertise.
- **Skill (S):** Able to translate guidelines and standards for the Area of Expertise into practical actions, to carry out consistently the activities to the required standard and to solve imaginatively common technical/operational problems in the area of expertise.
- **Mastery (M):** Able to diagnose and resolve significant, complex, unusual problems and to successfully adapt external practices into the area of expertise for substantial improvements.

Tier 2 Experience

	Working Experience	Remote Locations	Extreme Remote Locations
1	Working experience in Emergency Medicine	3 years	5 years
2	Working experience at in Remote Location	-	3 years

Table 7. Experience requirements for Tier 2 professionals.

Remote Medical Support (Topside)

What is Remote Medical Support (“Topside”)?

Remote healthcare practitioners often need to work in isolation without the presence of a medical team supporting him/her. In order to improve diagnostic accuracy and early treatment, remote medical support is commonly implemented. It involves real-time medical advice provided by medical professionals (usually doctors) via telecommunication and/or information technologies. These help eliminate distance barriers and allow access to medical services or specialist advice that would otherwise be unavailable. A competent and timely topside support enables the remote healthcare practitioner to initiate the correct treatment early, minimise unnecessary medevacs, and expedite necessary ones.

It is generally agreed that topside support is a significant enhancement to the site MER capability, especially in locations where the tier requirements cannot reasonably be met (see “MER Planning”). However, topside support cannot be considered as a replacement for a competent remote healthcare practitioner (RHCP)⁸.

Dedicated, close, privately resourced topside cover is common in the oil and gas industry. However, in maritime operations remote medical support is usually limited to contact with public Search and Rescue (SAR) services and national, radio medical centres.

Topside Role and Responsibility

Topside is responsible in providing medical advice to the remote healthcare practitioner, immediately upon request, at any time, via real time voice or video (telemedicine). The advice includes:

1. Provisional diagnosis
2. Immediate treatment required
3. Whether to pursue an evacuation, or to treat on site
4. Destination hospital (if an evacuation is recommended)
5. Evacuation transportation and route (if an evacuation is recommended)
6. The medical support requirements during transport, e.g. equipment, medical escort etc (if an evacuation is recommended)

It is important to note that the topside does not replace, or take over the RHCP role, or his/her duty of care towards the patient. In most remote operations within the energy industry, the topside support does not establish a doctor-patient relationship directly with the patient. The expert advice given by the topside is currently primarily aimed to assist the remote healthcare practitioner in making correct clinical decisions.

Topside advice is commonly given by a non-specialist medical practitioner. Whilst this is adequate for most remote locations, direct access to specialist medical advice (e.g. cardiologist, emergency physician, orthopaedic surgeon/traumatologist) may be required in extreme remote locations - as medical evacuations may not be possible for extended periods in the latter.

Topside Service Delivery Standards

There are several models of providing topside support in the energy and its associated maritime operations. In general, the topside support can be based from a call centre, from a hospital emergency room, from individual physicians’ mobile telephone or her computer, or a combination of any of those. Each has its own unique advantages and disadvantages. Regardless of the operating model, the following standards are expected in the energy industry and its associated maritime operations.

⁸

Deploying a RHCP may not be practicable at sites with very small number of workers. At such sites strengthening of Tier 1 (First Aid) with additional training, or direct support from Topside may be required. These represent mitigations to address a gap in the MER standards. Topside is currently not a substitute for the presence of an RHCP performing complex health interventions on-site (e.g. advanced life support). See “**Planning and Prevention: Sites with Low Exposure**”.

Standard	Remote Locations	Extreme Remote Locations
1. A single telephone number to call	✓	✓
2. Available 24 hours, 7 days a week, 365 days a year	✓	✓
3. Immediate response (within 20 seconds) to calls	✓	✓
4. Capability to triage a call	✓	✓
5. Capability to support mass casualties	✓	✓
6. Multiple methods of receiving communications (e.g. SMS, email, telephone, enhanced telemedicine, radio etc)	✓	✓
7. A system to record all contacts and advice	✓	✓
8. Use of a standard communication protocol	✓	✓
9. Ability for the topside physician to access and obtain the following specialist medical advice within 20 minutes:		
a. Orthopaedics	✓	✓
b. Cardiology		
c. General surgery		
d. Infectious diseases and tropical medicine		
e. Psychiatry		
10. Ability to provide the remote healthcare practitioner with direct real-time communication access to the following specialist medical advice within 20 minutes:		
a. Cardiology		✓
b. Orthopaedics/trauma	-	
c. General Surgery		
d. Psychiatry		
e. Dentistry		
11. Ability to initiate contact, and request for, national/public emergency resources	✓	✓

Table 8. A typical example of a service delivery standard for remote medical support (“topside”).

Topside Competency Requirements

To enable topside to provide accurate and timely advice to the RHCP, it is important that the topside possess technical competency in managing medical emergencies, understands the hazards and risks of the site he/she is covering, and has knowledge of the capabilities available health facilities within the site’s medical emergency response plan. The following outlines the topside competency requirements for remote and extreme remote locations.

Competency	Remote Locations	Extreme Remote Locations
1. Registered medical practitioner	✓	✓
2. Post-registration working experience	>5 years	>5 years
3. Basic training and certification in Emergency Medicine	✓	✓
4. Working experience in Emergency Medicine	>5 years	>5 years
5. Site-specific knowledge		
a. Hazards and risks of the workplace being covered	✓	✓
b. Site Medical Emergency Response Plan (MERP)		
c. Capability and characteristics of local health facilities in the MERP		
6. Specialist topside advisors competency requirements		
a. Basic training, and certification in appropriate speciality		✓
b. License/registration with Nationally recognised appropriate organisations/regulatory bodies	-	
c. Five years experience in appropriate speciality		

Table 9. Competency requirements for remote medical support (topside).

Telemedicine

Telemedicine is the use of telecommunication and information technologies to exchange medical information from one site to another in order to improve patients' health status. In its most basic form of telemedicine, a doctor on one end of a telephone line gives advice to a nurse/medic at a remote location. This mode of telemedicine has been in common practice throughout the energy industry and its associated maritime operations in over 40 years, and has shown to be indispensable.

Recent advances in information and communications technology have allowed the exchange of data, still images, and video at low cost. The information transmitted for review may include images of injuries/lesions, real-time video of the patient or doctor, laboratory test results, electrocardiogram (ECG) tracing and digital x-ray images. This has allowed topside to access much more relevant information than previously possible, allowing a more accurate diagnosis and treatment on site.

There are currently many peer-reviewed publications on the cost-effectiveness of enhanced telemedicine in the healthcare sector. Unfortunately there are few published data on its use in remote energy and maritime operations. However, anecdotal reports from energy and maritime operators suggest significant reduction in expected health complications, and significant cost savings.

The following are pertinent issues relating to the application of enhanced telemedicine (in addition to the real-time telephone advice) in remote energy and its associated maritime operations:

- Enhanced telemedicine is best utilised as a tool to assist the topside in providing advice to the remote healthcare practitioner (i.e. Topside to Tier 2). There is limited data and experience to show its effectiveness when it is applied to support designated first aiders (Topside to Tier 1), or directly to the patient (i.e. virtual consultations) in remote locations within the energy sector.
- Where telemedicine is utilised to provide advice directly to the patient (i.e. virtual consultations), there may be regulatory restrictions and licensing issues across jurisdictions (e.g. national or state boundaries). Such issues do not arise when telemedicine is limited to supporting the remote healthcare practitioner (i.e. Topside to Tier 2).
- In general, the application of enhanced telemedicine is considered desirable in remote locations (RL), and essential in extreme remote locations (EXRL).
- Although it can significantly improve the level of healthcare provision by bringing expert advice to the site, telemedicine is currently not a substitute for having competent, remote healthcare practitioner performing complex health interventions (e.g. advanced life support).
- The average data transfer rate of a chosen telemedicine system should match (or not exceed) the location's bandwidth capability. Typical systems currently in use require a minimum bandwidth of >385k/sec, with >512k/sec being desirable.
- Software must be available to the relevant topside.
- Medical data transfer must be secure (i.e. encrypted).

The following are typical requirements for a telemedicine system in current use to support remote locations in energy operations.

Telemedicine Requirement ⁹	Remote	Extreme	Remote
	Locations		Locations
1. 2-way voice communications (e.g. telephone, radio, or Voice Over IP)	Required		Required
2. Text messages (e.g. email, fax, SMS, instant messaging)	Required		Required
3. Still images	Desirable		Required
4. One-way video (Topside sees patient)			
a. General view (wide-angle video)	Desirable		Required
b. Macro view (close-up video)			
c. Otoscopic / Ophthalmoscopic video			
5. Real-time output data transmission from peripheral devices			
a. 12-lead ECG	Desirable		Required
b. Vital signs	Desirable		Required
c. Point-of-care (portable laboratory) testing	Desirable		Desirable
d. Portable X-ray	Desirable		Desirable
e. Portable ultrasound	Desirable		Desirable

Table 10. Typical Telemedicine requirements in remote energy and its associated maritime operations.

⁹ Risks and in different locations differ significantly. Exact requirements should be based on the site's Health Risk Assessment

Equipment and Supplies

Tier 1: First Aid Box

First aid boxes in remote locations or in extreme remote locations are maintained and used by Designated First Aiders (DFA). The first aid box requirements do not differ significantly between those in remote locations, or those in other workplaces within the energy or maritime operations. The contents of a typical first aid box in these locations are described below. Please note however, that exact requirements and quantities should be based on the site's health risk assessment (HRA). The remote location first aid box contents are listed in **Appendix C**.

As with other workplaces, the first aid box should be clearly marked, accessible and maintained. It should only be used by Designated First Aiders (DFA).

Tier 2: Site Clinic

In order to provide assessment and stabilisation by a remote healthcare practitioner (e.g. nurse, medic or doctor) within 1 hour at a remote location, an on-site clinic is often necessary. In addition to Medical Emergency Response, the site clinic will also need to function as a centre for primary health care, as well as an office for preventive health services (e.g. workplace health promotion program, hygiene inspections, fitness to work assessment, etc). In addition to the remote healthcare practitioner's (RHCP) competency, the effectiveness of the site clinic is also highly dependent upon its layout, equipment, supplies, as well as its operating procedures.

Sites with Low Exposure

Some sites have very small number personnel (e.g. less than 25 people on site), or may operate within a very limited period (e.g. less than one month). In these circumstances, an on-site clinic may not be practicable to implement. This is a common situation in marine, seismic and logistic operations. Where the exposures are low, tier response times or tier requirements above cannot reasonably be met, perform a risk assessment and provide measures to ensure that the risks are as low as reasonably practicable (ALARP). Examples of these measures are described further under **"Planning and Prevention: Demonstrating ALARP"**.

Room and Layout

Space constraints in most remote locations limit the size available for a remote site clinic. Where possible utilise space-saving furniture, fittings and equipment.

It is important to specify the site clinic layout very early in the planning stage, so this can be incorporated in the initial design and construction. Once built, structural changes to a vessel, rig or building are often difficult to implement.

It is generally agreed that remote site clinics and extreme remote site clinics both have identical room and layout requirements. As a minimum, consider the following room and layout:

Room and Layout Requirements	Remote Site Clinic	Extreme Remote Site Clinic
1. Easy ingress/egress with stretcher	✓	✓
2. Easy access to ambulance or helipad	✓	✓
3. 24 hours exclusive use and availability	✓	✓
4. Adequate space to hold up two beds/stretchers, working space (e.g. table, chairs), and storage cabinets	✓	✓
5. Ventilation, illumination, temperature control	✓	✓
6. Hand-washing facilities	✓	✓
7. A medical waste disposal system	✓	✓
8. Lockable filing cabinet	✓	✓
9. Material Safety Data Sheet archive and other medical reference materials	✓	✓
10. Communication with Site Manager and Remote Medical Support direct from Site Clinic	✓	✓
11. Medication storage	✓	✓
12. Drug refrigerator	✓	✓
13. Access limited to Tier 2 MER Professionals	✓	✓
14. Potable water (running or in containers)	✓	✓
15. Toilet and shower	✓	✓
16. Accommodation for Tier 2 MER Professional immediately adjacent to the Site Clinic	✓	✓

Table 11. Room and layout requirements for remote site clinics.

Site Clinic Equipment

Consider the following issues when planning to equip the Remote Site Clinic.

- **Portability.** Remote healthcare practitioners (RHCP) in remote location often need to mobilise quickly to a worksite to provide stabilisation. A number of selected site clinic equipment need to be portable enough (or a portable redundant made available) to be carried in a trauma bag by a single person to the incident site.

- Quantity. The quantity of items in stock should be based on the number of workers on site, the duration of operations, likelihood of injuries/illness, and resupply frequency. This will vary widely from site to site, and hence will not be included here.
- User-friendliness. The remote healthcare practitioner is often the only health professional onsite, and most cases they are nurses, medics, nurse practitioners and physician's assistants. Some emergency equipment are ideal for remote locations due their user-friendliness (e.g. the laryngeal airway, blind intubation devices, haemostatic dressings, etc).

The remote site clinic equipment is listed in **Appendix D**.

In the marine industry, there are separate statutory and other requirements for ship's hospitals and the equipment that must or may be provided for care.

Site Clinic Equipment for Specific Hazards or Specific Extreme Environments

Additional equipment may be needed for specific hazards, or specific environments. These include mass casualty scenarios, operating in temperature extremes, operating at an altitude, and diving operations. The recommended equipment is listed in **Appendix E**.

Site Clinic Medications

The remote healthcare practitioner (e.g. nurse, medic or doctor) is often the only health professional physically present during a medical emergency. He/she is expected to manage the multiple, simultaneous, urgent tasks during an emergency. Where possible, emergency medications should be pre-loaded, labelled and placed in a convenient, accessible storage (e.g. emergency trolley).

The quantity of emergency medications in stock should be based on the number of workers on site, the duration of operations, likelihood of injuries/illness, and resupply frequency. This will vary widely from site to site, and hence will not be included here.

Medications for Specific Hazards or Specific Extreme Environments

Additional equipment may be needed for specific environmental hazards, chemical exposures, and temperature extremes. Examples are listed in **Appendix F**.

Glossary

ALARP. See “As Low As Reasonably Practicable”.

As Low As Reasonably Practicable (ALARP). The point at which the cost (in time, money and effort) of further risk reduction is grossly disproportionate to the risk reduction achieved.

Competence. The ability to apply a combination of knowledge, skills and behaviours to a specific area of expertise.

Control. In the context of managing risk, a control is a barrier that prevents an Incident. Controls can be engineering, procedural or behavioural.

e-health. e-Health is the overarching term for the use of tools based on information and communication technologies in order to assist and enhance the prevention, diagnosis, treatment, monitoring of disease and management of health and lifestyle. Within the scope of e-health, telemedicine refers to direct patient care. See also “**Telemedicine**”.

Extreme Remote Locations (EXRL). Sites where medical evacuation to a hospital can never be achieved within 4 hours, even in the best of circumstances. Examples include seismic vessels operating hundreds of nautical miles from shore. These sites may be out of helicopters flying range, and evacuation times may exceed 24 hours.

Fitness to Work. The process of assuring that an individual can complete a task safely and without unacceptable risk to themselves, their employing company or a third party.

Health Risk Assessment (HRA). A process of identifying workplace health hazards, evaluating their risks to health and determining appropriate workplace control and recovery measures, in order to prevent acute and chronic health effects to the workers in that work location. It is not the same as fitness to work (see “**Fitness to Work**”).

Incident. An unplanned Event or chain of Events has occurred (i.e. energy was released), that has or could have, resulted in injury or illness to people or damage to assets, the environment or reputation.

Medevac. See “**Emergency Medical Evacuation**”.

Medical Emergency Evacuation (“Medevac”). The emergency transfer of ill or injured personnel from a remote site to a health facility, for the purpose of obtaining medical care. In simplistic terms it is an emergency evacuation from a work location due to medical reasons. It has priority over all normal operations. A medevac may be pursued using various transportation modes (e.g. helicopter, boat, AWD truck, or a crew change flight). The term “medevac” is not restricted to those where air transportation is used, or to those where a medic/nurse needs to provide medical support during transfer.

Remote Healthcare Practitioner (RHCP). A health professional (e.g. nurse, medic, paramedic, nurse practitioner, physician’s assistant, physician) who is competent in providing healthcare in remote locations. (Note: There are currently no “standard” competency requirements for RHCP. This guide proposes a set of competency requirements under the section “People and Competence”).

Remote Healthcare. The prevention, diagnosis, and treatment of illnesses and injuries for those who work in Remote Locations. It represents a set of controls and mitigations that minimises the health risks of workers in remote locations.

Remote Locations (RL). Sites where the medical evacuation of an injured or ill person to a hospital cannot be guaranteed to be achieved within 4 hours in foreseeable circumstances (e.g. inclement weather). A common example in the oil and gas industry is the offshore platform. Whilst most platforms can be reached within 4 hours by helicopter, this transportation time is not guaranteed in the event of adverse weather, aircraft availability, or at night.

Remote Medical Support (“Topside”). Real-time specialist medical advice by emergency medical professionals (usually doctors) to the site health professional working in remote locations via telecommunication and/or information technologies. It is also commonly known colloquially as “topside support” in the energy industry and its associated maritime activities.

Remote Site Clinic. A site health centre at a Remote Location, for the provision of casualty stabilization in transit to a Tier 3 Hospital. A remote site clinic has extended capabilities, in view of the need to provide Tier 2 support beyond 4 hours. (See also “**Site Clinic**”).

Site Clinic. A site health centre for stabilisation by a health professional and the provision of advanced life support (i.e. Tier 2 medical emergency response). (See also “**Remote Site Clinic**”).

Site Health Professional. A health professional (e.g. nurse, medic, paramedic, nurse practitioner, physician’s assistant, physician) who has been designated to provide healthcare in the energy or its associated maritime operations. A site health professional may be assigned to a remote location or a non-remote location. See also “**Remote Healthcare Practitioner (RHCP)**”.

Telemedicine. The use of telecommunication and information technologies to exchange medical information from one site to another in order to improve patients’ health status. The information exchange includes specialist referral services, patient consultation, remote patient monitoring and Remote Medical Support.

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Appendix A: Workshop Participants

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79. Tom Strawmyer	Shell Oil Company
80. Kumar Supramaniam	Shell Malaysia Limited
81. Michael Szafron	NuPhysicia Inc.
82. Siri Tau Ursin	Stavanger University Hospital
83. Agnar Tveten	Radio Medico Norway, Norwegian Centre for Maritime Medicine
84. Arne J. Ulven	Radio Medico
85. Ketil Vindenes	Viju
86. Brian Wells	Day Lewis PLC
87. Rutger Wilhelmi	Emea ATT
88. Bob Winter	Nottingham University Hospitals NHS trust

Appendix B: Organisations Providing Training specifically aimed towards Remote healthcare practitioners

1. Abermed (www.abermed.com)
2. Capita Health and Wellbeing Ltd (www.capitahealthandwellbeing.co.uk)
3. Exmed Global Medical Services (www.exmed.co.uk)
4. MediPro Training Ltd (www.mediprotraining.co.uk)
5. Remote Medical International (www.remotemedical.com)
6. Robert Gordon's University (www.rgu.ac.uk)
7. The Royal College of Surgeons of Edinburgh (www.rcsed.ac.uk)
8. University of Camerino, Italy (www.unicam.it)
9. University of Nottingham (www.nottingham.ac.uk)

Appendix C: First Aid Box Contents

The typical first aid box contents for remote locations are listed below. Please note that hazards and risks in different locations differ significantly. Exact requirements should be based on the site's health risk assessment (HRA).

As with other workplaces, the First Aid box should be clearly marked, accessible and maintained. It should only be used by designated first aiders.

First Aid Item
1. Automated external defibrillator (AED)
2. Barrier devices and protection <ul style="list-style-type: none"> a. Barrier device for cardiopulmonary resuscitation (CPR): Pocket mask, or face shield. b. Rubber gloves (disposable/ non sterile) c. Protective goggles d. Plastic apron e. Waterproof biohazard waste bag
3. Vital signs equipment <ul style="list-style-type: none"> a. Automatic blood pressure measurement device b. Digital thermometer
4. Bandages: <ul style="list-style-type: none"> a. Triangular bandages b. Elastic bandages c. Roller bandages
5. Dressings <ul style="list-style-type: none"> a. Non-sterile gauze pads b. Sterile gauze pads (various sizes) c. Burn sheet/dressing d. Sterile multi-trauma dressing e. Sterile eye pads f. Antiseptic wash (e.g. Savlon 100 mls) g. Elastoplast (sterile adhesive dressing)
6. Foil blanket (adult size)
7. Wooden splints (or SAM splints)
8. Cold pack compress
9. Miscellaneous: adhesive tape, cotton buds, safety pins, pen, paper, scissors
10. Guides: Basic life support (BLS) algorithm card, first aid pocketbook
11. Inventory of box contents

Table C-1. Typical first aid box contents in remote energy and marine operations.

Appendix D: Remote Site Clinic Equipment List

The typical site clinic equipment for remote locations is listed below. Please note that hazards and risks and in different locations differ significantly. Exact requirements should be based on the site's health risk assessment (HRA).

As with other workplaces, medical devices should only be used by qualified site medical professionals.

Equipment	Remote Site Clinic	Extreme Remote Site Clinic
Ventilation, Airway and Respiratory Equipment		
1. Oxygen delivery (portable and fixed) <ul style="list-style-type: none"> a. Oxygen cylinders (or oxygen concentrator) b. Variable flow regulator c. Manually triggered ventilator d. Delivery system (tubings, nasal cannulas, non-rebreather mask) 	✓	✓
2. Masks <ul style="list-style-type: none"> a. Bag valve mask b. Pocket mask with one-way valve 	✓	✓

3. Airways		
a. Oropharyngeal airways	✓	✓
b. Nasopharyngeal airway		
c. Laryngeal mask airway		
d. Supraglottic airway (e.g. King LTD)		
e. Blind insertion airway device (e.g. Combitube double lumen airway)		
4. Suction apparatus (portable and fixed)	✓	✓
5. Laryngoscope (or a video assisted laryngoscope device)		
a. Handle	✓	✓
b. Macintosh blades		
c. Miller blades		
d. Extra batteries and bulbs		
6. Endotracheal tubes (including stylettes)	✓	✓
7. Bougie	✓	✓
8. Nasogastric tubes	✓	✓
9. Magill forceps	✓	✓
10. Percutaneous tracheostomy kit	✓	✓
11. Decompression needle – 14 gauge	✓	✓
12. End Tidal CO ₂ detector (PETCO ₂ detector)	✓	✓
13. Asherman chest seal		✓
14. Portable patient ventilator		✓
15. Nebulizer	✓	✓
16. Chest drain	✓	✓
17. Haemostatic Gauze	✓	✓
18. Chest tube tray		✓
19. Thoracocentesis tray		✓
20. Pericardiocentesis tray		✓
Monitoring, Cardiac and Defibrillation		
1. Defibrillator	✓	✓
2. Vital Signs Monitor (BP, Pulse, Respiration, Temperature, SpO ₂)	✓	✓
3. 12-Lead ECG	✓	✓
4. Telemetry		✓
Orthopaedic, Trauma and Burns		
1. Immobilisation devices		
a. Cervical collars		
b. Head immobilisation device		
c. Upper and lower extremity immobilisation devices (e.g. SAM Splint)	✓	✓
d. Lower extremity (femur) traction devices (e.g. Hare traction splint)		
e. Finger splint (various sizes)		
2. Patient transfer devices		
a. Spine Board (with disposable straps)		
b. Kendrick Extrication Device (KED)	✓	✓
c. SKED stretcher		
d. Folding stretcher		
e. Wheeled cot		
3. Crutches (adjustable, two sizes)	✓	✓
a. Bandages	✓	✓
b. Elastic (ACE) bandages (various sizes)		
c. Slings		
d. Triangular bandages with safety pins	✓	✓
e. Shoulder sling		
4. Scissors and cutters		
a. Trauma shears, or paramedic scissors		
b. Ring cutter	✓	✓
c. Disposable razors		
d. Nail clippers		
5. Burn pack	✓	✓
6. Sterile burn blanket	✓	✓
7. Cold packs	✓	✓

8. Haemostatic solid dressing	✓	✓
9. Emergency tourniquet (e.g. CAT)	✓	✓
10. Surgical cautery pen		✓
Gynaecological		
1. Vaginal speculums	✓	✓
2. Stirrups	✓	✓
3. Pelvic light	✓	✓
Wound Care		
1. Wound disinfectants (e.g. Betadine, hydrogen peroxide)	✓	✓
2. Wound irrigation kit (includes 60 cc Luer-Lock syringe, splash guard, sterile water or saline, waterproof pad)	✓	✓
3. Wound closure materials		
a. Steri-strips	✓	✓
b. Dermabond		
c. Benzoin		
4. Suturing kit		
a. Tray	✓	✓
b. Artery forceps,		
c. Needle holder)		
5. Sutures (Nylon, various sizes)	✓	✓
6. Suture removal kit	✓	✓
7. Dressings		
a. Non-adherent dressings (various sizes)		
b. Band Aids (various)		
c. Tape (various)		
d. Self-adherent wrap (e.g. Coban 3M, various sizes)	✓	✓
e. Occlusive dressings (various sizes)		
f. Gauze rolls (sterile, various sizes)		
g. Adhesive tape (various sizes, hypoallergenic)		
8. Alcohol swabs	✓	✓
9. Incision and drainage kit	✓	✓
10. Assorted scalpels, blades, razors, etc.	✓	✓
Examination and Diagnostics		
1. Otoscope (with extra batteries, and speculums)	✓	✓
2. Ophthalmoscope (with extra batteries)		✓
3. Glucometer (with lancets and strips)	✓	✓
4. Snellen eye chart		✓
5. Stethoscope	✓	✓
6. Sphygmomanometer (adult regular and large)	✓	✓
7. Reflex hammer	✓	✓
8. Urine dip sticks	✓	✓
9. Tongue depressor (tongue blade)	✓	✓
10. Binocular magnifier (e.g. Optivisor LX)	✓	✓
11. Magnifying glass	✓	✓
12. Thermometer (with low temperature capability)	✓	✓
13. Peak flow meter	✓	✓
14. Exam light	✓	✓
Laboratory		
1. Point of Care Testing System (e.g. iStat)		
a. Cardiac Markers (e.g. cTnl, CK-MB, BNP)		
b. Blood gases (e.g. pH, pCO ₂ , HCO ₃ , BE)		✓
c. Haematology (e.g. Hct, Hgb)		
d. Chemistry/Electrolytes (e.g. Urea, Creatinine, Glucose)		
e. Coagulation (PT, INR)		
2. Urinalysis		✓
3. Faecal occult blood kit (Haemoccult)		✓
4. Specimen cups	✓	✓

5. Blood sample tubes	✓	✓
6. Rapid pregnancy test	✓	✓
	✓	✓
Radiology		
1. Digital Ultrasound		✓
2. Digital Plain X-Ray		✓
ENT		
1. Nasal tamponade device (e.g. Rapid Rhino)	✓	✓
2. 4% Lidocaine	✓	✓
3. Atomizer	✓	✓
4. Ear curette	✓	✓
5. Cotton tip applicator	✓	✓
Eye		
1. Eye magnet with loop	✓	✓
2. Eye patches (hard and soft)	✓	✓
3. Fluorescein strips	✓	✓
Personal Protective Equipment, Disinfection and Disposal		
1. Non-sterile latex gloves (various sizes)	✓	✓
2. Sterile gloves (various sizes)	✓	✓
3. Fluid Shield Mask	✓	✓
4. N-95 Mask	✓	✓
5. Goggles	✓	✓
6. Disposable Gown (large)	✓	✓
7. Sharps container	✓	✓
8. Bio-Hazard Tape	✓	✓
9. Bio-Hazard Trash Bags	✓	✓
10. Shoe covers	✓	✓
11. Body bag	✓	✓
12. Disinfectant hand wash, commercial anti-microbial (towelette, spray, liquid)	✓	✓
13. Disinfectant solution for cleaning equipment	✓	✓
Intravenous Therapy		
1. Intraosseous infusion system (e.g. EZ-IO)		✓
2. IV catheter	✓	✓
3. IV fluids		
4. Crystalloids (e.g. Normal saline, Lactated Ringers, Hartmann's, Dextrose)	✓	✓
5. Colloids (e.g. haemaccel, gelafundin)		
6. IV tubing	✓	✓
7. Tourniquet	✓	✓
8. Syringes (Luer Lock, various sizes)	✓	✓
9. Needles (various sizes)	✓	✓
10. Insulin syringes	✓	✓
11. Alcohol wipes	✓	✓
12. Pressure bag	✓	✓
13. IV pole (or roof hook)	✓	✓
14. IV arm board	✓	✓
Dental		
1. Dental mirror, dental explorer, periodontal probe, retractors	✓	✓
2. Excavator, plugger, scaler	✓	✓
3. Dental forceps, elevators	✓	✓
4. Topical anaesthesia	✓	✓
5. Temporary filling material	✓	✓
6. Cyanoacrylate glue	✓	✓
Communication		
1. Two-way radio communication	✓	✓

2. Satellite/cellular phone		✓
Medical and Miscellaneous Supplies		
1. Flashlights (2) with extra batteries and bulbs	✓	✓
2. Blankets	✓	✓
3. Sheets, linen/paper, pillows	✓	✓
4. Towels	✓	✓
5. Disposable emesis bags or basins	✓	✓
6. Disposable bedpan	✓	✓
7. Disposable urinal	✓	✓
8. Urinary indwelling catheter	✓	✓
9. Hospital bed/stretchers	✓	✓
10. Casualty care charts/forms/recording books	✓	✓
11. Magnifying glass	✓	✓
12. Autoclave or sterilizer	✓	✓
13. Refrigerator	✓	✓
14. Trauma Bag	✓	✓

Table D-1. List of clinic equipment for remote and extreme remote site clinics.

Appendix E: Equipment for Specific Hazard or Specific Extreme Environment¹⁰

The typical equipment for locations with specific hazards or specific extreme environment is listed below. Please note that hazards and risks in different locations differ significantly. Exact requirements should be based on the site's health risk assessment (HRA).

As with other workplaces, medical devices should only be used by qualified site medical professionals.

Equipment for Specific Hazard or Specific Extreme Environment	Remote Site Clinic	Extreme Remote Site Clinic
Mass Casualty		
1. Triage tags, tent and flag kit	✓	✓
2. Body bags	✓	✓
3. Foldable stretchers	✓	✓
Heat		
1. Cooling fans	✓	✓
2. Cooling area	✓	✓
3. Ice maker	✓	✓
4. Ice packs	✓	✓
5. Rectal thermometer	✓	✓
Cold		
1. Core body warming devices	✓	✓
2. Peripheral body warming devices	✓	✓
3. Rectal thermometer	✓	✓
Altitude		
1. Medications for altitude sickness (acetazolamide, dexamethasone, nifedipine)	✓	✓
2. Point of care testing for blood gases	✓	✓
3. Oxygen and oxygen delivery device	✓	✓
Diving		
1. Point of care testing for blood gases	✓	✓
2. Oxygen and delivery device (including a demand-valve regulator, and a non-rebreather mask)	✓	✓
3. Hyperbaric-safe vital signs monitor equipment (BP, Pulse, Resp, SpO ₂)	✓	✓

¹⁰ Risks and in different locations differ significantly. Exact requirements should be based on the site's Health Risk Assessment.

4. Hyperbaric ventilator (e.g. Siare IPER)		✓
5. Hyperbaric syringe pump (e.g. Pilote Hyperbaric)		✓
6. Heimlich valve (for chest tube)	✓	✓
Drug and Alcohol¹¹		
1. Point of collection test kits for Drug testing	✓	✓
2. Breath alcohol testing kit, or breathalyser	✓	✓

Table E-1. Additional equipment for Remote Site Clinics exposed to specific hazards or extreme environments.

Appendix F: Medications

The table below lists medications in a typical remote site clinic. Please note that hazards and risks and in different locations differ significantly. Exact requirements should be based on the site's health risk assessment (HRA).

Medications	Remote Site Clinic	Extreme Remote Site Clinic
Analgesics		
1. Co-Codamol Tablets 8/500 Tablets (or Effervescent Tablets)	✓	✓
2. Codeine phosphate 30 mg tablets	✓	✓
3. Diclofenac Emulgel (or similar)	✓	✓
4. Diclofenac Injection 75mg/3ml	✓	✓
5. Diclofenac Tablets 50mg	✓	✓
6. Entonox cylinder size D	✓	✓
7. Ibuprofen, 400 mg tablets	✓	✓
8. Lemsip Sachets (or similar cold remedy)	✓	✓
9. Migraveve Pink and Yellow Tablets (or similar otc migraine treatment)	✓	✓
10. Paracetamol, 500 mg tablets	✓	✓
11. Tramadol Inj. 100mg/2ml (alternative to Morphine)	✓	✓
12. Tramadol Tablets 50mg	✓	✓
13. Voltarol (Diclofenac Sodium) 50 mg suppositories	✓	✓
14. Morphine Sulfate Injection 10mg/1ml (note: this is a controlled drug)	✓	✓
Anaesthetic (Local)		
1. Citanest 3% Standard - with Octapressin (2.2ml Cartridge) (for Dental use)		✓
2. Lidocaine 1% Injection (5ml)	✓	✓
3. Lidocaine Gel 2% (Instillagel)	✓	✓
4. Lidocaine (Xylocaine) Pump Spray - 10%	✓	✓
Antibiotic & Antibacterial		
1. Amoxicillin 500mg Capsules	✓	✓
2. Cefixime Tablets 200mg	✓	✓
3. Ceftriaxone Injection 1G vial	✓	✓
4. Ciprofloxacin 500mg Tablets	✓	✓
5. Clarithromycin, 500 mg tablets	✓	✓
6. Co-Amoxiclav Injection 1.2G	✓	✓
7. Co-Amoxiclav Tablets 625mg	✓	✓
8. Crystapen (Benzylpenicillin sodium) 1.2G injection	✓	✓
9. Doxycycline 100mg capsules	✓	✓
10. Flucloxacillin Capsules 500mg	✓	✓
11. Metronidazole 0.5% IV Infusion - 100ml	✓	✓
12. Metronidazole suppositories 1g		✓
13. Metronidazole tab. 400 mg tablets	✓	✓
14. Trimethoprim 200 mg tablets	✓	✓

¹¹

Drug and alcohol testing must only be done within the scope of the company's drug and alcohol policy, using established testing protocols, and under the oversight of a qualified Medical Review Officer.

Antimalarials		
1. Artemether & Lumefantrine 20/120 (Riamet or Co-Artem) Tablets	✓	✓
2. Quinine Dihydrochloride Injection 600mg/2ml	✓	✓
Antidotes		
1. Carbomix Powder	✓	✓
2. Flumazenil Injection 500mcg/5ml	✓	✓
3. HF Antidote gel (where HF is in use)	✓	✓
4. Konakion (Phytomenadione - Vitamin K1) 10mg/1ml	✓	✓
5. Naloxone Mini jet 400mcg/ml	✓	✓
6. Vodka 40% (if Methanol is on site)	✓	✓
Antihistamine & Anaphylaxis		
1. Adrenaline injection 1:1000 BP 1 ml ampoule	✓	✓
2. Cetirizine Tablets 10mg	✓	✓
3. Chlorphenamine 4mg tablets	✓	✓
4. Chlorphenamine Injection 10mg	✓	✓
5. Hydrocortisone(Solu-Cortef) Injection 100mg	✓	✓
Cardiovascular		
1. Adenosine Injection - 3mg/ml - 2ml vial - Pack of 6	✓	✓
2. Adrenaline (Epinephrine) 1:10,000 Prefilled Syringe - 10ml	✓	✓
3. Amiodarone Hydrochloride Injection 300mg - 10ml pre-filled syringe	✓	✓
4. Amlodipine Tablets 5mg	✓	✓
5. Aspirin, 75mg dispersible tablets	✓	✓
6. Atenolol, 50mg tablets	✓	✓
7. Atropine Sulphate MiniJet 1mg/10ml	✓	✓
8. Bendroflumethiazide Tablets 2.5mg	✓	✓
9. Calcium Chloride 10% Injection 10ml	✓	✓
10. Dalteparin Graduated Syringe 10,000IU/1ml Solution for Injection	✓	✓
11. Digoxin Injection 0.5mg/2ml ampoule	✓	✓
12. Digoxin Tablets 250mcg	✓	✓
13. Furosemide 10 mg in 1 ml inj, 2 ml ampoule	✓	✓
14. Furosemide 40 mg tablets	✓	✓
15. Glyceryl trinitrate patches (Transiderm) 5mg	✓	✓
16. Glyceryl Trinitrate spray 400 mcg per actuation (200 diose)	✓	✓
17. Isosorbide Dinitrate Tablets 10mg	✓	✓
18. Lidocaine MiniJet 1% -10ml	✓	✓
19. Magnesium Sulphate 50% MiniJet - 4ml	✓	✓
20. Ramipril Capsules 5mg	✓	✓
21. Tenecteplase 10,000 units Injection	✓	✓
Ear Nose & Throat		
1. Cerumol Ear Drops	✓	✓
2. Otosporin (Antibiotic) Ear Drops	✓	✓
3. Beclometasone (50mcg/dose) Nasal Spray (Aqueous) 200 dose pack	✓	✓
4. Karvol Capsules	✓	✓
5. Naseptin Nasal Cream	✓	✓
6. Pseudoephedrine Tablets 60mg	✓	✓
7. Xylometazoline Nasal Spray 0.1%	✓	✓
8. Bonjela	✓	✓
9. Cavit	✓	✓
10. Corsodyl (Chlorhexidine) Mouthwash	✓	✓
11. Hydrocortisone Muco-adhesive Buccal Tablets 2.5mg	✓	✓
12. Miconazole Oral Gel	✓	✓
13. Oil of Cloves	✓	✓
14. Strepsils Lozenges	✓	✓
Endocrine		
1. Glucogen Hypokit 1mg Injection	✓	✓

2. Glucogel (Dextrose 40%) Gel	✓	✓
3. Glucose Miniject 50%w/v (50ml)	✓	✓
4. Hydrocortistab Injection 25mg/1ml vial		✓
5. Humulin S Insulin 100IU/ml 10ml vial	✓	✓
6. Prednisolone EC 5 mg tablets	✓	✓
Gastrointestinal system		
1. Anusol Ointment	✓	✓
2. Anusol Suppositories	✓	✓
3. Buccastem (Prochlorperazine maleate) 3 mg tablets	✓	✓
4. Cinnarizine Tablets 15mg - Pack of 100	✓	✓
5. Gaviscon Liquid	✓	✓
6. Glycerin (Glycerol) Suppositories 4g	✓	✓
7. Hyoscine butylbromide (Buscopan) Tablets 10mg	✓	✓
8. Hyoscine N-Butylbromide Injection 20mg/1ml ampoule	✓	✓
9. Kwells (Hyoscine hydrobromide, 0.3 mg) tablets	✓	✓
10. Lactulose Syrup	✓	✓
11. Loperamide Capsules 2mg	✓	✓
12. Maalox Oral Suspension	✓	✓
13. Maalox Plus Tablets	✓	✓
14. Mebendazole (Vermox) 100 mg tablets	✓	✓
15. Mebeverine Tablets 135mg	✓	✓
16. Metoclopramide Injection 10mg/2ml	✓	✓
17. Metoclopramide Tablets 10mg	✓	✓
18. Movicol sachets		✓
19. Omeprazole Capsules 20mg	✓	✓
20. Prochlorperazine (Stemetil) Injection 12.5% 1ml	✓	✓
21. Proctosedyl Ointment		✓
22. Proctosedyl Suppositories		✓
23. Senokot Tablets	✓	✓
24. Sodium Chloride + Dextrose Rehydration Salts (Multi Flavour) -	✓	✓
25. Sodium Citrate (Microlax) Enema (rectal)		✓
Immunisations		
1. Hepatitis B Vaccine Syringe Pack	✓	✓
2. Rabies Vaccine (Rabipur) 1ml	✓	✓
3. Ads Diphtheria [low dose], Tetanus and Poliomyelitis (Inactivated) Vaccine	✓	✓
4. Tetanus Immunoglobulin Injection 250 Unut	✓	✓
5. Injections (Miscellaneous)	✓	✓
6. Heparin sodium 10 units/ml - Ampoules - 5ml	✓	✓
7. Sodium Chloride Injection 0.9% Ampoules – 10ml	✓	✓
8. Water for Injections BP 5ml	✓	✓
IV Fluids		
1. Gelofusine	✓	✓
2. Glucose 5% infusion	✓	✓
3. Hartmanns Solution	✓	✓
4. Mannitol IV Infusion 20%	✓	✓
5. Sodium Chloride 0.9% infusion	✓	✓
Nervous system		
1. Chlorpromazine HCl 25 mg tablets	✓	✓
2. Diazemuls (Diazepam) Injection 10mg/2ml	✓	✓
3. Diazepam rectal tubes, 10 mg in 2.5 ml	✓	✓
4. Diazepam Tablets 5mg	✓	✓
5. Haloperidol Injection 5mg/1ml ampoule - Pack of 5	✓	✓
6. Procyclidine Injection 10mg/2ml ampoule - Pack of 5	✓	✓
7. Zopiclone Tablets 7.5mg	✓	✓
Ophthalmic		

1. Aciclovir Eye Ointment 3% -	✓	✓
2. Chloramphenicol eye ointment 1%	✓	✓
3. Dexamethasone Sodium Phosphate (Minims) eye drops 0.1%	✓	✓
4. Flourescein sodium (Minims), 1% eye drops	✓	✓
5. Fusidic Acid Eye Drops 1%	✓	✓
6. Gentacin Eye/Ear Drops 0.3%	✓	✓
7. Hypromellose Eye Drops	✓	✓
8. Emergency Eyewash (Sodium Chloride 0.9%)	✓	✓
9. Optrex Eye Lotion, 300 ml with eye bath	✓	✓
10. Pilocarpine Nitrate (Minims) eye drops 2%	✓	✓
11. Sodium Cromoglycate Eye Drops 2%	✓	✓
12. Tetracaine (Amethocaine) hydrochloride (Minims) eye drops 0.5%	✓	✓
13. Tropicamide Eye Drops (Minims) 0.5% - Pack of 20	✓	✓
Respiratory		
1. Beclometasone (CFC Free) Inhaler 200 mcg/metered dose - 200 dose	✓	✓
2. Benylin (Non-Drowsy) Chesty Cough	✓	✓
3. Benylin (Non-Drowsy) Dry Cough	✓	✓
4. Ipratropium Bromide Inhaler CFC Free 20mcg actuation - 200 dose	✓	✓
5. Ipratropium Bromide Nebules - 250mcg/ml	✓	✓
6. Oxygen - see equipment section	✓	✓
7. Salbutamol inhaler 100 microgram/metered dose - 200 dose	✓	✓
8. Salbutamol Injection 500mcg/1ml ampoule - Pack of 5		✓
9. Salbutamol Nebules 5mg	✓	✓
10. Spacer (Aerochamber) Device Std	✓	✓
Dermatology		
1. Aciclovir Cold Sore Cream	✓	✓
2. Aciclovir Tablets 800mg (Shingles Pack)	✓	✓
3. Betamethasone (Betnovate) Cream		✓
4. Calamine Lotion BP	✓	✓
5. Cetavlex (Antiseptic) Cream	✓	✓
6. Daktarin (Miconazole nitrate), 2% Cream	✓	✓
7. Deep Heat Rub	✓	✓
8. Delph Sun Cream SPF30		✓
9. Delph Sun Cream SPF30 pump dispenser		✓
10. E45 Cream	✓	✓
11. E45 Cream	✓	✓
12. Eurax Cream	✓	✓
13. Flamazine (Silver Sulphadiazine) 1% Cream	✓	✓
14. Fucidin cream	✓	✓
15. Hydrocortisone Cream 1%	✓	✓
16. Hydrocortisone Ointment 1% - 15g	✓	✓
17. Hydrogen Peroxide 6%	✓	✓
18. Lyclear (Permethrin) Cream Rinse	✓	✓
19. Lypsyl (Original) - Pack of 36	✓	✓
20. Magnesium Sulphate Paste	✓	✓
21. Mycota Cream	✓	✓
22. Mycota Foot Powder	✓	✓
23. Permethrin Dermal Cream 5%	✓	✓
24. Sudocrem (Replaces Zinc Ointment)	✓	✓
25. White Soft Paraffin	✓	✓
Solutions & Ingredients		
1. Clinell Hand and Surface Sanitiser	✓	✓
2. Hibiscrub	✓	✓
3. Sodium Chloride 0.9% (Normasol) Sterile Sachets 25ml	✓	✓
4. Tisept (Chlorhexidien & Cetrimide) Sterile Sachets 25ml	✓	✓
5. Videne (Povidone Iodine) Antiseptic Solution 10%	✓	✓

Gynaecology***		
1. Clotrimazole (Canesten) 500mg Pessary	✓	✓
2. Clotrimazole Cream 1%	✓	✓
3. Fluconazole Capsule 150mg	✓	✓
4. Levonorgestrel (Levonelle) Tablet 1500mcg	✓	✓
5. Mefenamic Acid Capsules 250mg	✓	✓
6. Syntometrine (Ergometrine maleate, Oxytocin) Inj. 1ml	✓	✓
7. Tranexamic Acid Injection 100mg/ml - 5ml ampoule		✓
8. Tranexamic Acid Tablets 500mg		✓
Post Exposure Prophylaxis***		
1. Kaletra (200mg Lopinavir and 50mg Ritoavir) Tablets	✓	✓
2. Truvada (emtricitabine 200mg, tenofovir disoproxil 245mg) Tablets	✓	✓
Anaesthesia***		
1. Hypnomindate Injection - 20mg/10ml		✓
2. Ketamine Injection - 10mg/ml (20ml vial)		✓
3. Ketamine Injection - 50mg/ml (10ml vial)		✓
4. Propofol Injection - 1% (20ml)		✓
5. Propofol Injection - 2% (50ml)		✓
6. Thiopental Injection - 500mg		✓
7. Lidocaine (Xylocaine) Pump Spray - 10%	✓	✓
8. Neostigmine with glycopyrronium - 500mcg/ml in 1ml amps		✓
9. Suxamethonium - 100mg/2ml		✓
10. Pancuronium - 2mg/ml in 4ml amps		✓
11. Rocuronium - 100mg/10ml		✓
12. Alfentanil Hydrochloride Injection 500mcg/mL - 10ml ampoule		✓
13. Alfentanil Hydrochloride Injection 500mcg/mL - 2ml ampoule		✓
14. Fentanyl Citrate Injection 100mcg/2ml		✓
15. Morphine Sulphate Injection - 10mg/1ml	✓	✓
16. Midazolam Injection - 10mg/5ml	✓	✓
17. Flumazenil Injection 500mcg/5ml	✓	✓
18. Naloxone Hydrochloride Injection 400mcg/1ml ampoule	✓	✓
Specific Antidotes***		
1. Calcium disodium EDTA (Versenate™) (for lead, copper, zinc, cobalt, or cadmium toxicity)	✓	✓
2. Calcium gluconate 10% (for hydrofluoric acid exposure)	✓	✓
3. Dimercaprol / BAL (for arsenic, lead, or mercury toxicity)	✓	✓
4. Hydroxocobalamin (Cyanokit™) (for cyanide, acrylonitrile, or HCN exposure)	✓	✓
5. Methylene blue 1% (for methaemoglobinemia from organic nitros and organic amines exposure)	✓	✓
6. Naloxone Hydrochloride Injection 400mcg/1ml ampoule	✓	✓

***include (or exclude), based on risk assessment

Appendix F-1. List of medications for remote site clinics.

If you would like to contribute to the development of this guidance please send comments/suggestions to kkb@irhc.co.uk or write to

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