

Healthcare Delivery for Oil Rig Workers: Telemedicine Plays a Vital Role

Introduction

Oil rig workers know the dangers presented by their jobs. Most, fortunately, do not experience the trauma faced by their brethren on the Deepwater Horizon in the Gulf of Mexico. However, lacerations, sprains, fractures, and minor injuries come with the territory, and despite their remote locations, oil workers are not immune to upper respiratory infections, kidney stones, heart attacks, or other acute conditions. For years, oil companies have staffed the rigs and platforms with a paramedic, emergency medical technician, or nurse who would assess the worker and telephone findings to a physician on shore. Without the ability to examine the patient or closely monitor him or her, physicians often ordered evacuations to onshore providers. Many workers returned the next day, after receiving treatment.

Now that drilling rigs and oil platforms are equipped with Internet and satellite connections, several entities are offering telemedicine services. Emergency medicine and other specialty physicians on shore can exam the patient and order electrocardiograms (ECGs) and laboratory tests, allowing them to more accurately assess the patient and determine a plan of care.

"Telemedicine's greatest advantage is to bridge access to care, and that is what it is doing for [the people on] these oil rigs," says Alexander Vo, Ph.D., executive director of the Center for Telehealth Research and Policy at the University of Texas Medical Branch (UTMB) in Galveston, which began piloting oil rig telemedicine services several years ago as part of its employee-health program.

"Oil rigs do not have medical specialists on board, so telemedicine is a means to bringing specialists on board and treating the patients," Vo says. "There is value to the patient and the corporation."

UTMB no longer provides telemedicine services to the oil-industry market, although it continues to provide other telemedicine services. Its physicians saw more than 80,000 patients through videoconference last year. Vo refers interested oil companies to NuPhysicia, based in Houston. Three of the university telehealth center's leadership staff left to establish NuPhysicia 3 years ago. Glenn G. Ham-

mack, O.D., M.S.H.I., serves as president of NuPhysicia; Oscar W. Boultinghouse, M.D., M.P.H., and Michael J. Davis, M.D., M.B.A., serve as senior vice presidents.

NuPhysicia aims at bringing proved UTMB telemedicine systems to new global markets. Its InPlace Medical Solutions division provides telemedicine to remote locations, including about 20 oil rigs in the South China Sea off Malaysia, the Persian Gulf off Saudi Arabia and Kuwait, the Atlantic off Brazil and South America, the southeastern Caribbean near Trinidad and Tobago, and the Gulf of Mexico. It is also working for a company producing oil in a remote, land-based Iraq location.

NuPhysicia is not the only provider of telemedicine services on oil rigs. Remote Medical International in Seattle began providing telemedical care to the oil industry about 5 years ago. Chris Kenney, director of the equipment and supply and telemedicine group for Remote Medical, would not release the number of oil-industry installations for which it provides telemedicine services. The company also offers telephone-based care, evacuations, and other services in remote locations.

The Maritime Medical Access program at the George Washington (GW) University Medical Faculty Associates Department of Emergency Medicine, an affiliate of GW University Medical Center in Washington, DC, provides physicians for telemedical care on one oil rig and on ships cleaning up the BP oil spill in the Gulf, reports Kyle Keenan, R.N., B.S.N., director of Remote Medical Programs and Maritime Medical Access for GW Medical Faculty Associates.

Abermed in Aberdeen, Scotland, provides occupational health services to about 100 offshore oil installations and to 25 diving support, survey, and pipe-laying vessels. It has made limited use of telemedicine, due to the cost, but the company is aware of developments in the field, says James Miller, chief executive of Abermed.

"The oil and gas industry has a particular interest in technology, as it is an industry driven by the use of new technology and is made up of engineers and technical people, and so are amenable to solutions that they perceive are bound to be of benefit," Miller adds. "If there

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are solutions that are of real benefit to the patient and enable the case to be better managed medically, then there is an opportunity and realistic expectation of selling a reasonably priced system to the oil and gas industry for use offshore and in remote locations.”

Shannon C. Caldwell, executive director of Offshore and Remote Services for NuPhysicia, estimates that the potential oil-industry market includes 322 active drilling rigs and about 1,000 occupied platforms, according to information published by RigData of Fort Worth, Texas. RigData did not return requests to verify the numbers.

Rig Workers' Health

Before deploying someone to an offshore job, most oil-industry employers require a medical examination that usually includes a detailed history, a physical exam, audiometry, spirometry, and a drug and alcohol screen. The evaluation may also involve vision testing or other exams. Individual countries set standards for people working in their waters.

Workers who pass the medical exam receive a certificate of fitness, which is typically good for 2 years. However, the physician may issue a certificate of shorter duration if a medical problem is detected and needs monitoring. Several companies offer medical assessments, but not necessarily the same company that provides the offshore medical care. Remote Medical limits providing the pre-employment and follow-up medical physicals to ships in the Seattle area. InPlace Medical offers physicals only in Brazil. The oil company usually specifies an onshore service partner to provide the physical examination.

Rig schedules vary, but the men often rotate 2 weeks offshore and 2 weeks onshore. Other companies may assign workers offshore for longer periods.

The vessel operator or owner usually contracts for the telemedicine services. However, it may be a logistic company the owner has subcontracted with, or it could be the oil or gas producing company.

Telemedicine Packages

InPlace Medical Solutions modifies its daily package depending on the needs of the oil company. It includes board-certified physicians the company has contracted with, diagnostic tools, the videoconferencing device, supplies, 128 prescription medications, and an electronic medical record. Polycom of Pleasanton, CA, manufactures the NuPhysicia-developed videoconferencing device (Fig. 1). The offshore equipment includes a digital stethoscope; a 12-lead ECG machine; and a multipurpose medical scope with halogen fiber-optic lighting for examining ears, nose, throat, and skin through high-resolution magnification. The offshore medic operates the equip-



Fig. 1. NuPhysicia provides a suitcase with diagnostic tools and a videoconferencing device, everything the onboard medic will need to communicate with the onshore physician.

ment, serving as the telemedicine physician's hands (Fig. 2). InPlace Medical may or may not provide the paramedic. Prices vary by geographic location and services needed. The service averages \$450 per day if the oil company hires the paramedic and \$825 per day if InPlace Medical provides the offshore medical personnel.

During a 2009 project on the Offshore Courageous rig for Scorpion Offshore, a Houston-based drilling rig contractor, InPlace Medical determined that both the drilling contractor and the rig operator saved equally due to reduction costs associated with medical

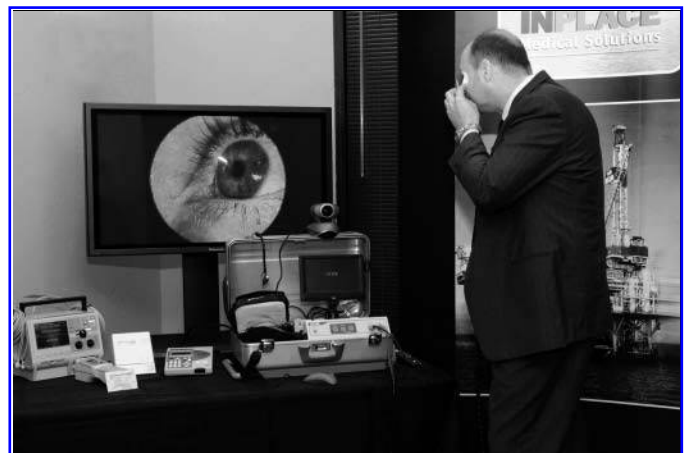


Fig. 2. Glenn G. Hammack, O.D., M.S.H.I., president of NuPhysicia, demonstrates use of the multipurpose medical scope to examine an eye.

evacuations, according to a paper published in *Drilling Contractor*, authored by Boultinghouse and Travis G. Fitts Jr.,¹ vice president of human resources, health, safety, and environment at Scopron.

Remote Medical also tailors its package to the needs of the client. It typically provides a trained rig medic, the telemedicine equipment, and supplies and medications. The company uses Tempus IC Telemedicine Devices (provided by Remote Diagnostic Technologies in Hampshire, U.K.), set up to work with satellite, Internet, or cell phone service. The device includes an integrated 12-lead ECG, pulse oximeter, blood pressure monitor, glucometer, camera, and tympanic thermometer. Tempus IC offers real-time two-way voice, data, and video transmission. Remote Medical stocks the medical supply kits based on the medics' level of training and the distance from local and definitive medical care. For instance, it might stock a rig 40 miles out into the Gulf of Mexico with first-aid supplies and basic pharmaceuticals. At the same time, it recently set up a three-bed hospital on a platform 300 miles from shore in the Gulf of Thailand. When an event occurs, the onshore physicians know what supplies are available and the skill level of the person on the rig.

"Our philosophy has been based around being a single source," Kenney says. "Where we have met with success is where you have a system that works together."

Remote Medical also offers evacuation services. Kenney estimates that a 50-mile helicopter evacuation will cost the oil company \$5,000–\$10,000, whereas one in the Gulf of Thailand might run \$150,000 for a boat ride to shore and then a Lear jet to Singapore or Hong Kong.

"That's where telemedicine can pay for itself 100 times over," Kenney says. "The affiliate who consults with a physician can either avoid an evacuation, which they can in a lot of cases, or degrade the urgency of an evacuation."

Remote Medical's base package costs \$3,500 a year, for a few people at a well-established oil rig. The cost increases if there are more people stationed on the vessel. There could be as many as 300 workers.

Ship or oil rig owners can subscribe to a package from GW University. The telemedicine program coordinates with a pharmacy to provide a supply kit appropriate to each vessel. All contents are listed in the electronic medical record. The onshore physician can order the appropriate drug.

"A daily corporate litigation fee supercedes the cost of a yearly contract with a smaller contract," says Keenan, who would not release a cost of GW's yearly contract fee.

Abermed primarily relies on telephone communication, with calls coming into a call-handling center, which forwards the call to a team of physicians. It has installed the VitalLink system by TeleMedic

Systems on dive chambers to help the diving contractor comply with Diving Medical Advisory Committee regulations. The VitalLink unit collects medical information from peripherals, to determine blood pressure, heart rhythms, and oxygen saturation; organizes it; and wirelessly passes it to a computer or handheld device.

During the past 2 years, Abermed has set up the BroomWell Healthwatch system's Heartview 12-lead ECG equipment, which converts the ECG trace data into a sound file that can be transmitted by telephone or e-mail to the onshore cardiology center.

Logistics

Telemedicine visits take place via satellite communication. Abermed participated in the €2.57 million Offshore Platforms Telemedicine Service Via Satellite market validation project, completed in 2006. The European Union partially funded the project conducted by the European Community eTEN program. The eTEN team concluded that the telemedicine service was feasible and profitable and mentioned plans to form a company to deliver the services, but that has not happened.² Total, a major oil exploration, drilling, and refining company based in France, received an Energy Institute safety award for its participation with the telemedicine project aboard the Total Alwyn North platforms.²

"The consortium leaders were then very keen to involve us in the proposal to Total, since Abermed is the medical advisor to Total North Sea," Miller says. "But the cost was so great that it was not possible for Total to justify installing the system. So there has been no outcome from the project, other than to confirm that bandwidth of any system is the critical part, with costs escalating the more bandwidth required."

Vo says that bandwidth has recently become less expensive, increasing opportunities for telemedicine at oil rigs.

"We initially had to work within the bandwidth allocated by the rigs, as low as 64 kilobits per second; but to have a decent telemedicine connection, a minimum of 384 kilobits per second is needed," Vo says.

"These rigs and remote locations all have Internet connectivity," says Hammack, estimating the speed at about twice that of a former dial-up modem. He says that the satellite service can still deliver medical-quality video images without consuming excess bandwidth. The system only uses bandwidth during an active telemedicine session (*Fig. 3*).

Keenan adds that some high-definition cameras use too much bandwidth, so the Maritime Medical Access program at the GW often relies on webcams and Skype. Alternately, someone with a smartphone can snap a photo and send it to the physician by



Fig. 3. A NuPhysicia physician evaluates a patient's throat at the company's telemedicine studio.

e-mail. Calls come into the facility's worldwide emergency communications center. An emergency-medicine physician fields the call. In addition, physicians in the telemedicine office or emergency department can handle simultaneous calls. Remote Medical partners with the GW University program to provide physician consultations.

"We encourage the use of telemedicine," says Kenney, at Remote Medical. "We want people to be calling in, so we can address it before it is an emergency."

InPlace Medical contracts with independent practice groups in various parts of the world. Medical teams are located in Texas, Georgia, Brazil (Rio de Janeiro), and Malaysia. Brazil, for example, regulates that the physicians, nurses, and paramedics must be licensed in that country. The company is not affiliated with a hospital or health system.

"That allows us to apply the technology anywhere in the world," Hammack says.

InPlace Medical has chosen not to provide evacuations and transportation. It provides only on-vessel care.

"We're there to do what is best for the patient and to not be distracted by opportunities for revenue for moving the patient," Hammack says.

Comprehensive Care

Keenan, with GW's maritime program, reports that lacerations, bumps, and bruises are common, but its physicians have also treated patients suffering from asthma, upper respiratory infections, and a cardiac arrest.

"There are a lot of injuries due to the occupational hazards," Keenan says.

InPlace Medical treats the same sort of illnesses and injuries seen in an urgent care center, Caldwell adds. Its telemedicine team resolves 80%–85% of the situations without evacuating the patient. In addition, by offshore management of a situation, the company may delay an evaluation from a riskier night flight to a safer daytime helicopter ride.

Caldwell offered as an example a patient who presented to a Malaysian on-rig clinic late in the evening with abdominal pain. The telemedicine physician assessing the patient determined he had a kidney stone. The InPlace Medical team treated him offshore, keeping him comfortable during the night until he could fly out the next morning.

"When he came back to the rig, he said everything we did for him was appropriate," Caldwell says. "But what mattered most to him was being able to speak to a physician and know what was going on, and that it wasn't life threatening."

In another case, the telemedicine team from InPlace Medical was able to rule out a myocardial infarction, eliminating the need to evacuate the patient.

InPlace Medical physicians provide the offshore paramedic with some standing orders for emergency situations to prepare for transport. The company may also provide standing orders to treat very minor conditions, such as athlete's foot, but the patient is always offered the opportunity to speak with the physician. More than half of the time, a videoconference takes place. On any given day, each rig will complete a telemedicine consult for one or two patients.

"It is a casual and frequent use of the physician teams to enable the best quality of care and manage the situations offshore," says Hammack, adding, "It is an ability to extend the physician's judgment to the remote location. It has improved management. There is nothing that we do that keeps people inappropriately onsite in a remote location. It's about making the best decisions possible for that patient."

NuPhysicia also provides wellness, health-education, and point-of-care cholesterol and other blood test screening services. Rig workers can fill out a health-risk assessment tool, which the telemedicine doctor will review with them. The physician can also monitor rig workers' chronic conditions, such as hypertension or diabetes.

"It's a day-rate service," Hammack says. "The companies engage us to create an all-you-can-eat cafeteria of physician-supported healthcare at their location. It's not just work-site accidents. InPlace Medical through telemedicine allows the delivery of wellness pro-

grams, health promotion programs, health-risk analyses—the types of things done as part of executive physicals.”

NuPhysicia indicates that patient satisfaction surveys have been positive. More than 600 patients have received care from InPlace Medical. Of the 54% who received telemedical services, more than 98% thought the videoconference with the physician improved their care, and more than 98% indicated they were satisfied with the care they received.

“They said it improved the morale and welfare of everyone on board,” Caldwell says. “They found an increase in productivity. It made them feel that the company cared about them working in a remote environment. There were a lot of positive comments.”

Rig leadership has also praised the service. Caldwell says that InPlace Medical offers peace of mind—to the workers and to the companies that have hired them.

“By providing physician oversight, real conversations, and live two-way video with their patients, we allow better decisions to be made that not only have a cost impact but a morale impact for people onboard,” Caldwell says.

—D.L. Anscombe

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