F-Cell World Drive 2011: Are Tactical Medicine Principles Applicable to a Civilian Scenario?

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ABSTRACT

In 2011, a Mercedes Benz (MB) conducted the F-Cell World Drive tour around the globe in 125 days. While crossing Asia from SHANGHAI (CHINA) to HELSINKI (FINLAND) by car, en route medical care was provided by embedded emergency physicians. The designated route crossed four different countries, multiple climate zones, and challenging road conditions. There was only limited information provided about hospitals and emergency medical services within different host-nations in the planning phase, so we adopted tactical medical principles for mission planning and execution, as we were facing remote conditions and limitations to equipment, staffing, and patient transport.

The medical mission was to provide medical care in all routine and emergency medical situations. The F-Cell Team was composed of up to 60 persons in 20 cars, including technical and public relations staff from MB and a changing number of VIPs and journalists from all over the world. While MB staff underwent travel medical checks and vaccinations beforehand, guests had not necessarily consulted travel-medical advice in advance. For protection of privacy reasons, no information on medical conditions was made available to the assigned emergency physicians during the planning phase. Medical risk assessment identified travelers' diarrhea, rabies, and road accidents as major medical risks en route. While working with electrical systems, preparation for electrical accidents had to occur.

A designated medical car (MB GL 450) was equipped according to risk assessment with a ventilator and oxygen bottles, an automatic external defibrillator (AED), a vacuum mattress, a scoop stretcher, a physicians' kit, a portable ultrasound unit and a cooling box before it was shipped to SHANGHAI (CHINA). At Chinese customs, we had to handle some challenges, as we chose to have Esketamine, Midazolam, Fentanyl, and rabies vaccines in our medical kit. Oxygen bottles had to be emptied during the vehicles' journey by ship. We had to refill the oxygen bottles under Chinese conditions. Crossing three borders, we had to handle three different types of customs procedures.

Contact details for hospitals and their level of care was only presented by local agencies on the very morning of each leg. It was impossible to have reliable information on the quality of local medical assets. En route communication was ensured by local and international cell-phones and satellite telephones. A translator was assigned to the embedded emergency physician at all times.

On the 33-day journey, we had 197 consultations. The treated medical conditions were gastroenteritis, flu symptoms, soft tissue infections, and infections of the upper airway, but we also treated a dog bite and a thrombosis due to an inherited deficiency of protein C. None of the participants had to leave the mission before scheduled.

In conclusion, we performed our planning process and mission execution according to tactical medical principles. Distinct from military conditions, possible information on participants' medical conditions is restricted to voluntarily provided details. Even rarely-seen medical conditions (like inherited protein C deficiency) can occur in an unknown group of participants. Reliable information on host-nation medical assets is limited and thus might not have a great impact on medical planning. Medicines can be imported, but meticulous documentation due to customs' requirements is necessary. In a convoy scenario, a dedicated medical car with redundant communications equipment and an assigned translator is mission essential.

Adopting principles of tactical medicine right from the beginning is beneficial at all times, even in missions not executed at gunpoint.

Introduction

Just before Christmas 2010, we received a call from a civilian client:

"Join us for nine weeks through the Asian wilderness with your medical knowledge. Be prepared for any incident or illness that may occur. You will have a rough number of participants, but no medical histories for those will be provided. There will be VIPs and journalists with you. You will have until January 25th 2011, to prepare your plan and gather and ship your gear to Shanghai."

Is this mission a tactical scenario?

Table 1 Criteria for Tactical Scenario

Criteria	Is the Criterion Met?
A number of casualties and injuries can quickly overwhelm available resources	Yes
Casualties are located in non-secure areas	Perhaps
Supplies are limited, and the provider is isolated	Yes
The pre-hospital phase is often extended	Yes
Evacuation may be delayed or prolonged	Yes

Background

While the automobile had its 125th anniversary in 2011, a large German car company sent the "F-CELL World Drive" around the globe in 125 days. A 22-vehicle convoy was composed of three Mercedes Benz B-Class based, Fuel (F)- cell driven cars plus 19 others providing either press coverage or logistical and technical support. F-CELL technology is based on a hydrogen-powered electric motor. The over-all mission was to promote F-CELL technology and to prove its endurance facing every day challenges in different parts of the world. In order to provide medical service according to home-nation-standards, German-qualified anesthesiologists with experience in travel medicine and working in remote scenarios were embedded in the Asian legs from SHANGHAI (CHINA) to HELSINKI (FINLAND). This part of the journey covered 12,000 kilometers in 33 days, four countries, different climate zones and terrains, challenging road conditions and varying levels of medical care and capabilities depending on the host-nation.

Medical planning had to be based on tackling medical challenges in remote areas with limited personnel, limited equipment and logistical possibilities. Economic considerations affected our planning as funding was limited. Civilian standards and local laws had to be obeyed. General criteria defining a tactical scenario were thus met (Table 1).[1]

Medical Mission Statement

Our mission was to provide medical care throughout our journey spanning all specialties of medicine, not only general and emergency medicine, but also covering aspects of preventive medicine and psychological support and/or care for the duration of our deployment. The support had to be based on economic principles and should be as close as possible to medical standards of the client's country of origin.

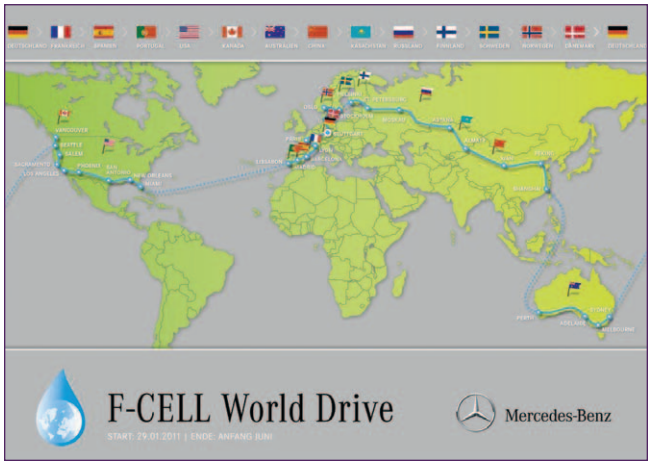
Planning Considerations and Mission Preparation

Assessing the terrain and composition of our route, lowest point was 200m (656 ft.) below sea-level, highest altitude to climb was over 2500m (8200 ft.), crossing urban, suburban, taiga and—steep terrains, not to forget the Gobi Desert (Pictures 1 and 2). Considering immediate medical risks, travelers' disease and traffic conditions, accidents were most likely to occur. Due to the nature of F-Cell technology, preparations for electrical accidents had to be made. Therefore, an electrocardiogram (ECG)—equipped Automatic External Defibrillator (AED) was part of the equipment.

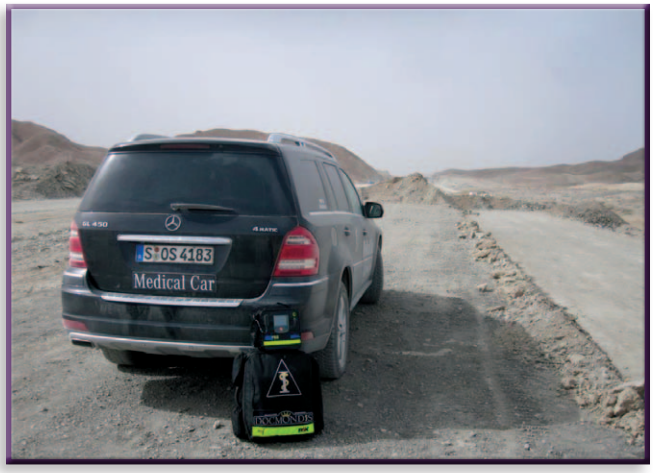
Environmentally, there is a high risk of exposure to rabies with animals in CHINA, KAZAKHSTAN, and RUSSIA. Rabies vaccine for post-incident vaccination and a consecutive cooling box were part of the medical kit. Rabies-Immunoglobulin was not considered for economic reasons.

The convoy consisted of approximately 60 people, both male and female. Most of them were public relations and technical staff from MERCEDES BENZ (MB). In addition there were a number of journalists and VIPs from all over the world rotating in and out, testing F-CELL cars for short periods of time. Whereas MB staff underwent occupational health checks and received pre-deployment vaccinations following a medical risk assessment; journalists,

Picture 1 Trip Map



Picture 2 Desert Gobi



VIPs and additional staff (i.e., scouts, local drivers, and translators) were not required to have a medical check-up beforehand. According to the law protecting the privacy of people, it was impossible to obtain information on the team members' medical conditions in advance, except for a request by e-mail to voluntarily provide such details to the medical team. There was no response to our email inquiry.

On driving days there were two stages of up to 350 km each, each planned for a driving time of about four hours. The afternoon break was taken somewhere in the field to refuel the F-Cell cars with hydrogen. As the stages were small, there was limited access to reliable information about local emergency medical services (EMS)[2,3] or level of care of regional hospitals beforehand. Due to economic restrictions, no medical site survey was possible.

As traffic accidents were an imminent threat, the plan was to treat casualties according to PHTLS® standards. The worst-case scenario we anticipated and prepared for was an accident around the afternoon-break (half-way through the day's driving distance) on poor road conditions with the necessity of handling one polytrauma patient and envisioning a delayed or total absence of EMS response by local authorities. Medical planning was conducted for handling an oxygen-dependent, analgo-sedated patient with mechanical ventilation. Medication needs were calculated based on the anticipated demands of a patient weighing 100kg and receiving a total of six hours of care (one hour of field care and five hours [four hours drive plus 20% redundancy] of evacuation care en route to the next suitable medical facility) (Table 2) (modified from 4). In case of repatriation, we relied on a global playing flight ambulance service.

Additionally, we had an emergency-backpack, a portable ultrasound unit,[5,6] a vacuum mattress, splinting material, KED®-System, and a folding scoop stretcher in the medical kit. Facing the possibility of prolonged evacuation care, equipment for urinary catheterization for en route treatment was also integrated. We chose internationally certified oxygen gas bottles (LUXFER 5l gas cylinders, 300 bar/4300 psi technology) with "pin index" pressure reducing valves.

Table 2 Drug Table Trauma

Drug	Field Care (1 hour)	Evacuation Care (5 hours)	Total Amount Planned
Oxygen	20 l/min = 1200 l	20 l/min. = 6000 l	7500 l (5 Btl. á 300 bar)
Fentanyl	0,5 mg	5 mg	5,5 mg
Midazolam	10 mg	100 mg	110 mg
Esketamine	100 mg	250 mg	350 mg
Norepinephrine			25 mg
Epinephrine			25 mg
Veccuronium	10 mg	90 mg	100 mg
Ringers'-Acetate	2000	5000	7000 ml
Voluven® (HES)	2000	5000	7000 ml
Small-Volume Solution	250 ml		500 ml

As there was advanced technical equipment with the MB staff, planning for technical rescue was conducted by the technical staff, there were cable winches, cutting torches, parting-off grinders and fire extinguishers in the casualty extraction kit.

Considering travelers' disease being the most important threat, we incorporated solutions for oral rehydration and electrolyte replacement, antibiotics and additional intravenous fluids (crystalline solutions) into our medical kit.

Based on our experiences from previous missions, we developed a DocMondis® general medical kit, which enabled us to diagnose and treat bronchitis/pneumonia, external and media otitis, urinary tract infections, pain, and to perform simple surgical treatment of small wounds (including consecutive multiple dressing-changes). For quality control and legally-required medical documentation, we also programmed an Access Database for other missions in the past.

As there was no information on the teams' medical conditions, medication for cardio-vascular-incidents (including Troponin I quick test, Tenecteplase, and Enoxaparin) was added on. MB occupational health department put pill packs with painkillers and diarrhea medication on a couple of cars in the convoy.

A 4x4 vehicle (MB GL 450 (Picture 3) was assigned exclusively as a medical car. It was equipped in STUTTGART (GERMANY) and shipped to SHANGHAI (CHINA). The designated car was off the shelf and bare bones without any fancy EMS-interior. Every piece of equipment had to be strapped down. In case of a MEDEVAC scenario, we planned for putting a stretcher in the back of the Medical Car. In case of rough road conditions the plan was to affix a stretcher by ropes and springs to the ceiling of one of the MB SPRINTER vehicles for transport to avoid major vibration.

Picture 3 **Medical Car**

As the medical doctor was exchanged on day 16 in ALAMATY (KAZAKHSTAN), replenishment of medical resources was scheduled there.

Customs, Immigrations and other Governmental Agencies

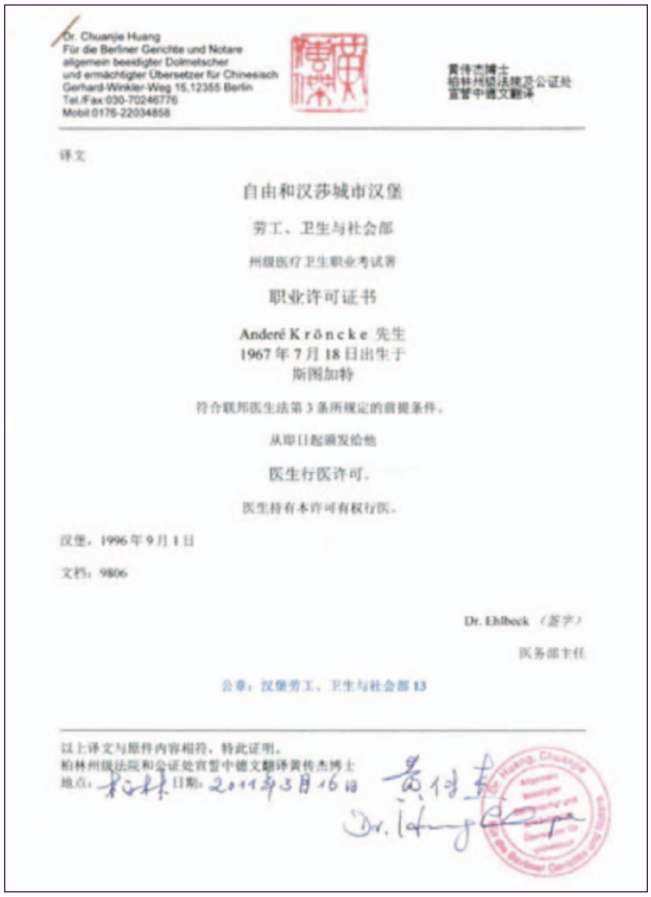
Following economic principles, we did not want to give the appearance of exporting medical goods to any of the countries we travelled. We were obligated to list every item and medicine we brought with us, including expiration dates, values, and weights. The chart had to be available in German and English language and had to be included in a Carnet ATA (international customs document). The last had to be produced at border-crossings.

In addition, no anesthetic drug, vaccine, or battery for AEDs was permitted to be transported by ship and had to be brought by plane. Transportation by ship of pressurized oxygen bottles was also prohibited, so those came to SHANGHAI empty.

In order to confirm import of fentanyl into CHINA, we had to contact the Inspection and Quarantine Office of SHANGHAI PUDONG Airport Customs. Like in European countries and the United States of America, Fentanyl is a controlled substance regulated by Chinese laws. Therefore, it had to be declared when brought into the country. In addition, Esketamine and Midazolam were also considered controlled substances by Chinese Customs as well. On top, we had to gain approval for bringing Rabies vaccine into CHINA from the Hygiene Supervision Division of the Shanghai Exit-Entry Admission Bureau, as vaccines are biologically active substances and thus subject to Chinese laws.

To be able to work in CHINA as the designated physician for the F-CELL World Drive, an original medical license and an accredited translation into Chinese had to be presented to Immigrations as well (Picture 4).

Picture 4 **Chinese Translation of Medical Certificate**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译文

自由和汉莎城市汉堡

劳工、卫生与社会部

州级医疗卫生职业考试署

职业许可证书

Anderé Krőncke 先生
1967 年 7 月 18 日出生于
斯图加特

符合联邦医生法第 3 条所规定的前提条件，

从即日起颁发给他

医生行医许可。

医生持有本许可有权行医。

汉堡，1996 年 9 月 1 日

文档：9806

Dr. Ehlbeck（签字）

医务部主任

公章：汉堡劳工、卫生与社会部 13

以上译文与原件内容相符，特此证明。

In order to enter KAZAKHSTAN and RUSSIA, providing a medical ID was enough. Neither Fentanyl nor vaccines were an obstacle for border-crossings there.

As it came to refilling the oxygen bottles in CHINA, our containers did not have Chinese approval. Although having bottles of the same manufacturer, local companies were not allowed to refill ours without a certificate of exemption. Maximum filling pressure available

in CHINA and KAZACHSTAN was 150 bar/2200 psi. This reduced our calculated reserves of oxygen.

Mission Execution

Once on the road, we experienced very rough terrain and traffic conditions in CHINA. There were no accidents with any of the vehicles in our convoy, which were spread out up to 60 km (37 miles), with the Medical Car always being in the rear part of the convoy.

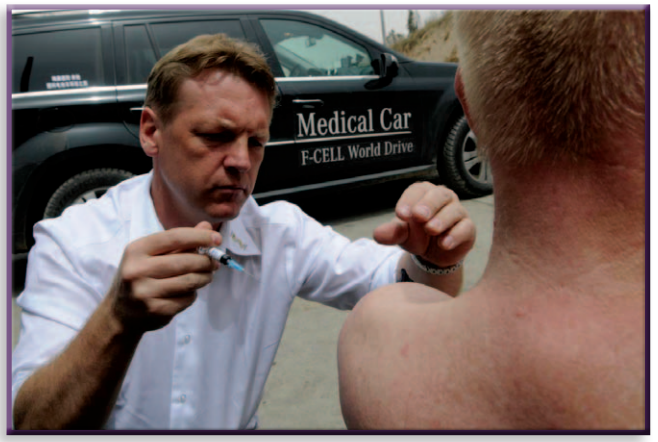
Communication was secured by local mobile phones, satellite phones, and private phones. While being on the road, immediate internet access was available by satellite phone on the medical car. In addition, high-speed internet access was granted in all hotels we stayed in. A designated translator was part of the Medical Cars' crew. Information on possible medical facilities in vicinity of the route was provided by a local agent on a daily basis, most of the time there was not much more information available than the address and a telephone number, while the convoy was on the road. Some hospitals along the route had open source information available in English, but most of the time we had to rely on information given during translated phone calls, as the language barrier was too high to have direct contact with responsible personnel at local hospitals. In addition, the hospital we had to rely on during the second half of the day's journey was an eight hours drive from the starting point for that particular date, so there was no way of visiting hospitals in advance to evaluate the facility and inspect its hygiene conditions. Finally, many questions one would like to ask with respect to trauma care, blood supplies, surgical capabilities, and laboratory support were not reliably answered over the phone through an interpreter. Last but not least, sustainable information on capabilities of local EMS or helicopter EMS was not always available either. Most of the time, the local agent had heard about helicopter EMS, without having used them before. In case of a MEDEVAC by local EMS, the emergency physician was prepared to accompany the casualty to wherever he/she was transported. Therefore, a daypack was prepared containing credit cards, an amount of local currency, travel documents, reserve clothes, additional food, etc.

Road navigation was conducted by TRIPY II® systems, as other "off the shelf" navigational systems were forbidden by CHINESE laws. Not all attending convoy personnel were trained to communicate a GPS position from a paperback map. In case of an accident, a vehicle tracking system with a panic button and a (near) rollover monitoring closed this information gap.

Along the mission there were 197 consultations for a total of 47 patients. Most of them were caused by diarrhea, due to interesting hygienic conditions, especially in CHINA und KAZAKHSTAN. We generally intervened earlier with the administration of antibiotics than we might have back home. Additional rehydration therapy kept participants going and the convoy was always on time. Some participants had never been away from home for such a long periods of time and under such demanding conditions. Intense psychological attentiveness was necessary throughout the mission.

Although there were multiple advisories during the tour not to pet animals, there was one dog bite in CHINA from a stray dog. The patient was vaccinated during mission preparation. We asked our translator to figure out if there were typical alert-signs for rabies-infected animals or unknown deaths in the community in the last couple of months. Fortunately, there were no such findings in the community. The patient got away with repeated wound dressings and another vaccination on scene (Picture 5).

Picture 5 **Vaccination after Dog Bite**



Following up on the incident, we repeatedly conducted non-representative surveys amongst additional personnel and visiting journalists. We were able to conclude, that a considerable number of attendees were not aware of rabies and its prevalence in the area of operation. In addition, and even more striking, we found that a couple of participants had not been seen by a travel medicine specialist and were thus not sufficiently vaccinated against typical risks for travelers like tetanus, diphtheria, typhus, or hepatitis (and rabies, obviously).

Another outstanding medical event was a patient who came up to the physician with a diagnosis of soft tissue infection and thrombosis of his left lower leg. In his medical history there was a known inherited activated Protein C deficiency. He was supposed to be on anticoagulation, since he experienced a life-threatening lung embolia in his younger years. He left his anticoagulation

medicine back home. The patient refused to be admitted to a hospital or to be MEDEVACED. He was considered to be mission-essential. After having straightened out that he was in a potential life-threatening situation, it was decided to put him on therapeutic anticoagulation with Enoxaparin and to prescribe Augmentin for his soft tissue infection. He agreed to stay in the back of the car, keeping his leg up without too much movement or weight bearing. His clinical condition was regularly evaluated every time there was a gathering of the convoy. In the morning of the next day an improvement of the symptoms were seen and he finished the designated leg to HELSINKI.

An accident occurred with an F-Cell vehicle in KAZAKHSTAN. It happened about 20 min. after lunch break, at nearly half of the daily distance. There was minor damage to the F-CELL vehicle; no one was injured. The Medical Car arrived on scene 20 minutes after the accident.

Last, but not least, one journalist team went for an independent story into a former test area for nuclear weapons near CHELYABINSK (RUSSIA), wearing sandals and sharing food with the inhabitants. Afterwards the medical team received inquiries about the possible hazards of radiation.

Lessons Learned

Looking back on the mission, the following lessons were learned by the attending emergency physicians:

1. Unconventional civilian missions need special planning. Adopting principles of tactical medicine is highly beneficial, even in purely civilian scenarios.
2. Time for medical mission planning can be pretty short in civilian scenarios as well, even if the over-all mission is planned for months.
3. In comparison to military missions, other considerations concerning equipment limitations, planning details and mission preparation timelines have to be taken into account. This is not only due to laws that have to be obeyed both in the country of origin as well as the host nation, but also for restrictions to receiving pertinent medical information on the health conditions of participants and limited reliable information on the capabilities of the host-nation's medical systems.
4. Earlier medicinal intervention (compared to homeland standards) might be necessary to achieve the over-all missions' goal.
5. Medical teams need designated vehicles, translators and redundant navigational and communications equipment and have to be extensively trained to be able to flexibly respond to and overcome unforeseen scenarios/events.
6. A lack of travel medical advice can bring unforeseen challenges to an attending medical team, one might offer important medical information proactively.
7. One faces diseases you might not often see at home; immediate access to a knowledge database is absolutely necessary.
8. People might not think about less obvious hazards in advance which will in turn challenge assigned medical personnel only after exposure.
9. Plan for a medical redundancy of 50%, rather than 20%.

Conclusion

We conducted medical support to a 33-day journey under remote site conditions with different limitation to medical care. Leaving "traditional" medical planning tracks and adopting principles of tactical medicine from the very beginning widened our range of thinking and the level of medical awareness. Thus a considerable number of experienced medical scenarios were anticipated beforehand. Still a high level of improvisational skills for the attending medical personnel is needed, when dealing with host-nation authorities and responding to upcoming challenges, which is also characteristic for tactical missions. In planning unusual civilian missions, one is well advised to think about applying tactical principles even though it might not be executed in the battlefield, law enforcement setting or similar hostile environment.

Editor's Note

The following is a list of questions asked by our peer-review editors. We have included this at the end of this article as we feel it gives some more insight into the authors experiences.

1. Page 2, second paragraph. You speak of "Logistical Possibilities"—What do you mean by that? Are you speaking of unforeseen events that may arise throughout your journey?

Limited logistical possibilities during the F-CELL World Drive were i.e., not having a fully and standardized equipped ambulance, as there were no pneumatically operated stretcher platform, no drawers for medicine and equipment and no immediate possibilities to replace used medical items (especially in CHINA). Another example might be a lack of 300bar technology for oxygen-bottles, in combination with the availability of only 150bar per container. Also there was no reliable and immediate possibility to MEDEVAC a patient on short notice, like there often is in military or homeland scenarios. As this paragraph is for background information only, I didn't elaborate on details there.

2. Page 2, third paragraph. You speak of practicing "general and emergency medicine" in addition to other specialties. Should you add dermatology, gastroenterology, urology, dentistry, otolaryngology, etc.? In my experience with extended deployments and limited medical resources, one ends up practicing all types of medicine as you so adeptly describe. If you treated it, you practiced it is the way I see it.

The paragraph you are referring to is our "mission statement." Purpose of this paragraph is to give the frame, which we were planning in, our level of ambition or the "commanders' intent", as you like. This recommendation was given to Mercedes Benz (MB) for resource (i.e. financial, personnel) planning. Why was this important? According to German medical training principles an emergency physician has two (2) years of experience after medical school in one of the fields surgery, anesthesiology, internal medicine or general medicine, plus six (6) months of ICU-training. Being a qualified emergency physician thus would not be sufficient training according to our mission statement and MB willingly planed (and paid) for experienced medical doctors specialized in anesthesiology with considerable experience in emergency medicine, general medicine, travel medicine and preventive medicine. Finally (again according to German laws) a medical doctor is only qualified to work on his own (like in remote site scenarios), when he has finished his training and is specialized as a consultant. This is different to battlefield or law enforcement scenarios (again according to German laws), where a specialist only has to be "in the area/around" and not necessarily on scene. As stated before, the standard of medical care has to be as close as possible to German level, thus German laws had to be obeyed at all times.

When it comes to the experience you mentioned above, I am absolutely with you. On execution one ends up handling it all. Surely, I always keep in mind, the experienced audience of JSOM will carefully distinguish mission planning from mission execution.

3. Page 2, sixth paragraph in which you describe the convoy made up of 60 members. You allude to a "Law of Protection of Privacy." We, your audience, could be educated on the restrictions of such a law you find yourself under. Here in the United States, as a Medical Provider I am bound by two separate acts regarding Confidential Patient Information: (1) The Health Insurance Portability and Accountability Act, and (2) The Patient Safety and Quality Improvement Act. Neither of those preclude me from gathering a detailed Medical History and screening on all of my team members prior to a deployment. These do, however, prescribe very strict confidentiality parameters that I must follow to ensure the safekeeping of personal medical information.

The law protecting the privacy of people withheld us from obtaining information IN ADVANCE. During the mission we of course had the possibility to ask for medical details, but this only happened in case of treatment and on demand. Basically, the patient with the inherited protein c deficiency only came up with his details when he had his thrombosis, although he stayed with us for 18 days already and knew that he forgot to bring his obligatory anticoagulation medicine and put himself to risk of death.

What I did on scene, was telling the patient about his potential life-threatening condition (he basically knew of course without me telling him). The condition was assessed potential life-threatening, because he already suffered a lung embolia in the past and had a soft tissue infection (which acts pro-coagulatory, as you surely will know) and a thrombosis in the area of infection to that time. Secondly, I made him sign a letter of indemnity and informed important team members about the hazards of his condition.

Conclusively, participants rather didn't tell the attending physician about their medical condition, than risking to be rejected participating on the tour. The last is something you will find in battlefield and law-enforcement scenarios as well. The difference from a medical point of view is: in military scenarios the attending medical personnel does in fact have access to medical records of the team members.

4. Page 3, the last sentence of the last paragraph started on page 2. You speak of "global playing flight ambulance." You described in your paper how you were prepared to provide medical care for an extended duration en route to a definitive care facility. What if you got to a Medical Facility and found them to be lacking? What would your next move be? Would you call Aero Care or Air Med or similar Medevac? I understand that medical facilities could not be readily researched in your preplan through open sources back in 2010 nor, as you describe further, could they be researched on the ground even when in place. My next move would have been to plot every possible airport or airfield along my anticipated route in case a Medevac was needed. I am sure you thought of it or of something very similar and we, your audience, could benefit from that wisdom.

You are right, we were thinking about this, too. Basically, we had to rely on the next local hospital for primary care (from our point of view: treatment according to ATLS® or damage control surgery etc.). Our medical chain of command was to inform MB occupational health service (MB OHS) about any medico-logistical need, while transporting the patient to the next hospital. The whole journey was tracked online 24/7 by a command post

of MB in Germany, so in case of an incident they (MB OHS) would have been informed automatically and were prepared to help whenever needed. With arrival at the next hospital the situation would have been assessed and next steps planned with MB OHS and iSOS (which is the global playing medical service; we had meetings with them in the preparation phase and along the trip). Next steps could have been calling in MEDEVAC assets for either in-country transport to a facility with a higher level of care or repatriation, in case the patient is stable enough. We only checked availability of airports at the places we stayed overnight on mission preparation, as those were reliable fix-points. For OPSEC reasons the definite route was kept secret by MB until the beginning of each leg. From our point of view, this was as much as we were able to plan in advance.

5. Page 3, fourth full paragraph. I did not understand what you meant by the last sentence in that paragraph with regards to having programmed an Access Database "in the past." Did you mean to say that prior to deployment, you created a database to record medical histories and track the delivery of patient care as well as perform Quality Assurance or Control?

Yes, indeed. As we are obliged (by law) to write down any medical treatment we performed, we created a database before (based on the experience from other not-that-remote-missions). In our experience it is beneficial to have a laptop-based tool, where we were able to fulfill documentation (SOAP-history-based) needs, to oversee medical stocks, to be able to extract diagnosises for statistical evaluations and thus easily prepare an after-mission report. After this mission we presented our report to MB OHS for external quality control. The data-base fulfills all requirements for the protection of medical data, of course.

6. Page 5, Lessons Learned #6. I am not sure what was the lesson learned. Was it lack of travel advice and screening in part of the participants prior to their deployments that created challenges for the Medical Team? Or was it something else?

As we were not aware of the fact, that not all participants had travel medical advice beforehand, there were a few things we were not able to anticipate:

a. As mentioned before the patient with his Protein C deficiency, if he would have seen a medical doctor with travel medical qualifications beforehand, he might not have participated on the tour or at least would have been more accurate in thinking about taking his anticoagulation medicine with him.
b. We might have thought twice about bringing Immunoglobulin for rabies-treatment with us, if we would have known about people (journalists in fact) attending, who are not vaccinated against rabies. The dog-bite happened to a MB team member who was vaccinated, so treatment was easy. Without prior vaccination a dog-bite by a rabies infected dog requires Immunoglobulin-treatment or the risk of death or at least serious injuries is very high.
c. Medical advice prior to entering a former nuclear test area would surely have changed the participants' behavior.

In conclusion, we faced challenges from the absence of travel medical advice and from people's behavior, which didn't seek prior-action medical advice (also stressed in lesson learned #8).

From todays' point of view, I'd rather not send out an e-mail asking for medical details, but sending out medical information about possible en route hazards, offering medical advice where needed.

7. Lastly, as the Medical Provider on an extended mission, we are expected to know it all, do it all and treat it all. I, more so than you, have moments where I do not know or have an answer so I have to consult my resource materials that I carry with me or consult with my Medical Control at Johns Hopkins University. Did you have a laptop with you where you kept you reference materials? Did you need such a thing? Did you have the capabilities, need or occasion of consulting via Sat Phone with anyone else?

First of all, for knowledge redundancy we have reference material on the laptop (i.e., national and international lists of medicine with indication, contraindication, dosage etc.) and brought emergency medicine and general medicine books.

Secondly, there was Internet access via SatCom on the medical Car. In addition, we had high-speed internet access at every hotel we stayed overnight (obviously a necessity for travelling journalists).

Finally, our network allows us to gain tele-medical advice 24/7. I personally had benefits from that on a former mission with a dermatologic case. I sent a picture to a consultant dermatologist of a big hospital and received an answer and conclusive recommendation for treatment within 24hrs.

Not to forget the possibility to contact MB OHS and the colleague of the other leg at home.

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