

**PHILIPS**

Ultrasound

# A patient in Antarctica

## Philips Lumify case study

I am an emergency physician with special interests in point-of-care ultrasound and wilderness and expedition medicine.

This is a story about my experiences as a medical doctor in Antarctica for seven weeks. During that period I spent time in a base camp, on a glacier, and in a mountain range. Oh yes, I had an ultra-mobile ultrasound system with me – a Philips Lumify.



A case study by  
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# A patient in Antarctica

Antarctica is a vast white canvas interspersed with splashes of black and gray amid towering peaks. It is the continent which holds the record for the lowest ever recorded temperature at  $-89$  degrees C ( $-128$  degrees F).

Antarctica is an extreme environment where it is easier to medically evacuate (medevac) an astronaut with a medical emergency from the International Space Station than it is to medevac a person from Antarctica in the winter.

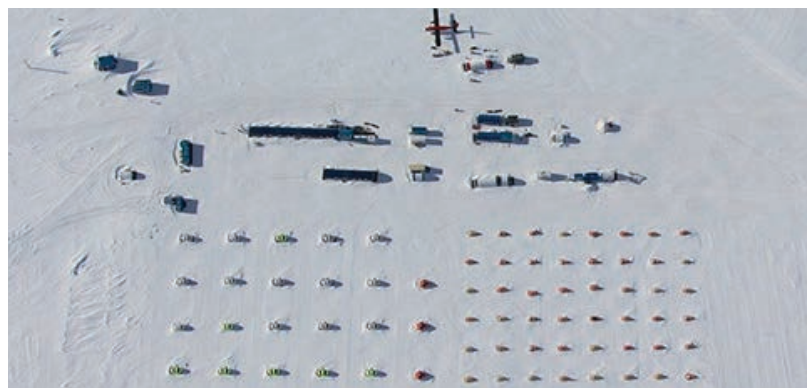
Luckily, I was there in the summer. Our medevac transport plane (an Ilyushin IL-72) was limited from landing on the blue ice runway only by high winds and low visibility.

I provided medical support for expeditioners who came to Antarctica for a wide variety of experiences. These ranged from summiting Mount Vinson



to skiing from the edge of the continent to the South Pole. Some wanted to ski the last-degree of longitude and some wanted to remote-camp close to an Emperor penguin colony. Some just wanted to enjoy the desolate landscape and the unequalled silence of this vast white continent.

During the expedition I was able to use Lumify in numerous situations to confirm or exclude a variety of medical issues. It was a priceless tool in this remote environment.





# A patient in Antarctica

Following are highlights of cases where the use of Lumify impacted my medical management.

## A patient with a hip fracture

Using Lumify, I was able to confirm the diagnosis of a fractured femoral neck and perform an ultrasound-guided femoral nerve block for the patient. The nerve block provided pain relief for the duration of her transport from camp to the medevac airplane and subsequent airlift to South America.

The use of ultrasound to guide nerve blocks for pain relief is well established. In situations with a limited stock of medication and with the potential for protracted transport times, effective analgesia is especially important, even more so in this case because of the difficulty associated with immobilizing fractures of the femoral neck or shaft.



Dr. Prince with patient post ultrasound-guided nerve block.

## A patient with possible foreign body

A patient was unsure whether or not he had retained an aluminum splinter. I was able to exclude a splinter still in situ using Lumify, and thus reassure the patient before he set out on his expedition.



The patients' faces have been obscured to protect their privacy.



# A patient in Antarctica

## A patient with possible High Altitude Pulmonary Edema (HAPE)

This patient was part of an expedition that was on a last-degree ski trip to the South Pole. The expeditioners were flown from 600m (~1970 feet) above sea level (our base camp) up to the start of the ski trip, which was about 3300m elevation (~10,800 feet). On arrival, the patient developed shortness of breath.

Part of the urgent medical assessment was to determine if he had developed HAPE. If, indeed, he did have HAPE, which is



life-threatening non-cardiogenic pulmonary edema, he would require immediate descent to a lower elevation. This meant that not only would we need to fly the patient out, but also evacuate the other expeditioners on the same flight.

Using Lumify, I was able to confirm that the patient did not have HAPE. This allowed us to remain at the South Pole that night and leave as planned the following day. The patient was diagnosed with pneumonia.



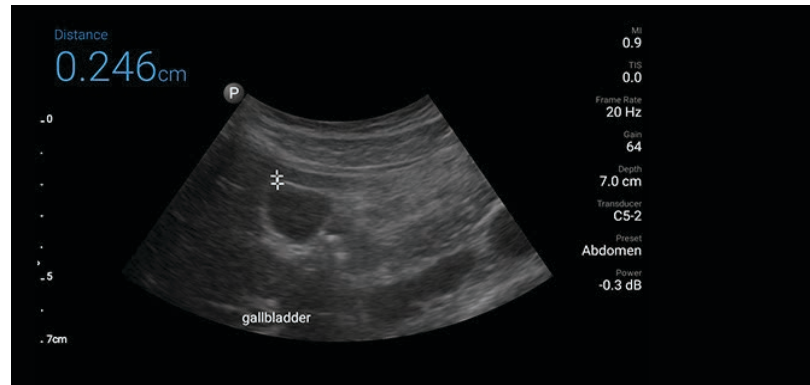
Lung ultrasound



# A patient in Antarctica

## A patient with possible biliary colic

A patient presented with epigastric pain with biliary colic being considered in the differential diagnosis. I performed a focused biliary ultrasound exam and was able to exclude gallstones and thus narrowed the differential diagnosis.



Gallbladder

## A patient with heel pain

An expeditioner presented four days before leaving for an extreme skiing expedition (skiing from the edge of the Antarctic continent to the South Pole).

This expedition demanded he be able to pull a sled while on skis. He had developed a focal erythematous and extremely tender area on the back of his heel. I was not able to determine the cause of the problem with physical examination alone.

Using Lumify, I was able to identify a bony spur on his calcaneus. This allowed me to provide some very specific advice regarding his expedition.

## A patient with a possible tibial shaft fracture

Using Lumify, I was able to exclude a tibial shaft fracture in a patient whose leg became entangled in a tiller (a machine used to groom snow).



The patients' faces have been obscured to protect their privacy.



# A patient in Antarctica

## Conclusion

Point-of-care ultrasound has emerged as an invaluable tool in the assessment of patients, both diagnostically and therapeutically. Having access to ultrasound in such a remote extreme environment where your diagnostic capability is prohibitively limited is extremely valuable.

I found the overall benefits of Lumify in this extreme environment to include excellent diagnostic image quality, ultra-portability, ease of use, and simple transfer of images.

In addition, the ability to replace the transducer cable (instead of having to replace the entire transducer) is a great feature in any environment. It is especially advantageous in an environment where the cable can become brittle and damaged due to extreme cold.

The Philips Lumify shed light on numerous cases, enhancing diagnostic capability and clinical decision making as well as streamlining medical logistics. It was a priceless tool during my time in Antarctica.



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Printed in the USA.  
ULT-17-36671 \* NOV 2017