Enhancing field data collection in an austere environment

1st (United Kingdom) Division

The Challenge

- Deliver better healthcare in austere locations by identifying a more efficient way of conducting patient consults in the field

The Benefits

- Faster and easier to implement online patient surveys
- Improved productivity of data collection and better interrogation of results
- Enhanced sharing of information with multiple agencies
- Innovative use of existing off-the-shelf technology

Each year the British Army's 1st (United Kingdom) Division deploys medical units to central Kenya, seeing medical teams working alongside Kenyan Defence Force and Non-Governmental Organisations, to provide primary healthcare, community health education and health outreach clinics in rural locations.   In 2017, the Division's Geo Support team created an innovative mobile survey using off-the-shelf ArcGIS technology, to allow the medical teams to collect patient data more quickly and efficiently.

The Challenge

Exercise ASKARI SERPENT is an annual 1st (UK) Division medical exercise that sees the deployment of a Medical Regiment to rural Kenya. The exercise involves the delivery of health outreach clinics and health education to the local population, alongside Kenyan Governmental and Non-Governmental Organisations.

Every patient consultation is recorded, albeit anonymously. The surveys, in rural locations, were originally conducted using laborious, paper-based methods with standard medical consultation forms. At the end of each day, all the paper forms were handed in and then reported to the main HQ, over the radio. Occasionally the results were also recorded onto spreadsheets but while the actual patient medical forms were accurate, there were often inconsistencies with the data on the spreadsheets. With these ongoing disparities, the spreadsheet results were extremely difficult to analyse and producing a meaningful picture of the survey results was a major challenge.

In 2016 the medical units had support from the Division's Geo Support team for the first time. The Royal Engineer Geographic Technicians are embedded within 1st (UK) Division and have a long-standing partnership with Esri. They assessed that the methodology using paper-based surveys was an inefficient way of doing things, data collection was incoherent, and that a lot more could be done with the analysis and sharing of results.

The Solution

The Geo Support team had been using Esri's ArcGIS platform for their GIS (geographical information system) requirements for many years, but the technology had not previously been used for recording medical data in the field. They immediately recognised the potential for improvement with GIS, identifying Survey123 as a suitable tool for patient data capture.

"Historically, our work focused on using geographic data and satellite imagery to create maps and information products to inform decision-making and support operational readiness, where to build a helicopter landing site for example" says LCpl James Smith. "This was a really interesting opportunity for us to show how we could innovate by using off-the-shelf GIS technology for mobile data collection, with more sophisticated analysis."

First, the team created a patient data survey with Survey123 Connect for ArcGIS.   This was shared with the next deploying medical team onto tablets - already available to the medical teams- so they could test the survey in the field running the Survey123 app, and identify any adaptions that needed to be made. The customised survey was then shared and used by all medical technicians in the field, who would record all patient information in an online survey and submit it after each consultation.

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Sgt D Barret
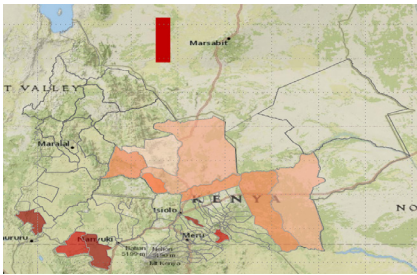
Data captured by Survey123 showing where musculoskeletal conditions are most common

Even surveying in remote locations, where there was no phone signal, was possible. Significantly, Survey123 works offline and allows users to save data to the device they are working with, uploading it when an internet connection becomes available.

The Geo Support team also created a simple web interface that allows users – the majority having no GIS skills - to interrogate the results as they come in and check the source by accessing the individual survey forms. This has been a particularly important development as the medical teams' work includes monitoring for notifiable diseases including Malaria and Yellow fever.

A Story Map was generated to communicate the results, updated daily, and used to brief up to the Commanding Officer to give the senior team a clear view of what was happening on the ground, all using off-the-shelf technology.

"One of the key things for me is that we have been able to exploit our training properly and, using off-the-shelf technology, develop an innovative solution that is helping the everyday community," adds Sgt Dave Barrett. "ArcGIS has helped us to get much more out of a pretty scarce resource, helping us to deliver value-added support to 1st (UK) Division."

The Benefits

Fast and simple to implement
Using the ArcGIS platform, the Geo support team could produce the app with off-the-shelf technology which, for them, meant it was a very low barrier to entry initiative. The medical units already had access to the hardware, ie tablet devices, so the predominant outlay was the minimal time required by the team to develop, then customise the patient briefing form on the mobile app.

Improved productivity of data collection
The medical units can now undertake more patient consultations and collect significantly higher volumes of patient data thanks to the ease of using the Survey 123 app. In 2018 6,000 records were collected using the mobile app, compared to 2,000 paper-based records in 2017. The mobile app also allows teams to work in remote locations with limited internet connectivity; data records are simply uploaded when a mobile signal is available. Timeliness of reporting has also improved, enabling the UK military medical units, working in partnership with the Kenyan Ministry of Health, to provide the Kenyan County Health Ministry with this important civilian primary information.

Improved sharing of information
Thanks to the simplicity of reporting via the web interface the data is available to a wider audience, including government departments, facilitating greater collaboration across multiple agencies. An excel spreadsheet has also been generated which allows users to query the data. Ultimately, this access to more accurate data will help all partners to better understand the medical needs of the local population so that better medical care can be delivered to those who need it.

A Story Map was also created as an internal reporting tool, to share results with Army colleagues. Updated daily, the Story Map includes embedded video and images which gives unequivocal insight into conditions on the ground.

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