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# Medical data collection on UK military exercise SAIF SAREEA 3: the EpiNATO-2 surveillance system

## Key words

Saif Sareea 3, Oman, EPINATO, epidemiology

## Key messages

- EpiNATO 2 does not capture complete Role 1 MTF activity.
- Additional coding criteria of Sierra (Other Medical) and Tango (Administration) gives better representation of spectrum of clinical presentations which informs manning for future exercises.
- Education of staff and use of a Summary Guide increases accuracy in reporting.

## Abstract

**Introduction.** Epidemiological data from military exercises is important to identify trends in medical presentations and treatment requirements to aid planning for future operations. UK Military exercises use the EpiNATO-2 surveillance system for this purpose, however it has some limitations in the spectrum of data it can collect. An enhanced reporting system titled EpiNATO-2 PLUS was developed and introduced in all LAND (Army) Role 1 Medical Treatment Facilities (MTFs) as part of Exercise SAIF SAREEA 3 (SS3). It was assessed as part of a Quality Improvement Project for its utility in terms of spectrum and validity of data capture. **Method.** Epidemiological data was collected over a 2-month period from medical consultations in Camp Shafa during SS3 by EpiNATO-2 or EpiNATO-2 PLUS. This involved categorisation of symptoms into a coding system which represents a spectrum of clinical presentations, as well as collecting data on the effect of medical issues on personnel productivity. Halfway through the collection period an EpiNATO-2 PLUS education session and summary guide were introduced. Data were audited for the period before and after these introductions. **Results.** Of the 1163 consultations conducted in the 2-month period, the use of EpiNATO-2 PLUS captured an additional 169 patient contacts not collected by EpiNATO-2. Provision of a summary guide and teaching session decreased coding errors in the second audit period from 12.9% to 6.8% for EpiNATO-2 and from 19.4% to 6.6% for EpiNATO-2 PLUS, respectively. **Conclusions.** Use of EpiNATO-2 PLUS collected a broader spectrum of medical activity in the R1 MTF, by capturing an additional 10% of the clinical workload compared to EpiNATO-2. The increase in coding accuracy correlates with the introduction of the education session and EpiNATO-2 PLUS Summary Guide. It is recommended that EpiNATO-2 PLUS is utilised in future deployments.

## Introduction

The recording of epidemiological data is vital in preparation and resource planning for future exercises/operations by reviewing the trends in medical activity from similar past exercises [1]. Since 2014 EpiNATO-2 has been defined in the North Atlantic Treaty Organisation (NATO) doctrine EpiNATO-2 as the only interoperable health surveillance system to monitor the burden of disease within military populations, however, other novel data capturing systems including using a 'read-code matrix' have also been trialled [2-4]. The EpiNATO-2 surveillance system (herein EpiNATO-2) captures epidemiological data at first presentation by categorising consultations into clinical coding groups based upon symptoms[]. Each category has a shorthand code (e.g. *Alpha*) and a descriptor (e.g. *Gastrointestinal infection*) (see Appendix X). EpiNATO-2 also captures patient disposition data by reporting days of work lost (number of days bedded down). However, any clinical work that falls outside the remit of these codes, including follow up consultations for the same patient, is not recorded. Similarly, no record is made of loss in personnel productivity due to restricted or limited duties resulting from their illness or injury. As previously noted with data captured during the European Union training mission Mali, the figures for lost working days were likely to have been underreported and as ambulatory care consultations failed to take into account any hospital admissions or strategic aeromedical evacuation[3].

UK Military Exercise SAIF SAREEA 3 (SS3) was a Brigade sized exercise of 5500 troops. In line with current practices, SS3 used EpiNATO-2 to capture epidemiological data from its Role 1 Medical Treatment Facilities (R1 MTF) [5]. At the start of SS3, clinical staff identified that additional data capture, further to that collected by EpiNATO-2, would give a more comprehensive overview of the clinical activities of SS3. This could provide more insight and improve planning for future deployments, such as Ex KANJAR OMAN in 2019.

To accommodate this, the EpiNATO-2 PLUS surveillance system was created (herein EpiNATO-2 PLUS) and trialled in SS3 as a Quality Improvement Project (QIP). This included two additional coded categories, *Sierra – Other Medical* and *Tango – Administration*, for presentations that did not meet the coding criteria in EpiNATO-2. In addition, EpiNATO-2 PLUS captured data for initial as well as any follow-up presentations, and recorded additional patient disposition data, including number of light duties given (i.e. days of reduced productivity) and referrals made to Role 2 Field Hospital. EpiNATO-2 and EpiNATO-2 PLUS data collected from Camp Shafa Role 1 Medical Reception Station (MRS) were recorded and are reported in this article.

This article aims to evaluate the use of EpiNATO-2 and 2-PLUS as systems for epidemiological data capture, using Ex SS3 as an example. Data collected by EpiNATO-2 demonstrates the level of data capture achieved by use of the current gold standard surveillance system, whilst data collected by EpiNATO-2 PLUS will reveal any capacity for additional data capture using an extended system. Assessment of the data will include analysis of the volume of data collected, the level of representation of the spectrum of clinical activities as well as analyse of the validity of the surveillance techniques in terms of ease of use, measured by the accuracy of categorisation.

## Method

Epidemiological data was captured from all medical consultations in the Role 1 MTF for the duration of any medical staff being in country, from 24 Aug 18 until 15 Nov 18, using either EpiNATO-2 or EpiNATO-2 PLUS. This included the final recovery phase on completion of SS3. Data was captured by all healthcare professionals including Combat Medical Technicians, Healthcare Assistants, Nurses, Medical Officers, a Physiotherapist, an Exercise Rehabilitation Instructor (ERI) and a Dental Officer. Upon the first presentation of a patient at a clinical consultation, symptoms were categorised using the EpiNATO-2 categorisation system. Where symptoms did not fall within these criteria, or for all follow up consultations, information was instead recorded using EpiNATO-2 PLUS.

Data were divided into two time periods: 'audit period 1' included the initial arrival in theatre and the majority of the acclimatisation phases (24 Aug - 24 Sept 18), whilst 'audit period 2' covered the exercise phase (25 Sept - 25 Oct 18). The exercise recovery period data is not discussed in this article due to minimal presentations to medical services. Data was assessed weekly and any errors in reporting was determined by reviewing the recorded coding alongside documented medical consultation notes or discussion with the reporting medical personnel. 'Common errors' were classified as coding errors occurring > 5 occasions.

Prior to deployment on SS3 all medical staff were supplied with document "*Annex D to Chapter 12 EPINATO 2 DATA CAPTURE AND REPORTING Edition 4.0 (Nov 16)*" to aid in the use of EpiNATO-2 [1]. This document provided guidance including definitions of each code (see Appendix X); all healthcare professionals were mandated to read this document prior to conducting consultations and a copy was kept in each MTF for reference.

In addition, an EpiNATO-2 PLUS Summary Guide was created and distributed to all LAND R1 MTFs on the 25 Sept 18 (the beginning of audit period 2). This was implemented alongside an education session delivered to all MRS clinical teams, which highlighted 'common errors' in coding for both EpiNATO-2 and EpiNATO-2 PLUS identified in the first audit period.

## Results

Details of consultations and coding accuracy audited between 24 Aug to 25 Oct 18 were collated and are shown in Table 1. Total consultations were 353 for audit period 1 and 810 for audit period 2, totalling 1163 consultations over the 2-month period. In audit periods 1 and 2 EpiNATO-2 PLUS captured data from 629 consultations (54.1%) that would not be recorded by EpiNATO-2, accounting for 144 (40.8%) and 485 (59.9%) consultations, respectively. By using EpiNATO-2 PLUS, the inclusion of codes *Sierra – Other* and *Tango - Administration* also accounted for 109 of the total first presentations (16.9% of 643) and 60 follow up presentations (11.5% of 520). Additionally, 1054 days of light duties were assigned and 29 patients referred to Role 2 Field Hospital/Host Nation hospital.

Errors in coding were high for both surveillance systems in audit period 1 (Table 1), in particular for EpiNATO-2 PLUS data which exhibited a coding error rate of nearly 1 in every 5 consultations (19.2%). During the second month of assessment and following the introduction of the EpiNATO-2 PLUS summary guide and education session, substantial improvements were seen in coding accuracy. It is of note that whilst the guide and education session pertained to EpiNATO-2 PLUS and the larger improvement was observed in data validity from this surveillance system, decreases were seen in the rate of coding errors for both surveillance systems, falling to 6.8% and 6.6%.

**Table 1. Collated audit data of consultations and coding errors between 24 Aug to 25 Oct 18**

Time period of capture	Audit period 1 (24 Aug to 24 Sept 18)		Audit period 2 (25 Sept to 25 Oct 18)	
	EpiNATO-2	EpiNATO-2 PLUS	EpiNATO-2	EpiNATO-2 PLUS
Consultations	209	144	325	485
No. of Coding Errors (%)	27 (12.9)	28 (19.4)	22 (6.8)	32 (6.6)

Common errors from both EpiNATO-2 and EpiNATO-2 PLUS identified during audit period 1 (initial arrival in theatre and acclimatisation) and audit period 2 (exercise phase) are shown in Table 2 and 3, respectively.

**Table 2: Common errors in coding during audit period 1 (24 Aug to 24 Sept 18)**

Consultation codes	Common errors identified	No. of errors (total)	No. of initial consults. (EpiNATO-2)	No. of follow up consults. (EpiNATO-2 PLUS)
<i>Alpha</i> – Gastro-intestinal Infection	Symptoms not meeting criteria for gastrointestinal infection and not requiring FMED85 wrongly coded as <i>Alpha (Gastrointestinal Infection)</i> instead of <i>Sierra (Other Medical)</i>	6	4	2

<p><i>Golf</i> - Musculo-skeletal Disorders</p>	<p>Acute musculoskeletal injuries to limbs queried as chronic injuries being wrongly coded as <i>Golf (Musculoskeletal Disorders)</i> instead of <i>Papa (Non-battle Non-sport Injuries)</i>.</p>	<p>6</p>	<p>3</p>	<p>3</p>
<p><i>Juliet</i> - Dermatological Disorders</p>	<p>Blisters caused by military organised physical training (PT) wrongly coded as <i>Juliet (Dermatological Disorders)</i> instead of <i>Papa (Non-battle Non-sport Injuries)</i>.</p>	<p>9</p>	<p>7</p>	<p>2</p>
<p><i>Quebec</i> - Climatic Injuries</p>	<p>Symptoms relating to heat and dust exposure but not heat-related dehydration or other heat illnesses wrongly coded as <i>Quebec (Climatic or Environmental Injuries)</i> instead of <i>Sierra (Other Medical)</i></p>	<p>6</p>	<p>6</p>	<p>0</p>

**Table 3: Common errors in coding during audit period 2 (25 Sept – 25 Oct 18)**

Consultation codes	Common errors identified	No. of errors (total)	No. of initial consults.	No. of follow up consults (EpiNATO-2 PLUS)
Juliet - Dermatological Disorders	( <i>Dermatological Disorders</i> ) should have been used but was instead coded as <i>Sierra (Other Medical)</i> .	19	1	18 (12 during ongoing review of one patient)
Tango - Administration	Initial and follow up patients wrongly coded as <i>Tango (Administration)</i> that should have used a clinical code. Follow up consultations should have retained the clinical code for their ongoing problem	5	0	5
Sierra - Other Medical Conditions	A number of first presentations did not meet the criteria for their original coding and should have been coded as <i>Sierra (Other Medical)</i> .	8	8 (captured by EpiNATO-2 PLUS)	0

### Discussion

Data analysed and presented in this study highlights the substantial increase in volume and detail of epidemiological data collected using the EpiNATO-2 PLUS compared with EpiNATO-2. Specifically, the use of EpiNATO-2 PLUS collected data from an additional 629 consultations, which fell outside the remit of EpiNATO-2 . This additional data includes consultation codes *Sierra* and *Tango* (which accounted for

nearly 20% of all first presentations and 9.5% of follow up consultations), number of days of light duties and number of referrals to Role 2 Field Hospital or Host Nation Hospital.

There was a noticeable decrease in coding errors for both EpiNATO-2 and EpiNATO-2 PLUS in period 2 compared with audit period 1, which correlated with the introduction of the EpiNATO-2 PLUS Summary Guide and the education session conducted with all MRS staff. Indeed “common errors” identified in audit period 1 and covered in the education session were resolved in audit period 2 (data not shown). Furthermore, coding errors fell from 12.9% of consultations to 6.8% for EpiNATO-2 and from 19.4% to 6.6% for EpiNATO-2 PLUS between the two audit periods. Together this data suggests that provision of an education session as well as a coding summary guide can improve coding accuracy for both surveillance systems. It is of note that the EpiNATO-2 PLUS Summary Guide condensed the tabular format of coding guidance provided in the pre-deployment mandated material, reducing the size from 5 pages to 2. The guide highlighted more simply and explicitly the criteria for each code, suggesting that coding accuracy may have benefitted from the addition of more condensed guidance. Given these improvements and the large overlap in codes between EpiNATO-2 and EpiNATO-2 PLUS it is also reasonable to hypothesise that improved coding accuracy may have benefitted from coding guidance being delivered via an education session compared with mandated reading material.

Furthermore, data relating to the number of light duties given could provide vital information regarding manning requirements for future exercises. Specifically, deploying Units may opt to over-bear on troop numbers to maintain Unit effectiveness in combat, even when active troop numbers are diminished due to medical complaints. Similarly, recording numbers of referrals to Role 2 Field Hospital highlights the activity level of these units and enables future planning of requirements and use of Host Nation support.

Whilst the inclusion of the coding category *Sierra – Other Medical* enabled capture of additional consultations, the category itself remains broad and with limited description. Analysis of the types of medical complaints in this group might identify additional coding categories, whose inclusion would provide more detail of MTF medical activity. This would require detailed capture of data from *Sierra* consultations across multiple larger exercises to ensure sufficient representation. Additionally, we acknowledge that inclusion of additional categories would require specific and in-depth description to avoid introducing new coding errors due to similarity with existing categories.

Previous literature relating to EpiNATO-2 highlights trends in epidemiological data that has been identified with the use of this surveillance system[1-4]. However, as with other novel data capturing systems and version 2 EpiNATO-2[2-3] these do not capture the full spectrum of clinical activity and patient disposition data that has been captured in EpiNATO-2 PLUS. This additional data could more effectively aid Commanders in their preparation for similar deployments in the future in terms of manning, pharmaceutical procurement and training.

## **Recommendations**



It is the recommendations of the authors that future PJHQ sponsored exercises should utilise the EpiNATO-2 PLUS surveillance in place of the EpiNATO-2 system. Furthermore, EpiNATO-2 PLUS implementation should be accompanied by an education session at the onset of deployment, highlighting coding inaccuracies observed in previous deployments. As part of this session, clinical staff should be provided with a concise coding summary table to be kept alongside the EpiNATO-2 PLUS data collection point to maximise coding accuracy.

### **Conclusions**

The additional level and detail of data collected by EpiNATO-2 PLUS will aid in the resource planning of medical provision for future operations. In particular, it provides a broader insight into personnel, medical equipment and drug requirements for a Role 1 facility than currently used EpiNATO-2. Capture of data relating to limited work provision, or light duties, used as an estimate of productivity lost will inform manning requirements for deploying Military Units. It is for all these reasons that it is recommended that the EpiNATO-2 PLUS surveillance system is utilised for future exercises and operations.

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