



NATO Centre of Excellence for Military Medicine  
Budapest, Hungary



# NATO MILMED COE

## Deployment Health Surveillance Capability (DHSC)

### EpiNATO-2 briefing

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Deployment Health Surveillance Capability, Munich  
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# Deployment Health Surveillance

## ■ Definition

Deployment health surveillance is ‘the continuous, systematic collection, analysis, and interpretation of health-related data and dissemination of findings’ with respect to deployed NATO forces

## ■ Objectives

1. **Detect, as soon as possible**, occurrences of public health incidents or **outbreaks**, natural or not, that may jeopardize NATO capabilities and missions.
2. Assess the public health burden of death, diseases, injuries, syndromes or consequences of exposure to environmental or occupational risk factors in terms of limiting operational capabilities and for which **preventive or counter-measures could be applied**.
3. Identify under which circumstances some of these diseases occur.
4. Evaluate implemented preventive measures and public health programs and policies.
5. Identify relevant medical research fields.



# DHSC - Historical Context



- **Nov 2002 - NATO Prague Summit:**  
Endorses implementation of 5 x CBRN defence initiatives, including a Disease Surveillance system
- **Nov 2006 - 26th COMEDS Meeting:**  
Decision to establish a NATO deployment health surveillance and analysis centre



# Main Areas of Activity



- **Operational Health Surveillance (EpiNATO-2 and SENSOR)**
- **Doctrine development**
- **Force Health Protection (FHP) Hub**
  - Advice and Subject Matter Expertise
  - Education & Training
  - Exercises
  - Support to Experimentation in the realm of FHP



# Current Surveillance Tools

## EpiNATO-2



- **Descendant of a GBR tool that was adopted by NATO in 1996 during the Balkan conflicts,**
- **Promulgated as part of AMedP-4.1 in July 2014 and updated in January 2017,**
- **The current and only NATO operational health surveillance tool,**
- **Some overlap with DNBI tracker and other national tools as they were considered during its development.**



# Current Surveillance Tools

## EpiNATO-2



- **Weekly reports from all MTFs within Theatre of Operations detailing:**
  - **MTF Identifiers**
  - **Count of first attendances classified into 16 specific DNBI serials and 4 non-specific healthcare activity serials,**
  - **Free text comments to elaborate on illness and injury report and unexpected/unusual events,**
  - **Count of total attendances (first and follow-ups),**
  - **Denominator (accurate but not precise)**



# Current Surveillance Tools

## EpiNATO-2



Event code	Description	Definition
Alpha	Gastrointestinal Infection	All diagnosis consistent with upper or lower gastrointestinal infection or food poisoning being the underlying cause.
Bravo	Respiratory tract and ENT infections without pulmonary or systemic complications	Symptoms and signs of uncomplicated acute respiratory tract infections including those affecting the ear, nose and throat but without any associated severe systemic effects.
Charlie	Asthma or reactive airways symptoms or signs	Asthma or allergen or irritant induced cough wheeze or shortness of breath.
Delta	Flu symptoms and pneumonia	Symptoms and signs consistent with respiratory tract infections such as Influenza, MERS-CoV, SARS, Legionnaires disease, Q fever, Tularemia and pneumonic plague.
Echo	Non-specific febrile illness	Presentation with febrile illness where no other obvious cause is apparent. Includes suspected septicaemia, parasitemia and viremia where the causative organism is not yet known.
Foxtrot	Systemic haemorrhagic illness	Acute systemic illness with haemorrhagic manifestations, with or without fever. This includes petechiae, ecchymosis/bruising, bleeding gums, epistaxis, hematemesis, melena and meno/metrorrhagia.
Golf	Musculoskeletal disorders	Cases of chronic musculoskeletal disease or where there has been a delay between the putative incident and first presentation with musculoskeletal symptoms.

Event code	Description	Definition
Hotel	Acute neurological symptoms or signs	Acute CNS disorders such as meningitis, encephalitis, or encephalopathy, and symptoms and signs such as meningism and delirium.
India	Mental health symptoms or signs	Symptoms and signs where disturbance of mental health is considered the likely cause. This includes changes to of sleep patterns, mood, appetite, and behaviour or anxiety, acute stress, self-harm, substance misuse and depression.
Juliet	Dermatological disorders	Disorders of skin, subcutaneous tissues, hair and nail including allergic reactions, infections and infestations but excluding traumatic injuries or psychosomatic problems.
Kilo	Sexual exposure	Any presentation following unprotected sexual intercourse or where there was failure of protection.
Lima	Dental disorders	Disorders of the teeth, or periodontal, gingival and oral soft tissues, salivary glands, mandible or maxilla.
Mike	Bites and stings	Bites or stings by any animal or insect but not by another human.
November	Battle Injuries	Presentation with physical injuries obviously sustained during battle.
Oscar	Non-Battle Injuries	Presentation with physical injuries not associated with battle.
Papa	Reserved	This event is reserved for future development
Quebec	Disorders caused by climate or altitude.	Disorders caused by exposure to heat, cold, altitude or sunlight.



# Current Surveillance Tools

## EpiNATO-2



Event code	Description	Definition
Romeo	Reserved for definition by MEDDIR/MEDAD	The theatre Medical Advisor might wish to use event Romeo for specific operational purposes with the agreement of the Chain of Command, which may seek epidemiological advice from the DHSC on the matter.
Sierra	Reserved for definition by nations	Nations might wish to use event Sierra for nation specific purposes, which may seek epidemiological advice from the DHSC on the matter.

Table A-1. EpiNATO-2 specific illness and injury events (Part 3 of 3)

Event code	Description	Definition
Tango	Urgent surgical condition not elsewhere classified	Any urgent presentation where the symptoms and signs suggest a diagnosis requiring referral to a surgeon that is not classified elsewhere.
Uniform	Urgent medical condition not elsewhere classified	Any urgent presentation where the symptoms and signs suggest a medical cause that is not classified elsewhere.
Victor	Routine clinical care	First encounter in an episode of non-urgent clinical care such as management of long term conditions, planned dental care, re-issue of medication and diagnostic tests.
Whiskey	Preventive care	First encounter in an episode of preventive care such as immunisations, routine physical examinations, dental inspections.



# Current Surveillance Tools

## EpiNATO-2



- **EpiNATO-2 currently implemented in:**
  - Resolute Support Mission (RSM)
  - Kosovo Force (KFOR)
  - Multinational Missions in Iraq (Operation Inherent Resolve, Op SHADER)
  - NATO Maritime Command (MARCOM)
  - European Union Training Mission Mali (EUTM)
- **EpiNATO-2 potential implementations:**
  - Other missions (USA DJI, more EU missions, NATO Battlegroups)
  - Exercises (TJ 18)



# EpiNATO-2 in MARCOM Ops



<b>Event</b>	<b>MARCOM Rate</b>	<b>All Ops Rate</b>
GI Infections	0.74	0.50
Upper respiratory tract infections	2.13	0.90
Musculoskeletal disorders	1.41	1.07
Dermatological disorders	1.28	0.78
Non-battle injuries	1.22	0.72

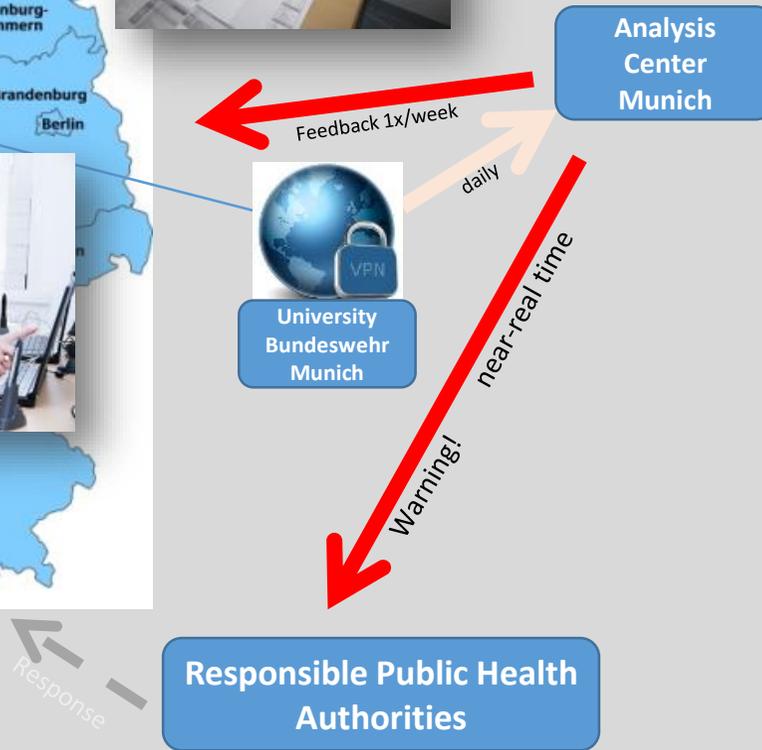


# Future Surveillance Tools SENSOR



- The goal of syndromic surveillance within NATO is to enable earliest possible warning of the emergence of the outbreak of disease that requires public health action. This is achieved by monitoring the incidence of combinations of symptoms and signs instead of clinical signs. This approach is believed to be highly sensitive (i.e. it detects all true outbreaks) but can be prone to false alarms.
- Although syndromic surveillance can be used to monitor a wide range of diseases, the main focus of this type of surveillance within NATO is to detect potential outbreaks of infectious disease. Used in conjunction with intelligence, it provides the means by which a potential deliberate biological attack can be detected.
- The development of the surveillance modules within **NATO MEDICS** is the key enabler for syndromic surveillance for the Alliance. Similarly, the development of electronic health records is the key enabler for individual nations to participate.

## DigiPen technology!



### OUTLINE:

#### Research procedure

- VISIT project cooperation partners launch a syndromic surveillance protocol
- Application of the project to selected refugee setting Bad Fallingbommel (Lower Saxony)
- Pilotphase: **Data entry via medical personnel/assistant staff** (training standardized by Bw) with DigiPen; afterwards also **via Community Health Worker** (training standardized by Ethnomedical Centre Hanover) via App
- Application (developed by University of the Bundeswehr, Munich) Smartphone/Pad, Excel-Sheets into PC,
- DigiPen sheets developed in cooperation with Diagram Halbach
- Data transfer via Bw University Munich into DHSC/Analysis Center Bw Munich,
- Data Analysis of the syndrome based data, development of feedback (pdf-file)
- Provision feedback to data enterers and responsible authorities

#### Intended methods, controls, statistical methods

- List of 56 signs and symptoms
- Protocol/implementation steps/list of syndromes & their definition
- Statistical analysis
  - EXCEL
  - U-Chart
  - Exponentially Weighted Monthly Average (EWMA)





# List of Signs and Symptoms (Steeb, 2016)

<p>1. Influenza-like illness (Also SARS, MERS, TB, Pneumonia)<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ Body temperature ≥38 degrees OR<sup>†</sup></li> <li>•→ Sensation of fever/thrills<sup>†</sup></li> </ul> <p><b>AND<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>•→ At least 1 of<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Aches and pains OR<sup>†</sup></li> <li>○→ Headache OR<sup>†</sup></li> <li>○→ Excessive sweating OR<sup>†</sup></li> <li>○→ Tired/weakness<sup>†</sup></li> </ul> </li> </ul> <p><b>AND<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>•→ At least 1 of<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Dry cough OR<sup>†</sup></li> <li>○→ Productive cough OR<sup>†</sup></li> <li>○→ Sore throat OR<sup>†</sup></li> <li>○→ Dyspnea OR<sup>†</sup></li> <li>○→ Runny nose OR<sup>†</sup></li> <li>○→ Conjunctivitis OR<sup>†</sup></li> <li>○→ Cyanosis OR<sup>†</sup></li> <li>○→ Crepitation OR<sup>†</sup></li> <li>○→ Blood in sputum OR<sup>†</sup></li> </ul> </li> </ul>	<p>4. Meningitis<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ Body temperature ≥ 38 degrees <b>AND</b> headache <b>AND</b> Stiff neck<sup>†</sup></li> <li>•→ One or more of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Nausea OR<sup>†</sup></li> <li>○→ Vomiting OR<sup>†</sup></li> <li>○→ Photophobia OR<sup>†</sup></li> <li>○→ Disturbance of consciousness OR<sup>†</sup></li> <li>○→ Tired, weakness OR<sup>†</sup></li> <li>○→ Stomach pain OR<sup>†</sup></li> <li>○→ Sore throat<sup>a</sup></li> </ul> </li> </ul>
<p>2. Fever and Rash<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ Body temperature ≥38 degrees OR<sup>†</sup></li> <li>•→ Sensation of fever/thrills<sup>†</sup></li> </ul> <p><b>AND<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>•→ At least 1 of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Vesicular eruption OR<sup>†</sup></li> <li>○→ Skin rash OR<sup>†</sup></li> <li>○→ Itching OR<sup>†</sup></li> <li>○→ Skin ulcer OR<sup>†</sup></li> <li>○→ Burn-like lesion OR<sup>†</sup></li> <li>○→ Insect bite<sup>†</sup></li> </ul> </li> </ul> <p><b>AND<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>•→ At least 1 of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Dry cough OR<sup>†</sup></li> <li>○→ Productive cough OR<sup>†</sup></li> <li>○→ Runny nose OR<sup>†</sup></li> <li>○→ Conjunctivitis OR<sup>†</sup></li> <li>○→ Aches and pains OR<sup>†</sup></li> <li>○→ Lymph nodes OR<sup>†</sup></li> <li>○→ Tired/weakness OR<sup>†</sup></li> <li>○→ Chest pain OR<sup>†</sup></li> <li>○→ Headache OR<sup>†</sup></li> <li>○→ Splenomegaly OR<sup>†</sup></li> <li>○→ Abdominal pain OR<sup>†</sup></li> <li>○→ Bleeding gums OR<sup>†</sup></li> <li>○→ Epistaxis<sup>a</sup></li> </ul> </li> </ul>	<p>5. Diarrhoea and Acute Gastrointestinal Illness<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ <b>At least 2 of the following<sup>†</sup></b> <ul style="list-style-type: none"> <li>○→ Diarrhoea OR<sup>†</sup></li> <li>○→ Nausea OR<sup>†</sup></li> <li>○→ Vomiting OR<sup>†</sup></li> <li>○→ Abdominal pain OR<sup>†</sup></li> <li>○→ Projectile vomiting OR<sup>†</sup></li> <li>○→ Watery stool OR<sup>†</sup></li> <li>○→ Bloody stool OR<sup>†</sup></li> <li>○→ Body temperature ≥38 degrees<sup>†</sup></li> </ul> </li> </ul>
<p>3. Parasitic infestation or Rash without fever<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ Body temperature ≤38 degrees <b>AND</b> NOT sensation of fever/thrills<sup>†</sup></li> <li>•→ At least 1 of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Itching OR<sup>†</sup></li> <li>○→ Skin rash OR<sup>†</sup></li> <li>○→ Vesicular eruption OR<sup>†</sup></li> </ul> </li> </ul>	<p>6. Upper Respiratory Tract Infection (Looking for Diphtheria)<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ At least one of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Dry/productive cough<sup>†</sup></li> <li>○→ Sore throat<sup>†</sup></li> <li>○→ Runny nose<sup>†</sup></li> <li>○→ Fever<sup>†</sup></li> <li>○→ Lymph nodes<sup>†</sup></li> <li>○→ Wheezing<sup>a</sup></li> </ul> </li> </ul>
<p></p>	<ul style="list-style-type: none"> <li>○→ Livedo OR<sup>†</sup></li> <li>○→ Burn-like lesion OR<sup>†</sup></li> <li>○→ Skin ulcer<sup>a</sup></li> </ul>	<p>7. Haemorrhagic fever<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ Body temperature ≥38 degrees OR<sup>†</sup></li> <li>•→ Sensation of fever/thrills<sup>†</sup></li> </ul> <p><b>AND<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>•→ One or more of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Bleeding gums OR<sup>†</sup></li> <li>○→ Conjunctival haemorrhage OR<sup>†</sup></li> <li>○→ Epistaxis<sup>†</sup></li> <li>○→ Bleeding from vagina<sup>†</sup></li> <li>○→ Blood in urine<sup>†</sup></li> <li>○→ Upper gastrointestinal haemorrhage<sup>†</sup></li> </ul> </li> </ul> <p><b>†</b></p> <p><b>AND<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>•→ One or more of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ headache OR<sup>†</sup></li> <li>○→ aches and pains OR<sup>†</sup></li> <li>○→ chest pain OR<sup>†</sup></li> <li>○→ Vomiting OR<sup>†</sup></li> <li>○→ Abdominal pain<sup>a</sup></li> </ul> </li> </ul>
		<p>8. Mental health/psychiatric issues<sup>a</sup></p>	<p>At least 1 of the following<sup>†</sup></p> <ul style="list-style-type: none"> <li>•→ Psychiatric symptom<sup>†</sup></li> <li>•→ Post-trauma response OR<sup>†</sup></li> <li>•→ Psychiatric illness OR<sup>†</sup></li> <li>•→ Anxiety OR<sup>†</sup></li> <li>•→ Palpitations<sup>†</sup></li> <li>•→ Tired, weakness<sup>†</sup></li> <li>•→ <sup>a</sup></li> </ul>
		<p>9. Jaundice (Hepatitis and severe Leptospirosis)<sup>a</sup></p>	<ul style="list-style-type: none"> <li>•→ Jaundice<sup>†</sup></li> <li><b>AND<sup>†</sup></b></li> <li>•→ One of the following<sup>†</sup> <ul style="list-style-type: none"> <li>○→ Body temperature ≥ 38 degrees OR<sup>†</sup></li> <li>○→ Nausea OR<sup>†</sup></li> <li>○→ Vomiting OR<sup>†</sup></li> <li>○→ Tired/weakness OR<sup>†</sup></li> <li>○→ Abdominal pain OR<sup>†</sup></li> <li>○→ Aches and pains OR<sup>†</sup></li> <li>○→ Diarrhoea OR<sup>†</sup></li> <li>○→ conjunctivitis<sup>a</sup></li> </ul> </li> </ul>



## **“...Qualitative evaluation of VISIT - a disease outbreak early warning tool for refugee populations”**

- “...VISIT shows a lot of benefits for the data-entering staff like a simplification of the documentation and reporting system.
- The satisfaction shown in this study could be explained by a specific, plausible, time saving intervention, which was introduced to an open-minded and well-structured team.
- Further research is necessary to implement the VISIT project in other settings, e.g. in foreign military assignments of the Bundeswehr.”

*Bianca Klee, Master thesis of Public Health, IBE, LMU Munich*



