



INSTITUTE FOR DEFENSE ANALYSES

**COVID-19 Lessons Learned for  
NATO Bio-responsiveness Capability**

Presentation to the COVID-19  
Lessons Learned Workshop  
Budapest, Hungary  
May 2023

Julia Burr  
Lucas LaViolet  
Ashley Farris  
Catherine Scheible  
Ana Venegas

May 2023  
Approved for public release;  
distribution unlimited.  
IDA Document NS D-33500  
Log: H 23-000162

INSTITUTE FOR DEFENSE ANALYSES  
730 E. Glebe Rd  
Alexandria, VA 22305



The Institute for Defense Analyses is a nonprofit corporation that operates three Federally Funded Research and Development Centers. Its mission is to answer the most challenging U.S. security and science policy questions with objective analysis, leveraging extraordinary scientific, technical, and analytic expertise.

#### **About this Publication**

This work was conducted by the Institute for Defense Analyses under contract HQ0034-19-D-0001, project FN-6-5234, "Medical CBRN Defense Analyses" for the U.S. Army Office of The Surgeon General (OTSG) Executive Agent. The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

#### **Acknowledgments**

The authors thank Dr. Jeff Grotte and Mr. Doug Schultz for their constructive comments; Joe Coombs for expert editing; and Amberlee Mabe-Stanberry for proficiently producing this document.

#### **For More Information:**

Ms. Julia K. Burr, Project Leader  
[jburr@ida.org](mailto:jburr@ida.org), 703-575-6623

Ms. Jessica L. Stewart, Director, SFRD  
[jstewart@ida.org](mailto:jstewart@ida.org), 703-575-4530

#### **Copyright Notice**

© 2023 Institute for Defense Analyses  
730 E. Glebe Rd  
Alexandria, VA 22305 • (703) 845-2000

This material may be reproduced by or for the U.S. Government pursuant to the copyright license under the clause at DFARS 252.227-7013 (Feb. 2014).

INSTITUTE FOR DEFENSE ANALYSES

IDA Document NS D-33500

**COVID-19 Lessons Learned for  
NATO Bio-responsiveness Capability**

Presentation to the COVID-19  
Lessons Learned Workshop  
Budapest, Hungary  
May 2023

Julia Burr  
Lucas LaViolet  
Ashley Farris  
Catherine Scheible  
Ana Venegas

This page is intentionally blank.



# COVID-19 Lessons Learned for NATO Bio-responsiveness Capability

Presentation to the COVID-19 Lessons Learned Workshop  
Budapest, Hungary  
May 2023

Julia Burr  
Ashley Farris  
Catherine Scheible  
Ana Venegas

**Institute for Defense Analyses**  
730 East Glebe Road • Alexandria, Virginia 22305

## Motivation

### The COVID-19 pandemic:

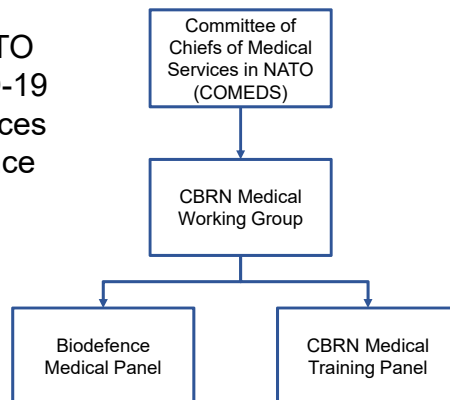
- Highlighted innumerable challenges of controlling outbreaks of infectious disease
- Provides an opportunity to prepare for the next outbreak

### But NATO was already considering the challenges from biological outbreaks:

- ACT initiated the Smart Defence 1.1045 Project on Bio-responsiveness (SD 1.1045) in 2015 following Ebola outbreak in West Africa
- Purpose: *“Enable NATO Commanders and medical staffs to generate an effective response to an outbreak of infectious disease of military significance in the Joint Operating Area, and by so doing, protect the health of the force and maintain or restore operational effectiveness”*
- Bio-responsiveness Project concluded in the fall of 2019 with several deliverables:
  - Bio-responsiveness CONOPS identifying response phases, tasks, triggers, and checklists
  - New and enhanced NATO capability codes

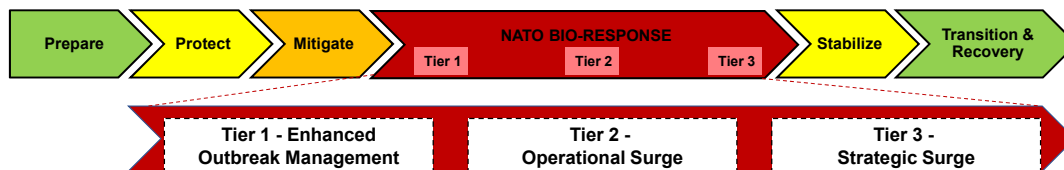
## Overview

- **Objective:** Promote the development of a collaborative, comprehensive program of work to learn the lessons of the COVID-19 pandemic for NATO's bio-responsiveness capability
- **Concept:** Adopt/adapt the process used in NATO for Medical Lessons Learned to assess COVID-19 pandemic response challenges and best practices within the framework of the NATO Smart Defence Bio-responsiveness Project (SD 1.1045)
- **Project Organization:**
  - Initiated by the CBRN Medical Training Panel in 2021
  - Intended to inform Program of Work for (at minimum) Biodefence Medical Panel



## SD 1.1045 Bio-responsiveness CONOPS Framework for Assessing COVID Observations

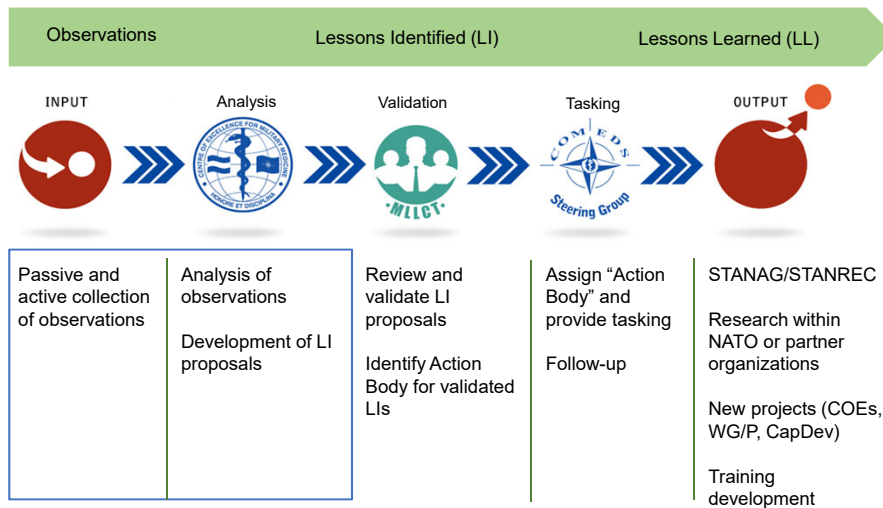
### CONOPS Phases and Levels:



### 21 CONOPS Tasks:

Medical C4I and Decision Support	Patient Management	Medical Support Operations
Deployment Health Surveillance	Infection Prevention and Control	Laboratory Support
Operational Epidemiology	Isolation, Quarantine, and Restriction of Movement	Sample Management
Medical Risk Assessment	Medical Evacuation	Contaminated Clinical Waste Management
Strategic Communications	Medical Countermeasures	Fatality Management
CIV-MIL Cooperation	Psychosocial Support	Forensics
National Outreach, Reach-back, and Fusion	Clinical Diagnosis	

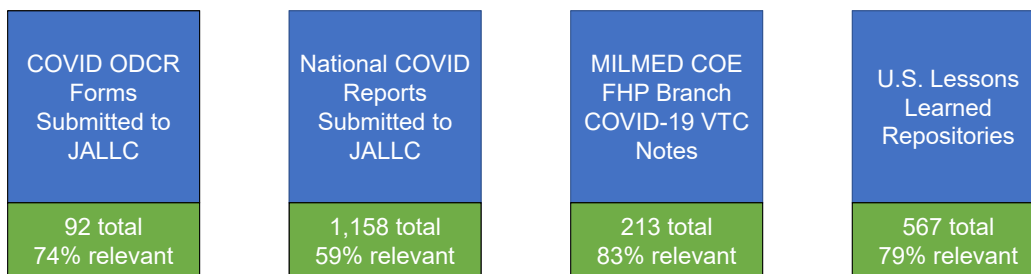
## NATO Medical Lessons Learned Process



Graphic courtesy of CAPT Jack Taylor (US/N), former Chief, MILMED COE Lessons Learned Branch

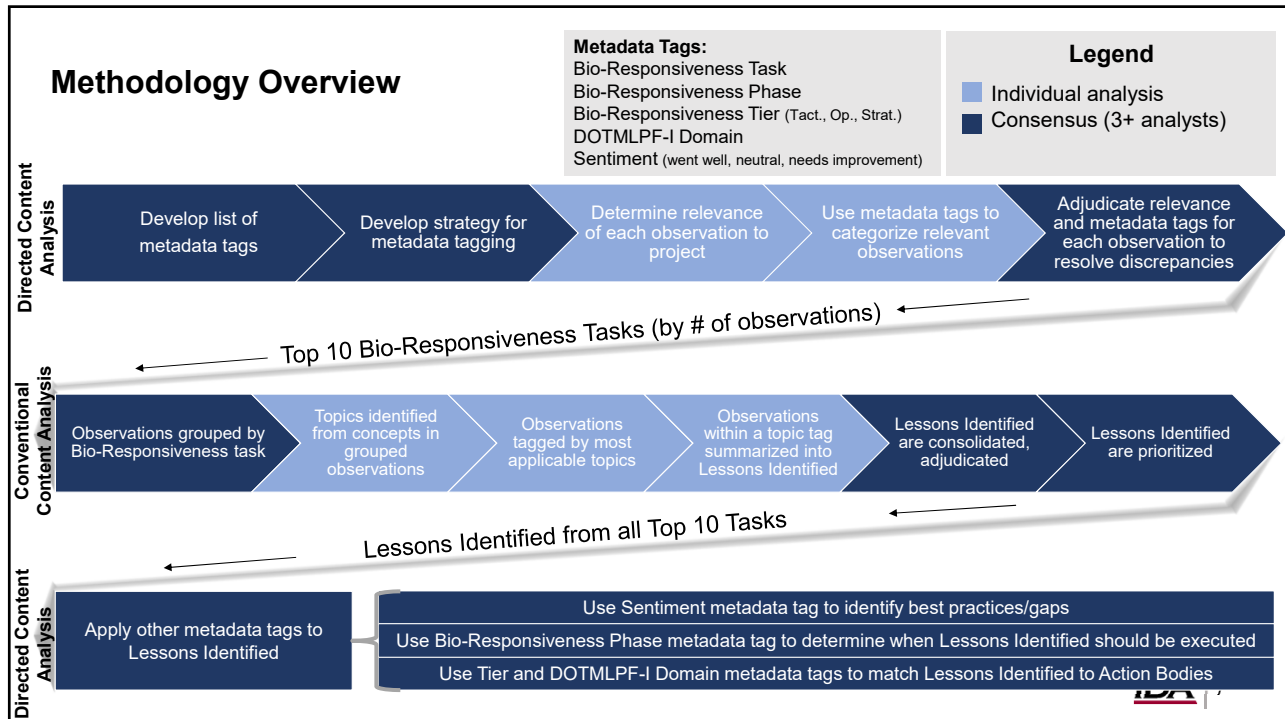
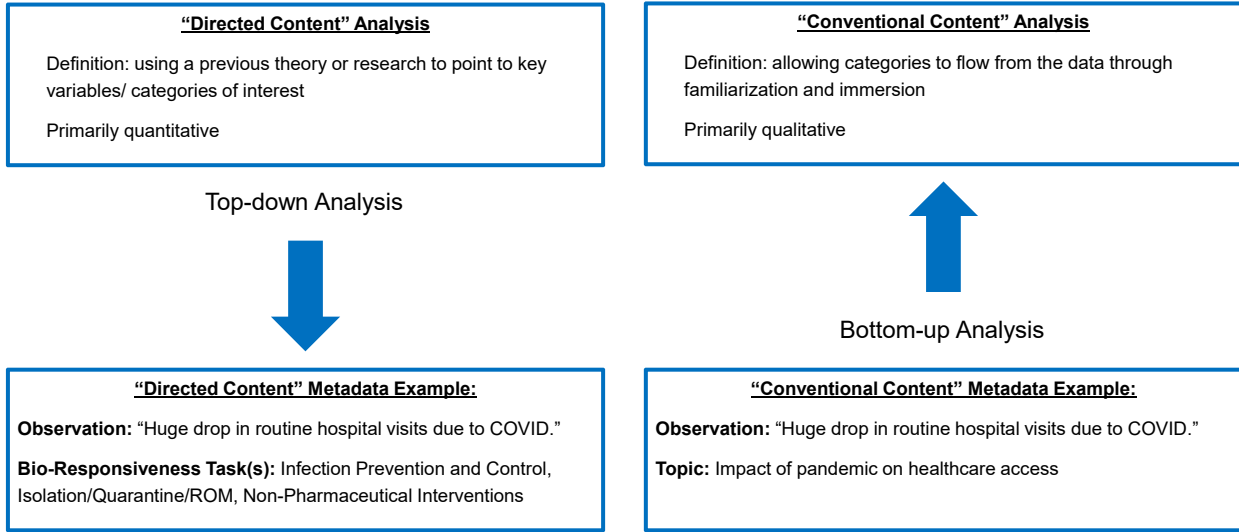
## Observations Pulled from NATO Sources, Lessons Learned Repositories Dated APR 2020 through AUG 2022

The IDA team collected 2,030 observations



All told, 1,369 (67%) were related to bio-responsiveness tasks, remaining 661 tagged as not relevant to project

## Generation of Candidate Lessons Identified is Driven by Metadata Analysis



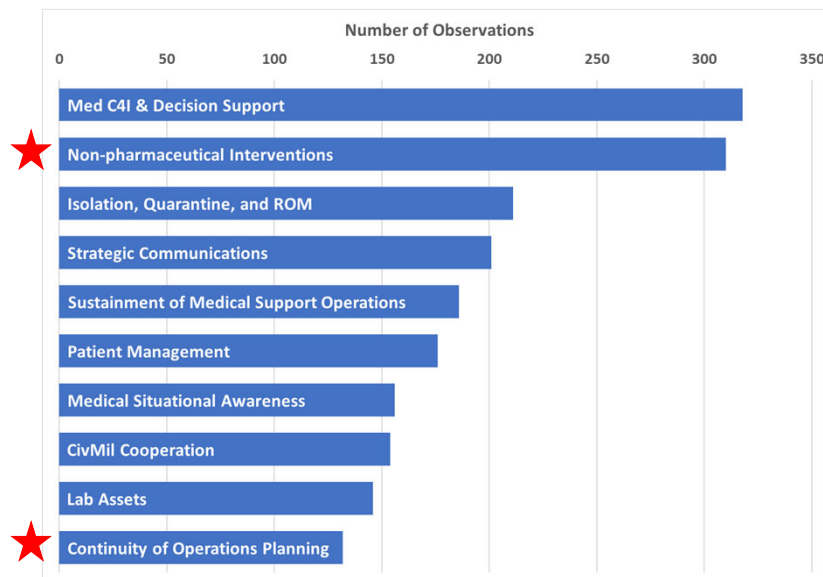


## Notional Schematic for Assigning Action Bodies

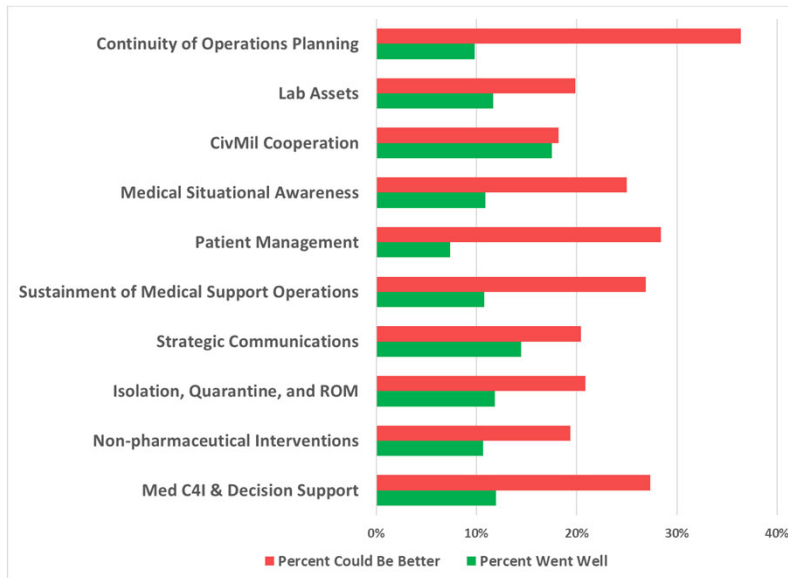
	IS/IMS	ACT	ACO	COMEDS	MILMED COE	WGs/Panels
Doctrine	●	● ●	● ●	●	●	● ●
Organization		● ●		●		
Training		● ●	● ●		● ●	● ●
Materiel	●					
Leadership		● ●	● ●	●		
Personnel	●			●		
Facilities	●		● ●			
Interoperability				●		● ●

● = Strategic/Policy Level      ● = Operational Level      ● = Tactical Level

## “Top 10” Most Prevalent Tasks Among Observations



## Top 10 Tasks: Percent of Observations by Sentiment



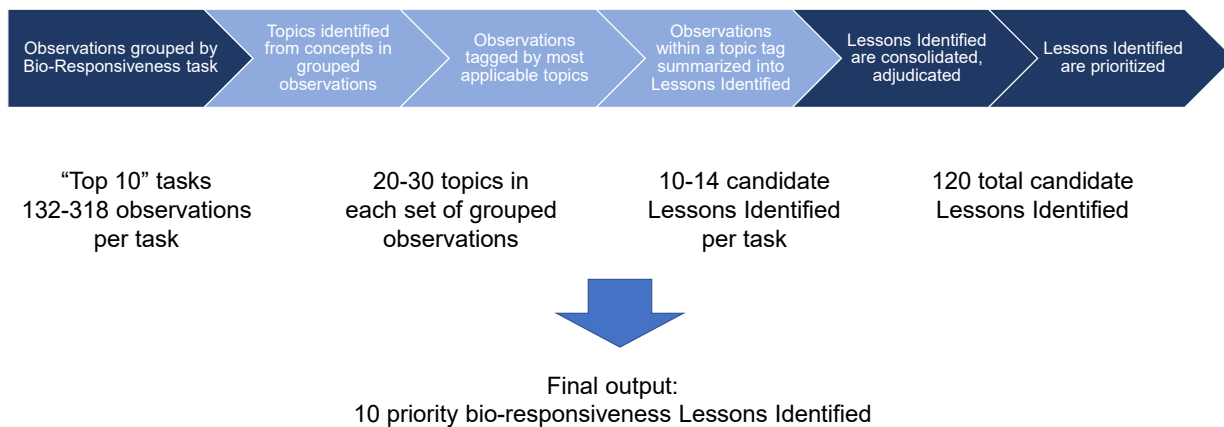
## Top 10 Tasks: Percent Tagged with Various Domains

	Doctrine	Organization	Training	Material	Leadership	Personnel	Facilities	Interoperability
Med C4I & Decision Support	92%	20%	9%	20%	3%	7%	6%	23%
Non-pharmaceutical Interventions	90%	11%	15%	43%	3%	8%	16%	18%
Isolation, Quarantine, and ROM	94%	10%	9%	27%	2%	9%	21%	15%
Strategic Communications	93%	14%	8%	14%	2%	4%	6%	24%
Sustainment of Medical Support Operations	73%	24%	4%	73%	2%	8%	26%	34%
Patient Management	76%	37%	15%	35%	0%	20%	30%	17%
Medical Situational Awareness	94%	20%	3%	32%	1%	8%	7%	30%
CivMil Cooperation	73%	37%	12%	30%	2%	12%	21%	77%
Lab Assets	92%	16%	8%	82%	2%	7%	21%	14%
Continuity of Operations Planning	84%	27%	19%	41%	5%	17%	27%	24%

## Top 10 Tasks: Percent Tagged with Various Domains

	Doctrine Only	Organization	Training	Materiel	Leadership	Personnel	Facilities	Interoperability
Med C4I & Decision Support	42%	20%	9%	20%	3%	7%	6%	23%
Non-pharmaceutical Interventions	35%	11%	15%	43%	3%	8%	16%	18%
Isolation, Quarantine, and ROM	38%	10%	9%	27%	2%	9%	21%	15%
Strategic Communications	55%	14%	8%	14%	2%	4%	6%	24%
Sustainment of Medical Support Operations	5%	24%	4%	73%	2%	8%	26%	34%
Patient Management	16%	37%	15%	35%	0%	20%	30%	17%
Medical Situational Awareness	35%	20%	3%	32%	1%	8%	7%	30%
CivMil Cooperation	8%	37%	12%	30%	2%	12%	21%	77%
Lab Assets	5%	16%	8%	82%	2%	7%	21%	14%
Continuity of Operations Planning	16%	27%	19%	41%	5%	17%	27%	24%

## Conventional Content Analysis Summary



## Conventional Content Analysis Example: Identified Topics in Non-Pharmaceutical Interventions



## Non-Pharmaceutical Interventions: Candidate Lesson Identified (1 of 14) Topics: Health Care Access, Risk Mitigation

- **Observation:** Medical readiness declined during the pandemic as individuals were unable to make or keep in-person maintenance and preventive care appointments.
- **Discussion:** Measures to reduce risks in health care settings for both patients and medical personnel led to reductions in appointment availability. In addition, pandemic public health restrictions placed physical limits on attendance.
- **Conclusion:** The reduction in maintenance and preventive care appointments indicates a need to mitigate the risk of in-person attendance and/or to expand the capabilities of virtual care.
- **Recommendation(s):**
  - Implement and sustain practices that reduce risk to both patients and providers, such as minimizing the number of staff in contact with the patient and swabbing patients in a separate/easily cleanable area.
  - Increase telemedicine capability to minimize healthcare worker exposures, reduce the use of PPE, allow for continued care of non-urgent or uninfected patients, and conserve overall medical capability and capacity.
  - Address challenges that make it difficult to get in-person or virtual care in pandemic conditions, such as IT issues, digital health records that are easily shareable, ease of prescribing medication, and staffing.

Tier: Tactical

Domains: Doctrine, Materiel, Facilities

## Non-Pharmaceutical Interventions: Candidate Lesson Identified (2 of 14) Topics: Masking Strategy, Risk Mitigation

- **Observation:** Masking is a simple and effective public health measure, especially in conjunction with other measures and when implemented early, but was adopted inconsistently among populations during the pandemic.
- **Discussion:** During the pandemic, information on when masking should be adopted, who needs to wear them and when, how to wear them correctly, etc. was inconsistently provided to populations at risk.
- **Conclusion:** The benefits of masking were often compromised by delays in implementation and inconsistent guidance/communications.
- **Recommendation:** During outbreaks of contagious disease, establish and communicate clear and common/interoperable guidance on the use of masks, alone and in conjunction with other infection control measures. Such guidance should address the impact of masking on mission accomplishment and issues related to prioritization of masking among personnel.

Tier: Primarily Tactical, Operational/Strategic Aspects

Domains: Doctrine, Materiel

## Remaining Steps

- Prioritize outputs of “conventional content” analysis using a ranked choice voting method (*June 2023*)
- Finalize and distribute paper documenting analysis and findings (*July 2023*)
- Present final set of candidate Lessons Identified to Biodefense Medical Panel/CBRN Medical Training Panel (*Oct 2023*)

## Questions?

Ms. Julia Burr  
Research Staff Member  
Institute for Defense Analyses  
jburr@ida.org

Dr. Ashley Farris  
Research Staff Member  
Institute for Defense Analyses  
afarris@ida.org

# Backup

## “New” Bio-responsiveness Tasks

- Tasks that can be added to current bio-responsiveness tasks through expansion of existing definitions:
  - Civilian support to military → CIV-MIL cooperation
  - Personal protective equipment → Infection prevention and control
  - At-home testing → Lab assets
  - Geo-spatial tracking → Operational epidemiology
  - Non-pharmaceutical interventions → Infection prevention and control OR Isolation, quarantine, and ROM
  - Terminology → Strategic communications
- New stand-alone tasks
  - Continuity of operations
  - Public health measures
  - Research and development

## Metadata Tag Definitions: SD 1.1045 Tasks (1)

Tag	Definition
Conduct infection prevention and control	Prevent loss or degradation of equipment and supplies from the effects of pathogens, including body fluids of infected casualties. Remove and neutralise infectious materials on equipment. Includes individual equipment, sensitive equipment, aircraft, watercraft, and facilities. Also includes the cleaning and sanitization of multi-use medical equipment. All decontamination operations must involve good personal protection practices (limited to equipment and sanitation).
Conduct isolation, quarantine, and restriction of movement	Establish isolation wards or separate MTFs for the care of contagious casualties. Quarantine suspected contacts/exposed personnel until they are determined to be free of infection. Consider implementing restriction of movement between exposed and unexposed personnel at either the unit or theatre level. Personnel interacting with isolated individuals must use good infection control and personal protection practices.
Conduct military and civilian cooperation	Liaise with NGOs, IOs, the host nation's medical system, other multinational medical forces, and NATO medical personnel.
Employ laboratory assets	Use one or more laboratories to support environmental hazard analysis, clinical diagnosis, medical treatment decisions, operational epidemiology, and forensics investigations. Disseminate laboratory results to appropriate medical and operational units.
Employ medical countermeasures	Use available pre- and post-exposure prophylaxis, and immediate and continuing therapy as part of the delivery of first aid, emergency medical care, and advanced medical care. Identify any particularly vulnerable subpopulations to be targeted for priority or exemption. Confirm that units follow standard procedures for recording the use of medical countermeasures (includes vaccine policy).
Manage contaminated clinical waste	Collect, safeguard, and safely dispose of potentially large volumes of waste contaminated with blood and other body fluids, cultures and stocks of infectious agents from laboratory work, or waste from contagious or potentially contagious patients. Use of disease-specific personal protective equipment and incinerators may be required.
Perform deployment health surveillance	Conduct continuous and systematic collection, analysis, interpretation, and dissemination of health-related data with respect to deployed NATO forces. Rapidly detect public health incidents or outbreaks that could affect NATO operational capacities or objectives, and monitor the progression of those incidents or outbreaks over time.

## Metadata Tag Definitions: SD 1.1045 Tasks (2)

Tag	Definition
Perform forensic functions	If attribution is desired, use specialist sample collection units and appropriate reach-back laboratories to apply chain-of-custody procedures in the collection, handling, transport, and analysis of samples. Reach-back and forensics efforts must adhere to differing national and cultural standards for the collection, management, and use of medical information and clinical samples.
Perform medical C4I and decision support	Provide medical advice to the Joint Force Commander and direct medical units in the performance of bio-response tasks. Provide medical staff and MEDAD with the tools and information needed to understand the causation, nature, and progression of disease outbreaks and the potential impact of control measures. Support development of bio-response courses of action, to include assessment of operational risk ( <b>includes modeling</b> ).
Perform medical evacuation	Provide medically supervised enroute care from point of presentation to a medical facility during tactical and strategic medical evacuation utilising appropriate infection control practices. May include movement by ground, intra-theatre air (fixed-wing or rotary), and strategic air assets. Evacuation assets will require patient isolation capability and/or enhanced personal protection equipment for crew, management of clinical waste, and decontamination after use.
Perform national outreach, reach-back, and fusion	Request support from designated reach-back experts, teams, laboratories (including NATO, partner, and host nation assets), or other facilities as needed to augment in-theatre capabilities or knowledge. Establish any necessary support agreements to enable reach-back. Disseminate reach-back analysis results to appropriate medical units and theatre organisations ( <b>includes SME POC phone book; standup reachback capability</b> ).
Perform operational epidemiology	Investigate disease outbreaks to determine their source, nature, and magnitude. The information provided can be used to improve medical treatment for existing cases and to support the implementation of public health and physical control measures to prevent additional cases. Operational epidemiology may also be an important component of forensic investigation of a biological incident known or suspected of being deliberately caused ( <b>includes contact tracing</b> ).
Perform patient management	Assess, triage, and treat infectious or contagious patients across all levels of care through acute and convalescent phases of illness. All interactions with infectious or contagious patients will require good infection control practices.
Perform sample management	Collect, anonymise (as necessary), transport, track, store, and dispense clinical and environmental samples using chain of custody as necessary. Consider the following sample types: body fluids, tissue samples, powders, and other environmental samples (food, vectors, water, soil, etc.). This would include veterinary and vector sampling. Good infection control practices and use of personal protection will be required.
Perform strategic communications	Coordinate and use NATO communications activities and capabilities, including public diplomacy, public affairs, information operations, and psychological operations as appropriate, at the strategic, operational, and tactical levels to provide NATO forces, host nation civilians, international and non-governmental organisations, and national governments and populations with the information needed to support bio-response objectives and operations ( <b>includes anti-IO</b> ).
Prepare medical risk assessment	Systematically identify, locate, assess, and document occupational and environmental infectious disease hazards to both military and civilian populations, and communicate the health threats and potential operational impact posed by those hazards to the commander.

## Metadata Tag Definitions: SD 1.1045 Tasks (3)

Tag	Definition
Provide fatality management	Safely perform initial processing and storage, post mortem radiographic or invasive examination, decontamination, and dignified disposal of potentially contagious human remains in accordance with national regulations and practice. Use of disease-specific personal protective equipment and fatality protective equipment may be required.
Provide medical situational awareness	Generate an overall picture of the health of the force by informing medical staff of relevant results from clinical diagnoses, clinical sampling, laboratory diagnoses, environmental analysis results, and operational epidemiology. This includes contextual information necessary to interpret the results and their potential impact on operations, such as background disease rates; characteristics of the disease and its causative agent; military and civilian vulnerability to infection; current and planned force dispositions and locations; and capabilities for medical diagnosis, force and civilian health surveillance; and medical countermeasures ( <b>includes internal info sharing short of strategic comms, reporting practices; findings from vaccine trials</b> ).
Provide psychosocial support	Foster resilience and prevent pathological sequelae in the medical team and patients by helping them and their families to cope with the stress of the illness and resume their normal lives. Use an integrated approach to encourage community acceptance and reintegration of survivors and medical personnel.
Support clinical diagnosis	Assess disease in military personnel and eligible civilians to support medical decisions. Establish presumptive or use existing case definitions. Includes identifying causative agents.
Sustain medical support operations	Sustain operation of medical treatment facilities providing isolation and quarantine. Provide security and sustainment for those facilities, and for personnel held therein. Manage the stockpiling, distribution, and resupply of medical countermeasures and other medical and non-medical materiel and consumables required by medical units for treating infectious or contagious patients, with particular focus on low-density, high-demand medical equipment (e.g., ventilators) and non-medical items that will be required in increased amounts (e.g., water) ( <b>includes log/planning</b> ).
Other	Continuity of operations planning ( <b>BCP</b> ) Civilian support ( <b>civ support</b> ) Common lexicon ( <b>lexicon</b> ) Non-pharmaceutical interventions ( <b>NPI</b> ) (e.g., border restrictions, hand sanitizer, handwashing, limiting public/private activities, masking, registration, remote work, screening, social distancing) Personal protective equipment ( <b>PPE</b> ) Public health measures (e.g., food safety) ( <b>PHM</b> ) Research and development ( <b>R&amp;D</b> ) At-home testing ( <b>testing</b> ) Tracking via mobile device or video surveillance ( <b>tracking</b> ) Unspecified public safety measures ( <b>unspecified measures</b> )
Not relevant	

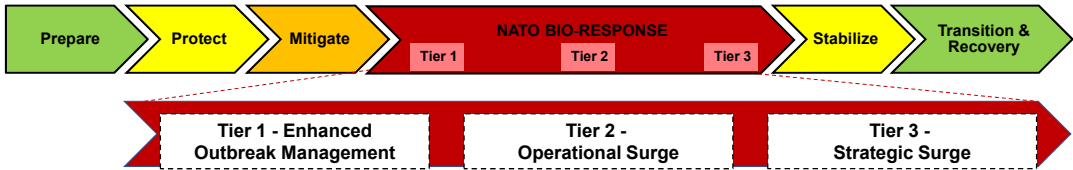
## Metadata Tag Definitions: DOTMLPF-I

Tag	Definition
Doctrine / Policy	Doctrine: fundamental principles that guide the employment of U.S. military forces in coordinated action toward a common objective. Policy: any DoD, interagency or international policy issues that may impact effective implementation of changes in the other DOTMLPF-I considerations ( <b>includes mandating a plan, authorities</b> ).
Organization	( <b>i.e., capacity</b> ) A joint unit or element with varied functions enabled by a structure through which individuals cooperate systematically to accomplish a common mission and directly provide or support joint warfighting capabilities.
Training	Training (including mission rehearsals) of individuals, units, and staffs using joint doctrine or tactics, techniques, and procedures to prepare joint forces or joint staffs to respond to strategic, operational, or tactical requirements considered necessary by the CCMDs to execute their assigned or anticipated missions.
Materiel	Everything necessary to equip DoD forces to operate effectively. Materiel includes ships, tanks, self-propelled weapons, aircraft, related spares, repair parts, and support equipment, but excludes real property, installations, and utilities.
Leadership	Professional development of joint leaders that is the product of a learning continuum that comprises training, experience, education, and self-improvement.
Personnel	( <b>i.e., capability</b> ) Ensuring that qualified personnel exist to support joint capability requirements. The number or quantity of personnel is a function of organization, while the quality, type, or skills of personnel is considered in the personnel function.
Facilities	Real property consisting of one or more of the following: buildings, structures, ranges, utility systems, associated roads and other pavements, and underlying land. Key facilities are defined as command installations and industrial facilities of primary importance to the support of military operations or military production programs.
Interoperability	The ability to be interoperable with forces throughout the NATO alliance.
Other	Other domains including logistics



# SD 1.1045 Bio-responsiveness CONOPS Framework for Assessing COVID Observations

## CONOPS Phases and Levels:



## 21 CONOPS Tasks:

- |   |  |  |
|---|--|--|
| Medical C4I and Decision Support          | Patient Management                                 | Medical Support Operations             |
| Deployment Health Surveillance            | Infection Prevention and Control                   | Laboratory Support                     |
| Operational Epidemiology                  | Isolation, Quarantine, and Restriction of Movement | Sample Management                      |
| Medical Risk Assessment                   | Medical Evacuation                                 | Contaminated Clinical Waste Management |
| Strategic Communications                  | Medical Countermeasures                            | Fatality Management                    |
| CIV-MIL Cooperation                       | Psychosocial Support                               |  |
| National Outreach, Reach-back, and Fusion | Clinical Diagnosis                                 |  |

This page is intentionally blank.

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. <b>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</b>					
1. REPORT DATE (DD-MM-YY) xx-05-2023		2. REPORT TYPE Final		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE  <i>COVID-19 Lessons Learned for NATO Bio-responsiveness Capability</i>			5a. CONTRACT NO. HQ0034-19-D-0001		
			5b. GRANT NO.		
			5c. PROGRAM ELEMENT NO(S).		
6. AUTHOR(S) Julia Burr Lucas LaViolet Ashley Farris Catherine Scheible Ana Venegas			5d. PROJECT NO.		
			5e. TASK NO.  FN-6-5234		
			5f. WORK UNIT NO.		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Institute for Defense Analyses 730 E.Glebe Rd Alexandria, VA 22305			8. PERFORMING ORGANIZATION REPORT NO. IDA Document NS D-33500 Log: H 23-000162		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS (ES) DHHQ 7700 Arlington Blvd. Falls Church, VA 22042-5143			10. SPONSOR'S / MONITOR'S ACRONYM(S) OTSG		
			11. SPONSOR'S / MONITOR'S REPORT NO(S).		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The work described in this Institute for Defense Analyses presentation adapts the process used in NATO for Medical Lessons Learned to assess COVID-19 pandemic response challenges and best practices within the framework of the NATO Smart Defence Bio-responsiveness Project. Observations were collected from official NATO lessons learned repositories and documented COVID response collaboration teleconferences, and assessed using metadata tagging and a combination of directed and conventional content analysis. The outputs of the analysis were collated into a prioritized set of Lessons Identified for enhancing bio-responsiveness concepts and capabilities, improving interoperability, and identifying areas for standardization. The results of this initiative can be used to generate a road map to improve NATO bio-responsiveness capabilities in the Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, and Interoperability domains at the tactical, operational, and strategic levels.					
15. SUBJECT TERMS Medical lessons learned; COVID-19; bio-response; observations; outbreak response; bio-responsiveness					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT  U	18. NO. OF PAGES  22	19a. NAME OF RESPONSIBLE PERSON LTC Mark Williams
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (Include Area Code) 703-681-8188

This page is intentionally blank.