



Study to Determine the Requirements of a National Operational Epidemiological Modeling Process

**National Center for Integrated Civilian-Military Domestic Disaster Medical Response
(ICMDDMR)**





Background on ICMDDMR

- Origin: Integrated Civilian-Military Domestic Disaster Medical Response (ICMDDMR) was created through cooperative affiliation between USNORTHCOM J7 and YNH-CEPDR and is governed by Interagency Panel
- Funding: Support via Connecticut Congressional Delegation (former Senator Dodd, Senator Lieberman and Congresswoman DeLauro) through the DoD Appropriations process
- Goal: Ensure civilian-military medical/public health preparedness and response integration for resources across all levels of government and private sector





PROJECT OVERVIEW





10221 Specific Tasks:

Study Objective:

Identify requirements for an operational epidemiologic modeling process within the interagency. The requirements must take into consideration:

- Multiple agency involvement
- 4-6 hour decision cycles
- Scientific validation of models

Specific Tasks:

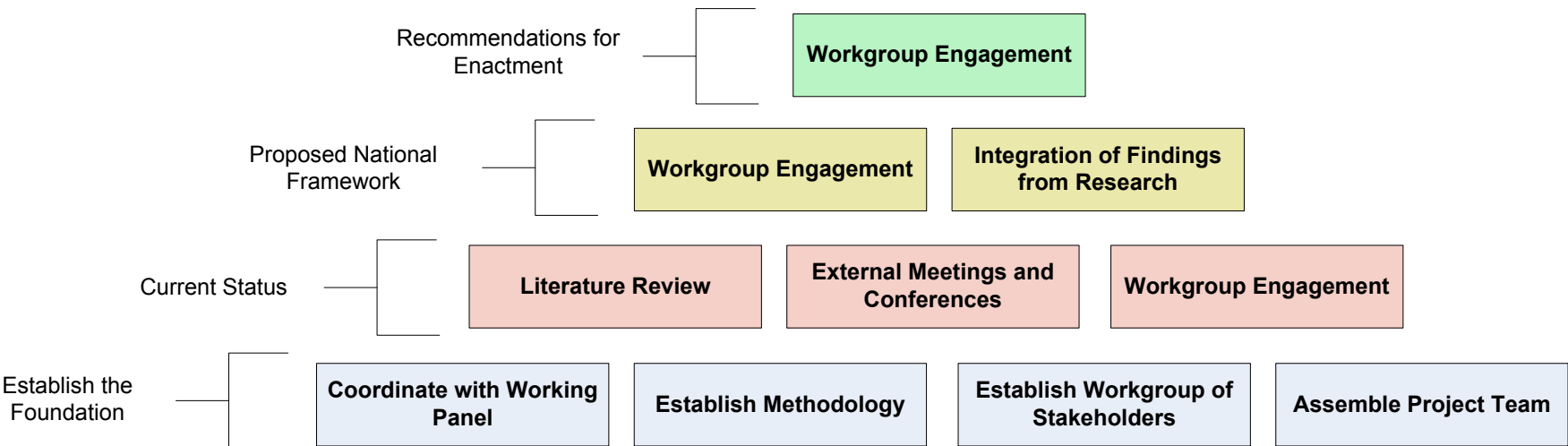
1. Identify requirements/taskings in policy which mandate that departments, agencies and/or organizations accomplish epidemiological modeling as part of their mission
2. Determine requirements for an operational epidemiological modeling process
3. Provide recommendations to develop an operational epidemiological modeling process to include what steps need to be accomplished for actual implementation (e.g., legislation, funding)



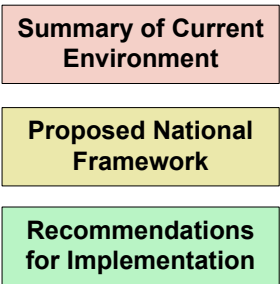


10221 – Overview of Effort

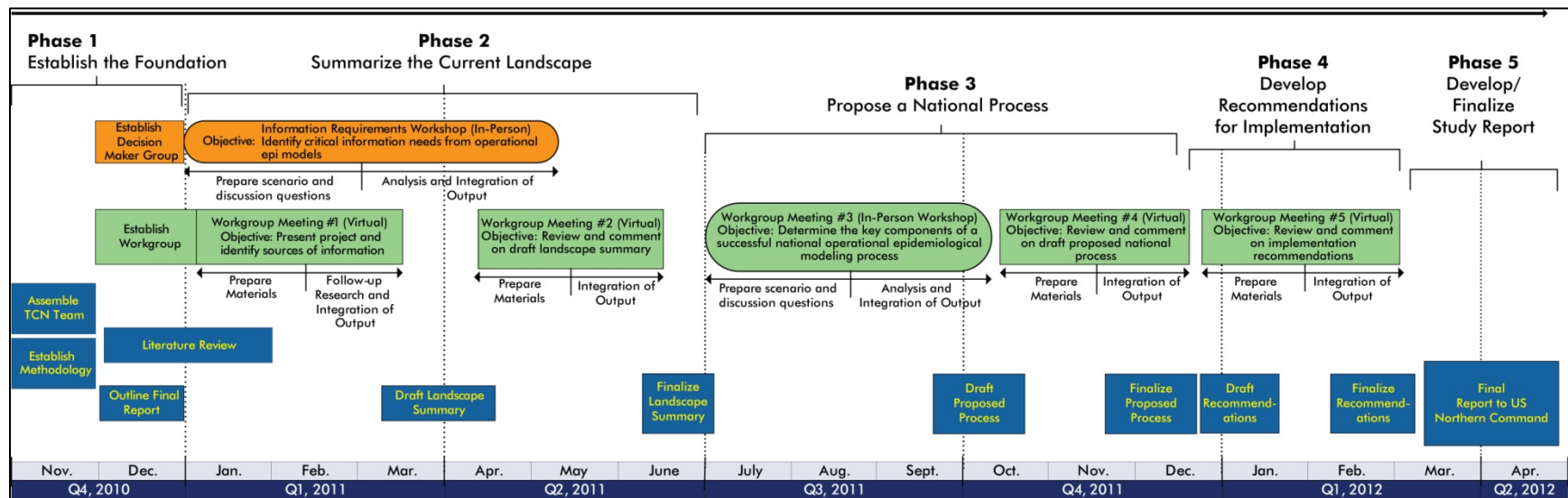
Key Activities



Final Report Components



10221 Timeline





Landscape Summary

- Information was gathered through:
 - Literature review
 - Government publication and reports
 - Peer reviewed articles
 - Agency/Organization policies and mandates
 - Stakeholder engagement
 - Interagency workgroup established through existing relationships and recruitment at national conference and meetings
 - Virtual workgroup meetings
 - 3/4/11
 - 5/31/11
 - In-person workgroup meetings
 - 3/30/11





Landscape Summary Findings

- The modeling community consists of government agencies, academic institutions, national laboratories and private sector partners and can be broadly categorized into the following groups:
 - **Model Sponsors:** the organization funds the development of a model through a contract or collaborative agreement
 - **Model Development Coordinators:** the organization is responsible for coordinating the development of models for the sponsoring agency and model users. This group typically oversees the model developers (see below)
 - **Model Developers:** the organization develops models for a specific purpose
 - **Model Users:** the organization uses models to support programmatic initiatives or operational decision making





Landscape Summary Findings, Cont.

- The consequence management community utilizes models for decision making and consists primarily (although, not exclusively) of governmental agencies. The operational units within these organizations can be understood by broadly categorizing them into the following groups:
 - **Policy Decision Makers:** the senior level staff at the coordinating agencies who are responsible for setting broad policies and ensuring that activities conducted by the organization are consistent with, and contribute to, the successful achievement of the organization's prescribed mission
 - **Operational Coordinators:** the staff responsible for coordinating the flow of information to and from policy decision makers and tactical capabilities (see below) as well as for identifying external sources of information and providing sufficient analysis of information to provide to policy decision makers and tactical capabilities for relevant operational decision making
 - **Tactical Capabilities:** the personnel that represent specific human and material resources of an organization that can be deployed to support the direct response to an incident within the scope of its mission





Landscape Summary Findings, Cont.

- No formalized process among governmental agencies and departments that facilitates relationships between modelers and decision makers
- No formalized process for decision makers to request operational epidemiological models, unless the models are being created by their agencies or through existing relationships
- 61* organizations were identified as having a role in developing or coordinating the development of epidemiological models
- 49* agencies and departments were identified as having specific responsibilities to coordinate or conduct infectious disease response
- Currently, use of models for operational decision making is sporadic and ad hoc

*Please note the study is not exhaustive and these numbers represent a sample of organizations





Landscape Summary Conclusions

- The development of a national operational epidemiological modeling process should be structured around the following three priorities:
 1. Develop an interagency process for establishing and cultivating relationships between model developers and operational coordination structures
 2. Increase the availability of models that can support operational decision making
 3. Enhance the ability of operational coordinators to integrate models into their information analysis processes for decision support





PROPOSED NATIONAL OPERATIONAL EPIDEMIOLOGICAL MODELING PROCESS





Process Structure Principles

1. Develop an interagency process for establishing and cultivating relationships between model developers and operational coordination structures to incorporate models into response planning and evaluation
2. Increase the availability of models and model outputs that can support operational decision making
3. Enhance the ability of Operational Coordinators to integrate models into their information analysis processes for decision support





August 11, 2011 - Workshop AAR Findings

Components of a successful National Operational Epidemiological Modeling Process (NOEMP) include:

1. Functions via a diverse interagency workgroup rather than a single organization
2. Operates with administrative and fiscal management provided by a lead agency
3. Develops and aligns modeling guidance and standards with available funding streams
4. Direct funds to model designed to support decision making
5. Channels funds to local and state public health and other similar users to mitigate shortfalls
6. Leverages existing federal modeling infrastructures
7. Accommodates the diverse missions of stakeholders
8. Enhances the use of models during an operation, including sharing models and model outputs within and between agencies/ organizations





NOEMP Purpose and Scope

Purpose:

- Establish and maintain a national capability to produce infectious disease modeling outputs that are supportive of broad range information requirements among agency/organizational consequence management operational coordinators

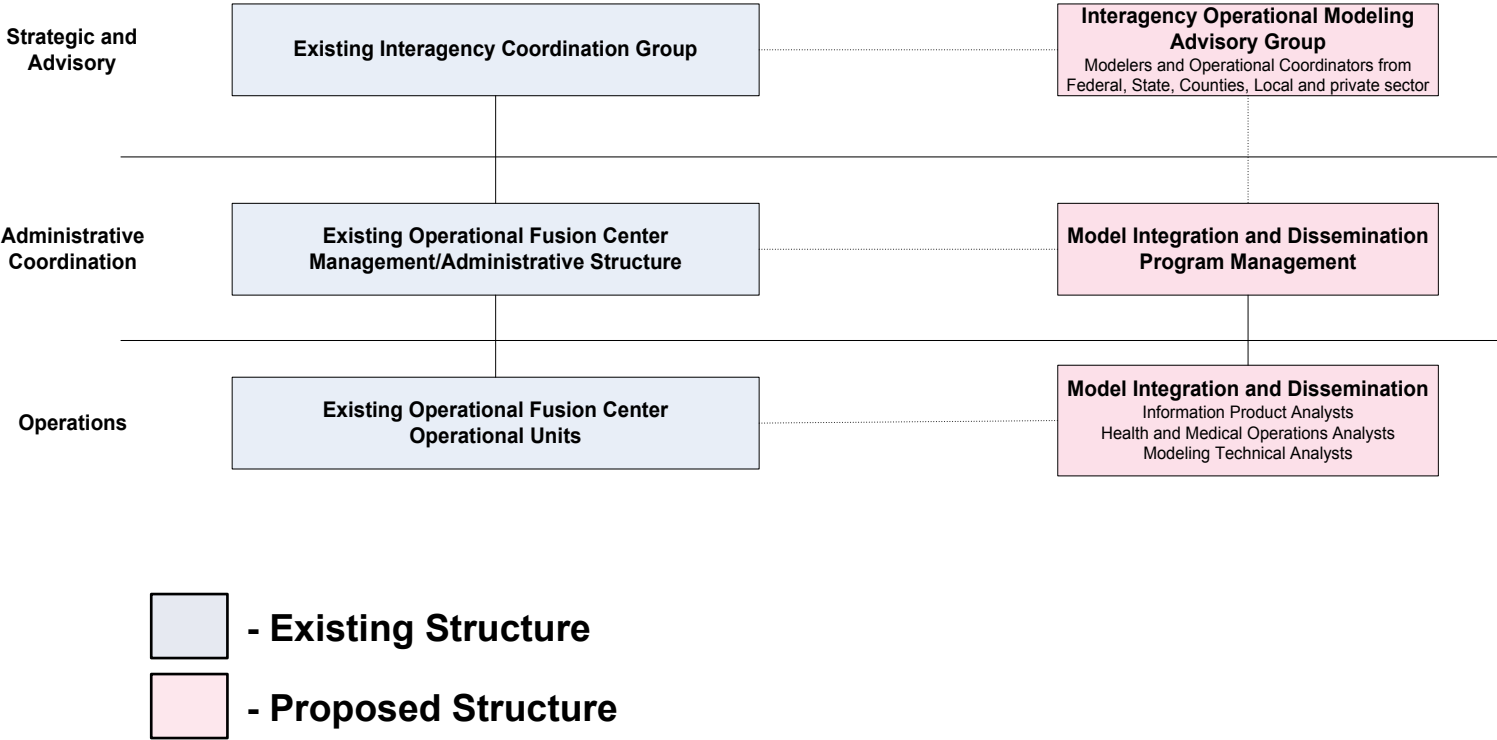
Scope:

- Will initially be limited to models that provide information on impact and intervention strategies at a national level, and where data is made available, at state and local levels
- Will expand to include information on spread patterns and intensity information
- Will include animal disease modeling





Proposed Governance Structure



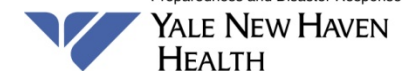


Modeling Information Dissemination Unit (MIDU)

Health and Medical Operations Analyst	Information Product Analyst	Epi Modeling Technical Analyst
Expertise includes: • Coordination of health and medical response operations • Identification of information requirements and information sources for operational decision making • Integration of model information with health and medical response operations	Expertise includes: • Health and medical operational decision making processes • Visual analytics • Technical/graphical systems for communicating information • Communications policy and guidance development	Expertise includes: • Mathematical model development • Epidemiology or infectious diseases data standards • Data management and aggregation • Technical policy and guideline development • Oversight of model validation, verification and evaluation
Duties include: • Support model output analysis and summarization • Draft content for information products • Maintain relationships with Operational Coordinators • Draft policy/guidance to prioritize research and develop initiatives based on information requirements of Operational Coordinators • Work with Operational Coordinators to educate agency/organizational stakeholders on the scope and limitations of models for decision support	Duties include: • Coordinate with Operational Coordinators to determine information requirements from model outputs • Develop templates for dissemination of model outputs • Develop/maintain list of Operational Coordinators to receive information products • Disseminate model outputs as needed	Duties include: • Draft model validation and verification requirements for IOMAG review/approval • Develop model output technical requirements (in collaboration with all MIDU analysts) • Run existing models, or solicit model outputs from external model developers as needed • Determine/review model parameters based on surveillance information • Coordinate the integration of models into the NOEMP • Provide technical assistance to external partners developing models for the NOEMP • Determine data input standards for the receipt and integration of data into NOEMP models



Center for Emergency
Preparedness and Disaster Response





Operational Capabilities

Steady-State Operations:

- Establish relationships with stakeholders
- Determine requirements of models to be included in catalog
- Determine how information products will be produced
- Determine validation and verification process
- Create models to be used during infectious disease outbreaks
- Provide targeted support to communities as needed
- Establish response triggers

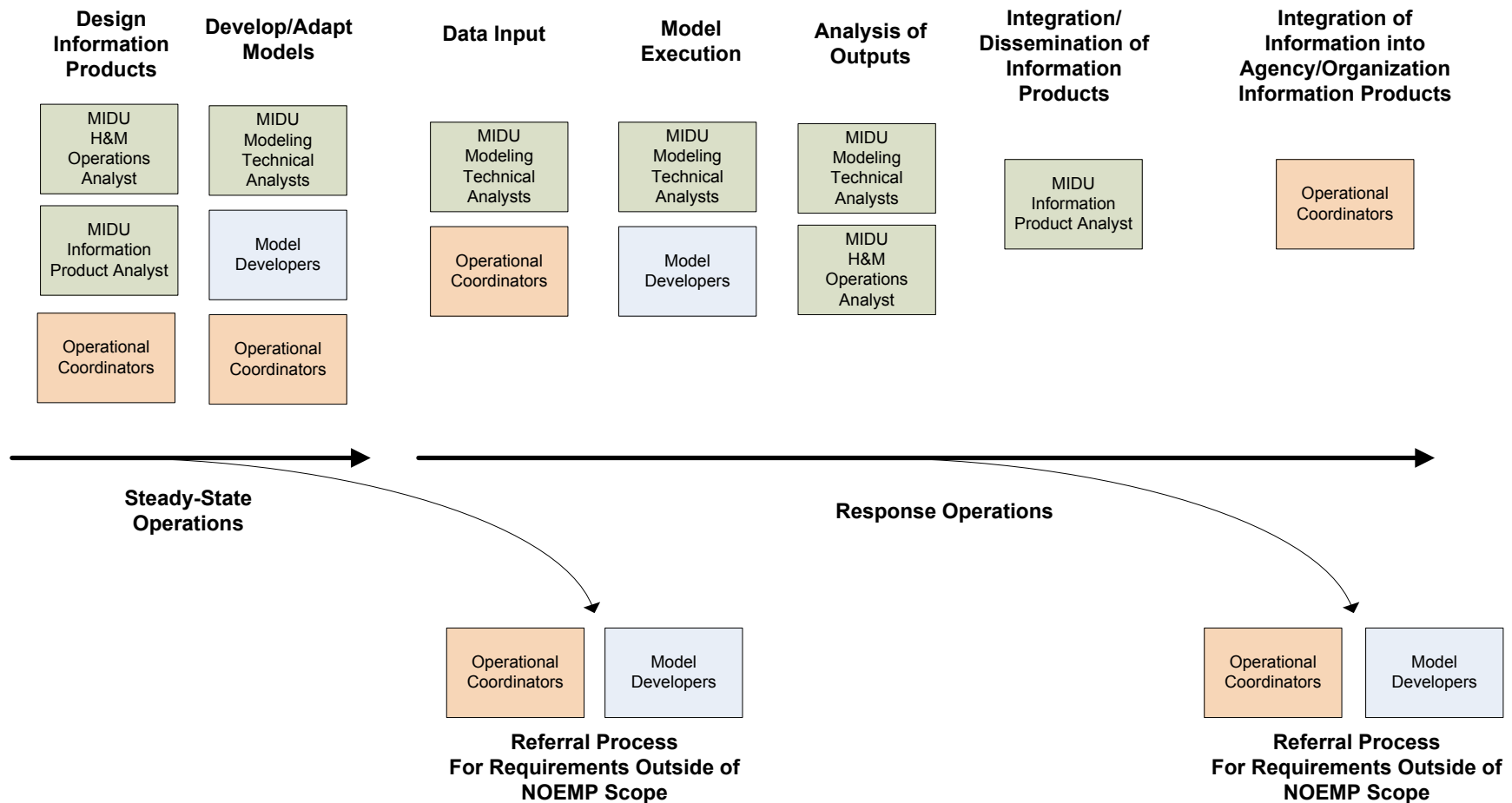
Response Operations:

- Process information collected
- Run models created within the unit
- Reach out to external partners with model requests
- Create information products based on information collected
- Refer agencies to external partners if they cannot fulfill the information request





Proposed Operations Structure





Proposed Courses of Action





Selecting COAs – Options Identified

- **Interagency Structures**
 - National Biosurveillance Integration System
 - ESF-8
 - Government Owned/Company Operated (GOCO) Reach-back Centers
- **Coordinating Agencies from Landscape Summary**
 - Department of Agriculture
 - Department of Defense
 - Department of Homeland Security
 - Department of Health and Human Services
- **Other Options Discussed at Meetings/Conferences**
 - GOCO Model
 - Reach-back center
 - Broader coordination center





Proposed Courses of Action (COA)

- **Course of Action #1** - Integration of the NOEMP into the existing National Biosurveillance Integration System (**NBIS**) with administrative support and operational capabilities provided by **DHS**
- **Course of Action #2** - Integration of the NOEMP as a function of **ESF-8** within the National Response Framework with administrative support and capabilities administered through **DHHS**
- **Course of Action #3** – Establishment of the NOEMP through a public/private partnership, with oversight through a robust Interagency Operational Modeling Advisory Group (**IOMAG**) with management and operational capabilities provided through a private entity through the Government Owned Company Operated (**GOCO**) model





COA's Scoring Metrics

1. Limited capability to meet the criteria. Procurement/development of this capability will be required
2. Some capability to meet these criteria. Investment in expansion of existing capabilities will be required
3. Existing capability to meet criteria. Re-alignment of existing resources may be necessary, but limited requirement for new or expanded capabilities





COA's Aggregate Scores

SCORE			CRITERIA
NBIS	ESF-8	GOCO	
2	3	1	Consistent with Existing authorities/mandates for supporting epidemiological research and response
3	2	1	Consistent with Existing representation from the primary coordinating agencies for the response to an infectious disease incident of national significance
3	3	2	Consistent with Existing administrative and fiscal management structures in place to support implementation of the NOEMP (e.g. contracting offices)
3	3	2	Consistent with Existing operational information sharing structures for coordination among the interagency
3	3	2	Has a response infrastructure for activation in support of infectious disease incidents of national significance
3	3	2	Has access to expertise suitable for MIDU Analyst positions
3	3	3	Has relationships with existing modeling community members
2	3	1	Currently coordinates epidemiological model research and development
2	3	1	Influence over epidemiological model development funding streams
1	3	1	Has existing structures for supporting, through funding, state and local epidemiological preparedness and response
1	3	2	Currently provides guidance to epidemiological response stakeholder decision support processes
26	32	18	AGGREGATE SCORE





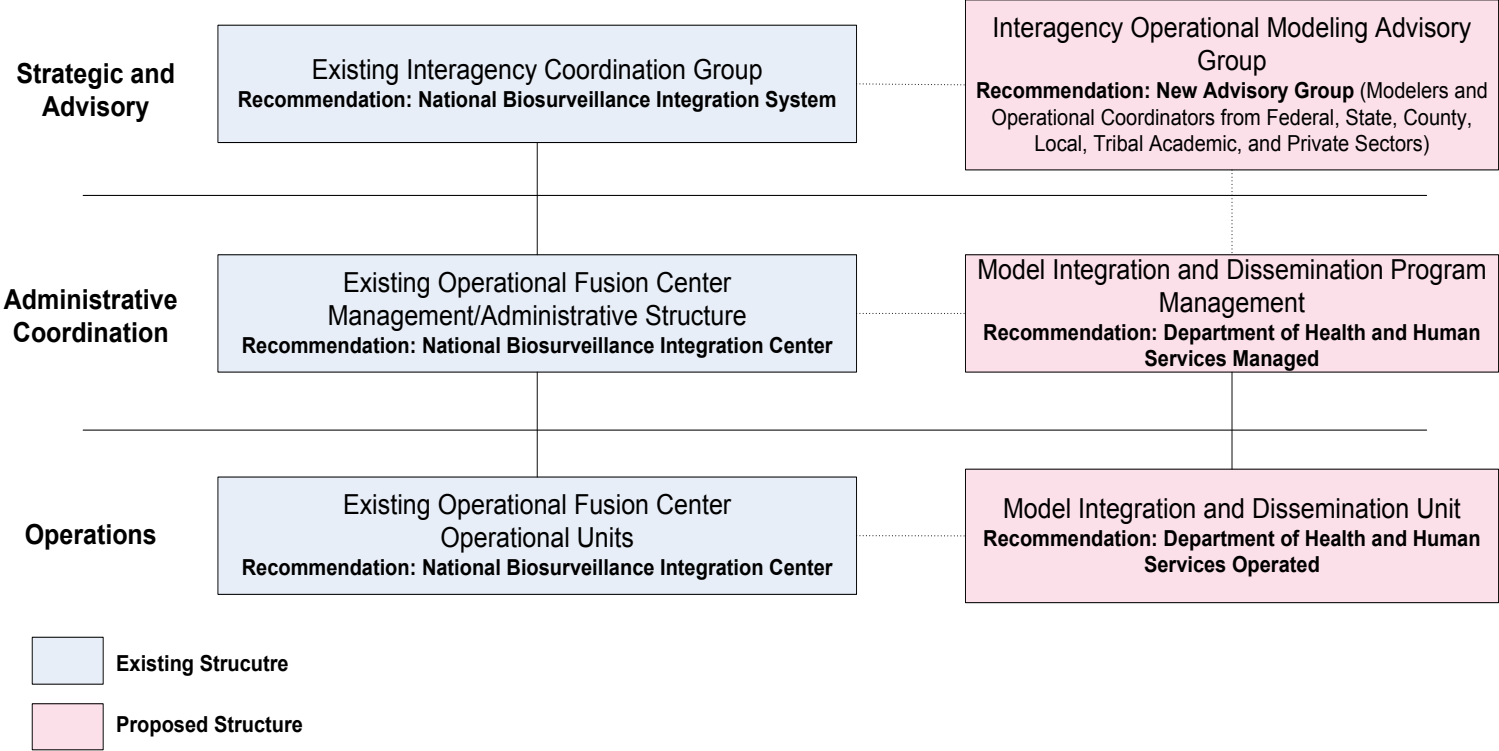
Findings and Recommendations

- The operational and strategic aspects of model development (including research and validation), stakeholder engagement and operational coordination decision support, as well as the management of the model referral process, will require staff that are connected to DHHS and the sub-agencies that conduct similar functions.
- It is also recommended that the NOEMP, Interagency Operational Modeling Advisory Group (IOMAG) and the MIDU be integrated into the NBIS and NBIC management and operational structures to ensure ongoing integration with the interagency within the mandate of DHS to create and establish an operational common operating picture.
- It is expected that this integrated approach is within the scope and intent of the creation of the NBIS/NBIC to serve as an integrator that brings the expertise of the interagency into a single structure for collaboration and integration.
- This will also provide greater strategic flexibility for the NOEMP to grow beyond human disease models and integrate additional operational components from the interagency in the future.





NOEMP Proposed Governance Structure and Recommended Responsible Organization





NEXT STEPS





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