5.m. Recipient Activity m: Standards and Network Development

Attend workgroups with Environmental Public Health Tracking (surveillance) Program partners to develop standardized data definitions; examine the availability and applicability of existing data standards and data exchange messages (Industry standards include, but are not limited to the HL7 Reference Information Model and its vocabularies.); define new data specifications based on these standards as needed in collaboration with national standards setting organizations; define a logical data model and data exchange messages for implementing the Environmental Public Health Tracking (surveillance) Network; and set standards for completeness, timeliness, and quality for the Statewide and National Environmental Public Health Tracking (surveillance) Network.

5.m.1. Results and Accomplishments

Our GIS and information technology support personnel have participated in numerous CDC Standards and Network Development (SND) workgroup and SND subgroup meetings over the three years of the grant. Staff have attended and contributed to products in 3 subgroups: Network Architecture subgroup (NAS), Geography and Locational Referencing (GLR) subgroup, and Data Access subgroup. In NAS, a document was produced by California that describes in diagrammatic form the data flow and transformation highlights encountered when environmental and health event data are brought together to form a linkage product (see APPENDIX cc: Standards and Network Development Materials). California has also contributed significant input to the network principles, network schematics, and the network glossary documents. In GLR subgroup, a document was produced by California which diagrams and generalizes the methods for linking geometries of environmental and health events (APPENDIX cc: Standards and Network Development Materials) that vary in spatial scale, dimension, and extent. These diagrammatic examples served as environmental health linkage use cases, and were intended to inform efforts to standardize methods for performing spatial transformation and linkage of environmental and health data. Enumerating possible linkage examples would lead to a generalized programmatic vocabulary that could be shared among our partners in automating and developing a standardized functionality for linking environmental and health data.

Our technical staff has also participated in defining the vision and requirements for the national-level SND vision document. The vision document, which was accepted in summer 2004 by the SND workgroup, is a collaborative document that addresses the requirements of a nationwide (integrated network) and national (individual networks) environmental health tracking system. Our technical staff worked diligently to make sure that this document accounted for the requirements of California's unique informatics architecture. One theme that we argued was the linchpin for assuring California's success was the ability for the network to support tools that can be invoked over the network. The language in the vision document is general enough so that the California architecture would allow the methods to be controlled by each of the environmental and health surveillance systems, but to be developed by our program.

A Content Modeling subgroup headed by Mead Walker received special attention from our technical staff. The ideas discussed in the Content Modeling group are a critical component to enabling enterprise spatial linkage architecture. In particular, the three main package content areas (i.e. health-related, substance-related, and estimated/derived linkage information), classes, and relationships that compose the current thinking in the EPHTN Conceptual Data Model, provide specific detail to assist in identifying health and hazard event inputs to spatial linkage services as well as the resultant data products from spatial linkage methods.

From the knowledge gained at the May 2004 PHIN conference in Atlanta and the October 2004 EPHTN Workshop in San Francisco, another key technical requirement was identified: the need to identify existing classes and structures in the PHIN Logical Data Model (LDM) that are of interest to the EPHTN. In addition, areas in the PHIN LDM that can be extended should also be identified to meet the needs of the EPHTN. Data modeling activities are underscored by confounding factors that we identified in the spatial linkage requirements and analysis activity. For example, the nexus for a spatial linkage for environmental and health data are the spatially and temporally coincident areas of a known or hypothetical exposure. To determine the relevant health and environmental units that should comprise the linkage, it is necessary to subset, aggregate, or otherwise transform environmental or health records into an event. The environmental or health event takes into account content issues that span data quality, quantity, completeness, and case/hazard definitional characteristics. Once identified, the event is nothing more than a record that describes when (period of exposure), where (location of exposure), and what took place (hazard released, diagnosis of disease, etc).

5.m.2. Challenges and Barriers

- Though it was democratically decided in the SND that methods for spatiotemporally linking environmental and health events should be automated and functionally standardized across the national network, doubt is continually raised on whether this specification should be included in the national network implementation plan.

5.m.3. Lessons Learned

- In the SND workgroup, communicating the need for supporting a standard vocabulary for methods and functions that support the spatiotemporal integration of environmental and health databases required a significant amount of buy-in. Through an online vote, it was democratically agreed that the EPHTN should support both automated data exchange processes as well as methods that transform and link environmental and health data.

5.m.4. Recommendations

- A standard model for data content and object-oriented interfaces that encompass the domain of linked environmental and health events in space and time should be cooperatively developed and adopted by the SND.
- EPHT programs should encourage, assist, collaborate, and identify funding mechanisms for environmental and health surveillance system owners to implement the specifications prescribed by the National Environmental Information Exchange Network (NEIEN) and the Public Health Information Network (PHIN).
- The CDC and other states should consider the potential to utilize an enterprise spatial linkage architecture approach for the network. This approach addresses several major hurdles in successfully implementing the network, including the reluctance of data providers to supply data and the need of stakeholders to be able to request and receive integrated/linked environmental health data in real time.
- The recommended spatial linkage architecture (as outlined in Section 5.g - Recipient Activity g: Increasing Capacity to Implement EPHT on p99 and detailed in the 120 day report) allows tracking data providers, including disease registries and other surveillance systems, to share data while maintaining the maximum control of their data resources. As important, enterprise spatial linkage is very attractive to stakeholders, especially those with limited technical expertise, as linked environmental health data could be provided in the most timely and accurate manner, without compromising individual record confidentiality. Further, enterprise services such as centralized geocoding can assist data providers to enhance their systems not only for the benefit of their own internal use, but for the benefit of tracking stakeholders who require high quality spatially-enabled surveillance data.
- EPHT programs and EPHTN should place great emphasis on securing personnel or contractors with specific and concurrent expertise and experience in geographic information systems, web application development, relational database management systems, data modeling and the application of these resources in an environmental health integration context.