Background:

Part of the Kingston, Frontenac and Lennox & Addington (KFL&A) Public Health's mandate is to conduct public health surveillance to guide the local development of public health programs and assist with timely response to public health events. Geographic Information System (GIS) applications are increasingly being used for public health purposes. GIS technology provides visual tools – through the creation of computerized maps, graphs, and tables of geographic data – that can assist with problem solving and inform decision-making. The Public Health Informatics team at KFL&A Public Health work on various surveillance projects, including several GIS applications. In 2011, the Public Health Information Management System (PHIMS) was developed using data that is primarily focused on environmental health and emergency preparedness.

Purpose:

The PHIMS tool uses GIS technology to enhance real-time situational awareness and assist with evidence informed decision-making to help protect the health of the population. PHIMS aims to enable visualization and spatial analysis of environmental data with underlying population based indicators. PHIMS consists of layers of environmental information across Ontario where users can view maps demonstrating environmental or demographic data as they apply to specific geographic areas. This is useful for observing where environmental events are occurring, detecting potential emergency situations, and identifying areas with vulnerable populations. By displaying available real-time data from multiple partners through the PHIMS system, public health events can be identified earlier to better prevent, prepare for, and respond to emergencies.

Methods:

PHIMS collects and compiles environmental and demographic data, and uses web-based mapping applications, spatial analytic functionality, and third party libraries to achieve map visualization of the information collected. The data collected by PHIMS is derived from various sources. Some of these sources include: Statistics Canada, Environment Canada, Ministry of the Environment, U.S Geological Survey, Ministry of Natural Resources, Canadian Nuclear Safety Commission, the Ontario Marginalization Index, and Standard Public Health Service data (e.g. Tap into Kingston, Cool Down and Warm Up Centres, Immunization Sites, etc.).

Functions:

PHIMS encompasses several tools and functions that can be accessed through a web-based user interface. PHIMS users can choose from several basemaps to visualize their map with different geographic features. Users have the ability to apply demographic layers related to age, deprivation, and marginalization to the selected basemap, which allows for colour-coded visualization of the social determinants of health as they apply to different geographic locations. These options enable users to easily view where the most vulnerable populations reside, which will help prepare and prioritize resources in the event of a public health emergency. PHIMS also enables map visualization of real-time environmental conditions, since environmental layers related to weather radar data, weather conditions, stream gauges, and heat information can be added to the basemap as well. PHIMS also includes several layers which visualize other pertinent public health data. For instance, PHIMS' tools can display forest fires occurring in Ontario, wildfire smoke forecasts for eastern Canada, well water uranium levels across Ontario, locations of various nuclear reactor stations in Canada and the United States, and earthquake information from around the world. Other tools enable users to view the Air Quality Index for cities in Ontario, the strength and direction of wind, and plume dispersion of air pollutants or toxins. All of these functions can assist public health to identify, predict, and plan for potential emergencies, as well as anticipate the spread and warn of potentially harmful air conditions or other weather patterns. PHIMS also includes features that depict, geographically, various public health services in a given area. This improves awareness of potential service gaps in the community and assists planning for emergency situations and for future public health programs.

Having a GIS portal, such as PHIMS, to visualize environmental and population based data in real-time, facilitates identification of environmental emergencies earlier than through traditional public health methods. PHIMS therefore enhances public health situational awareness to better predict and prepare for extreme weather events and other environmental emergencies.

For more information, please contact:

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