Outline

• What is GPHIN?
• Why is GPHIN important?
• How does GPHIN work?
• Who is using GPHIN?
• Where are we going?
Global Public Health Intelligence Network (GPHIN)

- Started in 1997 in collaboration with the WHO
- Event-based multilingual early-warning and situational awareness network for potential chemical, biological, radiological and nuclear (CBRN) public health threats worldwide
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- Two critical components:

  Analysts
  Multidisciplinary & Multilingual

  Information Management Tool
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• Two critical components:
  – 10 Analysts with advanced life science degrees working in 9 languages (Arabic, Farsi, Chinese – traditional and simplified, English, French, Russian, Spanish Portuguese) conducting rapid risk assessments to detect public health threats
  – Information Management Tool that uses machine learning and natural language processing to facilitate analysts’ work
• Inputs are open source information including news media
• Only event-based surveillance system that is state owned and operated
• Earliest event-based surveillance system to adopt Big Data
Why is GPHIN important?

- Supports compliance with International Health Regulations (2005) core capacity
- Increases situational awareness and capacity for the early detection of and response to emerging public health events
- An important component of international event-based surveillance activities such as Global Health Security Initiative’s Early Alerting and Reporting (EAR) Project:
  - Approximately 20% of WHO’s Epidemiological Intelligence from Open Source (EIOS) input comes from GPHIN
- Disseminates time-sensitive information to public health professionals in Canada and worldwide for appropriate risk management, control prevention, and response measures
How does GPHIN work?

Data collection

On a daily basis

~ 7000 Articles feed in GPHIN
How does GPHIN work?

Data collection:
- Factiva 81%
- RSS 15%
- Twitter 1%
- News Aggregator 2%
- Manually pushed 1%

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Data processing & analyst assessment
- Deduplication
- Metadata
- Categorization
- Translation
- Relevancy scoring

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Intelligence turned into Alert Notifications and Reports

Resources:
- Factiva 81%
- RSS 15%
- Twitter 1%
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How is data collected in GPHIN?

• Complete taxonomy at the basis of all searches and queries
  – Consists of keywords and variations in 9 languages
  – Regularly reviewed and updated by the analysts

• Set of complex logical queries created by the analysts in Factiva
  – Queries are constantly refined by the analysts

• RSS feeds with relevant articles and some twitter accounts fed into the system

• Google Alerts and other news aggregator applications programmed by the analysts

• Internet searches for relevant news including social media manually pushed into the system
Who uses GPHIN?

- Government authorities and non-governmental agencies and organizations that conduct public health surveillance

- Canada (> 350 active users)
  - Health Portfolio Programs
  - Other federal government departments
  - Provinces and Territories
  - Academics
  - Non-Governmental organisations (NGOs)

- International (> 450 active users)
  - Ministries of Health or Centres for Disease Control from 85 countries
  - Other Government Departments
  - International Organizations (e.g. WHO/PAHO, OIE, FAO)
GPHIN products

- Canada
  - Daily situational awareness report for Canadian public health stakeholders
  - Emergency responses reports
  - Ad hoc reports to stakeholders as requested (e.g., EVD situation update, vaping specific media reports, etc.)

- International
  - Alerts to all GPHIN users
  - Other Notifications e.g. FYIs
  - PAHO report
  - Support during mass gathering events
Examples of GPHIN’s early detection in Canada

GPHIN reported severe pulmonary disease associated to vaping in teenagers hospitalized in Wisconsin, USA.
Examples of GPHIN’s early detection in Canada

27-Jul-19
GPHIN reported severe pulmonary disease associated to vaping in teenagers hospitalized in Wisconsin, USA

3-Aug-19
GPHIN reported that 22 people have been hospitalized with vaping-linked breathing problems according to reports from Wisconsin and Illinois

22 people have been hospitalized with vaping-linked breathing problems. Doctors don’t know why.

ERIKA EDWARDS AND LAUREN DUNN
Aug 13th 2019 10:23PM

Social media icons for sharing the article
Examples of GPHIN’s early detection in Canada

- GPHIN reported severe pulmonary disease associated to vaping in teenagers hospitalized in Wisconsin, USA
- GPHIN reported that 22 people have been hospitalized with vaping-linked breathing problems according to reports from Wisconsin and Illinois
- PHAC senior management asked GPHIN to specifically monitor the situation and identify program lead
- Canada posted a health alert on the Healthy Canadians website
- GPHIN started producing vaping specific media reports for PHAC senior management and program lead
- First confirmed case reported in Canada
Examples of GPHIN’s early detection in Canada

- 27-Jul-19: GPHIN reported severe pulmonary disease associated to vaping in teenagers hospitalized in Wisconsin, USA.
- 3-Aug-19: GPHIN reported that 22 people have been hospitalized with vaping-linked breathing problems according to reports from Wisconsin and Illinois.
- 17-Aug-19: PHAC senior management asked GPHIN to specifically monitor the situation and identify program lead.
- 24-Aug-19: Internal resources mobilised to program lead for the monitoring of the situation and case finding activities.
- 31-Aug-19:
- 7-Sep-19:
- 14-Sep-19:
- 21-Sep-19:
- 28-Sep-19: First confirmed case reported in Canada.

Canada posted a health alert on the Healthy Canadians website.
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Examples of GPHIN’s early detection in Canada

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GPHIN’s recent improvements

• GPHIN renewal project
  – Collaboration with National Research Council Canada
  – Development of a new, enhanced web-based platform using emerging technologies to provide greater automation in the collection, collation, and analysis of open source information
    • Relevancy score with auto-publish and auto-trash functions
    • Categorization and geographical tagging of the articles
    • Near-duplicate detection
  – Redesign of system architecture for more flexibility

• Situational Awareness Daily Report revamp
  – Satisfaction survey issued to all users in May-June 2019
  – Revamped report implemented in September 2019
    • Scope of the sections is more explicit
    • More analysis on event reported
  – Implementation of a process to review the distribution list on a periodic basis
And more to come…

- **InSight research project**
  - Provide epidemiological context of events detected by GPHIN and EIOS
  - Develop advanced analytical tools that will help enhance GPHIN’s capacity to
    - Detect signals and events more accurately
    - Identify susceptible populations
    - Forecast the epidemiological curve of a disease outbreak
    - Estimate disease spread pathways
  - InSIGHT dashboard accessed via GPHIN

- Improvement in the geographical and time tagging algorithm
- Expansion to new data sources (e.g. social media)
- Addition of new languages
- Improvement of the administrative functions of the platform
- Development and implementation of the « Story building » and customable reporting tools
- Satisfaction survey to all GPHIN users (domestic and international)
GPHIN – Next generation

- Groups of users with tailored communication
- Enhanced collaboration within Canada and internationally

- Improved efficiency
- Data analysis and risk assessment
- Trends identification and outbreak forecast

- Enhanced visualisations
- Customizable reporting tools

- Modular architecture
- Artificial Intelligence
- Machine Learning
- Modeling

GPHIN Users

GPHIN Analysts

GPHIN Interface

GPHIN Core
THANK YOU
merci – muchas gracias – obrigado
مرسي – شكرا
спасибо – 谢谢 – 謝謝

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