

Real-time high resolution geo-spatial analysis of key indicators in a large-scale cholera outbreak in Port-au-Prince, Haiti, 2022-2023



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Introduction

- 29 September 2022, Port-au-Prince, Haiti: suspected **cholera cases** from different neighbourhoods simultaneously detected in two MSF hospitals
- Context development: Deteriorating security situation, restricted access to high-risk areas, renewed fuel shortage increasing pressure on water quantity and quality leading to another large-scale outbreak
- Rapid set-up of intersectional **surveillance system** (OCA, OCB, OCP) to support timely decision

⇒ **Aim:** to use **real-time 'high resolution geo-spatial surveillance data'** of key indicators in order to provide more targeted case management, Environmental Health (EH) and Health promotion (HP) preventive and control interventions

Real-time high resolution geo-spatial data of cholera patient origins can quickly inform decision makers and allow more **targeted and timely** decision making to control an outbreak and **optimise use of limited resources**

Conclusions

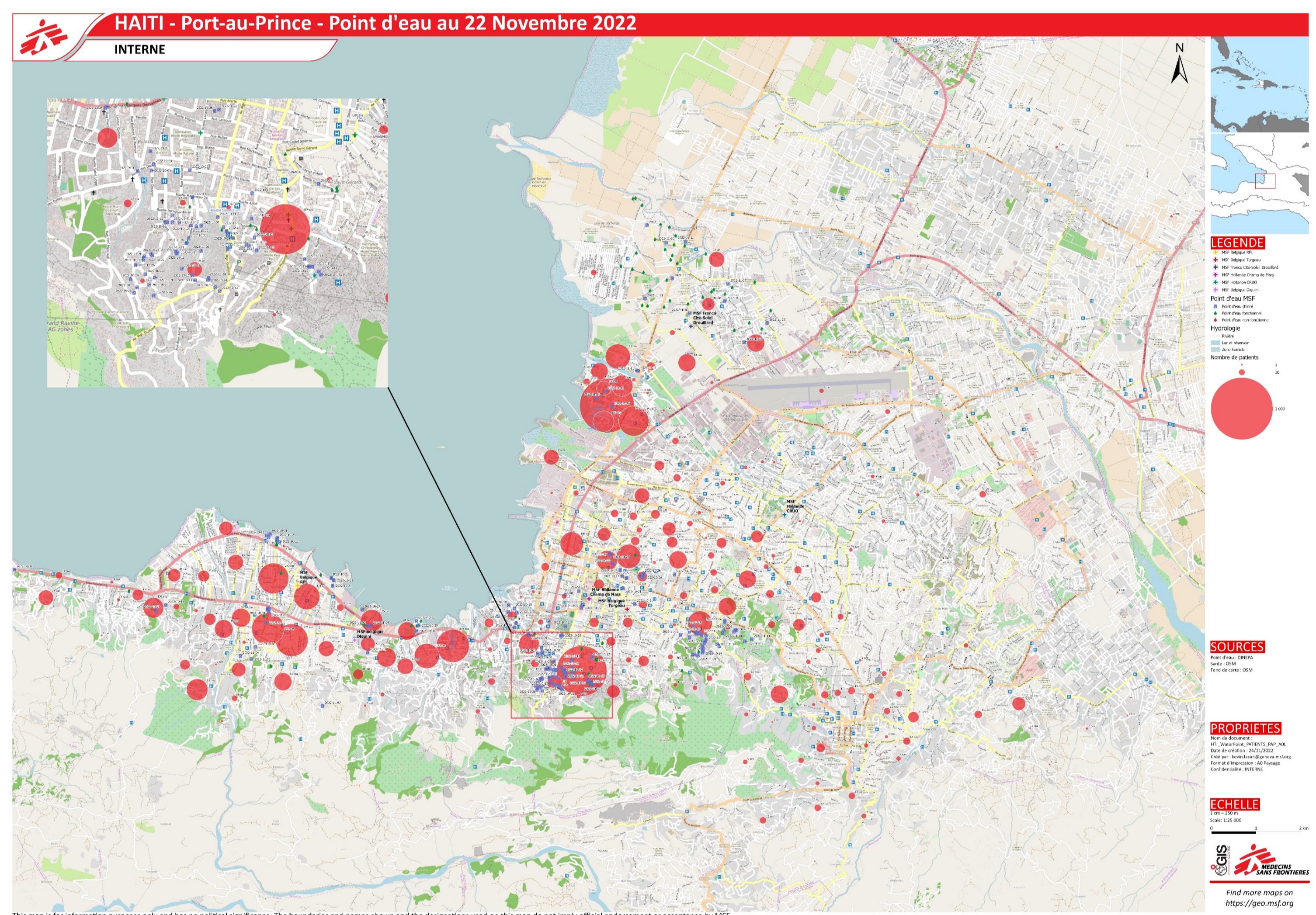
The real-time high-resolution geo-spatial surveillance system in urban Port-au-Prince:

- provided a timely way to **prioritise hot-spots** and **high-risk areas**
- facilitated more **targeted interventions** in a highly volatile security context with access constraints by better using the limited human, supply and financial resources

Methodology

- **GIS precision level:** The World Food Programme partially provided the Admin4 layers. GIS Layers were completed using the **Voronoi diagram method**
- **Data collection:** real-time self-reporting information from cholera suspect patients in MSF facilities including:
 - ⇒ geographical origin up to **administrative neighbourhood (Admin 4) & street level**
 - ⇒ cholera risk factors (**water source utilization, movement history, etc**)
- **Data entry:** MSF intersectional linelists
- **Data analysis:** **daily**, descriptive statistics of key cholera indicators:
 - ⇒ **attack rate, number of cholera suspected cases and deaths**
 - ⇒ **cholera risk factors** through patient case investigation interviews
 - ⇒ **community deaths** through a network of community leaders
 - ⇒ **water points'** real-time functionality and chlorination status with precise GPS coordinates to allow monitoring of evolution of disease burden
- **Dissemination:**
 - ⇒ Production of dynamic **PowerBI Report** (daily data synchronization, field managed) with graphs, tables, maps
 - ⇒ Production of daily **high-resolution printed case maps of neighbourhoods and streets** using ArcGIS

The innovation of this surveillance system is the **real-time high-resolution analysis**. Key **cholera indicators** were analysed on a **daily basis** at **neighborhood and street level**



Kevin Lacan (Intersectional GIS Expert)- Example of real-time high-resolution geo-spatial analysis. The Map is displaying cumulative number of suspected cholera cases by neighborhood (admin4) admitted to MSF Cholera Treatment Centers, with MSF chlorinated water points and data of first chlorination. MSF GIS Centre Geneva (2022)

Results

- **Sharing of daily analysis with MSF decision makers and operational teams, MoH and WHO**
- **Provision of public health recommendations to prioritize EH, HP and medical preventive and control interventions with limited resources available**

Through the timely high-resolution geo-spatial analysis:

- ⇒ **Timely identification of hot-spots and high-risk neighbourhoods**
- ⇒ **Optimization of water source chlorination** and supplies to break transmission routes by the EH teams
- ⇒ Collaboration of **HP teams in high-risk areas** with community leaders, traditional practitioners, religious leaders, youth groups and community members
- ⇒ Remote support of activities and setup of **Oral Rehydration Points**, especially in **neighbourhoods with access limitations**

Acknowledgements

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This innovation project meets the exemption criteria for ERB review.



To better prepare for future cholera outbreaks

in high-risk densely populated urban areas

it is recommended

to have ready for deployment

high resolution geo-spatial layers