

Global health-care facilities their **monitoring** and **adequacy** to cope with **acute** and **pandemic** emergencies

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Was this a rare example? Are there other potential Extremes.



Earthquakes, atmospheric events, floods and landslides are **regular** extremes with effects on population.

Epidemics are causing an escalating demand of hospitalizations that in case of pandemics lead to acute needs beyond the normal capabilities.

Toxic industrial releases and radioactive accidents are **rare** but with significant population exposure.

These are **transient** events leading to potential health emergencies for which the status and **operational capabilities** of health infrastructure is important.





Goals for the Area: **E. Health Care Infrastructure**

- Develop a partnership with UN agencies (WHO, UNISDR, UNEP) and governmental agencies (Australia, Canada, China, European Union, India, United Kingdom, United States) that share an interest in better identifying health care facilities at risk from environmental stressors and extreme weather events.
- Integrate EO datasets in order to develop an informational resource that assesses the vulnerability of health care infrastructures to local environmental stressors (during seasonal loads and local population needs).
- Develop methods to assess the adequacy of these infrastructures under regional acute catastrophes or during escalating chronic pandemics. This has implications for both real-time operations and for long-term health adaptation planning.

GEO Implementation (EO4HEALTH 2020-2022)



Steps for Health Care Infrastructure assessment:

- Geo-locate the health infrastructure facilities with their **operational capabilities** (mostly public in developing countries, starting from WHO)
- For countries with advanced private health care update initially with satellite imagery.
- Assess nearby health stressors versus local **population density** attributed in pixels of 1x1 Km² (account also the life expectancies and disease risks).
- Examine the adequacy of **seasonal loads** and treatments during regular conditions.
- From remote images, identify the **installed energy, transportation and communication resources**.
- Establish a consistent **framework** for remote **images** that could be used on **real-time** for emergencies and construct suitable extraction algorithms with reasonable precision.
- Conduct operational test for several **pilot events** and provide improvements.

Hospitals at North and South Europe



Geolocation processes on the basis of:

Public health care facilities at 27 EU member states in Europe and recently from US hospitals, medical centers, federally qualified health centers, home health services and nursing homes (arcgis.com and dhs.gov).

Real-time remote sensing



State-of-the-art handling required for:

- Algorithms with:
Graphical extraction of structural changes
- In-situ monitoring of:
Meteorology and external/internal site vision
- Suitable satellite sources:
Image complementarity and re-visit frequencies.



Big-data for efficient handling of emergencies



Assessment of **population** health care capabilities associated with environmental exposure.

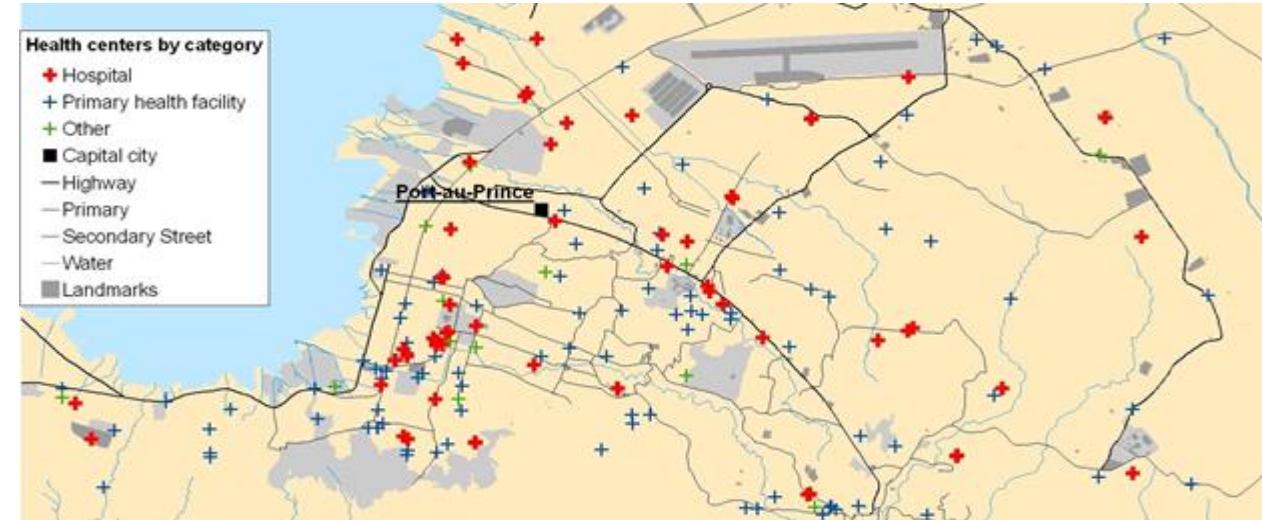
Adequacy of health care infrastructure facilities under usual and acute events.

Testing of health infrastructure needs during humanitarian interventions.

Coupled remote sensing with static in-situ observations for testing **real-time** extraction processes.

Moving population densities (with e-passports) and

Assessment and **adaptation** of health needs (intelligent with **in-situ** technologies).



Final Remarks



- This is the **starting** work and the initial efforts for developing an operational collaboration for health-care resilience,
- Identifies the data sources for **static geo-located** data,
- Covers the observations needed for assessing **vulnerability** of health care facilities and
- Describes the flow of data necessary for conducting the **monitoring** and assessment process.
- This process could identify the areas where **additional humanitarian facilities** will be necessary or the resources that could be borrowed from neighboring areas and
- Can assist in the **optimization** of relief capabilities during emergencies.