Are these rare extremes?

- Earthquakes, floods, atmospheric events landslides are regular natural extremes with significant effects on population.
- Man-made caused toxic releases and radioactive accidents are rare, but with large population exposures.
- These are “time depending events” with heath emergencies for which the status and operational capabilities of HCF is important.
- Epidemics (and the ongoing pandemic) are causing escalating demands for hospitalizations that can raise acute needs beyond the normal capabilities.
Geolocation: Covid-19 Short-term Mortality Fluctuations

Data credit of: https://mpidr.shinyapps.io/stmortality/

Geolocation of Excessive Mortality Fluctuations

Data credit of: https://doi.org/10.1136/bmj.n1137 (19 May 2021)
Hospitals at North and South Europe

2020-2022: Geolocation processes on the basis of Public health care facilities in Europe and US and working on: hospitals, medical centers, federally qualified health centers, home health services, nursing homes and pharmacies (arcgis.com and dhs.gov).

Big-data for efficient handling of emergencies

- Assessment of population health care capabilities associated with environmental exposure.
- Adequacy of their infrastructure status under usual and acute events.
- Testing of health infrastructure needs during emergency interventions.
- Coupled remote sensing with static ground observations for facilitating the real-time extraction processes.

In the future integrate:
- Moving population densities (with e-passports) and
- Assessment and adaptation of health needs (intelligent with on-site technologies).

Current HCF (all levels) Italy:

In Italy 3816.
In Lombardy 737 and in the counties:
- Milano 260;
- Brescia 77;
- Bergamo 76;
- Monza 63;
- Varese 57;
- Pavia 50;
- Mantova 49;
- Cremona 31;
- Como 30;
- Lecco 26;
- Lodi 10;
- Sondrio 8.
The automation process …

Footprint of the residential structures,
Using deep learning models from the imagery,
Image segmentation and
...no trivial GPU or CPU capacity.

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Stories of Success: Healthcare Facility Resilience

*Texas Medical Center in Houston, Texas*

Tropical Storm Allison, 2001

Hurricane Harvey 2017

Projected Future (2040s) Climate Risks for HCF

Figure credit: Dr. Binita KC, NASA

Projections of future climate risk: KC et. al (2020)
Some final remarks …

- This is the starting work and the initial efforts for developing an operational collaboration for health-care resilience,
- 3d generation of handling data sources for static geo-located data (with pilot studies)/
- Describes the flow of data necessary for conducting the monitoring and assessment process.
- Covers the observations needed for assessing vulnerability of health care facilities and
- 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.
- Target to specific vulnerable population groups (child, elderly or …) and
- Proliferate from the immense opportunities of Covid-19 pandemic for advancing big (and reliable) data handling for the benefit of many rich and poor countries.

Thank You!

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Collaborate and communicate with GEO: