

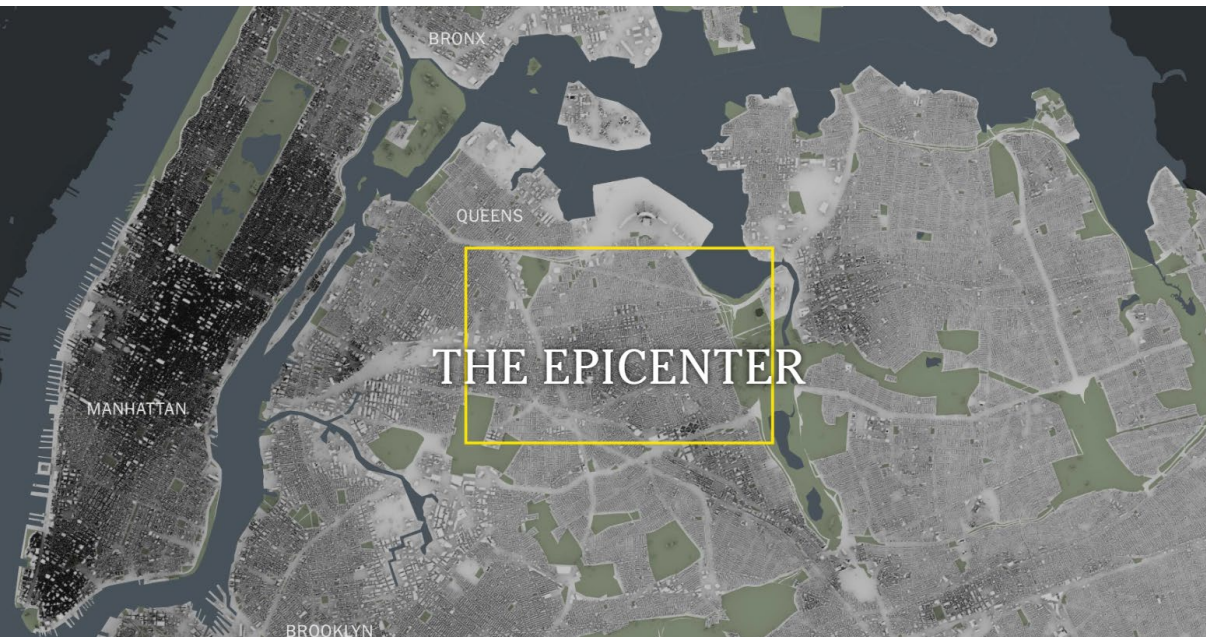
Oxygen for Health System Resilience

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A Personal Reflection



March 2020



April 2020



Risks of Infrastructure Failure

- Oxygen pressure gauges alarmed with low pressure
- Clinical teams (providers, nurses, respiratory therapy) scrambled to switch patients from piped oxygen to portable tanks
- No patient safety issues
- Safety shut-off steam valve failure led to oxygen bulk vaporizer and supply lines freezing





[The Night We Held Our Breath: Inside Bellevue's Oxygen System Upgrade - YouTube](#)

Take-Aways

- Just-in-time models can lead to significant disruptions in the supply chain, as healthcare facilities do not have large on-hand stockpiles of critical supplies
- Small numbers of vendors serving large populations will increase competition in obtaining limited resources
- Strength of systemization – For all consumable resources, systemizing as we do in H+H allows us to redeploy from other facilities.
- Weather impacts to deliveries – blizzards and storms can impact roads and travel. Bellevue is on an island which can be vulnerable if bridges & tunnels are closed or impacted. Limited space for helicopter or air deliveries. Also space constraints make it difficult to have warehouses or major stockpiles in Manhattan, not just for Bellevue but all critical infrastructure.

Take-Aways

- Staffing components – when swapping from a piped to a portable system in an emergency, a large amount of staff resources are required to monitor and swap empty tanks. As we've updated our O2 failure plan, we identified the staffing needs across RT and nursing to manage the tanks.
- Long-term mitigation from an all-hazards perspective – After Sandy, when the oxygen plant was hardened against flooding with barriers and doors, it affected the atmospheric condensers and the ability to convert liquid oxygen to gas. As Systems are hardened, all hazards have to be considered for the best mitigation planning. We have alternate means (steam condenser) and trailers to assist.