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# COVID-19: Why Blockchain Technology Is a Better way to Manage the Ventilator and PPE Supply Chain

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## Abstract

During the COVID-19 crisis, states from New York[1] to Kentucky[2] are scrambling to find ventilators and personal protective equipment (PPE) needed to curb the spread of this pandemic. A ventilator shortage was predicted back in 2018 when the US Department of Health and Human Services (HHS) and the Johns Hopkins Center for Health Security determined that during a severe respiratory pandemic such as COVID-19, up to 742,500 people might need mechanical ventilation; however, as of this writing, the maximum number that the US has available to distribute is 160,000.[3]

The result? Healthcare workers are concerned about running out of PPE and other supplies to protect themselves and their patients. Doctors are worried about whether there will be enough ventilators to go around, and whether they'll be forced to make terrible life-or-death decisions on who gets one and who doesn't.[4] Patients are fearful that an overextended healthcare system won't have the supplies and resources to provide the care they need to survive.

[1] https://www.usatoday.com/story/news/2020/04/04/coronavirus-ventilator-shortages-may-force-tough-ethical-questions-nyc-hospitals/5108498002/

[2] https://thehill.com/homenews/state-watch/491261-kentucky-governor-says-its-very-hard-to-compete-with-federal-government

[3] http://www.centerforhealthsecurity.org/our-work/events/2018_clade_x_exercise/pdfs/Clade-X-ventilator-availability-fact-sheet.pdf

[4] https://www.nytimes.com/2020/04/01/nyregion/coronavirus-doctors-patients.html

## Who Ensures Hospitals Have Essential Supplies?

Given the urgency of this situation, Federal Emergency Management Agency (FEMA) and HHS have been tasked with jointly managing the supply and distribution of vital medical supplies[5]. In addition to two governmental agencies acting as "owners," no consistent mechanism exists for manufacturers, hospitals and other stakeholders to communicate their supply and demand information to State-level emergency managers. In the current process, some stakeholders use spreadsheets; some use emails and others direct phone calls. States share this information with FEMA, who then manually coordinates and allocates the resources among the states based on a continually changing supply and demand information. Because disparate systems along with manually intensive methods are used to manage these essential supplies, this creates shortages and delays in the supply chain. Clearly, a tightly integrated and consistent mechanism is now more important than ever for manufacturers, hospitals and other stakeholders to communicate their supply and demand information to State-level emergency managers. Blockchain technology can provide the backbone for such a system.

## What Is Missing from the Picture?

Currently, states and hospitals have inconsistent information about how many ventilators there are, where ventilators are located, who can share them, and who has the most urgent need. In other words, there is no systemized way to prioritize and no single consolidated view of supply and demand information for existing and newly sourced ventilators and PPE.

The information flow is siloed and unorganized, making it exceedingly difficult for government agencies to respond effectively to this pandemic.[6] This problem only gets compounded as the crisis escalates and peaks at different times from state to state.[7] Without accurate and real-time information, moving vital resources such as ventilators from one hotspot to another becomes an ongoing logistical nightmare.

[5]  https://www.fema.gov/news-release/2020/03/27/fema-administrator-march-27-2020-letter-emergency-managers-requesting-action

[6]  https://www.denverpost.com/2020/03/08/colorado-coronavirus-care/

[7]  https://www.beckershospitalreview.com/patient-flow/when-will-covid-19-peak-a-state-by-state-analysis.html

Another big challenge is to strategically allocate equipment as it is delivered from various, new sources (e.g. GM, Ford[8] and Tesla[9]) and unorthodox places (e.g. veterinarians[10], police custody[11] and universities). Government leaders and hospitals have expressed their willingness to accept ventilators from nearly anywhere. For example, NY Governor Andrew Cuomo has been very vocal about the need for 40,000 ventilators and his willingness to accept them from nontraditional sources.[12]

## How Can We Improve This Situation?

To coordinate and effectively manage this crisis, it is vital to have a single consolidated and accurate view of real-time supply and demand information for ventilators and PPE.

The combinatorial power of digital technologies like Blockchain, Cloud and AI can be used to create a single, trusted and transparent view of supply and demand information across multiple stakeholders, geographies and legal entities. This platform would enable hospitals, manufacturers, suppliers, distributors, FEMA, state emergency managers and other stakeholders to securely read and/or update a shared repository of inventory (supply and demand) information. FEMA and state governments could then coordinate to quickly and efficiently allocate supplies as need shifts from state to state.

By providing a much-needed, consolidated view and connecting the entire ventilator and PPE stakeholder ecosystem, this kind of solution eliminates the need to exchange information and coordinate next steps. It also enables a direct-to-hospital model that accelerates the overall delivery process by enabling suppliers (manufacturers, donors and other hospitals) to connect and exchange directly with the recipient hospital.

In addition, improving real-time tracking and traceability of ventilators and PPE helps forecast demand and better allocate and reallocate the available ventilators and PPE. Non-functional, incompatible or defective units can also be traced and removed from the ecosystem, therefore giving central authorities and hospital providers a more accurate view of their actual stock.

[8]  https://www.cnbc.com/2020/04/06/video-tesla-building-ventilators-for-covid-19-patients-from-car-parts.html

[9]  https://whdh.com/news/hank-investigates-animal-hospitals-loaning-ventilators-to-help-people-with-covid-19/

[10]  https://www.spotlightnews.com/news/2020/03/25/guilderland-police-donate-ventilator-used-in-teens-murder-case/

[11]  https://www.kxan.com/news/central-texas-schools-and-universities-donate-supplies-to-help-fight-covid-19-pandemic/

[12]  https://www.syracuse.com/coronavirus/2020/03/cuomo-refutes-trump-insists-ny-needs-up-to-40000-ventilators-i-operate-on-facts.html

# The Power of Technology to Provide Quick and Coordinated Collaboration

The ongoing COVID-19 pandemic has shown the power of technology to unify organizations, students and citizens to collaboratively prevail during these challenging times. For example, video communication tools facilitate social distancing, allowing many to continue working and studying from home[13]. But technology also has a key role in helping governments and healthcare networks coordinate and manage supplies, including for ventilators and PPE shortages by creating better end-to-end visibility and transparency.  In other words, technology can help us prevail in our most pressing hour by enabling nationwide collaboration to deliver life-saving essentials.

Brave healthcare professionals are on the frontline providing care for sick patients and saving lives. Grocery workers find themselves working grueling shifts to stock stores to provide food to sustain entire communities. Truck drivers continue to ensure that delivery of packages arrive to our homes. These are just a few examples of how individuals are doing their part. Now is the time for other organizations, including government bodies, corporations and businesses, and thought and industry leaders, to come together and collaborate in helping countries respond quickly and efficiently, when it matters most.

[13]  https://www.theverge.com/2020/3/23/21175407/remote-work-working-from-home-guide-how-to-tips-video-conference-calls-laptops-zoom-slack

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