

Unpublished OpEd sent to the NY Times: “Use Location To Fight COVID – 19”

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Co-Authors

Alan Leidner, President, NYC Geospatial Information Systems and Mapping Organization (GISMO) and former NYC Chief Geospatial Information Officer (CGIO)

<https://www.gismonyc.org/about-us/leadership/>

Sean Ahearn, Professor of Geography and Director of the Center for Advanced Research of Spatial Information (CARSI) at Hunter College – CUNY

<http://www.geo.hunter.cuny.edu/people/fac/ahearn.html>

George Percivall, Chief Technology Officer (CTO) and Chief Engineer, Open Geospatial Consortium (OGC) <https://www.ogc.org/ogc/organization/staff/gpercivall>

Use Location To Fight COVID-19

If you are experiencing a health emergency, see flames coming from a window, or observe a crime in progress, you dial 911. Talking to the dispatch operator, perhaps the most important piece of information you can provide is your location. 911 operators generally take time getting the exact spelling of the street name and the precise numerical address, which they then validate by checking against a “geocoding” application designed to correct mistakes, return geographic x,y coordinates, and ensure accuracy. Then, based on this location, the closest emergency response team is dispatched to the right place. Many emergency calls in New York City and in other jurisdictions across the U.S. get responders to the right location within six minutes, fast enough, for example, to save the life of someone suffering from cardiac arrest when every second counts.

The 911 system, deployed at public safety access points (PSAP) across the nation, saves hundreds of lives every day. While most Americans understand the life-saving ability of 911 systems, few realize that these systems are based upon geospatial information systems (GIS) that relate address to a specific place on a map that can be as precise as a building footprint, a building floor, and even an apartment number. The more accurate the location, the shorter the response time and the more lives saved. Moreover, the same spatial principles that make 911 systems so effective are also used to support hundreds of municipal operations such as inspections, infrastructure repairs and delivery of human services; increasing government efficiency and effectiveness, and saving money. But these GIS operations are largely behind the scenes away from public awareness.

Now we face the challenge of COVID-19, and accurate GIS based geocoding and locating systems offer the opportunity to help control this Pandemic. Since coronavirus spreads within households, from apartment to apartment, from building to building, along travel routes and within places of employment and business, knowing who is infected, where they live and work,

how they travel, and who they come in contact with is essential to fighting it. If we can comprehensively gather this information, we can understand where the virus has been and predict where it is likely to go next. If we then relate information about neighborhood characteristics, health, demographics, socio-economic data, and travel information on top of COVID-19 cases (which the data integration powers of GIS enable us to do) we can get a more in-depth understanding of disease behavior that allows us to design and implement better containment strategies. For example, knowing that twenty active cases of COVID-19 within a zip code comprising fifty city blocks are actually occurring on the top floors of one large residential building effectively focuses the response. Additionally, it is also vital to detect the gathering of large groups of people likely to include COVID-19 positive individuals, and to then identify and notify those who might have been exposed to the virus.

The advantages of rapid, near real time, precision and proximity mapping of COVID-19 cases should be obvious. But a number of departments of health across the U.S. are declining to join forces with their mapping co-workers in other agencies, and are unaware of the power of geocoding and proximity sensing tools. Address data collected at testing sites and hospital admission offices is mostly hand written and known to have an error rate that can exceed twenty percent. Government agencies are also not taking advantage of ways patient location information can be captured without exposing health care workers at intake sites. Digital bar code readers utilized to automate traffic ticket issuance by having traffic agents scan registration stickers on windshields, can be given to personnel at drive-in testing stations. For walk in sites, the address information fields of an online registration form can be linked to a geocoding application that automatically corrects and validates address information. We should be deploying these tools – which already exist, are in widespread use, and have years of proven effectiveness.

Many DOH's are saying HIPAA privacy rules prevent them from working with their GIS colleagues because they fear the release of personal health information. But HIPAA rules can easily be interpreted to allow the use of personal health information (PHI), such as addresses, by a variety of public safety agencies working on operations support and analysis aimed at battling the pandemic and saving lives. Many means exist to make certain that personal location information is fully protected.

<https://www1.nyc.gov/assets/doh/downloads/pdf/public/hipaa>

We are entering a new phase in our fight against the coronavirus where contact tracing will be used to identify infected individuals. We must identify those with whom they interacted, the places where they work and shop, and their means of transportation. It should be clear that contact tracing cannot be successful without reliable location information so that accurate activity and interaction maps and analyses can be developed. Ideally, contact tracing applications like CommCare and Sara Alert, which specify the capture of many different kinds of location information, would be interfaced with existing state and local address and mapping systems to ensure that the location data collected is precise, accurate, standardized and able to

be combined to see larger patterns. But this means that DOH's across the country must be willing to speak with their GIS counterparts, something which is happening only sporadically right now. Additionally, new techniques in proximity mapping using smart phone to smart phone sensing to identify interactions with COVID-19 positive individuals also need to be deployed.

Contact tracing information combined with smart phone-based proximity data can also yield analytics that show us how and where safe distance can be maintained and congestion avoided. This will be essential to determining safe re-opening practices for businesses, schools, cultural institutions, and entertainment and recreational venues.

In 1854, Dr. John Snow, considered to be the father of modern epidemiology, <https://www.rcseng.ac.uk/library-and-publications/library/blog/mapping-disease-john-snow-and-cholera/>, used manual mapping techniques to identify the buildings where those infected with cholera lived. He used this map to discover that a nearby water pump was the cholera source. Yet today, many DOH's are refusing to fully use far more sophisticated mapping methods to deal with COVID-19. Ironically, DOH's across the country, starting with NYC in 2000, used GIS to manage and suppress the West Nile Virus outbreak. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3381548/> These lessons seem to have been forgotten.

We urge government executives across the U.S. to talk to their state and local GIS managers and bring them together with their DOH leaders to develop better, more automated and accurate ways to capture location information about the coronavirus outbreak. We must make sure that the data and analytics we use to fight the pandemic are the very best we have, so that lives can be saved, and the virus brought under control.

Readers may wish to go to the statement issued <https://nsgic.memberclicks.net/joint-statement-on-the-value-of-gis-in-the-pandemic> by the National States Geospatial Information Council (NSGIC), composed of the Geospatial Information Officers (GIO's) of every state. The NSGIC statement is endorsed by key professional geography and GIS organizations both local, regional, national, and international.