R13 - U.S.-Mexico Risk Taskforce to Support the Health Supply Chain Systems for Infrastructure and Workforce Threatened by the COVID19 Pandemic

Monthly Risk-Bulletin January 2021

The objective of the Monthly Risk-Bulletin is to provide an overview a) of lessons learned during the past month in the project, b) of a score-card-type system to communicate the state of risk of supply chains impacted by COVID-19 supporting health infrastructure and the workforce between the U.S. and Mexico, and c) of a communication system to facilitate the restoration of broken supply chains and the formation of new ones to reactivate trade between U.S. and Mexico. The report aims to offer valuable insights to the general public and decision-makers towards informed preventive actions to reduce the current pandemic's potential impact on critical supply chains and better strategize about feasible social, economic, and environmental risk-mitigating actions against COVID19 and converging threats. This bulletin is jointly produced by the project's PIs, the project's contractors, and the U.S. binational task force serving as advisors to the project.

PIs

Zenon Medina-Cetina, PhD – PI	Gregory Pompelli, PhD – Co-PI
Matt Cochran, DVM, MIA – Co-PI	Maria Jose Perez-Patron, PhD – Co-PI
Miriam Olivares, GISP – Co-PI	

Document prepared with the support of:

Guillermo Duran
PhD Student
SGL - Graduate Research Assistant

Reviewed & Approved by:

Dr. Medina-Cetina – PI

02/12/2021

Table of Contents

CROSS-BORDER THREAT SCREENING
AND SUPPLY CHAIN DEFENSE
A Department of Homeland Security Center of Excellence

SGL Stochastic
Geomechanics
Laboratory

I. Introduction

This risk bulletin report provides an overview of the project status, general objectives, and the most important initial lessons learned during the last period of covered performance.   The main objectives of this project are support all health supply chain systems for both infrastructure and workforce, and to do it accounting for the inherent cultural regional differences, and considering the current and emerging regional social, economic and environmental risks. As a reference for the publication of the Risk Bulletin, the three main milestones of the project are:

1. Integrate a triple-helix binational taskforce comprised of representatives from academia, industry, and government from the U.S. and Mexico. Address the public health impacts of the COVID-19 pandemic on the U.S. – Mexico health supply chain systems for health infrastructure and for the health of the workforce, considering current and emerging regional social, economic, and environmental Risks.
2. Develop a data-lake platform concentrating near real-time analytics following a risk systems approach that can provide strategic information about the evolution of COVID19 and related current and emerging threats, the state of vulnerability of the health supply chain systems and the likely impacts a combination of these may cause to society, the economy and the environment.
3. Publish a monthly U.S.-Mexico COVID-19 Risk Bulletin to provide scientific, technological, and strategic cultural support to secure the operation of the U.S.-Mexico health supply chain systems.

This risk-bulletin report primarily serves as a liaison to inform the general public of our ongoing efforts and general lessons learned during the discussed timeframe. Once the Data-Lake System becomes operational, risk-based analytics produced will be summarized in the bulletin.

II.   Project Status & Lessons Learned

Milestone & Activity	Lesson Learned	Type
Milestone 3: Data-Lake		**Research**
Research Problem 1: COVID-19 Vaccine	• The development of the COVID-19 vaccine demands unprecedented logistical challenges related to manufacturing, purchasing, distribution, allocation, and uptake (Cameron-Chileshe, 2020; National Academies of Sciences & Medicine, 2020). • Vaccination is an effective and inexpensive tool to fight against major diseases. However, obstacles such as a well-organized anti-vaccine movement and misinformation have jeopardized popular acceptance of vaccination in the past (Bloom et al., 2005). • There is an urgency to protect healthcare workers against COVID-19 transmission.	

CROSS-BORDER THREAT SCREENING
AND SUPPLY CHAIN DEFENSE
A Department of Homeland Security Center of Excellence

SGL Stochastic
Geomechanics
Laboratory

Literature Review

- New York Times Coronavirus Vaccine Tracker provides a world perspective vaccine tracker to communicate to the general public about the status of vaccines as follows (Neagu, 2020):
    - Phase 1: safety trials.
    - Phase 2: expanded trials.
    - Phase 3: efficacy trials.
    - Authorized: early or limited approval.
    - Approved: a review of complete trial results and plans for manufacturing.
    - Abandoned: pause or discarded.
- The Mexican government published on January 11th, 2021, 5 phases for vaccination against COVID-19 (Salud, 2020):
    - Phase 1 (Dec 2019 – Feb 2021): healthcare workers only.
    - Phase 2 (Feb – Apr 2021): remaining healthcare workers and people over 60 years old.
    - Phase 3 (Apr – May 2021): people between 50-59 years old.
    - Phase 4 (May – Jun 2021): people between 40-49 years old.
    - Phase 5 (Jun 2021 – March 2022) general population.
- COVID-19 Vaccine Pre-Ordered Supply for Mexico (Salud, 2020):
    - 34.4 MM by Pfizer.
    - 77.4 MM of doses by AstraZeneca.
    - 51.5 MM by COVAX (WHO).
    - 35 MM by CanSino Builogics.
    - 24 MM by Sputnik.
- U.S. Kaiser Family Foundation Health Tracking Poll COVID-19 Vaccine Monitor January 2021 (KFF, 2020, 2021):
    - This monthly survey measures public's opinion about vaccine efforts in a monthly basis.
    - The survey was conducted November 30 - December 8, 2020, among a nationally representative random digit dial telephone sample of 1,676 adults ages 18 and older living in the United States, including Alaska and Hawaii.
    - 27% of the public says they probably or definitely would not get a COVID-19 vaccine. The main reasons are side effects, lack of trust in the government,

CROSS-BORDER THREAT SCREENING
AND SUPPLY CHAIN DEFENSE
A Department of Homeland Security Center of Excellence

SGL Stochastic
Geomechanics
Laboratory

	concerns that the vaccine is too new, and concerns over the role of politics in the development process. • U.S. COVID-19 Vaccines Kits. Ancillary supply kits include (McKesson, 2020): o Alcohol prep pads. o Face shields, surgical masks and additional PPE. o Needles and syringes. o Vaccine administration sheet for healthcare providers. o Vaccination record and reminder cards. o 100 vaccination records. o 1 Needle guide.	
Research Problem 3: Healthcare Sector	Research relevance • Healthcare workers are vital to reduce the fatality percentage of a population. • COVID-19 positive cases and deaths in healthcare workers are still increasing. • There is a need to provide information on how vulnerable healthcare workers are in U.S. and Mexico health institutions due to COVID-19 in order to improve decision-making to protect healthcare workers. Literature Review • Official U.S. Cases & Deaths among Healthcare Personnel according to the CDC as of January 21st, 2021 (CDC, 2020): o 373,670 COVID-19 positive cases. o 1,269 COVID-19 deaths. o However, "Lost on the frontline" study estimates a total of 3,248 deaths (Guardian, 2021). o The majority of deaths were during the months of April and May 2020. o Nurses, healthcare supporters, and physicians account for the most deaths in healthcare personnel. • Official Mexico's Cases & Deaths among Healthcare Personnel as of January 18th, 2021 (Health, 2020; Health, 2021): o 204,070 COVID-19 positive cases. o 2,687 COVID-19 deaths. o Nurses, healthcare supporters, and physicians account for the most COVID-19 cases in healthcare personnel. o Physicians, healthcare supporters, and nurses account for the most deaths in	

CROSS-BORDER THREAT SCREENING
AND SUPPLY CHAIN DEFENSE
A Department of Homeland Security Center of Excellence

SGL Stochastic
Geomechanics
Laboratory

	healthcare personnel.	
Milestone 4: **Risk- Bulletin**		
Cloud configuration of the Data-Lake System	• The cloud configuration of the Data-Lake System was finalized, and the following tools to installed start the data ingestion process: ○ Apache NiFi ○ Ambari ○ Spark ○ Hadoop • Access to commercially available Eikon platform for real-time financial markets information.	**Information Technology**
Third-party data providers & platforms	• Contracting with Eikon was finalized.	**Management**

III.   Risk Communication Mechanism

The PIs started a discussion to design the CBTS-SGL dashboard systems to be hosted at the Data Lake System. These included SGL, THEI, Centro-Geo and Plenumsoft Americas, to review a preliminary dashboard design, including future risk-based analytics. A literature review conducted earlier in the project and best practices from industry are being discussed to produce the best risk-based dashboard system. Dr. Medina-Cetina introduced the 3D dashboard conceptual model including geographical locations (U.S., Mexico, Binational U.S.-Mexico Dashboards), risk components (threat, vulnerable systems, exposure, mitigating actions, state of risk), and stochastic variables $(V, V(t), V(X), V(X, t))$.

IV.   Restoration and Creation of Supply Chains

Contact was made with Dr. Maria Marinissen, at the Department of Health and Human Services in the U.S. Embassy in Mexico, to discuss a partnership on developing a system to interconnect supply-chains across the Mexico-U.S.-Canada borders on pandemic-related supply chains. A series of meetings took place between Dr. Cochran and Dr. Medina-Cetina to identify common interests in the restoration and creation of supply chains threatened and impacted by COVID-19 and related converging threats.

V.   References

Bloom, D. E., Canning, D., & Weston, M. (2005). The value of vaccination. *WORLD ECONOMICS-HENLEY ON THAMES-*, *6*(3), 15.

Cameron-Chileshe, C. C. S. N. J. (2020, December 7, 2020). Output of Oxford-AstraZeneca doses held up. *Financial Times*. https://www.ft.com/content/651be7e7-2a4e-410f-8089-b4b7e887f6e8

CDC. (2020). *COVID Data Tracker*. Retrieved January from https://covid.cdc.gov/covid-data-tracker

Guardian, T. (2021). *Lost on the Frontline: US Healthcare Workers Who Died Fighting Covid-19*. Retrieved January from https://www.theguardian.com/us-news/ng-interactive/2020/aug/11/lost-on-the-frontline-covid-19-coronavirus-us-healthcare-workers-deaths-database

Health, M. D. o. (2020). *Exceso de Mortalidad en México*. Mexico's Department of Health. Retrieved November from https://coronavirus.gob.mx/exceso-de-mortalidad-en-mexico/

Health, M. s. S. o. (2021). *Weekly Report "Informes sobre el personal de Salud COVID19 en México"* Retrieved January from https://www.gob.mx/salud/documentos/informes-sobre-el-personal-de-salud-covid-19-en-mexico

KFF. (2020, December 15). KFF COVID-19 Vaccine Monitor: December 2020. *Kaiser Family Foundation*. http://files.kff.org/attachment/Topline-KFF-COVID-19-Vaccine-Monitor-December-2020.pdf

KFF. (2021, January 22). KFF COVID-19 Vaccine Monitor: January 2021. *Kaiser Family Foundation*. http://files.kff.org/attachment/Topline-KFF-COVID-19-Vaccine-Monitor-January-2021.pdf

McKesson. (2020, January 22). Coronavirus Vaccine Support for COVID-19. *McKesson* https://www.mckesson.com/About-McKesson/COVID-19/Vaccine-Support/

National Academies of Sciences, E., & Medicine. (2020). *Framework for Equitable Allocation of COVID-19 Vaccine*. The National Academies Press. https://doi.org/doi:10.17226/25917

Neagu, M. (2020). The bumpy road to achieve herd immunity in COVID-19. *Journal of Immunoassay and Immunochemistry*, 1-18. https://doi.org/10.1080/15321819.2020.1833919

Salud, S. d. (2020, December 8, 2020). 243. En México, la vacunación contra COVID-19 será gratuita y universal. *Secretaria de Salud*. https://www.gob.mx/salud/prensa/243-en-mexico-la-vacunacion-contra-covid-19-sera-gratuita-y-universal