

Poster Listing

2014 Health & Humanitarian Logistics Conference

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Poster 1

A Proposal Based on Risk Management and Collaboration for Facing Drug Shortages in Colombia

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In Colombia, like in other countries, there have been essential medicines shortages explained by different causes. In some cases this situation has not only caused bigger expenses in Colombia's health system budget but also has affected the patient's treatment. Other cases are just warnings to be confirmed or they require actions and stakeholders participation in order to avoid a shortage. To develop a national

approach to face this problem a risk management strategy based on collaboration between agents and government was designed for being implemented by the Health Department.

Methodology: An initial diagnosis of drug shortage was done over the Medicines Supply Network (MSN), in order to establish the problem importance and also dismiss situations considered as shortages. Then, a risk model was applied according to the National Risk Standard finally a framework was developed for the MSN.

Results: During the last 2 years Colombia, has faced different issues related with medicines shortages that have made authorities to review: which situations must be considered real shortages?, its causes, responsibilities, and solutions. Colombia should guarantee the health access; the MSN is highly fragmented and very complex. So that, It was necessary to establish and manage a National plan for drug shortages based on risk management with focus on communication strategies through supply network.

Conclusions: The National shortages plan is based on collaboration, involves government offices such as: National Health Surveillance Agency (INVIMA), the Foreign Trade Office, The Cancer National Institute, in this way other supply network agents must collaborate generating early warnings about supply problems due to the offer, in order to find early solutions. Communication and information sharing are fundamental for the strategy. The plan also includes changes in legal issues.

Poster 2

Critical Success Factors in the Adoption of an Electronic Personal Health Record: The BIOCARNET Case

Ángel García (Tecnológico de Monterrey (Monterrey Campus)), Martha Corrales (EGADE Business School (Monterrey))

The health information for Mexican citizens has been documented in a physical, paper-based, National Health Carnet. Personal health records are dispersed and fragmented in multiple institutions, including hospitals, labs, pharmacies, several doctors offices, and different regions. As a consequence, the interest to integrate a comprehensive and longitudinal health information record from birth to death has triggered the design and implementation of BIOCARNET, an Electronic Personal Health Record (ePHR) that is free, web based, mobile, interoperable, and platform independent in which the user has a unique ID, the CURP, for secure identity and access. BIOCARNET uses clinical guides and protocols to monitor and to alert of recommended checkups based in customized information (gender, age, weight, region, and physical activity) to prevent diseases

and to promote a health prevention culture. The idea is similar to the carnet used to maintain the vehicle in excellent condition.

Poster 3

Decision Support System for Flood Preparedness and Response

Óscar Rodríguez-Espíndola (Aston University), Pavel Albores (Aston University), Christopher Brewster (Aston University)

Given the number of people affected by natural disasters driven by the combination of the number of events, vulnerability and population growth; it is important to strengthen the body of research aiming to protect and provide adequate care for disaster victims, particularly in developing countries provided that the majority of disasters occur there. Among all disasters, floods are one of the most common and destructive phenomenon world-wide, thus the development of disaster management tools for floods is highly relevant. Moreover, compared to other natural disasters these catastrophes are more predictable and allow more time to react; however there is an absence of studies focused on floods in developing countries. Therefore, this research will introduce a decision-support system for flood preparedness and response based on the use of multi-objective optimization and geographical information systems (GIS). The use of raster GIS encompasses the assessment of the impact of the disaster, providing information for two optimization models. First, a bi-criteria multi-commodity preparedness optimization model encompasses the use of human resources for multi-agency collaboration in the coordination of the activities related to facility location (shelters and distribution centres), stock pre-positioning and service allocation to satisfy the needs of people displaced by a disaster right after the event. Then, a multi-period bi-criteria response optimization model is used to minimize shortages of different commodities on shelters and non-evacuated areas and the number of actors involved for the entire duration of the disaster, considering limited human and material resources.

Considering that Mexico has the second largest economy in Latin America but nearly 50% of population living under poverty conditions, combined with the physical vulnerability of the country to natural disasters, this research will include an application to three case studies in the country, analyzing the performance of the system under different scenarios and contexts.

Poster 4

Disaster Risks and Impacts on Supply Chains: Building a Model Using a Bayesian Network Analysis

Masahiko Haraguchi (Columbia University)

Floods negatively impact the global economy through disruptions in supply chain networks. Today's global supply chain has achieved cost savings through reduced inventories, shortened transit cycles, and streamlined production processes. Even though the supply chain is very efficient, it is still susceptible to systemic risk, a financial term used to describe a risk originating from one node of a financial network which then harms the entire financial market. Thailand, for example, was economically devastated by prolonged flooding in 2011. The country accounts for approximately 40% of the world's production of hard disk drives (HDD). HDD shipments from the industry's five major manufacturers declined severely in the fourth quarter of 2011 to 123.3 million units, which was down 30% from 175.2 million units the quarter before. As a result, United States consumers faced an 80%-190% price increase for certain hard drive models. Other industries were also affected by the Thailand floods, including the automobile sector. Since the Japanese automakers consist of more than 90% of automobile productions in Thailand, Japanese automakers' operating profits drastically declined on the global scale. For example, Honda lost operating profit due to Thai floods than due to Yen appreciation in April – December 2011. Base on the case study of supply chain disruptions caused by Thai floods in 2011, my preliminary research identified 5 research questions. These questions relate to critical nodes, critical links, cascading failure, bridge ties, reliability in a network, tie degree (strong and weak) and network performance. This paper demonstrates how a Bayesian Network is an effective methodology to analyze supply chain risks and attempts to build a simple model to test these hypotheses. In particular, the paper focuses on conducting sensitivity analysis for inventory data as well as including flood probability for input data.

Poster 5

Entrepreneurial Approach to Humanitarian Logistics: A case study from Turkey

Yavuz Gunalay (Bahcesehir University), Levent Aksoy (Maltepe University)

Entrepreneurship is the process of identifying and starting a business venture, sourcing and organizing the required resources and taking both the risks and rewards associated with the venture. Typical opportunity is a business venture; typical reward is monetary

profits. In the broader sense opportunities can include innovative solutions to social problems, public issues; rewards include personal gratification, career accomplishment, social recognition etc.

Recently we do see more and more professionals from different fields involve in humanitarian relief activities as volunteers, due to these non-monetary rewards. These can be analyzed under the social responsibility umbrella and it is known that both individuals and organizations benefit from such actions and become heroes in the eyes of public. The question is: 'Besides these internal and public eye rewards that these professionals get, do victims of natural disasters benefit involvement of these professionals?'

In this study, we compare entrepreneurial approaches and a government controlled volunteer structure to provide humanitarian aid to victims of natural disasters. Logistics will be the core of this comparison and the discussion is made on the efficiency comparison of these two approaches. A case study from Turkish experience will be given at the end of the presentation.

Poster 6

Food Aid Distribution During Disaster Response and Short-Term Recovery: Enhancing Performance of Heterogeneous Humanitarian Logistics Structures

Juan Camilo Sánchez Gil (University of Delaware), Sue McNeil (University of Delaware)

Victims from armed conflicts and natural hazards in developing countries may experience double-vulnerability due to the exposure to one or more disaster events at a time. Such is the Colombian situation where in 2013 more than four million internally displaced persons from the armed conflict combined with at least three and a half million affected by the 2010 and 2011 floods created intersecting population groups concurrently affected by manmade and natural disasters. In self-evaluating the performance of food aid distribution, the humanitarian agencies in Colombia acknowledge dissatisfaction when it comes to assuring minimal food security levels to disaster victims during the response and short-term recovery phases of disaster management. A challenge is that the humanitarian action that assists both kinds of victims operates separately ignoring opportunities for gaining efficiencies in the food aid distribution process by operating synergistically, either among actors from the same humanitarian agency or combined. This research recognizes the heterogeneity of the established humanitarian logistics structures that orchestrate food aid distribution, but hypothesizes that such heterogeneity may be a link to improving the performance of

disaster response operations. Based on concepts widely discussed by scholars in humanitarian and commercial logistics, this research defines typologies of humanitarian logistics structures that contribute to closing a performance gap in the context of orchestrating food aid distribution using the supply chains identified. Following a new approach to humanitarian logistics modeling from the literature (Pérez, 2011), this research assesses the performance of recommended food aid distribution policies, as determined by both operational and social considerations. Using formulations that realistically represent some of the challenges of the humanitarian action and actual data collected through fieldwork, this research focuses on the humanitarian logistics strategies that contribute to minimizing the human suffering of internally displaced persons and natural disaster victims.

Poster 7

Multicriteria Models for a Humanitarian Logistics Problem: An Integral Approach

Christopher Mejía-Argueta (Center for Latin-American Logistics Innovation - LOGYCA / RESEARCH), Juan Gaytán-Iniestra (Universidad Autónoma del Estado de México - Facultad de Ingeniería), Rafael Caballero-Fernández (Universidad de Málaga), Julián Molina-Luque (Universidad de Málaga), Begoña Vitoriano-Villanueva (Universidad Complutense de Madrid)

Natural disasters and man-made disasters are phenomena which strike countries all around the world with recently more frequency than before. Sometimes, either by the intensity of the disaster or the vulnerability of the lashed country. Humanitarian aid and help are requested, not only nationwide but also worldwide, from NGO's, government authorities and private organizations in order to respond effectively by delivering basic aid to those in need. To handle effectively this kind of help is important to face the different stages of the disaster, mainly during the preparedness and the response phases to guarantee a better performance. Humanitarian logistics is a critical factor in managing relief operations because of the rescue and aid actions. However until nowadays, there was a lack of attention on the development of mathematical models and solution algorithms for strategic and tactical decisions in this area.

It is necessary to distinguish that in humanitarian logistics traditional cost minimizing measures are not central, and then, new performance measures such as time of distribution, time of evacuation, equity in delivery of humanitarian aid and in evacuation of the operation routes become more relevant. In this work several criteria for an aid distribution, evacuation, location of shelters, evacuation points and distribution centers, and stock management problem during disasters are proposed in a

multicriteria optimization model for the preparedness phase and in a multicriteria metaheuristic for the response phase. Once the proposed model and the metaheuristic are described, an illustrative case study based on a Mexican catastrophic flood and other 10 instances are presented.

Comparing the results obtained from the mathematical models against the real response, it is shown that there exists opportunities to deal with these phenomena in a more effective way in all the criteria.

Poster 8

Promises of DNA based vaccines in improving vaccination supply in the developing world

José González-Valdez (Centro de Biotecnología FEMSA, Tecnológico de Monterrey, Campus Monterrey), José Manuel Aguilar-Yáñez (Centro de Biotecnología FEMSA, Tecnológico de Monterrey, Campus Monterrey), Jorge Benavides (Centro de Biotecnología FEMSA, Tecnológico de Monterrey, Campus Monterrey), Marco Rito-Palomares (Centro de Biotecnología FEMSA)

Vaccination is a major line of defense against infectious diseases. However, with many current vaccines production methods can be both time-consuming and expensive. These characteristics, together with the low number of vaccine manufacturers and the occurrence of region-specific diseases, prevent the ready availability of vaccines worldwide. These shortcomings particularly affect developing countries and present real vaccine supply concerns in the event of a global pandemic. DNA-based vaccines are now emerging as a potential alternative that could provide broader access to vaccination around the world. Although this technology is still in its initial research and development stages, production, processing and distribution of these kinds of vaccines could be greatly simplified since DNA is in essence a simple-to-handle molecule. With the proper methodologies and protocols, health care efforts around the world could enormously benefit from this technology ensuring better life-quality standards in less developed regions.

Poster 9

Using Performance-based Financing to Motivate Supply Chain Improvement at a Central Medical Store in Mozambique

Brian Serumaga (John Snow Inc), James Rosen (John Snow Inc), Cary Spisak (John Snow Inc), Lindsay Morgan (Broad Branch Associates), Rena Eichler (Broad Branch Associates)

Background: The predominant model of public health commodity supply chains in developing countries is one dominated by a central medical store (CMS). Challenges with technical and organization capacity at the CMS level has led to longstanding difficulties in creating sustainable performance improvements in several countries. In Mozambique, the central medical store (Central de Medicamentos e Artigos Médicos—CMAM) receives significant US government support (through USAID) for both health commodities and technical assistance. This has led to significant process improvements, but evidence for improvements in performance indicators is not clear.

Materials and methods: In January 2013, USAID entered into a year-long government to government grant arrangement that conditions disbursement of tranches of USAID support on specific results at CMAM. The disbursements would take the form of a fixed amount reimbursement award (FARA) of up to \$125,000 per quarter (\$500,000 per year) if CMAM could demonstrate meeting quarterly targets on six performance indicators. These indicators were related to planning, distribution, and warehouse management. The aim of the PBF program was to spur innovation and hard work, reduce pilferage, and improve warehousing.

We hypothesized that the FARA incentive would lead to improved supply chain performance through increased:

1. Staff motivation due to bonus payments
2. Collaboration between CMAM departments, and
3. Targeted investments in infrastructure, systems and human resources.

Indicators were selected in areas where change had previously been difficult to achieve, where baseline data could be collected, where performance was entirely under CMAM's control, where measurable targets could be set and achieved within one year. We collected baseline data in 2012.

Results: We found improvements in process and quality indicators. Matching records of stock status reports and physical counts improved from 70% at baseline to 85%. picking accuracy, order cycle times and distribution planning also improved. The incentive improved collaboration between CMAM departments.