

## Appendix B: Content Summaries of Selected Best Papers for the 2021 IMIA Yearbook, Special Section on Managing Pandemics with Health Informatics

Ahmed K, Bukhari MA, Mlanda T, Kimenyi JP, Wallace P, Okot Lukoya C, Hamblion EL, Impouma B

**Novel approach to support rapid data collection, management, and visualization during the COVID-19 outbreak response in the World Health Organization African Region: development of a data summarization and visualization tool**

*JMIR Public Health Surveill* 2020;6(4):e20355

This paper describes the development and deployment of a regional surveillance tool in low- and middle-income countries by the World Health Organization (WHO). The tool was created to support field data collection, contact tracing follow-up, and generating epidemiological information for decision makers in a timely manner; core functions of public health during a pandemic. The tool leveraged a wide variety of available information systems and open standards to enable each member state in the Africa region to contribute data, providing flexibility in reporting requirements. As member states submit data to the WHO Africa regional office, they are integrated into a data warehouse that then enables analysis. Information are visualized on a dashboard available to WHO and the Ministry of Health in each member nation. In addition, the WHO generates weekly situation reports and epidemiological updates. The paper nicely documents the data sources, information architecture, and processes used by public health authorities in leveraging health informatics to manage a pandemic. Furthermore, the paper is an important contribution from scientists based in Africa.

Garcia M, Lipskiy N, Tyson J, Watkins R, Esser ES, Kinley T

**Centers for disease control and prevention 2019 novel coronavirus disease (COVID-19) information management: addressing national health-care and public health needs for standardized data definitions and codified vocabulary for data exchange**

*J Am Med Inform Assoc Jul* 2020;27(9):1476-87

This article introduces readers to COVID-19 Information Management Resources Repository created by the U.S. Centers for Disease Control and Prevention (CDC). The free, online resource contains a wealth of information about emerging as well as harmonized data and information standards relevant to managing the COVID-19 pandemic. Health care and public health organizations needed to rapidly access information on data standards, including International Classification of Disease (ICD), LOINC (Logical Identifiers Names and Codes), and Current Procedural Terminology (CPT) codes, to apply in electronic health record (EHR) and other clinical information systems when documenting and/or sharing data on diagnoses, symptoms, and outcomes. The repository also contained documentation and details on CDC case definitions for confirmed and probably cases, as well as guidelines for defining patients under investigation (PUIs). These are critical resources for local jurisdictions as well as clinical organizations and researchers. The article nicely summarizes the variety of data, information, process, and workflow standards necessary for development by national public health authorities to support the management of patients and populations during a pandemic.

Gong M, Liu L, Sun X, Yang Y, Wang S, Zhu H

**Cloud-based system for effective surveillance and control of COVID-19: useful experiences from Hubei, China**

*J Med Internet Res Apr* 2020;22(4):e18948

This paper describes the development and deployment of a population surveillance

system in the city of Honghu located in Hubei province in China. The article details the various data sources and information systems deployed to detect, triage, screen, diagnose, and manage patients. Population questionnaires screened individuals outside of care settings, and these data were integrated with laboratory test results as well as EHR system data on patients in hospitals. A common data model was quickly developed to harmonize information into a cloud-based platform upon which analytics and modeling were deployed to inference population trends. The paper nicely illustrates the concept of integrated disease surveillance, in which health care and public health organizations work together to manage population health at the community level. The paper further discusses the facilitating factors and challenges faced by the informatics team asked to rapidly build and deploy the system within 72 hours. It was selected as a best paper, because it documents an impressive achievement and offers a schematic for how other jurisdictions might leverage health informatics systems to manage a pandemic.

Reeves JJ, Hollandsworth HM, Torriani FJ, Taplitz R, Abeles S, Tai-Seale M, Millen M, Clay BJ, Longhurst CA

**Rapid response to COVID-19: health informatics support for outbreak management in an academic health system**

*J Am Med Inform Assoc Jun* 2020;27(6):853-9

Hospitals in many nations were overwhelmed with patients affected by SARS-CoV-2. In response to the pandemic, hospitals leveraged multiple information systems to triage patients based on acuity, expand capacity to care for growing numbers of patients, and keep clinicians and other employees healthy. This case report from the University of California San Diego Health system summarizes the various activities many hospitals and health systems undertook to leverage the EHR and other information systems to manage their response to COVID-19. The case study highlights how a commercially used EHR

system was expanded to implement new order sets, triage protocols, and documentation templates rapidly. Upon establishing an Incident Command Center, the health system identified several operational areas that would benefit from expanded use of their informatics infrastructure. A dashboard streamlined access to data and information for clinical operations leaders, and a patient portal became a hub for virtual visits as ambulatory centers

were closed to allow for expansion of inpatient services for those severely ill from COVID-19. The EHR played a central role in collecting data and communicating information out to leaders and clinicians. This case study is also important because it detailed the many practical challenges the health system faced in deploying technologies in the wake of the pandemic. The evidence base for screening and treating COVID-19 patients changed almost daily.

Guidelines, order sets, and documentation requires rapidly changed, and there was no time to train staff on these frequent system updates. The Incident Command Center played a central role in disseminating information and identifying failures to inform iterations of the informatics tools. The lessons in this case report are important for the health system to note as the pandemic continues and preparedness begins for the next pandemic.