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The Black Canyon Forecast Station: Experiences And Lessons Learned

James M. Wilson*[1, 2], Bonnie Koehler[3], Kathleen Sramek[2] and Treve Henwood[2]

[1]Black Canyon Forecast Station, Delta, CO, USA; [2]Delta County Memorial Hospital, Delta, CO, USA; [3]Delta County Health and Human Services, Delta, CO, USA

Objective

To evaluate the sociological effect on indigenous biological event signature recognition and community resilience due to the operational activities of an infectious disease forecast station.

Introduction

The nation's first operational infectious disease forecast station, modeled after warning protocols developed in the meteorology community, was activated in 2011. The approach was originally pioneered in Haiti following the 2010 earthquake.

Methods

We assembled global event signature and forecast libraries that reflected locally diagnosed infectious disease activity and infrastructure impact in a rural community from a public health, veterinary, and human clinical medicine perspective. The deployment site is home to a variety of infectious disease including hantavirus, plague, tularemia, and West Nile in the context of high wildlife-livestock-human interfacing. Information derived from the issuance of forecasts coupled to situational awareness was shared with the public, local officials, public health officers, veterinarians, healthcare providers, and patients through various social media methods.

Results

Provision of 30-60-90 day forecasts for routine and non-routine endemic infectious disease activity and impact facilitated better coordination of public health messaging and daily conversation with patients in the inpatient and outpatient settings. The signature of an unusual, infrastructure-disruptive outbreak of metapneumovirus and respiratory syncytial virus was recognized and communicated with enough time to activate effective clinical mitigation protocols. Cost estimates demonstrated financial benefit at a local level to anticipating surges of infectious disease activity with enough time to mitigate patient demand. Community-wide engagement with infectious disease forecasts and live event advisories included the promotion of proactive infection control and public health surveillance and response, healthcare provider recognition of non-routine infectious disease, clinical sampling and diagnostic testing protocols, clinician and patient education, and synchronization of proactive disease reporting both in the routine daily clinical setting and in times of crisis. Collateral benefit of consistent messaging delivered to the public by the participating entities was noted. Community awareness of the repertoire of indigenous infectious disease activity was expanded beyond the official public health notification list. Neither issuance of infectious disease forecasts nor advisories issued during crises triggered an influx of anxious well phone calls or visits to the medical system that was deemed operationally relevant.

Conclusions

Activation of a local infectious disease forecast station modeled after a local weather station promotes routine communication of a broader array of infectious disease activity than that monitored by public health; facilitates proactive, cost effective healthcare; and enabled recognition of unusual, disruptive infectious activity with enough time to enable mitigation of clinical, infrastructure, and financial impact to the community. Routine communication of comprehensive infectious disease forecast and situational awareness information promotes community adaptive fitness to a wide variety of infectious hazards. The results suggest it is possible to transform the traditional public health model of data collection and analysis to one of transparent and open data availability to support innovative reduction in morbidity and mortality.

Keywords

biosurveillance; forecast; meteorology

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*James M. Wilson
E-mail: jwilson@ascelbio.com