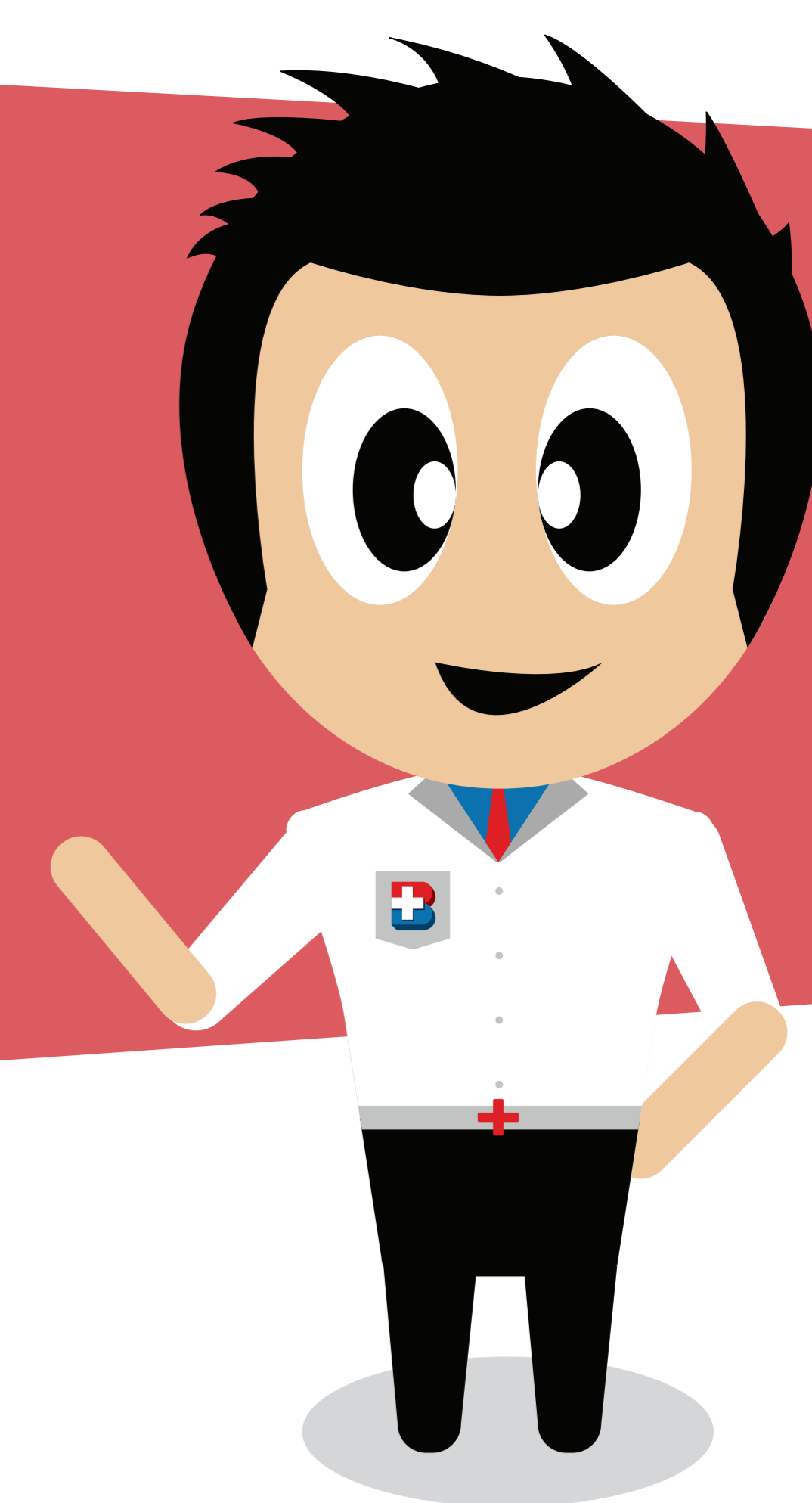


Implementation and Initial analysis

of a near real-time laboratory-based influenza system,
a network of 20 hospitals in Bangkok Dusit Medical Services
Public Company Limited, Thailand



Authors

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Objective

To demonstrate the feasibility and validity of a novel electronic surveillance system utilizing a business intelligence system that consolidates laboratory test results, patient demographics and geographic information in near real-time among a network of 20 hospitals in Bangkok Dusit Medical Services Public Company Limited, Thailand.

Introduction

Previous studies have demonstrate the benefit of laboratory surveillance and its capability to accurately detect influenza outbreaks earlier than syndromic surveillance^{1,2}. Current laboratory surveillance has an approximately 4-week lag due to laboratory test turn-around time, data collection and data analysis³. In order to provide near real-time access to aggregated test results, we utilized business intelligence system connectivity with a laboratory-based influenza test to consolidate test results along with patient demographic and geographic information. Type-specific results were available to physicians and uploaded for public health awareness within 24 hours of patient nasopharyngeal swab.

Methods

We implemented a new near real-time laboratory-based influenza surveillance system, the Bangkok Dusit Medical Services surveillance system (BDMS-SS), in a network of 20 hospitals of the Bangkok Dusit Medical Services. We systematically collected information of influenza test results from the National Healthcare Systems Co., Ltd. (NHealth) which provides Medical Lab and Shared Services for a network of 20 hospitals. The test results were daily automatic submitted into the Bangkok Hospital Data Warehouse, after that the Lab Influenza surveillance Business Intelligence system will retrieve that test results that integrated with the Health Information from the Data Warehouse, verify and transform the data and finally visualize the information to the Business Intelligence system (Intranet).

Results

From January 2010 to April 2017, the near real-time laboratory based surveillance system automatically uploaded test results and associated data which were 24 hours available to affiliated physicians, infectious nurses, local and national public health users. A total of 482,789 subjects were tested and 86,110 cases of influenza were identified. Of those positive cases, 40,552 (47.1%) were influenza type B, 31,412 (36.4%) were influenza A unspecified subtype, 6,181 (7.2%) were influenza A H1N1 and 4,001 (7.2%) were influenza A H3N2.

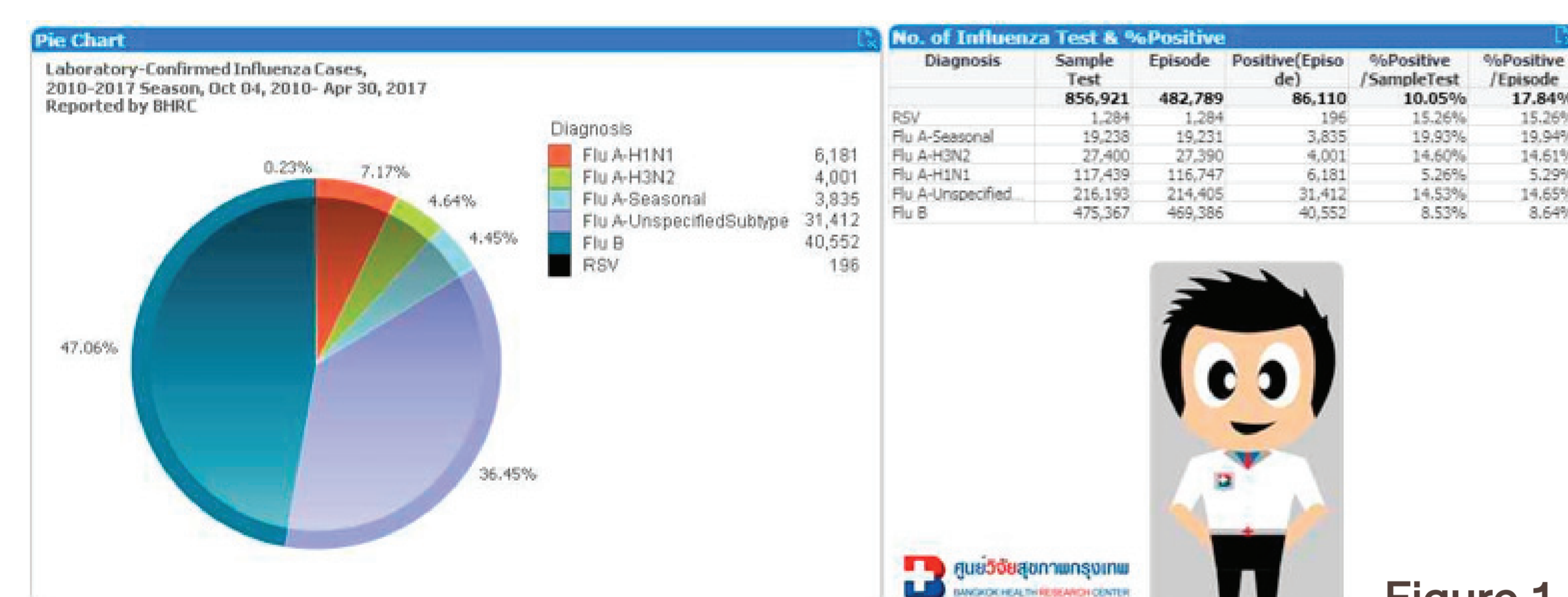


Figure 1

Figure 1 Laboratory confirmed influenza cases, Bangkok Hospital Group, Bangkok Dusit Medical Services Public Company Limited, October 2010 to April 2017

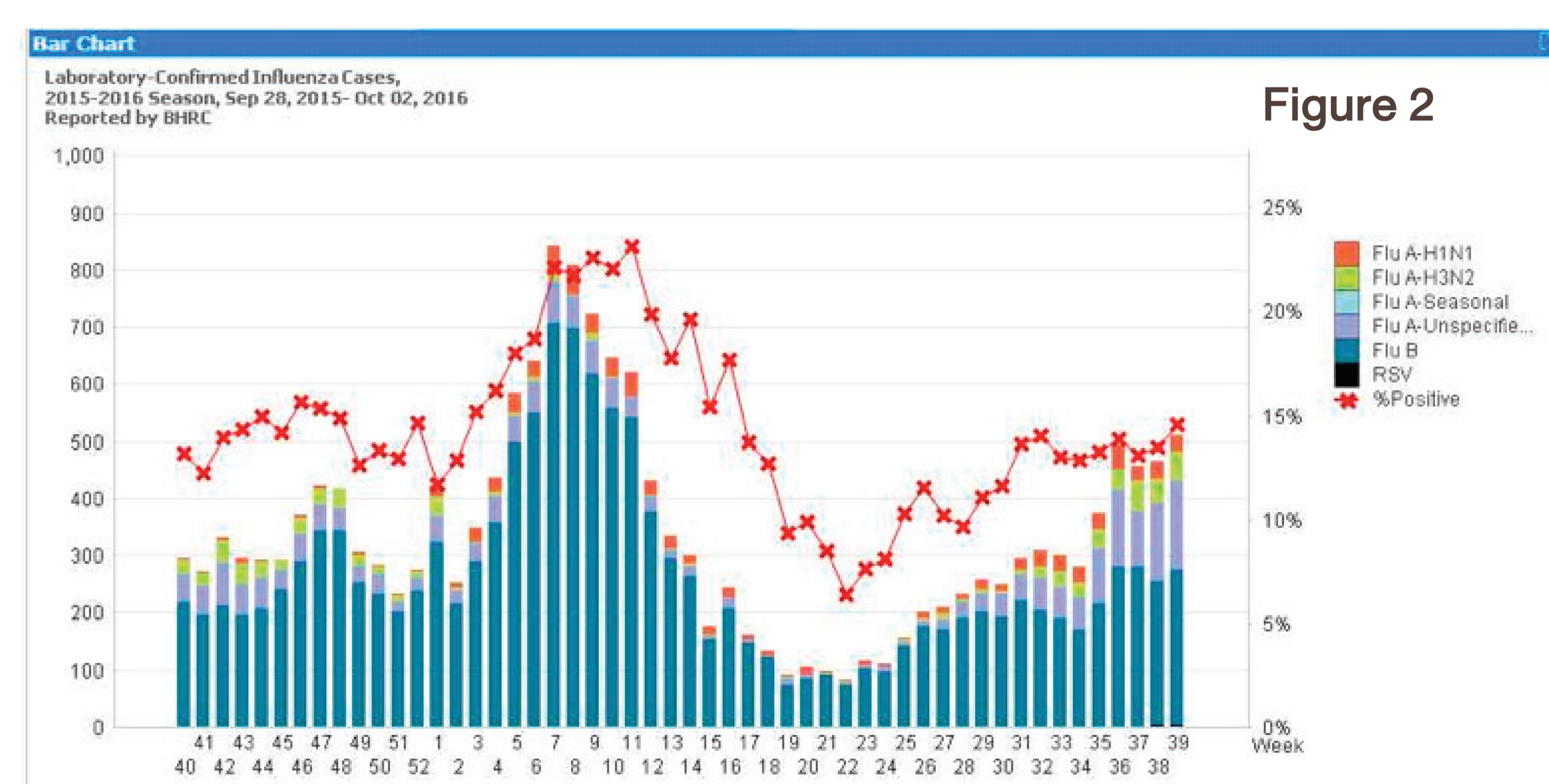


Figure 2 Weekly distribution of number of samples collected and influenza viruses confirmed, Bangkok Hospital Group, Bangkok Dusit Medical Services Public Company Limited, September 2015 to October 2016

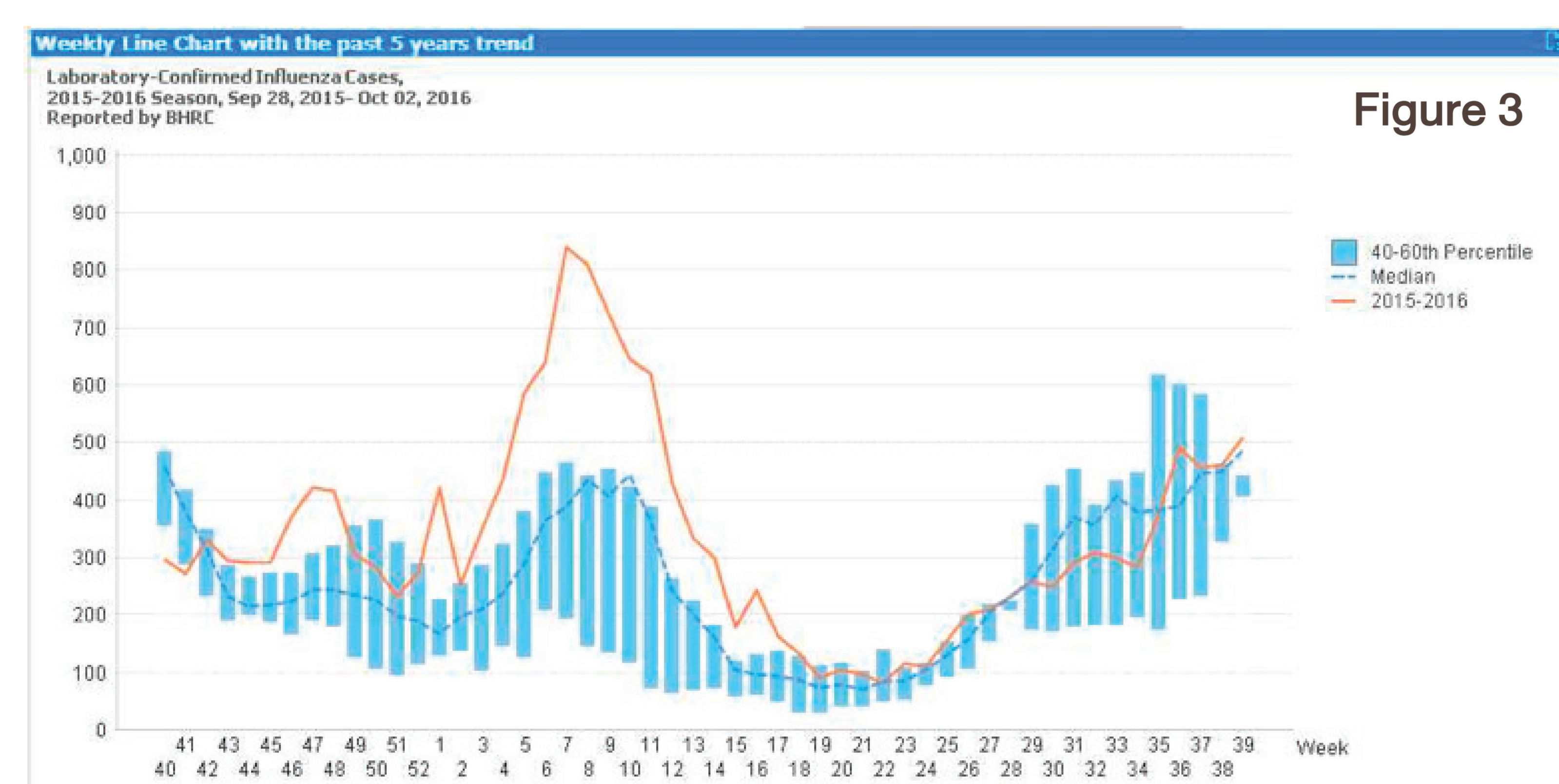


Figure 3

Figure 3 Weekly distribution with the past 5 years trend of number of samples collected and influenza viruses confirmed, Bangkok Hospital Group, Bangkok Dusit Medical Services Public Company Limited, September 2015 to October 2016

Conclusions

This novel, near real-time laboratory-based surveillance system automatically uploaded and aggregated influenza test results and associated information from a network of 20 hospitals.

Expansion of this near real-time capability to public health agency could improve both local and national surveillance and response, reducing the need for syndromic influenza surveillance. With a large sample size from the networking hospitals, this new system provides a robust supplementary mechanism, through the

collection of routinely available laboratory data at minimum extra cost, to monitor influenza. The BDMS-SS was the first near real-time, daily reporting surveillance system to report biggest data based from private hospital in Thailand.

Furthermore, this system can be quickly adapted and used to monitor future influenzas pandemics and other major outbreaks of respiratory infectious disease, including novel pathogens.

References

1. Baumbach J, Mueller M, Smelser C, Albanese B, Sewell CM. Enhancement of influenza surveillance with aggregate rapid influenza test results: New Mexico, 2003–2007. Am J Public Health. 2009;99(Suppl 2):S372–377.
2. Ghosh TS, Vogt RL. Active influenza surveillance at the local level: a model for local health agencies. Am J Public Health. 2008;98(2):13–15.
3. Centers for Disease Control and Prevention. The National Respiratory and Enteric Virus Surveillance System (NREVSS). 2011; <http://www.cdc.gov/surveillance/nrevss/>. Accessed Nov 25, 2011.

