CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)

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Project Number

S1729

Project Title

To Test or Not to Test: 2009 Swine Flu with Rapid Influenza Antigen Test, RIAT

Abstract

Objectives/Goals

The objective is to study the performance of Rapid Influenza Antigen Testing (RIAT) on the diagnosis of 2009 H1N1 Swine Flu and to compare with Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) in an observational study performed at Desert Regional Medical Center (DRMC) from August 2009 to November 2009.

Methods/Materials

Eluted Nasal/Nasopharyngeal specimen were applied to the RIAT detection card, an immunochromatographic membrane assay using monoclonal antibodies detecting the nucleoprotein antigens of Influenza A and B. The results of RIAT tests were compared with the results of the RT-PCR tests sent out to the state laboratory from August 2009 to November 2009.

Results

A significance Z test for two pooled sample proportion was computed to determine whether the difference in the number of positive tests confirmed by each independent viral diagnostic tests was statistically significant at default 5 percent significance level. For the cumulative data from August 2009 to November 2009, RIAT detected 36 patients out of 252 total cases while RT-PCR detected 99 positive cases out of 364 ordered. The z score was calculated, z = -5.232849393 reaping a p-value of (3.0309093X10 ^-7). Since the p-value is lower than the 5 percent significance level, the null hypothesis that the number of positive cases confirmed by both viral diagnostic testing as equivalent should be rejected in favor of the alternative hypothesis.

Conclusions/Discussion

RIAT has been the mainstay of influenza testing due to its commercial availability and its instantaneous 15 minutes diagnosis serving as a point of care test. Poor performance of the RIAT tests stem from its wide range of sensitivity (10%-70%), to detect the 2009 H1N1 Influenza A virus, which requires further viral diagnostic testing with either the RT-PCR or viral culture to confirm the negative RIAT testing. Inability to differentiate between Influenza A subtypes and its lower sensitivity to detect the swine flu is confirmed by the significance z-tests for two-pooled sample proportion. Thus, the CDC cautions diagnostic decisions should be determined by the patient's symptoms, risks of complication, and epidemiology links.

Summary Statement

Due to the wide range of sensitivity of the RIAT tests, negative RIAT does not rule out swine flu, but needs to be verified with the RT-PCR testing.

Help Received

I used the microbiology lab at DRMC under the supervision of John Franzier.