#287

Comparison of Turnaround Time (TAT) and Time to Oseltamivir Discontinuation between Two Respiratory Viral Panel Testing (RVP) Methodologies

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Abstract *(revised)*

Background: Multiplex PCR has been shown to be more sensitive with more rapid TAT compared to other methodologies for respiratory viral testing. Our microbiology laboratory switched from Luminex xTAG® RVP (LxT) which detects 12 respiratory viruses and has an assay time of 8.5 hours to Biofire Diagnostics, Inc. FilmArray® RVP (BDFA) testing, which detects 17 respiratory viral and 3 bacterial targets and has an assay time of 1.2 hours. We sought to compare the actual TAT between the two testing methods and determine time to discontinuation of empiric oseltamivir.
Methods: All adult inpatients with an RVP test result reported between 12/1/2011-2/28/2012 performed on LxT and 12/1/2012-2/28/2013 performed on BDFA were evaluated for average TAT (defined as the time period between when the specimen was received to the time when the result was reported). Among patients with influenza negative RVP results, the time to discontinuation of empiric oseltamivir was also determined.
Results: The average TAT for the LxT performed 2-3x/week between 12/1/2011-2/28/2012 (n=230 assays) was 46.4 hours compared to an average TAT of 3.1 hours (p<0.001) for BDFA performed 24 hours a day/7days per week from 12/1/2012-2/28/13 (n=872 assays). The average time to discontinuation of empiric oseltamivir among patients with an RVP negative for influenza was 4 and 2 days for the LxT (n=42) and BDFA (n=74) groups, respectively (p<0.001).
Conclusion: Use of BDFA testing has important clinical advantages compared to LxT. Consistent with previous literature showing that the TAT for BDFA is significantly shorter than for LxT testing, we observed an average TAT 43.3 hours shorter. We also found that the average duration of empiric oseltamivir was reduced by 50% when the RVP was performed with BDFA.

Background

♦Respiratory viral infections contribute to many emergency room visits and hospitalizations throughout the year. Rapid detection is crucial for optimal management, appropriate use of antibiotics, avoidance of unnecessary evaluations, decisions on infection control and overall cost savings to the health care system.

♦Shortening the duration/severity of respiratory viral illness through initiation of effective antiviral therapy may reduce the incidence of secondary bacterial infection, thereby reducing the number of antibiotic courses prescribed to these patients. This dual approach could potentially reduce the risk of antibacterial resistance while more effectively treating viral infections.

♦Molecular methods, such as the highly sensitive and specific nucleic acid amplification tests (NAAT) aid in the accurate detection of respiratory pathogens.

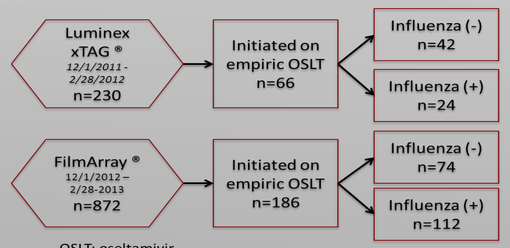
♦Our microbiology laboratory switched from LxT (detects 12 respiratory viruses and has an assay time of 8.5 hours) to BDFA testing (detects 17 respiratory viral and 3 bacterial targets and has an assay time of 1.2 hours). The BDFA testing platform uses nested multiplex PCR chemistry to identify pathogens. The LxT uses target specific amplification of different viral sequences and microfluidic-based hybridization to fluorescently labeled beads and detection by instrument.

Methods

Primary Endpoint
♦ Turnaround time (TAT) for RVP result
Secondary Endpoint
♦ Time to discontinuation of empiric oseltamivir following negative RVP result
Experimental Design
Retrospective, observational, single-center study
♦ Analysis period: 12/1/2011-2/28/2013
Inclusion criteria
♦ Age ≥ 18 years old, with an RVP result reported
  ♦Only patients with an RVP test negative for influenza were included in the de-escalation analysis

Results

Figure 1:



OSLT: oseltamivir

Table 1: Baseline characteristics *(Influenza negative patients)*	**Luminex xTAG® (n=42)**	**FilmArray® (n=74)**
Age	50.2 ± 13	53.8 ± 19.3
Gender, M (%)	23 (55)	36 (49)
RI primary admitting diagnosis	14 (33)	29 (39)
DM	13 (31)	26 (35)
COPD/Asthma	10 (24)	22 (30)
ESRD on HD	1 (2)	5 (7)
CV Disease	11 (26)	26 (35)
HIV	6 (14)	3 (4)
SOT	9 (21)	11 (15)
HONC	14 (33)	18 (24)

RI: Respiratory infection, DM: diabetes mellitus, COPD: chronic obstructive pulmonary disease, ESRD: end-stage renal disease, HD: hemodialysis, CV: cardiovascular, SOT: solid organ transplant, HONC: hematology-oncology

Figure 2: Average Turnaround Time (TAT)

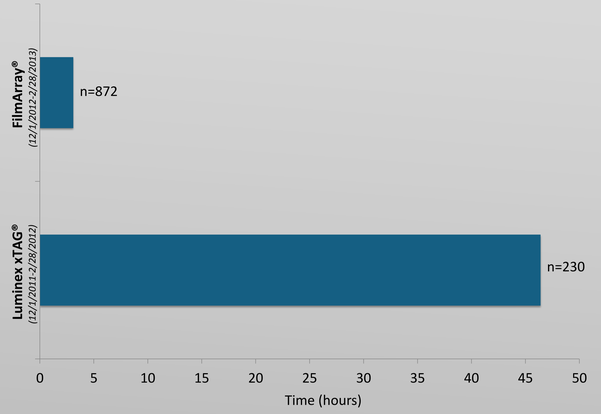
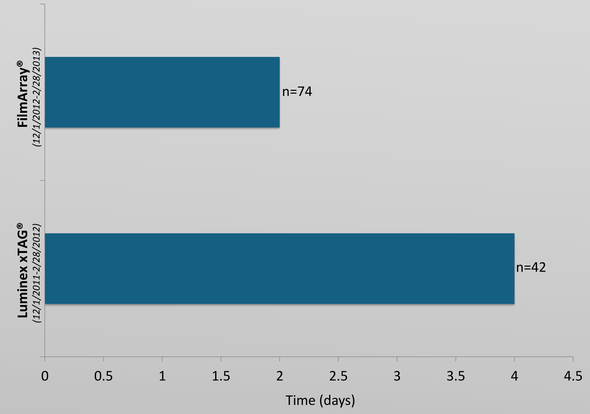
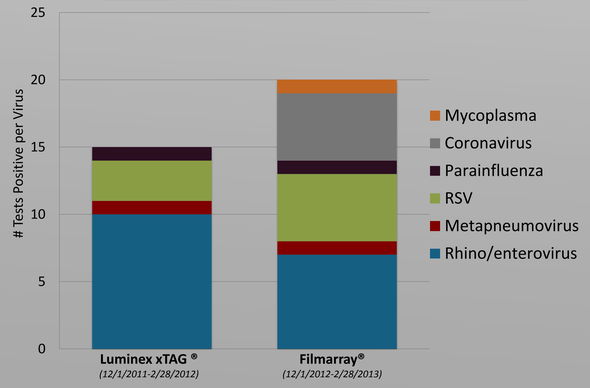


Figure 3: Average Time to De-escalation of Oseltamivir *



**Cost savings per patient: 265 dollars (based on average wholesale price (AWP) of oseltamivir with shortened duration of empiric use after implementation of FilmArray®)*

Figure 4: Other Viral Pathogens Identified Among Patients with Influenza Negative Result



Conclusions

- The shorter TAT and reduced laboratory handling time with the BDFA RVP has important clinical advantages.
- Consistent with previous literature, we found the use of the BDFA RVP to be associated with a significantly shorter average TAT (3.1 vs. 46.4 hours) compared to LxT.
- The duration of empiric oseltamivir among patients found to be influenza negative was also significantly reduced with the improved TAT of the BDFA RVP.

References

1. Xu M, et al. Implementation of FilmArray Respiratory Viral Panel in a Core Laboratory Improves Testing Turnaround Time and Patient Care. *Am J Clin Pathol* 2013;139:118-123.
2. Rand KH, et al. Comparison of Two Multiplex Methods for Detection of Respiratory Viruses: FilmArray RP and xTAG RVP. *J Clin Microbiol* 2011;49:2449-2453.

Disclosures

The authors of this presentation have no financial interests with commercial entities that may have a direct or indirect interest in the subject matter of this presentation