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P-226 Analytical evaluation of a new point-of-care multiplex respiratory platform

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INTRODUCTION

Respiratory infections : 1st cause of Morbi-mortality worldwide [Elderly and children < 5 years old]

- Leading cause of antibiotics prescription
- Viral infections main causative agent or trigger of bacterien infections

During Outbreaks: Socio-economic impact

- Overkrowding primary health care and lengthening of waiting time

Democratisation of Syndromic panel for respiratory pathogens since last decades

Availability of PCR Multiplex POCT: gain time and efficious managemnt of healthcare in community

OBJECTIVES

- Evaluation of Sensitivity of the Flash Dx RP 1.1 compared to reference technologies (GeneXpert-Cepheid and/or Filmarray RP 2.1 plus-Biomérieux and/or RGene- Biomérieux)
- Evaluation of Overall/individual Specificity
- Correlation study of Threshold Cycles obtained by Flash Dx and Rgene
- Diagnostic performance Evaluation on Coinfected samples
- Evaluate simplicity and ease of use

METHODS

Miniaturised PCR Multiplex diagnostic tool (POCT)

Detection : 13 targeted Bacteria and Viruses

Cartridge with 42 Primers Target

Samples : Nasopharyngal swab, Broncho alveolar lavage

Screening and test:

- 61 Positive samples with GeneXpert : SARS-CoV2, VRS, Flu-A, Flu-B
- 64 Positive samples with Filmarray : hRV /EV, hPIV, ADV, hMPV, MP, BP
- 13 Negative samples
- 15 Positive samples for 2 or more pathogens

Controle Ct : Rgene (hRV /EV, hPIV, ADV, hMPV) and Altona (hMPV)

RESULTS

1

Pathogens (n total tested)	Methods	Reference Ct range	False negatives	Flash Dx Sensitivity (95% CI) in single infection	Flash Dx Sensivity (95% CI) with coinfection	Specificity
SARS-CoV2 (n=18)	GeneXpert®, Cepheid	14 to 38	2	100%; *(n=15)	88,9% (74,4%-100%); *(n=15), **(n=3)	100%
RSV-A, RSV-B (n=16)	GeneXpert®, Cepheid	17 to 36	0	100%; *(n=15)	100%; *(n=15), **(n=1)	100%
Influenza A (n=17)	GeneXpert®, Cepheid	14 to 37	1	93,75% (97,45%-100%); *(n=16)	94,18% (80,34%-100%); *(n=16), **(n=1)	100%
Influenza B (n=15)	GeneXpert®, Cepheid	12 to 35	0	100%; *(n=15)	100%; *(n=15), **(n=0)	100%
Human Adenovirus (hADV) (n=15)	Filmarray, Biomérieux ®	9 to 37	6	62,5% (38%-84,79%); *(n=8)	60% (35,2%-100%); *(n=8), **(n=7)	100%
Human Parainfluenzavirus (hPIV-1, hPIV-2,hPIV-3)(n=18)	Filmarray, Biomérieux ®	19 to 31	0	100%; *(n=14)	100%; *(n=14), **(n=4)	100%
Human Metapneumovirus (n=20)	Filmarray, Biomérieux ®	21 to 41	3	93,75% (83,14%- 100%); *(n=16)	85% (69,4%-100%); *(n=16), **(n=4)	100%
Human Rhino/Enterovirus (n=18)	Filmarray, Biomérieux ®	24,6 to 34,8	3	91,67% (78,90%- 100%); *(n=12)	83,3% (66,1%-100%); *(n=12), **(n=6)	100%
Mycoplasma pneumoniae (n=12)	Filmarray, Biomérieux ®	10 to 23	1	90% (73,03%- 100%); *(n=10)	91,66% (76%-100%); *(n=10), **(n=2)	100%
Bordetella pertusis (n=4)	Filmarray, Biomérieux ®	6 to 23	0	*(n=0)	100%; *(n=0), **(n=4)	100%
Negative samples (n=13)	Filmarray, Biomérieux ®	/	/	/	/	100%

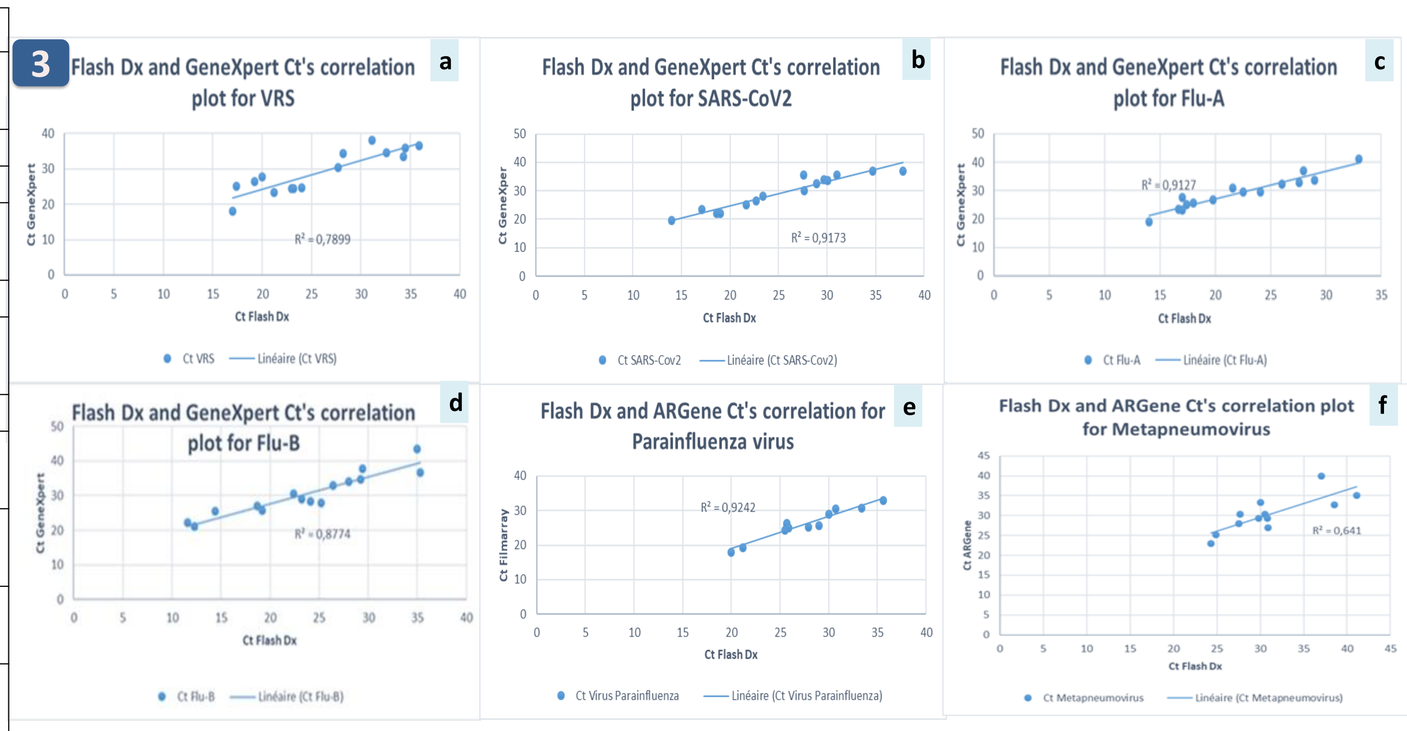
Table 1: Target tested, discrepancies found with Flash-Dx, Individual sensitivity and specificity with single infected and coinfected samples

2

Co-infection (Filmarray)	Number of samples	Flash Dx	Reference technique
hAdV + hRV/hEV (+/+)	3	(+/+), (+/-[a]),(-[b]/+) a : Ct = NA, b : Ct=29	(+/+), (+/-), (+/+)
hAdV + hMPV (+/+)	1	(+/+)	(+/-)
hAdV + *B. pertussis (+/+)*	1	(+/+)	(+/+)
hAdV + FluA (+/+)	1	(-[a]/+) a : Ct=37	(+/+)
hRV/hEV + *M. pneumoniae (+/+)*	1	(+/+)	(+/+)
hMPV + SARS-CoV2 (+/+)	1	(-[a]/+) a : Ct=30	(+/+)
hMPV + VRS (+/+)	1	(+/+)	(+/+)
hPiV + hRV/ hEV (+/+)	2	(+/+), (+/-[a]) a : Ct=27	(+/+), (+/+)
hPiV + SARS-CoV2 (+/+)	1	(+/-[a]) a : Ct=20,9	(+/+)
SARS-CoV2 + *B. pertussis (+/+)*	1	(-[a]/+) a : Ct=17,1	(+/+)
B. pertussis + SARS-CoV2+hAdV+hMPV (+/+ /+/+)	1	(+/-[a]/-[b]/-[c]) a : Ct=22, b : Ct=22, c : Ct= NA	(+/+/+/-)
hRV/hEV + hPiV + *M. pneumoniae (+/+/+)*	1	(+/+/+)	(+/+/+)

Table 2: List of coinfected samples and discrepancies results found, a, b, c: Ct values

3



Figures a, b, c, d, e, f: Ct values correlation graphs for VRS, SARS-CoV-2, Flu-A, Flu-B, hPIV and hMPV

CONCLUSION

- Turnaround time= 1hour
- Validity rate: 94,90% (149/157)
- Overall sensitivity: 89.54% (95%IC; 84.40%-95%)
- Individual sensitivity varying between 83% and 100%
- Overall and individual specificity: 100% (95%IC; 100%)
- Very good Ct correlation with reference techniques
- Compact tool, easy to use, short response time
- Reliable for bedside use in community
- Fast and earliest management of respiratory infections
- Appropriate treatment/ Reduce overuse of Antibiotics
- Perspective: improvement of hADV detection
- Expand the panel with other bacterial targets

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