# Multipex PCR versus FilmArray for Rapid Genotyping of Influenza A in the Whole 2012-2013 Influenza Season

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## Introduction

The Influenza season of 2012-2013 in the Netherlands was characterized by co-circulation of two Influenza A types, i.e H1N1 2009pdm09 and H3N2. The UMCG is a tertiary referral hospital providing care for both adults and children and has the largest Solid Organ Transplant program of the Netherlands. The large proportion of immune-compromised patients requires isolation from patients with respiratory illness. Due to the circulation of two Influenza viruses Influenza A-positive patients had to be admitted in single rooms.
We investigated the use of FilmArray RP compared to routine PCR testing and genotyping of respiratory samples in providing adequate isolation of infectious patients as well as limiting the number of patients having to be cared for in single rooms.

## Methods

Our routine LDT-multiplex PCR detects 16 respiratory targets with an internal control. Following a positive result for Influenza A, a second set of duplex PCRs was performed for subtyping H1 and H3, as well as H1pdm09 and N1pdm09, allowing distinction of the two circulating genotypes.
The FilmArray RP detects 16 viral targets within 65 minutes. In addition to detecting Influenza A, it also detects simultaneously the hemagglutinins H1pdm09 and H3. However, it has a capacity of one sample per 65 minutes per instrument.

## Results

**FilmArray RP**

Influenza A H1
Influenza A H3
Influenza A H1 2009
Influenza B
hMPV
RSV
Adenovirus
Bocavirus
Coronavirus HKU1
Coronavirus NL63
Coronavirus 229 E
Coronavirus OC43
Rhinovirus/enterovirus
Parainfluenza 1
Parainfluenza 2
Parainfluenza 3
Parainfluenza 4

Negative or positive result
Turn-around time 2 hours

**Routine PCR**

Influenza A
Influenza B
hMPV
RSV
Adenovirus
Bocavirus
Coronavirus NL63
Coronavirus 229 E
Coronavirus OC43
Rhinovirus
Parainfluenza 1
Parainfluenza 2
Parainfluenza 3
Parainfluenza 4

Negative or positive result
Turn-around time 1.25 days

Influenza A H1
Influenza A H3
Influenza A H1pdm09
Influenza A N1pdm09
Influenza A N2

Influenza A with genotype
Turn-around time 2 days

**Fig. 1 Number of viruses identified**

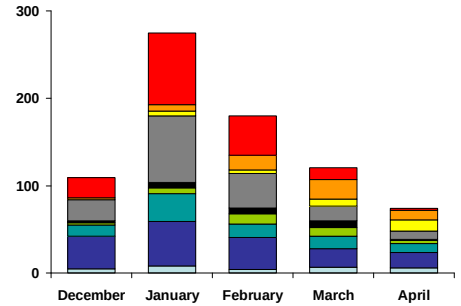



**Fig. 2 Typing results of Influenza A positives**

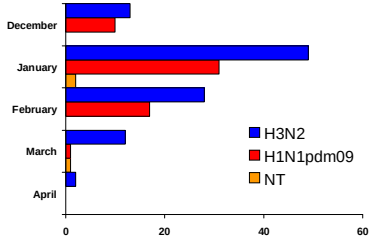
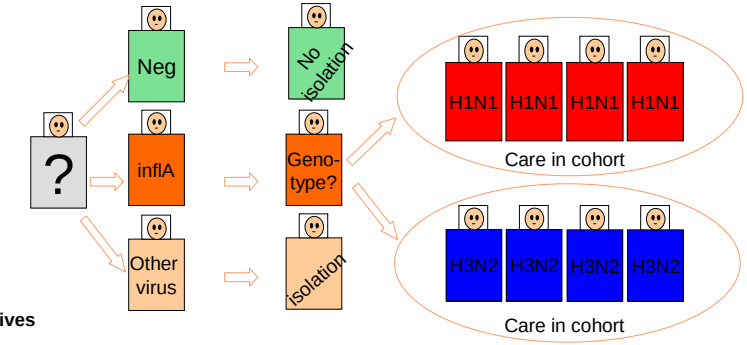



**Fig. 3 Isolation regiment of patients admitted with a respiratory illness**




A total of 1259 respiratory samples were tested between December 1st 2012 and April 17th 2013. 161 of these samples were tested by FilmArray RP.

184 patients had Influenza A, of whom 89 had H1N1pdm09 and 95 had H3N2.

Rapid genotyping facilitated patients receiving hospital care in Influenza A cohorts, according to genotype.

## Conclusions

Because of the activity of two Influenza A genotypes in the 2012-2013 Influenza season and the hospital's commitment to prevention of nosocomial transmission, rapid genotyping of Influenza strains was essential.
FilmArray RP provides rapid diagnosis of Influenza A infections with simultaneously detection of the genotype. Its capacity for only one sample per instrument however, is a serious limitation.

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