

## Introduction

Respiratory viruses are a significant cause of morbidity and mortality - especially in immunocompromised patients. A highly sensitive, specific and reasonably fast assay is required to provide optimal clinical care and reduce the risk of nosocomial infections. We evaluated the novel Argene Multi Well (MWS) r-gene real-time PCR assay to detect respiratory viruses on the QCMD Samples 2011 and 2012 and on all adult patient samples during the 2011/2012 Winter Season.

## Samples and Methods

575 Respiratory specimens from adult patients with respiratory infection were prospectively collected and tested from October 2012 to April 2013 by the Argene PCR assay for different respiratory viruses. 112 QCMD 2011 and 2012 respiratory samples were analysed as external reference material. Patient samples (median age 61 years, range: 16-90yrs, 61% male, 31.7% Immunocompromised) were analyzed for the viruses requested by the clinic. The DNA/RNA were extracted with NucliSENS easyMAG and amplified/detected on an ABI7500.

## QCMD Samples

### QCMD 2011

Sample contents	QCMD CT or copies	Argene CT values		% Real Time correct per pannel member	
		Inf A	InfB	Com-mercial	In-House
Influenza A and B					
H1N1	33	31.6	Neg	97	98
H3N2	36	39.8	Neg	46	64
<b>Negativ</b>	Neg	Neg	Neg	96	99
Inf B (Victoria)	36	Neg	38.5	40	55
H1N1	30	30.3	Neg	99	97
<b>Negativ</b>	Neg	Neg	Neg	97	100
Inf B (Yamagata)	36	Neg	32.8	91	96
H1N1	36	35.7	Neg	71	89
<b>Inf B (Victoria)</b>	33	Neg	36.0	67	88
H3N2	33	36.0	Neg	88	93
H3N2	30	31.9	Neg	99	98
<b>Inf B (Yamagata)</b>	33	28.8	Neg	96	98
RSV					
RSV B	35.9	32.1		97	96
RSV B	31.7	29.1		94	99
RSV A	32.9	31.6		100	96
RSV B	35.8	31.8		97	96
<b>Negativ</b>	Neg	Neg		100	99
RSV A	38.3	38.6		63	65
RSV B	38.3	34.8		86	80
RSV A	36.2	34.2		97	89

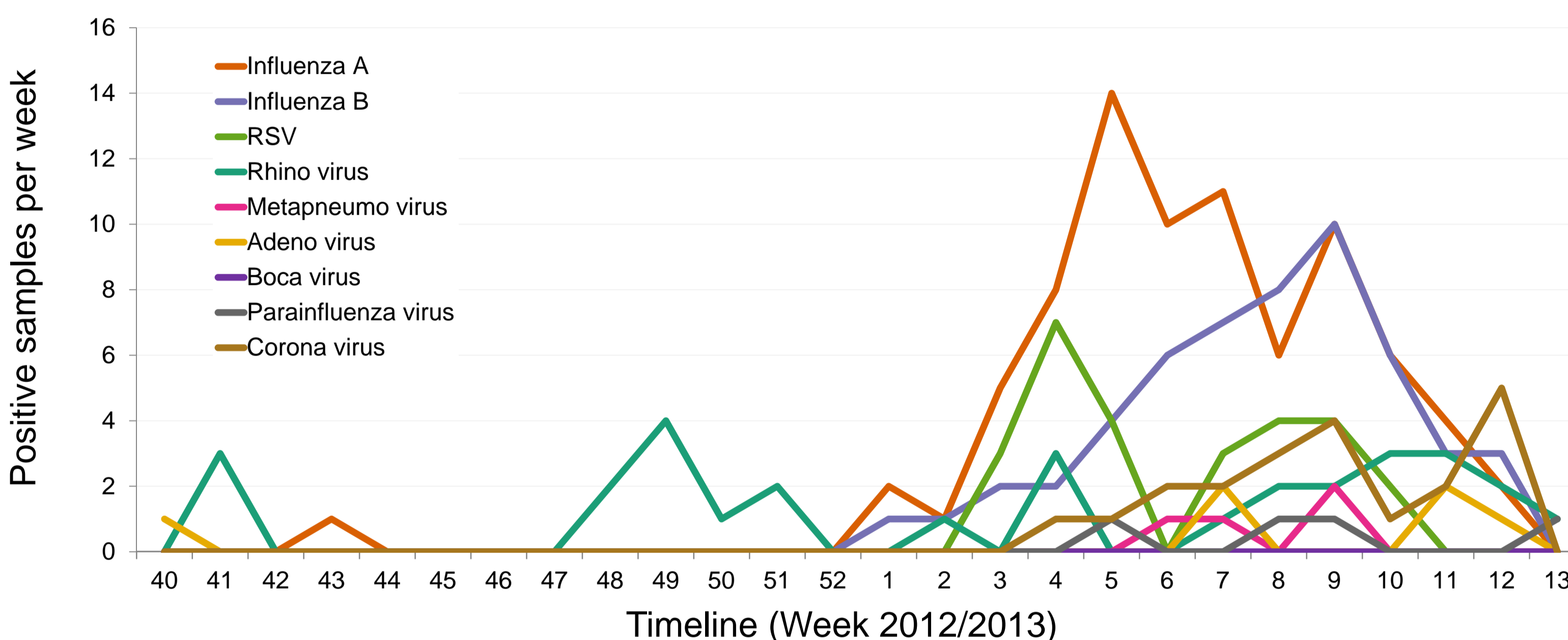
### QCMD 2012

Sample contents	QCMD CT or copies	Argene CT values		% Real Time correct per pannel member	
		Inf A	InfB	Com-mercial	In-House
Influenza A and B					
<b>Inf B (Victoria)</b>	30	Neg	30.6	94	99
H3N2	36	37.1	Neg	41	56
H1N1	30	28.3	Neg	99	99
H1N1	36	34.9	Neg	74	81
H1N1	33	31.5	Neg	98	99
Inf B (Victoria)	33	Neg	34.5	63	87
<b>H3N2</b>	30	30.9	Neg	97	99
<b>Inf B (Yamagata)</b>	33	Neg	28.3	97	100
H3N2	33	34.2	Neg	91	97
Inf B (Victoria)	36	Neg	37.3	37	53
Inf B (Yamagata)	36	Neg	31.7	93	98
<b>Negativ</b>	Neg	Neg	Neg	98	100
RSV					
RSV A	36.2	32.0		86	96
RSV B	35.8	29.3		97	97
<b>Negativ</b>	Neg	Neg		98	100
RSV B	38.3	32.5		81	84
RSV B	35.9	28.9		95	96
RSV B	31.7	25.6		100	99
RSV A	38.3	35.1		63	75
RSV A	32.9	28.7		98	99

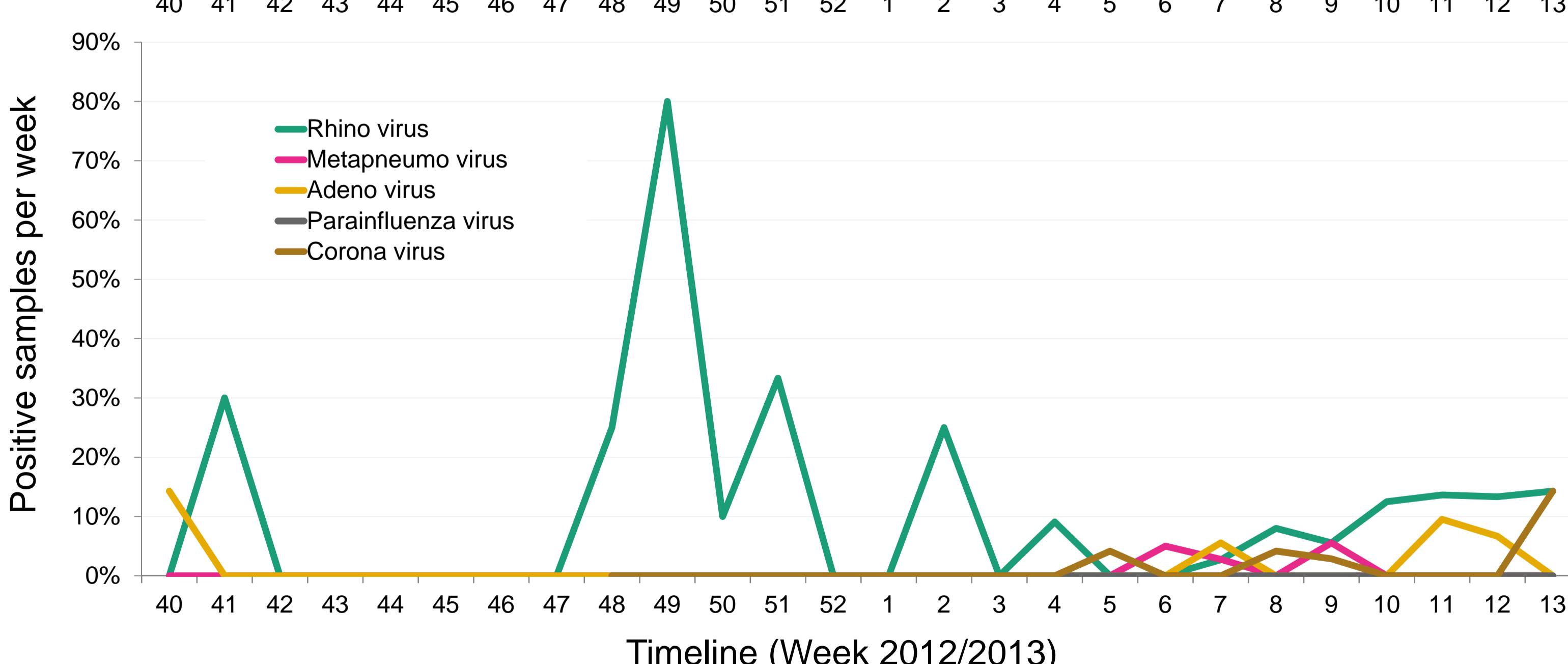
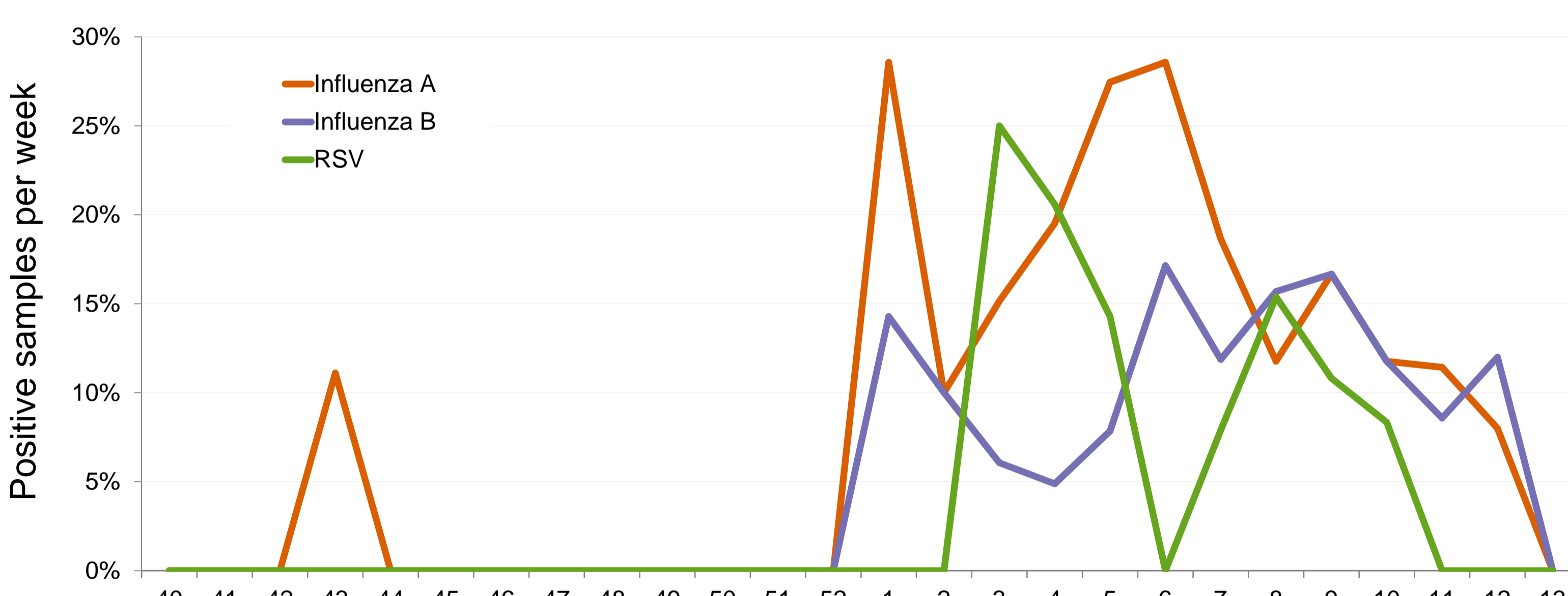
Number of samples analysed										
	Influenza A	Influenza B	RSV	Rhino virus	Metapneumo virus	Adeno virus	Boca virus	Parainfluenza virus	Corona virus	
Normal / immunocompromised										
Nasopharyngeal aspirate	16/6	16/6	10/5	9/5	12/5	10/6	10/6	10/5	10/5	
Nasopharyngeal swab	246/92	246/92	128/68	128/63	116/60	116/60	116/60	109/54	109/54	
Sputum	5/2	5/2	3/2	3/2	3/2	3/2	3/2	0/2	0/2	
Throat swab	63/18	63/18	23/8	21/13	21/12	20/12	20/12	19/11	19/11	
Tracheobronchial aspirate	6/5	6/5	6/5	6/5	6/5	4/3	4/3	3/3	3/3	
Bronchoalveolar lavage	53/54	53/54	45/53	44/54	44/53	44/53	44/53	33/35	33/35	
<b>Total</b>	389/177	389/177	215/142	211/142	202/137	197/136	197/136	174/110	174/110	

## Timeline of positive tested samples

### A) Number of positive tested samples per week



### B) Positivity rate of each tested virus per week



Rhinovirus 90	42.2	33.2	79	93
<b>Rhinovirus B5</b>	31.1	24.3	95	87
Rhinovirus16	39.1	37.1	90	90
<b>Rhinovirus 90</b>	38.0	29.1	100	97
Rhinovirus16	41.0	Neg	47	66
Rhinovirus B42	34.0	26.4	95	84
<b>Rhinovirus 8</b>	35.4	29.7	100	97
Enterovirus 68	35.4	25.7	26	60
<b>Rhinovirus 16</b>	33.7	32.1	86	95
<b>Negativ</b>	Neg	Neg	100	100
<b>Rhinovirus Type C</b>	32.5	26.6	100	86
Rhinovirus Type C	36.1	30.2	95	77

<b>hMPV A1</b>	29.5	33.6	97	98
hMPV B2	34.4	42.6	40	48
<b>hMPV A1</b>	26.5	30.1	100	100
<b>Negativ</b>	Neg	Neg	100	100
<b>hMPV B2</b>	28.7	33.1	94	91
<b>hMPV A1</b>	26.4	30.9	100	99
hMPV B2	31.3	35.2	80	77
<b>hMPV A1</b>	32.5	37.8	77	78

Adenovirus Type 34	993	31.5	96	66
Adenovirus Type 1	1'358	32.7	86	90
Adenovirus Type 1	272	Neg	64	56
<b>Negativ</b>	Neg	Neg	100	99
Adenovirus Type 1	10'765	29.7	100	99
<b>Adenovirus Type 4</b>	13'804	28.4	98	100
Adenovirus Type 34	7'413	28.2	98	84
Adenovirus Type 1	1'250	30.7	98	94

<b>Parainf. virus Type 1</b>	30.1		96	67
<b>Parainf. virus Type 3</b>	25.6		100	99
Parainf. virus Type 1	36.1	Kit not available at the time	17	28
Parainf. virus Type 4	35.4		57	51
Parainf. virus Type 1	34.5		78	68
<b>Parainf. virus Type 2</b>	28.6		100	95
<b>Negativ</b>	Neg		96	99
Parainf. virus Type 2	32.6		91	90
<b>Parainf. virus Type 2</b>	25.7		100	100
Parainf. virus Type 1	35.1		78	57

Coronavirus NL63	22.6		55	100
Coronavirus 229E	34.5		64	72
Coronavirus 229E	28.0		100	97
Coronavirus OC43	32.4		91	78
Coronavirus NL63	28.9		55	87
<b>Negativ</b>	Neg		91	97
<b>Coronavirus OC43</b>	26.3		100	100
Coronavirus 229E	31.3		100	89
Coronavirus OC43	29.7		100	95
Coronavirus NL63	25.9		55	100

Coronavirus OC43	26.3	26.3	100	100
<b>Coronavirus NL63</b>	22.6	21.7	86	100
<b>Coronavirus 229E</b>	28.0	26.3	100	100
Coronavirus OC43	32.4	36.4	86	84
Coronavirus NL63	28.9	29.2	86	97
<b>Negativ</b>	Neg	Neg	100	100
Coronavirus 229E	31.3	29.9	100	95
<b>Coronavirus OC43</b>	29.7	31.7	100	95
<b>Coronavirus NL63</b>	25.9	25.8	86	97
Coronavirus 229E	34.5	33.3	96	74

Core samples are shown in bold, false negative samples are boxed in red

## Conclusions

The Argene MWS r-gene real-time PCR assay is a highly sensitive and specific assay for the detection of respiratory viruses. Compared to current multiplex assays on the market, the possibility to test for 1 to 2 virus independently allows to screen for specific virus e.g. according to the clinical question or seasonality which reduces the cost for the test immensely. The assay was easily implemented within routine diagnostics and with a time required from sample to result in under 4 hours the test can be offered twice a day.