



From the Department of Laboratory Medicine - Yale-New Haven Hospital Medical Center

Clinical Virology Laboratory Newsletter

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YNHH York Street Campus Respiratory Virus Test Protocol 2012-13

I. Respiratory Virus Test Protocol for 2012-13 Winter Respiratory Virus Peak Season*

	PCR ^a Panels	DFA ^b (2 shifts)	Rapid flu test ^c (3 rd shift)
Weekdays (peak season)	Respiratory virus PCR Panel will be performed <u>twice a day</u> , morning and late afternoon. PCR takes ~4-5 hrs to complete and is the most sensitive test <i>If demand is high and staffing permits, a 3rd run may be done.</i>	DFA will be performed continuously from <u>7 AM to 11 PM</u> ; TAT ~2 hrs from sample receipt. <i>Note: If test volume is overwhelming on 2nd shift, priority may be given to <u>ICUs and ED admissions</u></i>	When Virology is closed, a "Rapid Flu test" will be available in the Chemistry Laboratory for <u>new admissions from Adult ED to aid in bed management.</u> <i>Note: Rapid Flu tests detect 1/2 Flu DFA-positives and about 1/4 Flu-PCR positives.</i> <i>Done on-site at SMC and SRC.</i>
Weekends (peak season)	PCR panel will be run <u>once a day</u> , at midday	DFA will be performed continuously from <u>8 AM to 11 PM</u> ; TAT ~2 hrs from sample receipt.	Same as above

*Peak season generally runs from late December to early March.

a, PCR: uses 45 cycles of genome amplification before detection, giving a very sensitive result

b, DFA: direct immunostain of respiratory epithelial cells applied to slides and examined under a microscope for infected cells

c, Rapid test: simple to perform; requires ~10⁵ logs virus for a positive result

II. Comparison of Respiratory Virus Tests:

a) **PCR is the preferred test** in hospitalized patients with respiratory symptoms due to its greater sensitivity.

b) **DFA** (direct immunofluorescence) detects only 55-85% of influenza PCR-positive samples. DFA should be ordered on inpatients only when a faster preliminary result is needed.

DFA requires ~ 2 hrs to pellet cells, prepare, fix, stain and examine slides microscopically. Positives require 2-3 slides to determine specific virus.

c) **Rapid Flu Tests** (lateral flow immunochromatography) are very simple and fast, but the least sensitive, detecting approximately 50-60% of influenza-positives detected by DFA.

III. Viruses Detected by Respiratory Virus Tests Offered at York Street Campus

Test	Viruses detected
Rapid flu tests	Flu A and B
Respiratory virus screen DFA	RSV, Flu A, Flu B, Parainfluenza 1,2,3, Adenovirus
Human metapneumovirus DFA	HMPV
Respiratory Virus PCR Panel	All viruses above plus Rhinovirus
Viral Culture* <i>(should be reserved for lower tract samples)</i>	RSV, Flu A, Flu B, Parainfluenza 1,2,3, adenovirus, rhinovirus, enterovirus, parechovirus, CMV, HSV, VZV

*PCR is more sensitive than culture, but culture includes some viruses not in the PCR panel.

Influenza A subtyping will be performed on hospitalized patients for public health purposes, as time permits

Appendix:

Sensitivity of DFA compared to PCR on a Subset of Inpatients in 2010-11 Season

Viruses tested by DFA and PCR	Total positive	PCR positive (%)	DFA positive (%) ^a	
			Adult	Pediatric
RSV A, B	101	99/101 (99%) ^b	39/61 (64%)	35/40 (88%)
Influenza A	154	154/154 (100%)	70/134 (52%)	15/20 (75%)
Influenza B	32	32/32 (100%)	9/17 (53%)	12/15 (80%)
Parainfluenza 1,2,3	33	31/33 (94%) ^b	14/23 (61%)	7/10 (70%)
Adenovirus	27	27/27 (100%)	1 /4 (25%)	5/23 (22%)
hMPV	22	22/22 (100%)	8/15 (53%)	5/7 (71%)
Total Positive	369	365/369 (99%)	141/254 (56%)	79/115 (69%)

a, Both DFA-negative and DFA-inadequate samples are included

b, PCR negative/ DFA positive

c, Note 68.8% of samples were on adults, who shed lower titers of virus than children