



LABORATORY SURVEILLANCE FOR RESPIRATORY AND ENTERIC VIRUS IN MARYLAND FROM JULY 2002 TO DECEMBER 2009

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BACKGROUND

- Respiratory viruses including influenza viruses, human parainfluenza viruses (PIV), adenoviruses (AdV), respiratory syncytial viruses (RSV), and non-polio enteroviruses primarily infect the respiratory tract.
- Enteric virus, such as rotaviruses, can cause severe gastroenteritis among infants and young children.
- Virus isolation and antigen detection results reported to the National Respiratory and Enteric Virus Surveillance System maintained by the CDC.

MATERIALS & METHODS

- For respiratory virus testing, nasopharyngeal specimens were collected from patients with influenza-like illness (ILI) and screened by polymerase chain reaction assays for influenza viruses. Specimens tested negative by PCR for influenza viruses were inoculated in cell culture, and virus identification was performed by Direct Fluorescent Antibody (DFA) testing.
- For enterovirus testing, nasopharyngeal specimens, stool specimens, and/or cerebrospinal fluid were inoculated in cell culture. Echoviruses and coxsackieviruses were detected by indirect FA.
- For enteric viruses testing, stool specimens were tested first by polymerase chain reaction assays for noroviruses. Specimens tested negative for noroviruses were further tested for rotavirus by an enzyme immunoassay.

RESULTS

Table 1. Non-influenza respiratory viruses and enteric viruses identified at the DHMH Virus Isolation Laboratory from July 2002 to December 2009

Year	Respiratory and Enteric Virus by Virus Isolation										Enteric Virus by Antigen Detection	
	PIV		AdV		RSV		Enterovirus genus		Rotavirus		No.	No. Pos (% Pos)
	No. Tested	No. Pos (% Pos)	No. Tested	No. Pos (% Pos)	No. Tested	No. Pos (% Pos)	No. Tested	No. Pos (% Pos)	No. Tested	No. Pos (% Pos)		
2002	108	2 (1.85)	102	1 (0.98)	4	0 (0)	NA	NA	145	3 (2.07)		
2003	672	3 (0.45)	175	2 (1.14)	81	0 (0)	NA	NA	118	1 (0.85)		
2004	539	4 (0.74)	106	0 (0)	92	0 (0)	NA	NA	0	0		
2005	903	6 (0.66)	213	3 (1.41)	409	4 (0.98)	NA	NA	0	0		
2006	489	7 (1.43)	489	15 (3.07)	489	3 (0.61)	NA	NA	54	4 (7.41)		
2007	528	2 (0.38)	528	6 (1.14)	528	14 (2.65)	124	5 (4.03)	70	5 (7.14)		
2008	776	3 (0.39)	776	18 (2.32)	776	6 (0.77)	317	5 (1.58)	27	0 (0)		
2009	3325	59 (1.77)	3325	34 (1.02)	3325	21 (0.63)	267	24 (8.99)	55	2 (3.64)		
Total	7340	86 (1.17)	5714	79 (1.38)	5704	48 (0.84)	708	34* (4.80)	469	15 (3.20)		

* 18 were identified by the DHMH Virus Isolation Laboratory and 16 were identified by the Enterovirus Diagnostic Laboratory at CDC, Fort Collins, CO.

During the 2009 H1N1 influenza pandemic (April to December 2009), the following algorithm were implemented.

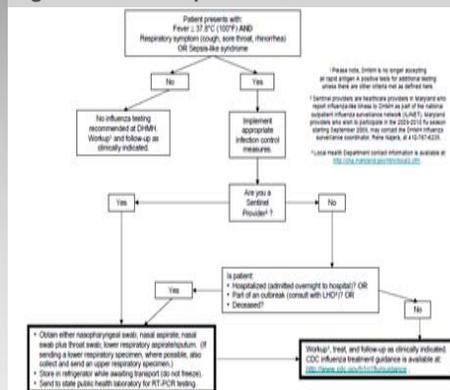


Table 2. Number, percentage, and rate of respiratory virus infections identified by the DHMH Virus Isolation Lab from April to December 2009

Characteristic	Total (N = 115)	Nonhospitalized (n = 35)		Hospitalized (n = 75)		Dead* (n = 5)	
		No.	(%)	No.	(%)	No.	(%)
Age group (yrs)							
0-4	58	11	(19)	42	(72)	5	(9)
5-14	13	6	(46)	7	(54)	0	(0)
15-24	10	6	(60)	4	(40)	0	(0)
25-59	19	7	(37)	12	(63)	0	(0)
≥ 60	12	5	(42)	7	(58)	0	(0)
Unknown	3	0	(0)	3	(100)	0	(0)
Sex							
Female	47	18	(38)	29	(62)	0	(0)
Male	63	16	(25)	42	(67)	5	(8)
Unknown	5	1	(20)	4	(80)	0	(0)
Race/Ethnicity							
Black	33	7	(21)	24	(73)	2	(6)
White	37	11	(30)	23	(62)	3	(8)
Hispanic	4	4	(100)	0	(0)	0	(0)
Asian/Pacific Islander	3	1	(33)	2	(67)	0	(0)
Unknown	38	12	(31.6)	26	(68.4)	0	(0)

Table 2. Non-influenza respiratory viruses and enteroviruses isolated at the DHMH Virus Isolation Lab from April to December 2009

	No. Inoculated	PIV	AdV	RSV	Rhinovirus	Enterovirus
Apr 2009	65	1	0	0	0	0
May 2009	251	10	4	0	0	0
Jun 2009	170	7	5	0	0	0
Jul 2009	251	0	1	0	0	0
Aug 2009	158	2	2	0	0	0
Sep 2009	522	11	1	0	(3)	5 (8)
Oct 2009	504	14	1	1	0	4 (2)
Nov 2009	580	7	8	8	0	0
Dec 2009	284	2	1	4	0	1
Total	2785	54	23	13	(3)	10 (10)

Numbers in parenthesis represent viruses that were isolated at the MD DHMH Virus Isolation Laboratory but were identified by the Enterovirus Diagnostic Laboratory at CDC.

DISCUSSIONS

- Five death cases were associated with viral infections of adenovirus (2), PIV-1 (1), PIV-2 (1), and rhinovirus (1) during the 2009 H1N1 influenza pandemic.
- Adenovirus infections were associated with the deaths of a 3-month-old infant and a 5-month-old infant, both males, in May 2009.
- PIV-1 infection was associated with the death of a 5-month-old male infant in May 2009.
- PIV-2 infection was associated with the death of a 2-month-old male infant in September 2009.

CONCLUSIONS

These findings highlight the importance of continued laboratory surveillance for respiratory and enteric viruses as seen during the 2009 H1N1 influenza pandemic.

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DISCLAIMER

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