Comparison of nasopharyngeal and oropharyngeal swabs for the diagnosis of eight respiratory viruses by real-time reverse transcription-PCR assays.

Abstract:

BACKGROUND: Many acute respiratory illness surveillance systems collect and test nasopharyngeal (NP) and/or oropharyngeal (OP) swab specimens, yet there are few studies assessing the relative measures of performance for NP versus OP specimens. METHODS: We collected paired NP and OP swabs separately from pediatric and adult patients with influenza-like illness or severe acute respiratory illness at two respiratory surveillance sites in Kenya. The specimens were tested for eight respiratory viruses by real-time reverse transcription-polymerase chain reaction (qRT-PCR). Positivity for a specific virus was defined as detection of viral nucleic acid in either swab. RESULTS: Of 2,331 paired NP/OP specimens, 1,402 (60.1%) were positive for at least one virus, and 393 (16.9%) were positive for more than one virus. Overall, OP swabs were significantly more sensitive than NP swabs for adenovirus (72.4% vs. 57.6%, $p<0.01$) and 2009 pandemic influenza A (H1N1) virus (91.2% vs. 70.4%, $p<0.01$). NP specimens were more sensitive for influenza B virus (83.3% vs. 61.5%, $p=0.02$), parainfluenza virus 2 (85.7%, vs. 39.3%, $p<0.01$), and parainfluenza virus 3 (83.9% vs. 67.4%, $p<0.01$). The two methods did not differ significantly for human metapneumovirus, influenza A (H3N2) virus, parainfluenza virus 1, or respiratory syncytial virus. CONCLUSIONS: The sensitivities were variable among the eight viruses tested; neither specimen was consistently more effective than the other. For respiratory disease surveillance programs using qRT-PCR that aim to maximize sensitivity for a large number of viruses, collecting combined NP and OP specimens would be the most effective approach