Comparison of the Starplex Flocked Swab or Dacron Swab for Epithelial Cell Recovery from Nasopharyngeal Samples in Healthy Volunteers



russ.wheeler@sjhc.london.on.ca

R. WHEELER*, D. HATHAWAY, T. HAYES, D. JASKOT, J. KRAHN, A. TIROLESE, R. LANNIGAN.
Virology Department, London Laboratory Services Group, London, Ontario

Objective: To validate the claim that the newly available "flocked swab" (Starplex Starswab Multitrans Collection and Transport System) increases the yield of epithelial cells from samples taken for routine respiratory virus diagnostic testing, over the currently used standard Dacron nasopharyngeal swabs.

Methods: Infection Control Practitioners, skilled in the collection of nasopharyngeal swabs, collected 66 samples from 33 healthy volunteers. The method of collection was a published standard. One nostril was sampled using the standard swab, followed by the second nostril sampled with the flocked swab. Sample material was eluted into equal volumes of phosphate buffered saline and smears were made from a standard volume of the eluted material. Smears were stained with Evan's Blue and a technologist observed 5 random fields at 400X magnification per set of samples and counted the observed epithelial cells recovered from each swab type.

Results: On average the cellular recovery for the flocked swab was 36% higher than the standard Dacron swab (range 19%-48%). Further statistical analysis was not carried out and increased sensitivity of virus detection using the flocked swab could not be determined as the samples were taken from asymptomatic normal volunteers and the purpose of the study was simply to determine if a greater number of epithelial cells could be obtained using the new swab. However, higher cell recovery should result in increased detection of respiratory viruses by DFA, EIA, Culture and Molecular methods. The volunteers did not report any significant level of discomfort when the slightly larger flocked swab was used. The individuals collecting the samples found the flocked swabs easy to use and a definite improvement over nasal aspirate collection methods.

Conclusion: The newly introduced Starplex Starswab Multitrans Collection and Transport System (S160-NASO) has been shown to recover an increased number of epithelial cells from nasopharyngeal samples collected for the diagnosis of respiratory viral disease over traditional Dacron swabs. Combined with the previously demonstrated efficacy of the transport media for maintaining virus viability and desirable features like room temperature storage, this product is an improvement for the collection of upper respiratory specimens for viral diagnosis.

Introduction:

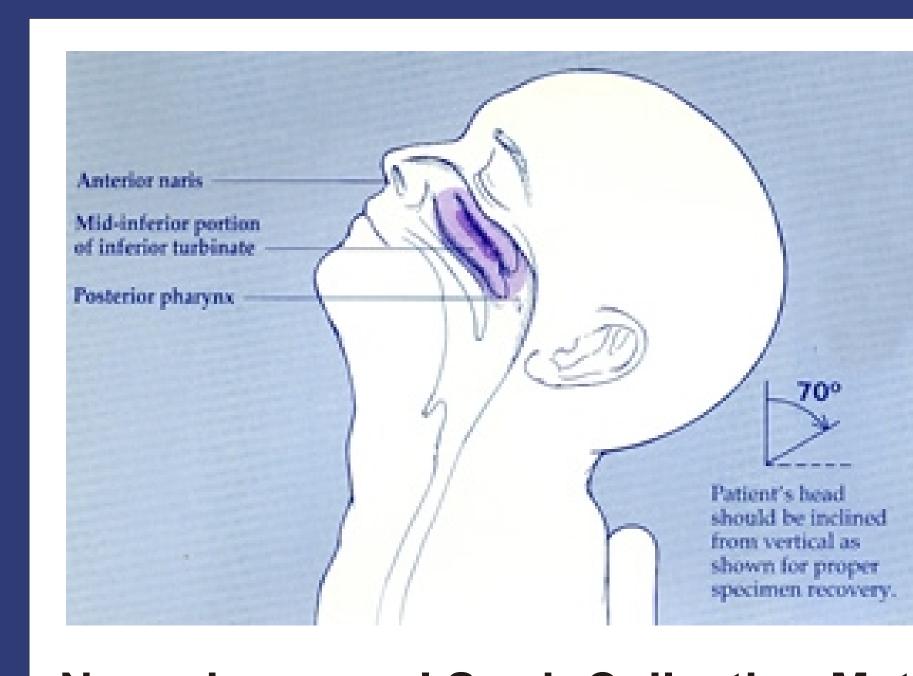
Specimens from the respiratory tract can represent almost one-half of the source material and one-third of the total viruses diagnosed in the clinical laboratory. The convenience of using a swab for medical personnel and the willingness of the patient to allow collection of this specimen (compared with washings) are important factors in this choice. Nasal wash specimens submitted for fluorescent antibody detection of viral antigen often contain debris such as mucous, squamous cells, leukocytes and erythrocytes¹.

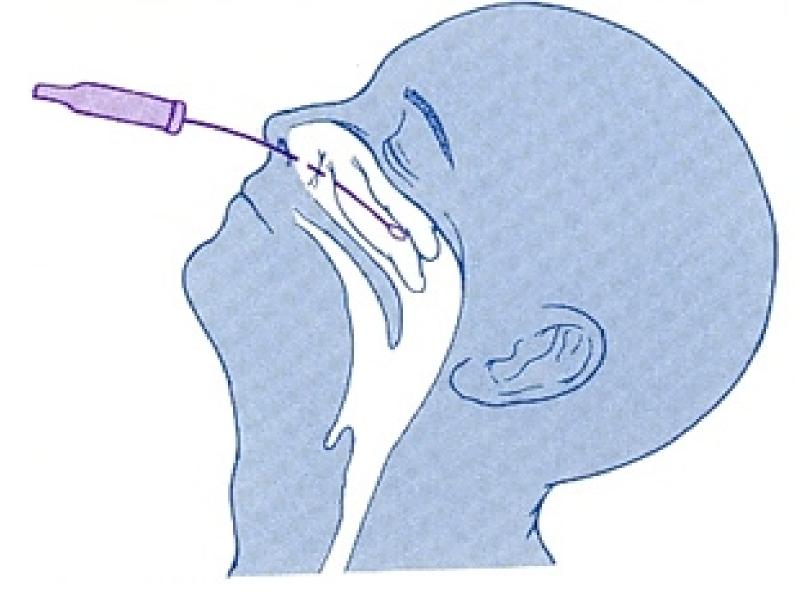
Objective:

To study the effect of swab design on the recovery of Epithelial cells from Nasopharyngeal specimens. Flocked swabs were blindly compared to the Dacron style swab previously available in combination with the Multitrans Collection and Transport System.

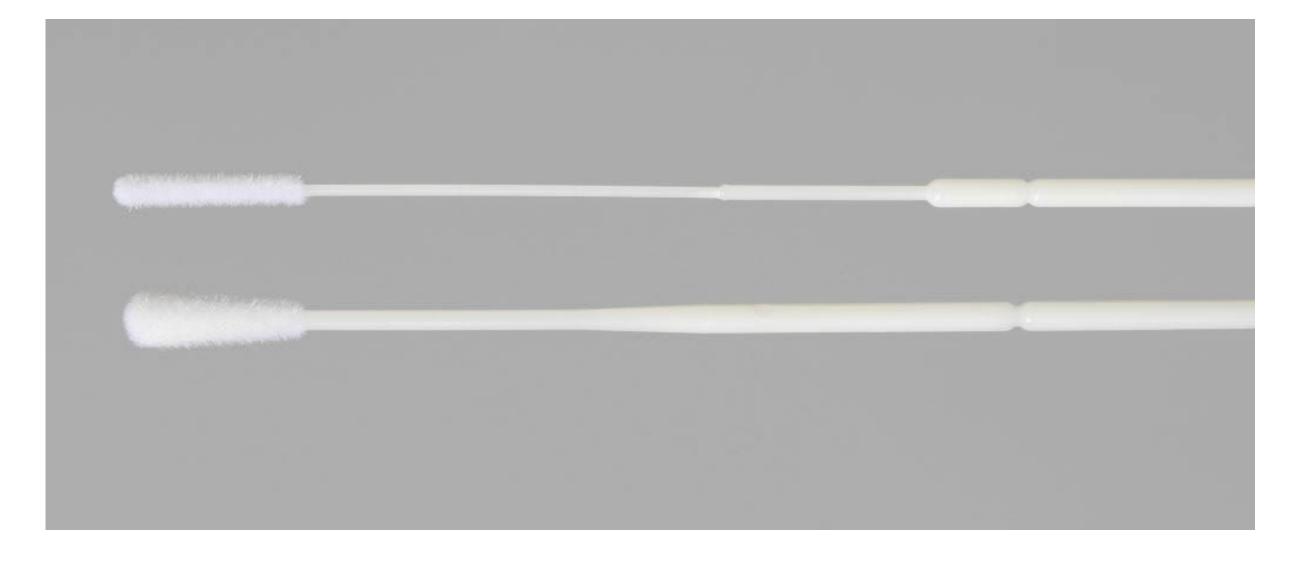
Methods:

Healthy volunteers were invited to partake in a study to compare the two swab designs by having each nostril sampled with one or the other swab type. Sixty-six swabs were collected from 33 individuals. The swabs were handed to the collection personnel in a random order for each subject. Swabs were collected according to the published procedure.





Nasopharyngeal Swab Collection Method

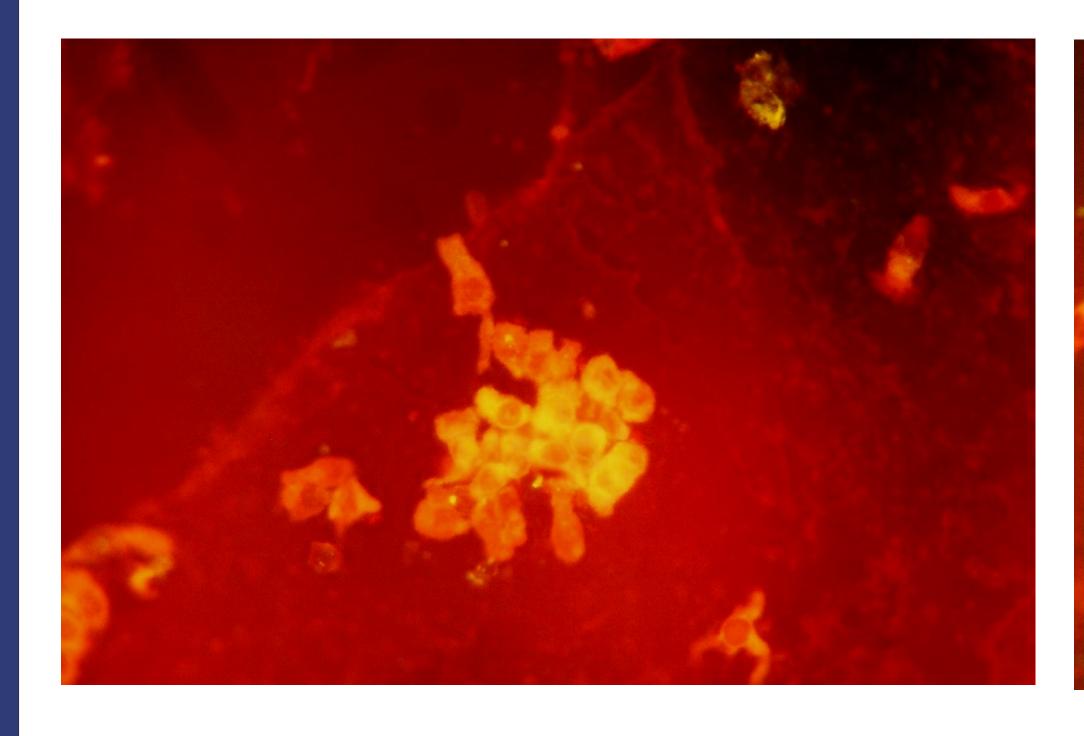


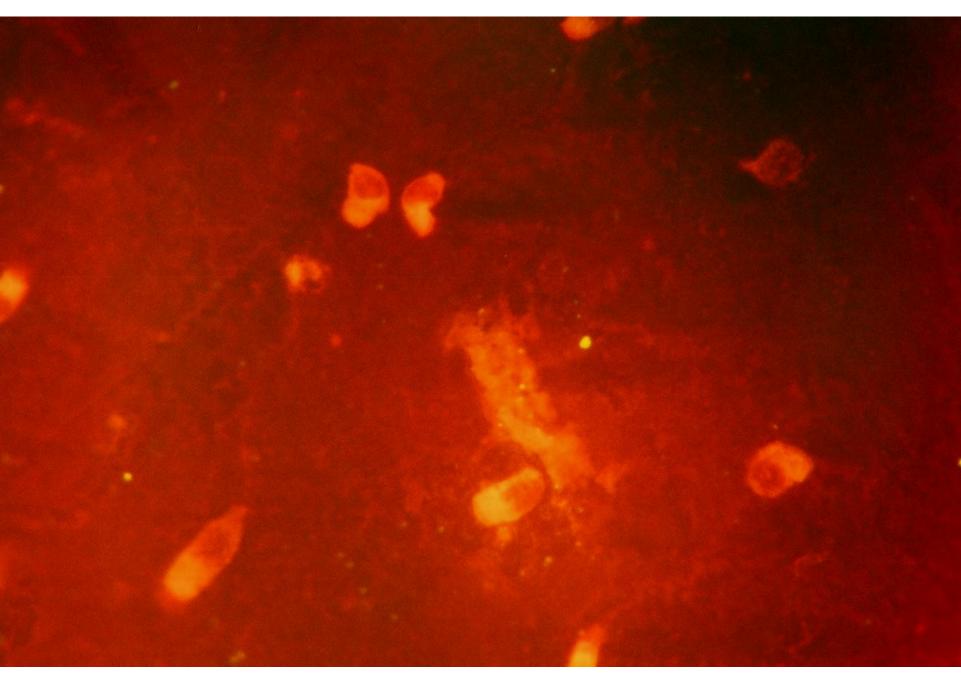
Flocked Collection Swabs

After collection the swab was then handed off to second member of the team and the bottom 3-4 centimeters was cut-off with sterile scissors into a pre-labeled polypropylene tube containing 400 ul of phosphate buffered saline (neutral pH). Tubes were identified with only a random number and an alpha character to denote which swab type was inside. Tubes were vortexed for 5 seconds and then 20 ul of eluted material was used to make smears. After drying and fixing was complete, each well was stained with 15 ul of Evans Blue. A technologist who was not familiar with the alphanumeric identification pattern was then asked to read 5 random fields (at 400X magnification) per well and record the results accordingly.

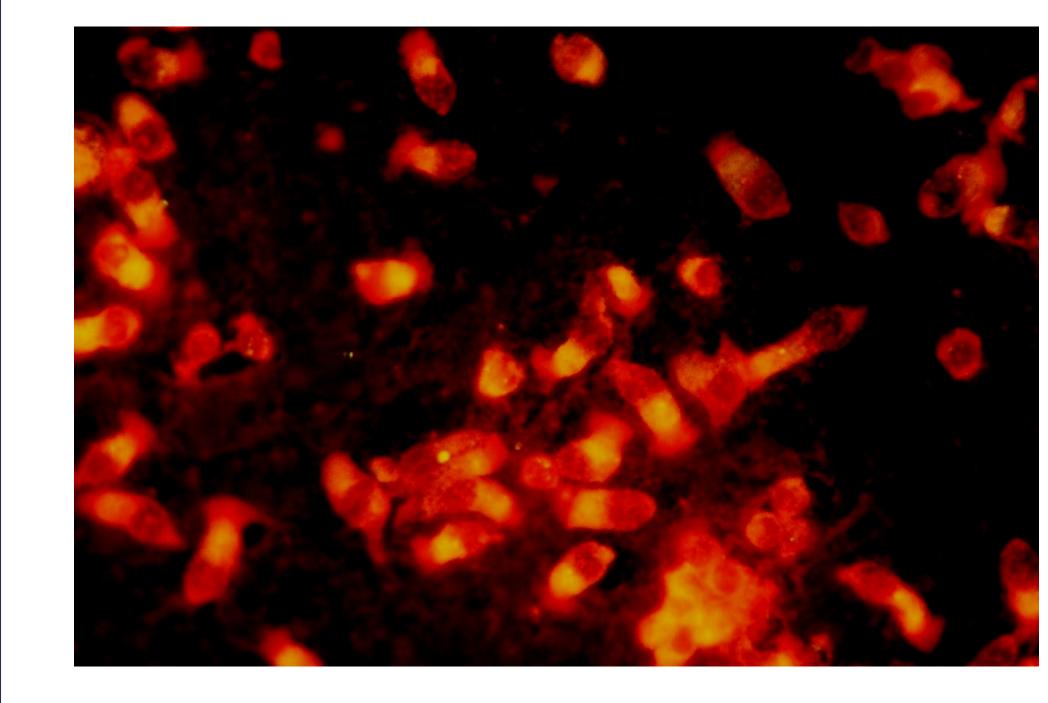
Results:

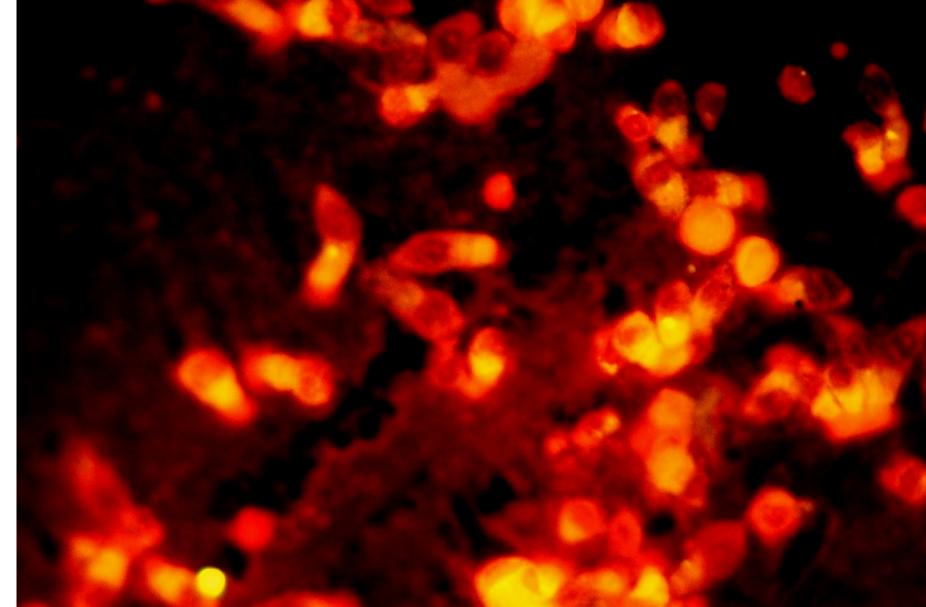
Statistical analysis was not part of the objective from the start, but average counts per swab type and per high-powered field ranged from 3 to greater than 100 cells for all samples analyzed. The flocked swab had a 36% higher recovery of epithelial cells on average than the Dacron swab previously available. The range between subject samples was from 19% to 48% higher.



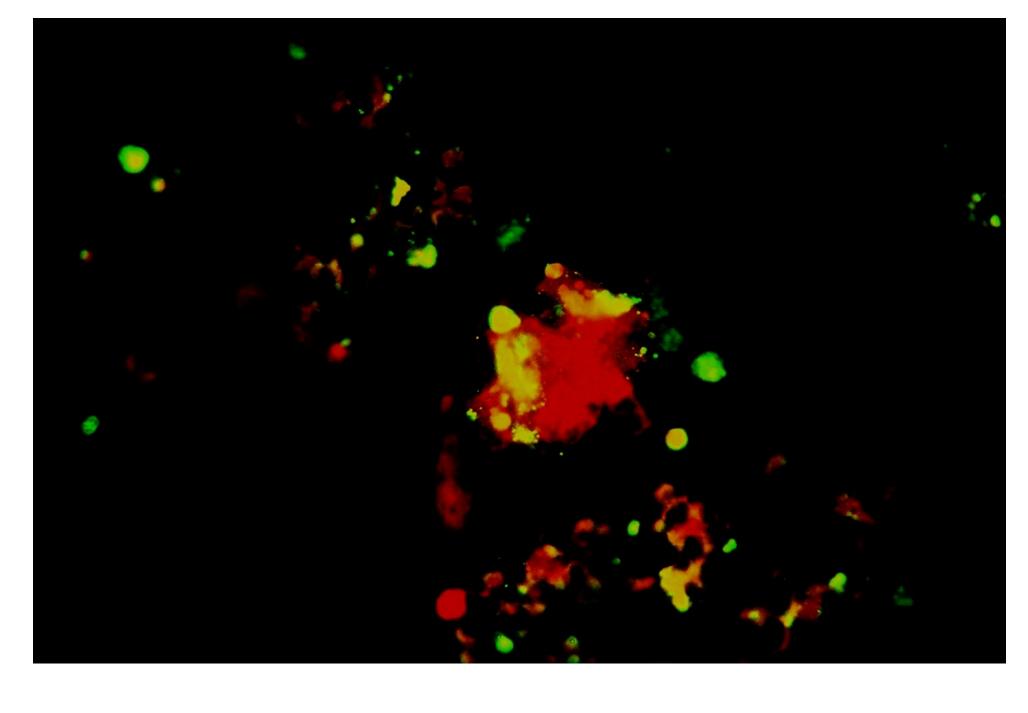


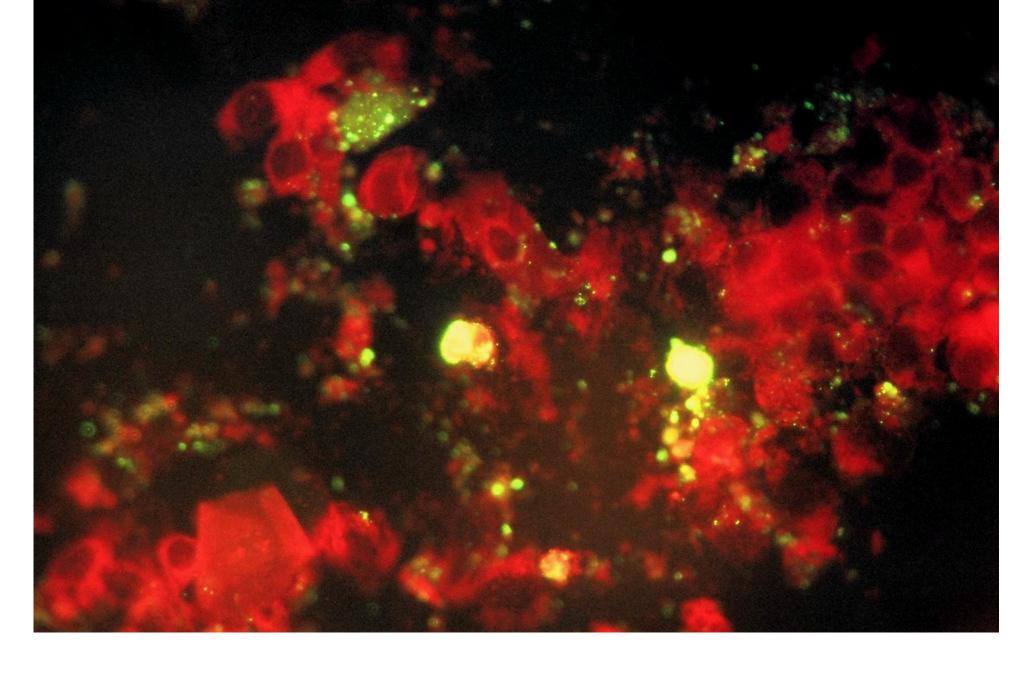
Smear of Dacron swab sample collection





Smear of flocked swab sample collection





RSV Positive Smear

Influenza A Positive Smear

Conclusions:

Microscopy analysis clearly indicated that the new-flocked swab design was able to collect significantly more epithelial cells from subjects when compared to the conventional swab design. This ability to collect a higher quality specimen for upper respiratory infections should increase greatly the laboratories ability to identify the etiology of the disease. The volunteers that participated in the sample collection did not indicate any significant increased level of discomfort using the slightly larger swab design. Sample collection was described as easy and straightforward and a vast improvement over the aspirate process. When the collection system is used under normal circumstances the scored line comes in handy to eliminate leaking samples due to cross-threaded lids when swabs are too long.

Currently respiratory samples are collected and analyzed for common viral pathogens by DFA and culture as well Bordetella pertussis is detected by an in-house PCR technique. A selected number of samples also undergo analysis by a multiplex PCR test combined with a fluorescence detection system. The pediatric care facility at our institution has recently switched from collecting aspirates to flocked swabs samples for upper respiratory infections and we currently are experiencing less than a 3% rate of sub-standard submissions due to a lack of cellular material. Keeping in mind a quick introduction of a new technique to a large number of care providers, that rate is better than expected.

Acknowledgements:

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Reference:

1. Specter, S., Hodinka R.L., Young S.A. 2000 Clinical Virology Manual, Third Edition