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Track 2; Category C

Improving HIV surveillance, and outbreak detection, using the SMARTube™ Stimulation Index (SI): Differentiation between very early, recent, and non-recent infections.

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Background: Several factors hinder good surveillance and outbreak monitoring, including the inability to differentiate recent from non-recent infections, and the seronegative window period (WP) i.e. missing the very early infections. The length of the WP varies in different populations, countries, etc. and with it the ratio of very early infections, missed by current antibody testing.

Methods: Blood was collected from high risk populations in the USA and Kenya, transferred to the laboratory, at room temperature, and one ml of whole blood was incubated in the SMARTube. Plasma was kept from the remaining blood. After the incubation, the supernatant (SMARTplasma) was collected and the two concordant samples were tested for antibodies using ELISA. The ratio: antibody levels in the SMARTplasma / plasma was determined as the SI for that sample. Based on the humoral immune response during the HIV infection, it is expected that the SI will decrease over time, starting with high values at seroconversion, and decreasing to values lower than one as the immune system deteriorates.

Results: Using the SI the HIV infected individuals/samples could be divided into four groups. $SI=\infty$, representing those in the WP; $SI>1.0$, for recent seroconversions; $SI=1.0$, for non-recent infections; and $SI<1.0$, in the late stage of HIV infection. The ratios of the different SI sub-groups varied among the various populations and countries. Thus an epidemiological picture could be obtained, by the distribution of the SI in a cross sectional survey.

Conclusions: The ability to detect those in the WP, and distinguish the recent infections from the whole, provides a tool for identifying the populations with high incidence. During an outbreak the full scope of the spread can be monitored since by using SMARTplasma even the very early infections can be detected, providing true, complete, and current information on the scope of the outbreak.