Age-stratified cellularity in self-collected vaginal samples and first void urine samples

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Introduction

High-risk HPV (hrHPV) DNA testing on vaginal self-samples using clinically validated PCR-based tests demonstrated acceptable performance in previous meta-analyses. Also urine has been suggested to be an alternative sample type in cervical cancer screening. Assessing sample cellularity is of critical importance to ensure sample quality in primary screening.

This analysis aims to assess cellularity in urine and vaginal self-samples collected with different devices in relation to patient´s age.

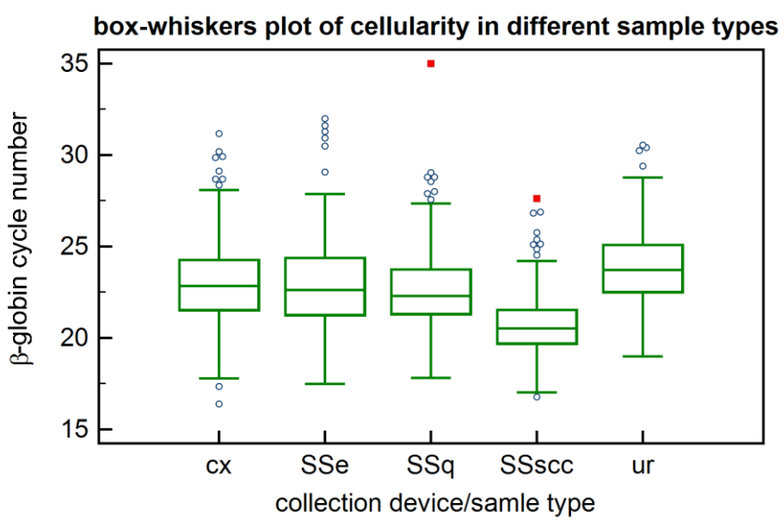

Figure 1. Sample cellularity. Cx: cervical sample ; SSe: self-sample Evalyn ; SSq: self-sample Qvintip ; SSscc: self-sample Multi-Collect swab ; ur: urine sample

Methods

Sample cellularity was evaluated in self-collected vaginal self-samples [Multi-Collect swab (Abbott), Evalyn brush (Rovers), Qvintip brush (Aprovix)], self-sampled urine [Colli-pee; 20 ml version with Universal Collection Medium (Novosanis)], and physician-collected cervical samples (ThinPrep LBC [Hologic]) from 394 patients referred for colposcopy collected within the VALHUDES study, using the the *m*2000 RealTi*m*e High Risk HPV assay (Abbott). Multi-Collect swabs kept dry after collection, were transferred into Cervi-Collect tubes (Abbott) containing 2.5 ml transport medium upon arrival at the laboratory. Evalyn and Qvintip brush heads were eluted in 20 ml of ThinPrep upon arrival at the laboratory. Cellularity was assessed by the cycle number (CN) for ß-globin amplification (Cellular Internal Control) reported by the RealTi*m*e High Risk HPV Assay. Kolmogorov-Smirnov analysis was used to determine normal distribution and differences in average CNs were assessed by ANOVA. CN values categorized as high (CN: <22), intermediate (CN: 22 to 26) and low (CN: >26) were analyzed across age groups <30 years, 30-50 years and >50 years.

Results

Sample cellularity was similar for vaginal brush and cervical samples, while it was significantly higher in vaginal swabs and lower in urine (Fig.1). The lowest proportion of low cellularity samples was found with vaginal swabs (0.7%), followed by cervical (8.1%), vaginal brushes (10.9%), and urine (11.2%). Kolmogorov-Smirnov analysis revealed normal distribution of CN frequencies for cervical and urine samples, but not for self-collected vaginal brushes (Fig.2). While sample cellularity in cervical samples slightly increased with ascending patients´ age, the opposite was observed in self-collected vaginal brush samples. In contrast, cellularity in vaginal swabs and urine samples did not vary significantly by patient´s age (Fig.3).

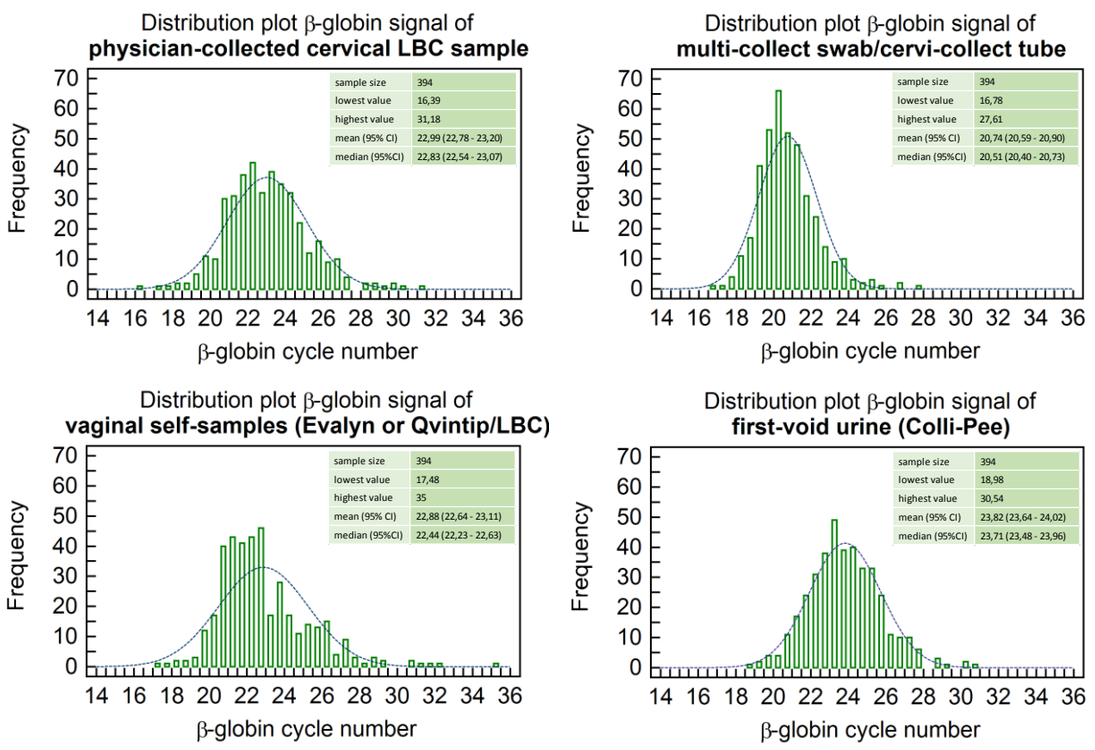

Figure 2. Kolmogorov-Smirnov analysis of CN frequencies

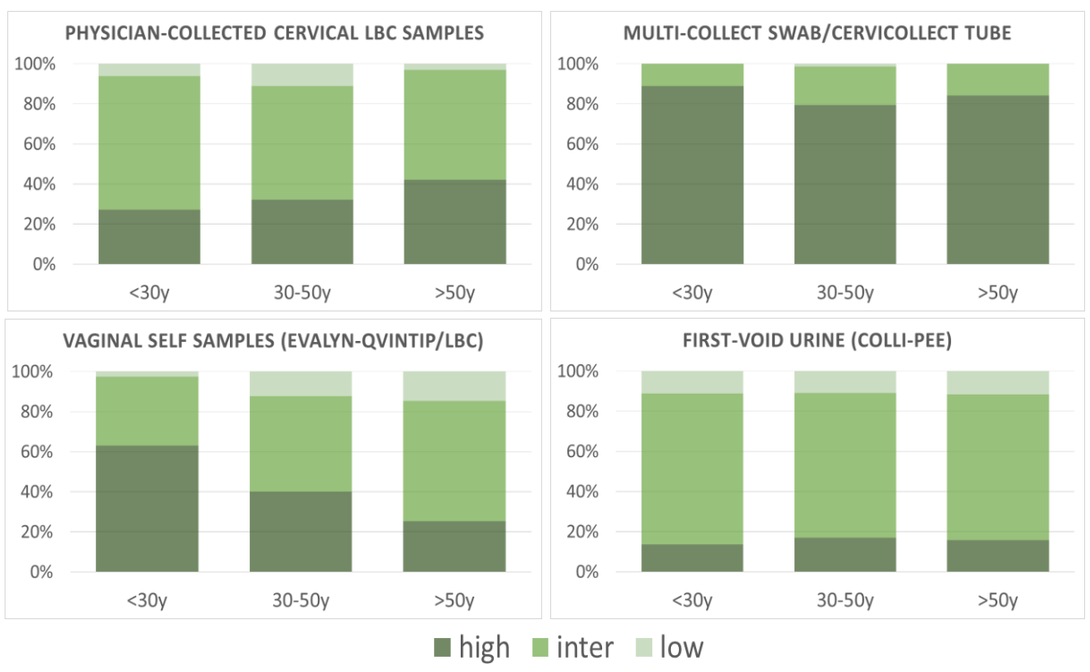

Figure 3. Cellularity (ß-globin signal) per age category.
high: CN <22; intermediate: CN 22 to 26; low: CN >26

Conclusions

We observed significant differences in sample cellularity of self-collected vaginal and urine specimens sampled with different devices and processed with specific media/volume configurations, and physician-collected cervical LBC samples. Patients´ age did not significantly impact the cellularity of vaginal swabs and urine samples, while it decreased with in vaginal brush samples and increased in physician-collected cervical samples with ascending age. The practical impact of transport medium volume and/or its chemistry and patients´ age on cellularity in self-collected vaginal and urine samples, as well as the analytical and clinical accuracy of HPV tests requires further research, which is ongoing in the VALHUDES study.