

# Risk evaluation of iatrogenic transmission of Human Papillomavirus (HPV) during gynaecological procedures

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Iatrogenic transmission of HPV is considered a potential non-sexual mode of contagion, due to the high environmental resistance of the virus and the risk of reusable medical devices contamination, if not properly reprocessed. Our goal is to evaluate the risk of transmission during transvaginal ultrasound examinations.

The study, approved by the Ethics Committee, is conducted at Pisa University Hospital and involves patients aged between 18 and 65 years, who have had a positive molecular test for HPV within the previous 12 months.

## METHODS

### Ultrasound sampling

When? After patient's examination, with ultrasound ready for next use

6 samples are collected

1. Ultrasound probe under probe cover
2. Ultrasound probe NOT under probe cover
3. Probe holder
4. Keypad
5. Ultrasound probe cable

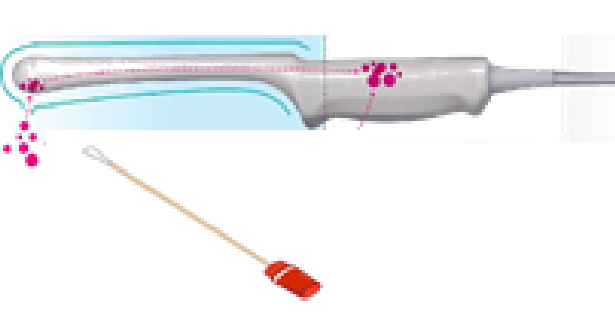


Samples isolated from the PROBE COVER used as a POSITIVE CONTROL, given their direct contact with vaginal secretions

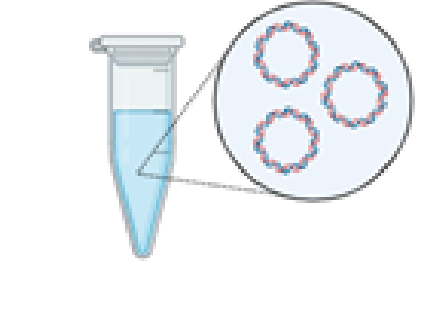
### Workflow



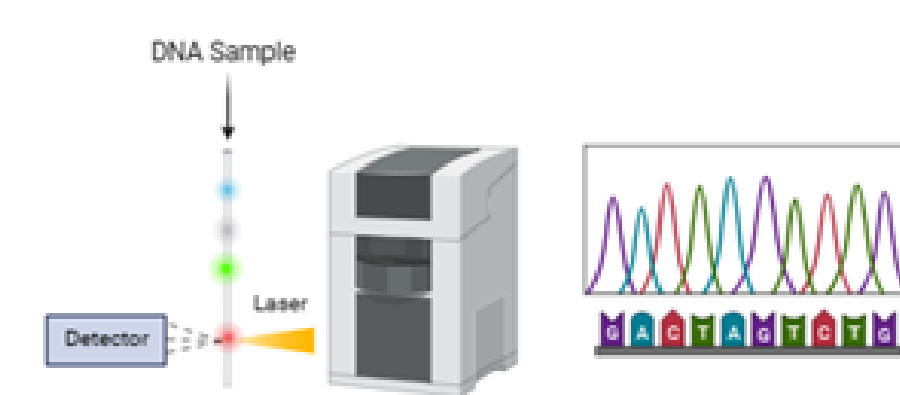
1. Informed consent signing, filling anamnestic questionnaire



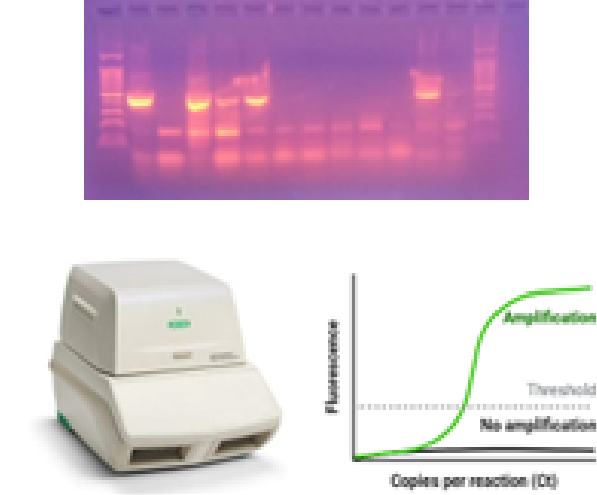
2. Sampling



3. DNA extraction



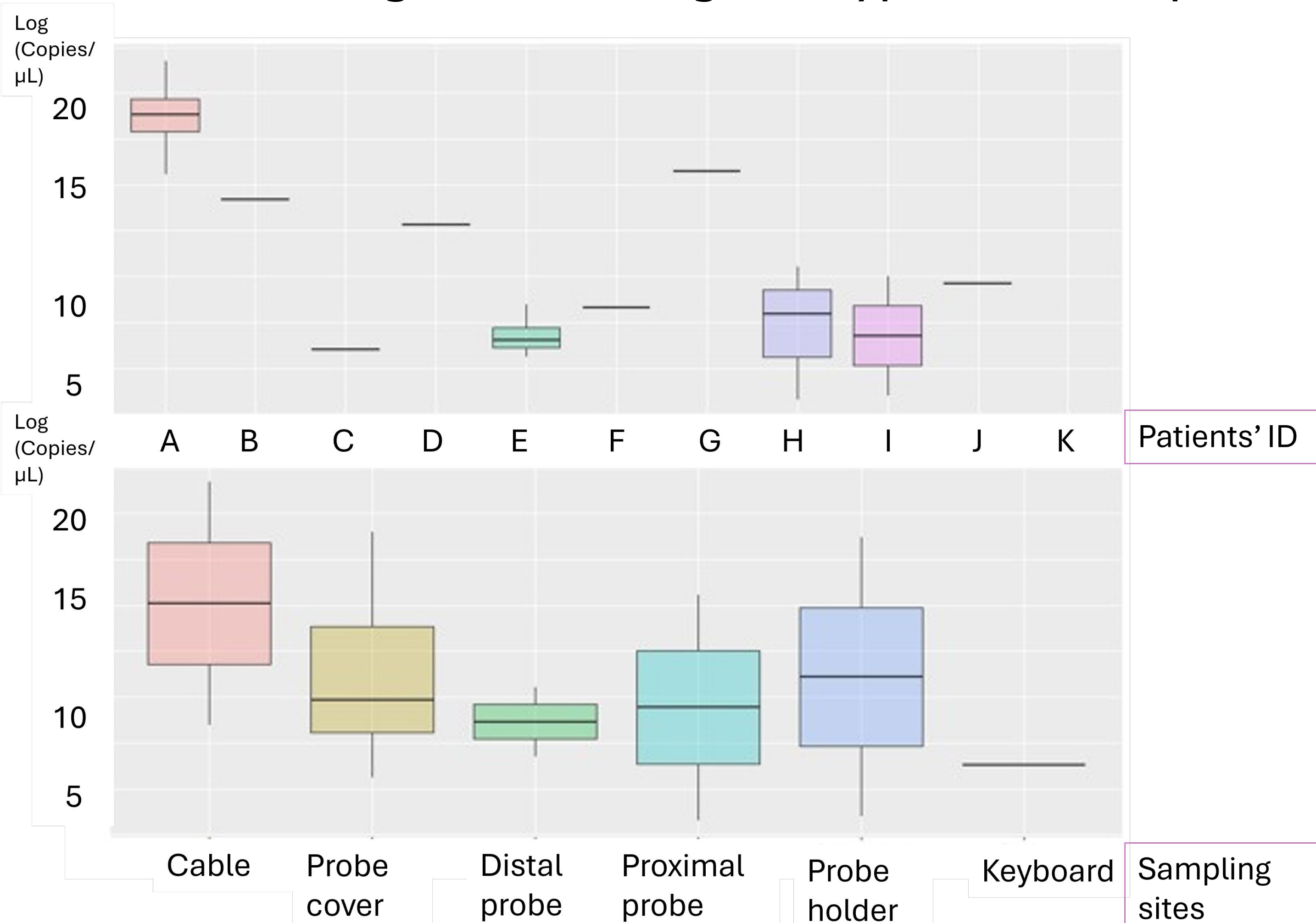
5. Sanger sequencing of positive samples to determine HPV genotype



4. End Point PCR and Real-Time PCR, with primer consensus PGMY09-11

## RESULTS

The box plots show the viral load (measured as copies per  $\mu\text{L}$ ) across different sampling sites, highlighting that the cable is the most contaminated site, while the keyboard is the least contaminated. In all sessions with positive samples, sequencing revealed intra-session genotypic variability between the environmental surfaces and the probe cover. Some genotypes detected on environmental surfaces (e.g., HPV16, HPV51) are classified as high-risk oncogenic types (heatmaps).



## DISCUSSION AND CONCLUSIONS

The results of the initial sampling show that the surfaces of the ultrasound device are contaminated with HPV. The discrepancy between the genotypes found on the probe cover and the ultrasound device could be due to a coinfection in the patient or contamination of the instrument from previous sessions.

This highlights the need to implement reprocessing procedures for ultrasound probes.

## FURTHER PERSPECTIVES: INFECTIVITY ASSAY

The transport medium of the samples will be inoculated into HaCaT cells to assess infectivity. The successful entry of the virus into the cell will be detected using consensus primers by evaluating the presence of mRNA for the early genes E6 and E7.

