BACKGROUND: CD8 T lymphocytes are important in HIV-1 control and mediate virus-specific immunity in the blood and genital tract. The induction and monitoring of mucosal CD8 cell responses will be an important component of HIV-1 vaccine trials, but information regarding the frequency, phenotype and function of genital tract CD8 cell responses is lacking. METHODS: Simultaneous blood and cervical cytobrush samples were obtained from 16 HIV-1-infected Kenyan sex workers. Epitope-specific CD8 T lymphocyte frequencies in the blood and genital tract were analysed after short-term peptide incubation and intracellular cytokine staining for interferon-gamma (IFN gamma). RESULTS: Cervical sampling resulted in adequate cell numbers for analysis in 10/16 women. Background IFN gamma production was higher in CD3+/CD8+ lymphocytes from the genital tract than from blood (0.48% versus 0.1%; $P < 0.01$). Responses to staphylococcal enterotoxin B were detected in cervical CD8 lymphocytes from 10/10 women, at a similar frequency to blood (16.7% in cervix and 13.3% in blood; $P = 0.4$). HIV-1-specific responses were detected the cervix of 8/10 women, with a trend to higher response frequencies in the genital tract than blood (2.1% versus 0.8%; $P = 0.09$). Co-expression of integrin CD103 (alpha E beta 7), a mucosal marker, was used to confirm the mucosal origin of cervical responses. CONCLUSIONS: Cytobrush sampling and intracellular cytokine staining is well suited to the analysis of cervical CD8 cell responses. The frequency of functional virus-specific CD3+/CD8+ T cells is similar in the genital tract and blood of HIV-1-infected women. The role of genital tract CD8 cell responses in HIV-1 control warrants further investigation.