Purpose: The Radiological Physics Center (RPC) reviews patient records on brachytherapy cervix trials for completeness, consistency with the protocol and dosimetric accuracy to minimize patient dose delivery and reporting uncertainty for NCI funded clinical trials. Within cervical protocols, bladder and rectum doses are specified to limit toxicity to these normal tissues. However, bladder and rectal doses reported by institutions often disagree with the RPC's calculated doses. The RPC has investigated the sources of these disagreements.

Methods:The RPC reviewed 182 HDR brachytherapy (tandem and ovoids (T&O)/tandem and ring (T&R)) implants and compared the institution's bladder and rectum point locations and doses to those determined by the RPC strictly adhering to protocol specifications (ICRU 38) for point location and using its independent dose calculation algorithm. The RPC also analyzed its own uncertainty in defining these two points. A dose agreement criterion of ±15% was used as agreed upon by the study group and RPC.

Results:The RPC disagreed with the bladder and rectal doses in 25% and 45%, respectively, of the 182 implants. The RPC's own uncertainty in defining the bladder and rectal points was 1mm±0.1(STDEV), respectively which in a worst case scenario might account for 7% of the dose disagreement. The majority of the dose disagreements were due to the institution's incorrect localization of the bladder and rectal points, by greater than 5mm and 4mm, respectively, away from the ICRU 38 defined location. There were no differences noted whether the applicator used was a T&O or T&R.

Conclusions:Most errors resulted from institutions incorrectly defining the bladder and rectum dose calculation points per ICRU 38. Additional education, timely reviews of implant data and communication with institutions are needed to reduce the number of discrepancies.