PURPOSE: Radiation-induced chromosome aberrations are routinely used in biologic dosimetry to monitor radiation exposure. Translocations are considered stable aberrations with time after exposure. This study was performed to determine the temporal persistence of radiation-induced translocations during a 36-month period in therapeutically irradiated testicular seminoma patients who underwent partial body exposure (>10% of bone marrow).

METHODS AND MATERIALS: Chromosome analyses were carried out in peripheral lymphocytes of 11 patients with testicular seminoma (n = 9), germinoma (n = 1), or follicular non-Hodgkin's lymphoma (n = 1). All patients received radiotherapy with photons from a linear accelerator; in 1 case, additional electron beams were used. Doses ranged from 26 Gy (seminoma) to 45 Gy (non-Hodgkin's lymphoma). None of the patients received chemotherapy. From each patient, blood samples were taken during the 36 months after irradiation at defined points. Chromosomal aberrations were scored after fluorescence in situ hybridization painting of chromosomes 1, 4, and 12 in combination with a pancentromeric probe.

RESULTS: For 9 patients (7 with testicular seminoma, 1 with germinoma, and 1 with non-Hodgkin's lymphoma), a significant temporal decline of translocations, with a mean decline rate of 4.4% +/- 0.4% monthly, could be detected. Two testicular
seminoma patients showed no temporal decline of aberration frequencies. CONCLUSION: Most partial body irradiated patients (9 of 11) showed a significant temporal decline of translocation frequencies during a 36-month period. Thus, reciprocal translocations after partial body irradiation cannot be regarded as stable over time. The temporal decline of aberration frequencies has to be taken into account for retrospective dose estimations.