The updated AAPM Task Group Report No. 43*, prepared by the Low-Energy Interstitial Brachytherapy Dosimetry Subcommittee (LIBD), is currently under review by the Radiation Therapy Committee. Its main goal is to define a protocol for calculation of dose-rate distributions around single photon-emitting sources, supplementing and updating the original 1995 TG 43 Report as needed. Since 1995, the number of commercially available low-energy interstitial brachytherapy sources has dramatically increased; the National Institute of Standards and Technology (NIST) has introduced a new primary standard of air-kerma strength; and a substantial literature on brachytherapy dosimetry has been published. The revised protocol includes: (a) a revised definition of air-kerma strength; (b) elimination of the "apparent activity" parameter; (c) elimination of the anisotropy constant in favor of the distance-dependent 1-D anisotropy function; (d) guidance on extrapolating tabulated TG-43 parameters to longer and shorter distances; (e) addressing minor inconsistencies and omissions in the original protocol; and (f) guidelines for experimental and Monte Carlo estimation of single-source reference-quality dose-rate distributions. To address (e), consistent guidelines for use of point- and line-source geometry functions are provided. In addition, this report recommends a unified approach to comparing reference dose distributions derived from different investigators to develop a single, critically evaluated consensus dataset as well as guidelines for performing and describing future theoretical and experimental single-seed dosimetry studies. Finally, this report includes consensus datasets consisting of dose-rate constants, radial dose functions and 1-D and 2-D anisotropy functions, for all source models that met the AAPM dosimetric prerequisites (Med. Phys. 25, 2269, 1998) as of July 15th, 2001. These include the following ^{125}I sources: Amersham-Health models 6702 and 6711, Bebig model I25.SO6, Best Industries model 2301, Imagyn *isostar* model IS-12501, and North American Scientific Incorporated (NASI) model MED3631-A/M. The ^{103}Pd sources included are the NASI model MED3633 and Theragenics model 200. Depending upon the dose-calculation protocol and parameters currently used by individual physicists, adoption of this protocol may result in substantial changes in patient dosimetry. Therefore, the changes should be carefully evaluated and reviewed with the radiation oncologist preceding implementation of the current protocol. A procedure for the clinical implementation of the revised dose-calculation protocol and revised source-specific dose-rate distributions is presented in this report. While the dose-calculation protocol is applicable to all photon emitting seed sources, the current document focuses on ^{103}Pd and ^{125}I interstitial sources. Guidance on source-strength determination issues and consensus dosimetry data for higher energy sources, extension of the protocol to intracavitary and other non-seed sources, and development of consensus datasets for more recently introduced low energy photon-emitting seeds will be addressed in a series of supplements to this report.

<u>Learning objectives</u>

- To develop a general understanding of the physical methods used for dose-estimation in brachytherapy
- To understand the basic components of the TG-43 dose-calculation protocol and the main differences between the original and revised reversions

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