Appendix

Probabilistic Sensitivity Analysis

With use of probabilistic sensitivity analysis (second-order Monte Carlo simulation), we iteratively evaluated our deterministic model with use of sets of random numbers sampled from defined probability distributions as inputs. In principle, the probability density function (where the area under the curve is equal to 1) can also be defined as a cumulative density function (with a range of values between 0 and 1). At each iteration, a random number between 0 and 1 is drawn from a uniform distribution and the corresponding value of the cumulative density function is chosen (input). This random value is used to calculate the expected value (output) for this iteration. This process is repeated 10,000 times to generate distributions of output variables (hip fractures avoided, costs) (Fig. E-1).

Since the relative risk of future hip fracture (Table II) is a ratio, we used log-normal distribution to represent uncertainty in relative risk parameters. We calculated the parameters defining the log-normal distribution with use of the 95% confidence interval reported by Robinson et al.[16].

To calculate the probability of treatment, compliance, treatment effectiveness, and costs (Table IV), the type of distribution was chosen to be consistent with the data type. Beta distributions are restricted to the interval between 0 and 1, as are probabilities. Gamma distribution is constrained on the interval 0 to positive infinity and is therefore useful to represent uncertainty in cost parameters. In Table IV, the parameters for the distributions were estimated with use of the data available from the program[8] (patients educated, investigated, and treated for osteoporosis, with coordinator; patients educated, investigated, and treated for osteoporosis, without

coordinator; adherence with coordinator) or with use of the smallest possible number of events in a population reflecting the probability used in the base case (adherence without coordinator; efficacy).

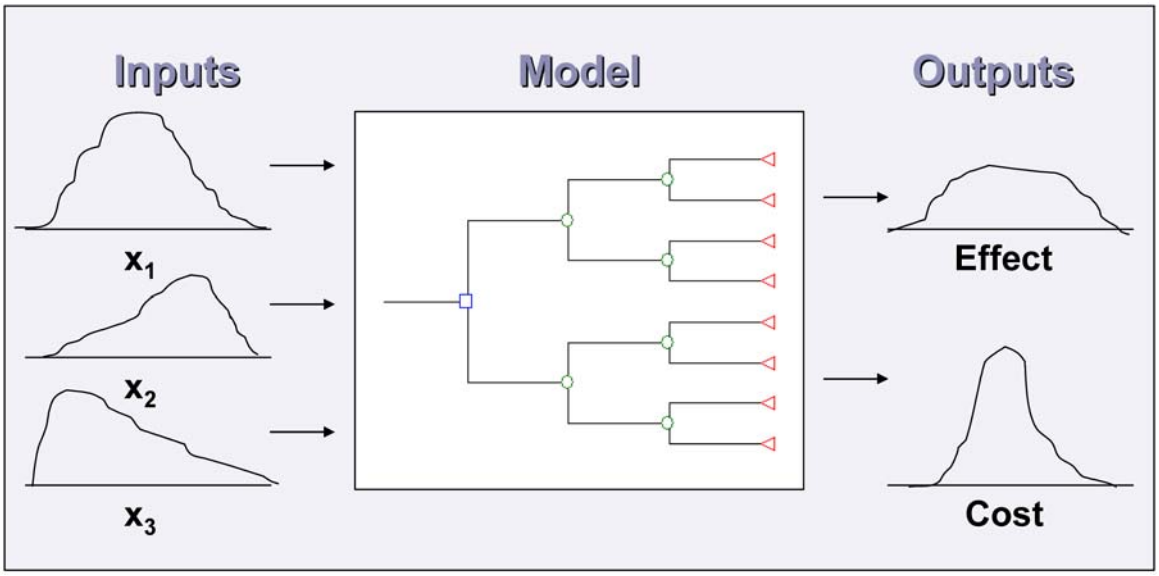

Fig. E-1

Probabilistic sensitivity analysis. (Reprinted, with permission, from: Hunink M, Glasziou PP, Siegel J, Weeks J, Pliskin J, Elstein A, Weinstein M. Decision making in health and medicine: integrating evidence and values. Cambridge, UK: Cambridge University Press; 2001.)