Finding the Optimum Scenario in Risk-benefit Assessment: An Example on Vitamin D

**Background:** In risk-benefit assessment of food and nutrients, several studies so far have focused on comparison of two scenarios to weigh the health effect against each other. One obvious next step is finding the optimum scenario that provides maximum net health gains. **Aim:** This paper aims to show a method for finding the optimum scenario that provides maximum net health gains. **Methods:** A multiple scenario simulation. The method is presented using vitamin D intake in Denmark as an example. In addition to the reference scenario, several alternative scenarios are simulated to detect the scenario that provides maximum net health gains. As a common health metric, Disability Adjusted Life Years (DALY) has been used to project the net health effect by using the QALIBRA (Quality of Life for Benefit Risk Assessment) software. **Results:** The method used in the vitamin D example shows that it is feasible to find an optimum scenario that provides maximum net health gain in health risk-benefit assessment of dietary exposure as expressed by serum vitamin D level. With regard to the vitamin D assessment, a considerable health gain is observed due to the reduction of risk of other cause mortality, fall and hip fractures when changing from the reference to the optimum scenario. **Conclusion:** The method allowed us to find the optimum serum level in the vitamin D example. Additional case studies are needed to further validate the applicability of the approach to other nutrients or foods, especially with regards to the uncertainty that is usually attending the data.