Supplemental digital content 3 – Internal device survival

Internal device survival data were obtained from Cochlear®, the market leader in cochlear implants. Data from type CI24M were used, because long-term follow-up data of 22 years are available. Curves were fitted with the SOLVER function in Microsoft Excel 365. This resulted in g(x), f(x), and h(x), which each express the probability of an internal device failure as a function of time (x) in years after implantation. For adults a linear function was used (g(x)=-0,0007x + 0,9987). For children, in the first 9 years of life a logarithmic function was used, followed by a linear function (f(x)= -0,013ln(x) + 0,9909 h(x)=-0,0007x+0,9681) (Figure A1)

In addition, an analysis was performed in which 100% failure after 50 years was assumed. The long-term follow-up data from Cochlear® were used for the first 22 years. In the following years, a linear function was plotted resulting in 0 % survival at 50 years after implantation (figure A2)

Figure A1. Fitting curves cumulative survival Internal device. The marks indicate the actual data from Cochlear®, the dashed lines are projections

Figure A2. Fitting curves cumulative survival internal device. The endpoint of 0% survival after 50 years was assumed. The marks indicate the actual data from Cochlear®, the dashed lines are projections