**Appendix 2: Data selected for the non-homogeneous condition of X2**

The proportional distribution of the population frequency by the 10 age groups (An) is obtained through a polynomial regression equation to obtain a smoothed decrease in the number of people above 65 years old in Belgium, year 2022 (Stable):

𝑦𝑛 = 2.83𝐸−07 ∗ 𝐴𝑛5 + 9.37𝐸−06 ∗ 𝐴𝑛4 − 0.0204 ∗ 𝐴𝑛3 + 3.0367 ∗ 𝐴𝑛2 − 171.611 ∗ 𝐴𝑛 + 3502.074

The disease rate 𝐼𝑛 by age group follows an exponential increase marked by the following equation: 𝐼𝑛 = 0.0562 ∗𝑒0.2353𝐴𝑛, given that the highest proportion was approximately 60% in the oldest age group and the lowest 7% in the youngest age group.

The disease severity rate 𝐼𝑠 follows a linear decrease (𝐼𝑠𝑛 = −0.061 ∗ A𝑛 + 0.71) by age group, defined by the highest proportional value of 65% and the lowest proportional value of 10% for low severity from young to old. The inverse value is given for high severity, and the complementary value is given for medium severity, as indicated in the next table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Age (X2)** | **Disease** | **Severity level** |
|   |   |   |   |   |   | **Low** | **Medium** | **High** |
| Total Population | N | 1000 | I | 150 |   |   |   |   |
| Number of age groups | Z | 10 | Z | 10 | Z | 10 | 10 | 10 |
|   |   | Frequency |   | Rate |   | Frequency | Frequency | Frequency |
| Age group | A1  | 0.19 | I1  | 0.07 | Is1  | 0.65 | 0.251 | 0.1 |
| A2 | 0.18 | I2 | 0.09 | Is2 | 0.59 | 0.251 | 0.16 |
|  A3 | 0.16 |  I3 | 0.11 |  Is3 | 0.53 | 0.251 | 0.22 |
|  A4 | 0.15 |  I4 | 0.14 |  Is4 | 0.47 | 0.251 | 0.28 |
|  A5 | 0.12 |  I5 | 0.18 |  Is5 | 0.41 | 0.251 | 0.34 |
|  A6 | 0.08 |  I6 | 0.23 |  Is6 | 0.34 | 0.251 | 0.41 |
|  A7 | 0.07 |  I7 | 0.29 |  Is7 | 0.28 | 0.251 | 0.47 |
|  A8 | 0.03 |  I8 | 0.37 |  Is8 | 0.22 | 0.251 | 0.53 |
|  A9 | 0.01 |  I9 | 0.47 |  Is9 | 0.16 | 0.251 | 0.59 |
|  A10 | 0.005 |  I10 | 0.59 |  Is10 | 0.1 | 0.251 | 0.65 |
| Unit cost per severity level of infection | CTm |   |   |   |   | 10 | 20 | 30 |

Age groups are defined (in years) as A1: 65-68.5; A2: 68.5-72; A3: 72-75.5; A4: 75.5-79; A5: 79-82.5; A6: 82.5-86; A7: 86-89.5; A8: 89.5-93; A9: 93-96.5; and A10: 96.5-100.

A: Age group; I: infection; Is: infection severity