=== DEBUGGING AMP LIFETIME RISK CALCULATION ===

Region: 156

Number of age groups: 18

Age Group 1 : 0-4

Ri = 0 , Mi = 72370 , Di = 0 , Ni = 65606014 , wi = 5

Denominator (Ri + Mi - Di) = 72370

lambda\_c = Ri / denominator = 0 / 72370 = 0

Cumulative hazard (before update) = 0

S0\_star = exp(-cumulative\_hazard) = 1

Hazard rate = (wi/Ni) \* denominator = ( 5 / 65606014 ) \* 72370 = 0.005516

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.005516 ) = 0.0055

Contribution = lambda\_c \* S0\_star \* Sx = 0 \* 1 \* 0.0055 = 0

Updated cumulative hazard = 0.001103 (added 0.001103 )

Age Group 2 : 5-9

Ri = 0 , Mi = 22654 , Di = 0 , Ni = 90500949 , wi = 5

Denominator (Ri + Mi - Di) = 22654

lambda\_c = Ri / denominator = 0 / 22654 = 0

Cumulative hazard (before update) = 0.001103

S0\_star = exp(-cumulative\_hazard) = 0.998898

Hazard rate = (wi/Ni) \* denominator = ( 5 / 90500949 ) \* 22654 = 0.001252

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.001252 ) = 0.001251

Contribution = lambda\_c \* S0\_star \* Sx = 0 \* 0.998898 \* 0.001251 = 0

Updated cumulative hazard = 0.001353 (added 0.00025 )

Age Group 3 : 10-14

Ri = 148 , Mi = 23674 , Di = 50 , Ni = 87909429 , wi = 5

Denominator (Ri + Mi - Di) = 23772

lambda\_c = Ri / denominator = 148 / 23772 = 0.006226

Cumulative hazard (before update) = 0.001353

S0\_star = exp(-cumulative\_hazard) = 0.998647

Hazard rate = (wi/Ni) \* denominator = ( 5 / 87909429 ) \* 23772 = 0.001352

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.001352 ) = 0.001351

Contribution = lambda\_c \* S0\_star \* Sx = 0.006226 \* 0.998647 \* 0.001351 = 8e-06

Updated cumulative hazard = 0.001624 (added 0.00027 )

Age Group 4 : 15-19

Ri = 239 , Mi = 27038 , Di = 87 , Ni = 80171427 , wi = 5

Denominator (Ri + Mi - Di) = 27190

lambda\_c = Ri / denominator = 239 / 27190 = 0.00879

Cumulative hazard (before update) = 0.001624

S0\_star = exp(-cumulative\_hazard) = 0.998377

Hazard rate = (wi/Ni) \* denominator = ( 5 / 80171427 ) \* 27190 = 0.001696

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.001696 ) = 0.001694

Contribution = lambda\_c \* S0\_star \* Sx = 0.00879 \* 0.998377 \* 0.001694 = 1.5e-05

Updated cumulative hazard = 0.001963 (added 0.000339 )

Age Group 5 : 20-24

Ri = 506 , Mi = 44220 , Di = 185 , Ni = 80852781 , wi = 5

Denominator (Ri + Mi - Di) = 44541

lambda\_c = Ri / denominator = 506 / 44541 = 0.01136

Cumulative hazard (before update) = 0.001963

S0\_star = exp(-cumulative\_hazard) = 0.998039

Hazard rate = (wi/Ni) \* denominator = ( 5 / 80852781 ) \* 44541 = 0.002754

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.002754 ) = 0.002751

Contribution = lambda\_c \* S0\_star \* Sx = 0.01136 \* 0.998039 \* 0.002751 = 3.1e-05

Updated cumulative hazard = 0.002514 (added 0.000551 )

Age Group 6 : 25-29

Ri = 1554 , Mi = 64666 , Di = 466 , Ni = 89704202 , wi = 5

Denominator (Ri + Mi - Di) = 65754

lambda\_c = Ri / denominator = 1554 / 65754 = 0.023634

Cumulative hazard (before update) = 0.002514

S0\_star = exp(-cumulative\_hazard) = 0.997489

Hazard rate = (wi/Ni) \* denominator = ( 5 / 89704202 ) \* 65754 = 0.003665

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.003665 ) = 0.003658

Contribution = lambda\_c \* S0\_star \* Sx = 0.023634 \* 0.997489 \* 0.003658 = 8.6e-05

Updated cumulative hazard = 0.003247 (added 0.000733 )

Age Group 7 : 30-34

Ri = 4125 , Mi = 99605 , Di = 1264 , Ni = 118128097 , wi = 5

Denominator (Ri + Mi - Di) = 102466

lambda\_c = Ri / denominator = 4125 / 102466 = 0.040257

Cumulative hazard (before update) = 0.003247

S0\_star = exp(-cumulative\_hazard) = 0.996758

Hazard rate = (wi/Ni) \* denominator = ( 5 / 118128097 ) \* 102466 = 0.004337

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.004337 ) = 0.004328

Contribution = lambda\_c \* S0\_star \* Sx = 0.040257 \* 0.996758 \* 0.004328 = 0.000174

Updated cumulative hazard = 0.004114 (added 0.000867 )

Age Group 8 : 35-39

Ri = 6052 , Mi = 107419 , Di = 1690 , Ni = 109430575 , wi = 5

Denominator (Ri + Mi - Di) = 111781

lambda\_c = Ri / denominator = 6052 / 111781 = 0.054142

Cumulative hazard (before update) = 0.004114

S0\_star = exp(-cumulative\_hazard) = 0.995894

Hazard rate = (wi/Ni) \* denominator = ( 5 / 109430575 ) \* 111781 = 0.005107

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.005107 ) = 0.005094

Contribution = lambda\_c \* S0\_star \* Sx = 0.054142 \* 0.995894 \* 0.005094 = 0.000275

Updated cumulative hazard = 0.005136 (added 0.001021 )

Age Group 9 : 40-44

Ri = 10194 , Mi = 141324 , Di = 2803 , Ni = 95819839 , wi = 5

Denominator (Ri + Mi - Di) = 148715

lambda\_c = Ri / denominator = 10194 / 148715 = 0.068547

Cumulative hazard (before update) = 0.005136

S0\_star = exp(-cumulative\_hazard) = 0.994877

Hazard rate = (wi/Ni) \* denominator = ( 5 / 95819839 ) \* 148715 = 0.00776

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.00776 ) = 0.00773

Contribution = lambda\_c \* S0\_star \* Sx = 0.068547 \* 0.994877 \* 0.00773 = 0.000527

Updated cumulative hazard = 0.006688 (added 0.001552 )

Age Group 10 : 45-49

Ri = 20691 , Mi = 242408 , Di = 6189 , Ni = 104901930 , wi = 5

Denominator (Ri + Mi - Di) = 256910

lambda\_c = Ri / denominator = 20691 / 256910 = 0.080538

Cumulative hazard (before update) = 0.006688

S0\_star = exp(-cumulative\_hazard) = 0.993335

Hazard rate = (wi/Ni) \* denominator = ( 5 / 104901930 ) \* 256910 = 0.012245

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.012245 ) = 0.012171

Contribution = lambda\_c \* S0\_star \* Sx = 0.080538 \* 0.993335 \* 0.012171 = 0.000974

Updated cumulative hazard = 0.009137 (added 0.002449 )

Age Group 11 : 50-54

Ri = 47598 , Mi = 488952 , Di = 13762 , Ni = 122960964 , wi = 5

Denominator (Ri + Mi - Di) = 522788

lambda\_c = Ri / denominator = 47598 / 522788 = 0.091046

Cumulative hazard (before update) = 0.009137

S0\_star = exp(-cumulative\_hazard) = 0.990905

Hazard rate = (wi/Ni) \* denominator = ( 5 / 122960964 ) \* 522788 = 0.021258

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.021258 ) = 0.021034

Contribution = lambda\_c \* S0\_star \* Sx = 0.091046 \* 0.990905 \* 0.021034 = 0.001898

Updated cumulative hazard = 0.013389 (added 0.004252 )

Age Group 12 : 55-59

Ri = 57082 , Mi = 673844 , Di = 17530 , Ni = 113599177 , wi = 5

Denominator (Ri + Mi - Di) = 713396

lambda\_c = Ri / denominator = 57082 / 713396 = 0.080014

Cumulative hazard (before update) = 0.013389

S0\_star = exp(-cumulative\_hazard) = 0.986701

Hazard rate = (wi/Ni) \* denominator = ( 5 / 113599177 ) \* 713396 = 0.0314

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.0314 ) = 0.030912

Contribution = lambda\_c \* S0\_star \* Sx = 0.080014 \* 0.986701 \* 0.030912 = 0.002441

Updated cumulative hazard = 0.019668 (added 0.00628 )

Age Group 13 : 60-64

Ri = 60299 , Mi = 734215 , Di = 20201 , Ni = 69176933 , wi = 5

Denominator (Ri + Mi - Di) = 774313

lambda\_c = Ri / denominator = 60299 / 774313 = 0.077874

Cumulative hazard (before update) = 0.019668

S0\_star = exp(-cumulative\_hazard) = 0.980524

Hazard rate = (wi/Ni) \* denominator = ( 5 / 69176933 ) \* 774313 = 0.055966

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.055966 ) = 0.054429

Contribution = lambda\_c \* S0\_star \* Sx = 0.077874 \* 0.980524 \* 0.054429 = 0.004156

Updated cumulative hazard = 0.030862 (added 0.011193 )

Age Group 14 : 65-69

Ri = 92532 , Mi = 1274663 , Di = 35490 , Ni = 75962980 , wi = 5

Denominator (Ri + Mi - Di) = 1331705

lambda\_c = Ri / denominator = 92532 / 1331705 = 0.069484

Cumulative hazard (before update) = 0.030862

S0\_star = exp(-cumulative\_hazard) = 0.96961

Hazard rate = (wi/Ni) \* denominator = ( 5 / 75962980 ) \* 1331705 = 0.087655

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.087655 ) = 0.083923

Contribution = lambda\_c \* S0\_star \* Sx = 0.069484 \* 0.96961 \* 0.083923 = 0.005654

Updated cumulative hazard = 0.048393 (added 0.017531 )

Age Group 15 : 70-74

Ri = 81043 , Mi = 1461124 , Di = 37415 , Ni = 54531188 , wi = 5

Denominator (Ri + Mi - Di) = 1504752

lambda\_c = Ri / denominator = 81043 / 1504752 = 0.053858

Cumulative hazard (before update) = 0.048393

S0\_star = exp(-cumulative\_hazard) = 0.95276

Hazard rate = (wi/Ni) \* denominator = ( 5 / 54531188 ) \* 1504752 = 0.137972

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.137972 ) = 0.128877

Contribution = lambda\_c \* S0\_star \* Sx = 0.053858 \* 0.95276 \* 0.128877 = 0.006613

Updated cumulative hazard = 0.075987 (added 0.027594 )

Age Group 16 : 75-79

Ri = 59243 , Mi = 1416101 , Di = 35396 , Ni = 31736601 , wi = 5

Denominator (Ri + Mi - Di) = 1439948

lambda\_c = Ri / denominator = 59243 / 1439948 = 0.041142

Cumulative hazard (before update) = 0.075987

S0\_star = exp(-cumulative\_hazard) = 0.926828

Hazard rate = (wi/Ni) \* denominator = ( 5 / 31736601 ) \* 1439948 = 0.226859

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.226859 ) = 0.202967

Contribution = lambda\_c \* S0\_star \* Sx = 0.041142 \* 0.926828 \* 0.202967 = 0.00774

Updated cumulative hazard = 0.121359 (added 0.045372 )

Age Group 17 : 80-84

Ri = 43466 , Mi = 1607203 , Di = 33503 , Ni = 19798119 , wi = 5

Denominator (Ri + Mi - Di) = 1617166

lambda\_c = Ri / denominator = 43466 / 1617166 = 0.026878

Cumulative hazard (before update) = 0.121359

S0\_star = exp(-cumulative\_hazard) = 0.885716

Hazard rate = (wi/Ni) \* denominator = ( 5 / 19798119 ) \* 1617166 = 0.408414

Sx = 1 - exp(-hazard\_rate) = 1 - exp(- 0.408414 ) = 0.335296

Contribution = lambda\_c \* S0\_star \* Sx = 0.026878 \* 0.885716 \* 0.335296 = 0.007982

Updated cumulative hazard = 0.203042 (added 0.081683 )

Age Group 18 : 85-85+

Ri = 32334 , Mi = 2497251 , Di = 33979 , Ni = 14388370 , wi = 5

Denominator (Ri + Mi - Di) = 2495606

lambda\_c = Ri / denominator = 32334 / 2495606 = 0.012956

Cumulative hazard (before update) = 0.203042

S0\_star = exp(-cumulative\_hazard) = 0.816244

Sx = 1 (final age group)

Contribution = lambda\_c \* S0\_star \* Sx = 0.012956 \* 0.816244 \* 1 = 0.010576

Updated cumulative hazard = 0.376488 (added 0.173446 )