

## **A DEATH AND DISABILITY LIFE TABLE FOR INSURED WORKERS BORN IN 1985**

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### **Introduction**

The Social Security program is not just a program for providing income during retirement. A worker, who meets certain requirements for insured status, will also receive monthly cash benefits in the event of disability and survivors may receive benefits after the worker's death<sup>1</sup>. For a young worker who maintains insured status, this note illustrates the likelihood that these types of benefits will be provided before becoming eligible for full retirement benefits. These illustrations reflect the intermediate assumptions of the 2005 Trustees Report. *Actuarial Note #129*, which was based on the intermediate II-B assumptions of the 1986 Trustees Report, was the prior publication that illustrated this likelihood.

In order to assess the financial condition of the Social Security program, the Office of the Chief Actuary of the Social Security Administration annually makes projections of the number of insured workers who die or become disabled each year for the next 75 years. These projections depend on the age-sex-specific projections of mortality and disability incidence, and age-sex-duration-specific projections of disabled life mortality and recovery. Additional information regarding these projections is published by the Board of Trustees of the Old-Age and Survivors Insurance and Disability Insurance Trust Funds in annual reports (Trustees Reports) and in actuarial studies<sup>2</sup>.

Using the assumed rates of death, recovery, and disability incidence from the intermediate assumptions of the 2005 Trustees Report, this note presents estimates of the chance that someone who becomes insured at age 20 in 2005 and maintains insured status thereafter will become disabled or die before reaching age 67, the age at which full Social Security benefits could first be received (normal retirement age). Table A compares these estimates using the 1985 birth cohort with those published in *Actuarial Note #129*, which used the 1966 birth cohort. The projected probabilities of death before normal retirement age have decreased between the 1966 and 1985 cohorts, reflecting in part the actual improve-

ment in mortality experience since 1986.<sup>3</sup> The projected probability of becoming disabled before normal retirement age has decreased for insured men between the 1966 and 1985 cohorts, but has increased for insured females. For the 1985 insured cohort, the probability of surviving from age 20 to normal retirement age without ever being disabled is projected to be 62 percent for males and 69 percent for females. Comparable probabilities projected for the 1966 insured cohort are 58 percent for males and 70 percent for females.

### **Assumptions and Methods**

Tables B and C contain death and disability life tables for insured males and females, respectively, born in 1985. Death and disability rates by sex and single year of age (20 through 67) are derived for four population groups: total, active, disabled, and recovered. The active group is composed of insured workers who are alive and have never been disabled. The disabled group consists of workers who are currently disabled. The recovered group consists of insured workers who have had a prior disability, but are not currently disabled. All workers are assumed to be fully and disability insured at all times after reaching age 20.<sup>4</sup> Deaths, entitlements to disability-worker-benefit, and recoveries from the disability rolls are calculated for each age. For each population (active, disabled, recovered, and total), the number of persons alive at the beginning of the next year is calculated by adding and/or subtracting the relevant components of change to the number of persons alive at the beginning of the year.

Cohort insured life tables for each sex from age 20 to age 67 are developed for those born in 1985. Deaths for the insured population are calculated by applying age-sex-specific mortality rates of the general population to the beginning of the year total population.<sup>5</sup> Deaths for

<sup>3</sup> For the 1986 as well as the 2005 Trustees Reports, mortality is assumed to continually improve for younger cohorts. The comparisons reflect the fact that improvement in the mortality of women since 1981 has turned out to be much less than projected.

<sup>4</sup> Computing disability incidence rates by age using insured workers gives a larger probability of disability entitlement than if all workers were included in the calculations.

<sup>5</sup> Using general population mortality rates may slightly overstate death rates for the insured because the group excluded, the uninsured, are likely to have higher death rates than the general population.

<sup>1</sup> Disabled means receiving Social Security disability benefits, and, thus, meeting all qualifications to receive these benefits.

<sup>2</sup> Additional information is located at the following internet site: <http://www.socialsecurity.gov/OACT/pubs.html>.

the disabled population are calculated by applying age<sup>6</sup>-sex-duration-specific mortality rates to the beginning of the year disabled population. Newly entitled disabled-worker-beneficiaries, those with duration 0, are assumed to be exposed for half a year, since on average they become entitled at mid-year. Deaths occurring to those who have recovered from disability (recovered deaths) are calculated by applying age-sex-specific mortality rates of the general population to the recovered population at the beginning of the year with adjustments. The adjustments consist of adding half of the newly recovered population and subtracting half of those newly disabled from the recovered population. Active deaths are calculated as the residual by subtracting the disabled and recovered deaths from the total population deaths.

Cohort disability incidence rates are developed for each sex from age 20 to age 67 for those born in 1985. Newly disabled-worker-beneficiaries are calculated by applying the age-sex-specific incidence rates to the active and recovered populations at the beginning of the year.

Cohort rates of recovery from disability are also developed for each sex from age 20 to age 67 for those born in 1985. Recoveries from the disabled population are calculated by applying age<sup>6</sup>-sex-duration-specific recovery rates to the beginning of the year disabled population. Newly entitled disabled-worker-beneficiaries, those with duration 0, are assumed to be exposed for half a year.

## Results

Table B provides tabulations which allow for the computation of various probabilities of survival, death, and

disability for insured males born in 1985. Table C provides the same information for insured females born in 1985. For example, the probability that an insured female, age 25 in 2010, will survive to age 60 without ever becoming disabled is the number of active lives at age 60 (765,362) divided by the number of active lives at age 25 (991,819), resulting in a probability of 77 percent.

Table D uses the tabulations in tables B and C to derive various probabilities of survival, death, and disability for insured males and females born in 1985. The probability of survival without disability from age 20 to age x is calculated by dividing the active population at the beginning of the year at age x by the active population at the beginning of the year at age 20. The probability of dying or becoming disabled after age 20 and before age x is calculated as the complement of the probability of surviving without disability from age 20 to age x. For example, an insured male worker who attained age 20 in 2005 has a 62 percent chance of surviving to age 67 without ever becoming disabled and a 38 percent chance of either dying or becoming disabled prior to age 67.

Table D also includes probabilities of an insured worker becoming disabled and of an insured worker dying while active. These probabilities are shown from age 20 to age x and are calculated respectively by dividing the total newly disabled and the total deaths from the active population prior to age x by the active population alive at the beginning of the year at age 20. For example, the probability that a continuously insured female worker, who attained age 20 in 2005, will become disabled before age 60 is 20 percent. In addition, the probability that she will die before age 60 without receiving disability Social Security is only 3 percent.

<sup>6</sup> Age is age at entitlement to a disability-worker-benefit.

**Table A: Probability of Death and/or Disability for Illustrative Cases of Insured Workers**

Trustees Report Year <sup>1</sup>	Year of Attainment of Age 20	Probability of Death Before NRA (while active <sup>2</sup> )			Probability of Disability Before NRA			Probability of Survival to NRA (never disabled)		
		Male	Female	Total <sup>3</sup>	Male	Female	Total <sup>3</sup>	Male	Female	Total <sup>3</sup>
1986	1986	0.095	0.060	0.077	0.322	0.240	0.281	0.583	0.700	0.642
2005	2005	0.086	0.056	0.071	0.293	0.252	0.273	0.621	0.692	0.656

<sup>1</sup> Calculations based on the intermediate assumptions of that year's Trustees Report (intermediate II-B for the 1986 Trustees Report).

<sup>2</sup> Active workers are defined as those who are alive and have never been disabled.

<sup>3</sup> Totals are obtained by combining tables B and C. For example, the probability of dying before NRA while active would equal 7.1 percent, (85,971 + 55,957) / (1,000,000 + 1,000,000).

Note: Probabilities are determined assuming all are disability insured throughout their working lives.





**Table D: Probabilities of Non-disability Survival, Death and Disability for Insured Workers Attaining Age 20 in 2005 (Born in 1985)**

Age x	Males Attaining Age 20 in 2005				Age x	Females Attaining Age 20 in 2005			
	Probability of Surviving Not Disabled From Age 20 To Age x	Probability of Disability From Age 20 To Age x	Probability of Death While Active From Age 20 To Age x	Probability of Disability or Death From Age 20 To Age x		Probability of Surviving Not Disabled From Age 20 To Age x	Probability of Disability From Age 20 To Age x	Probability of Death While Active From Age 20 To Age x	Probability of Disability or Death From Age 20 To Age x
21	99.7%	0.1%	0.1%	0.3%	21	99.8%	0.1%	0.0%	0.2%
22	99.5	0.3	0.2	0.5	22	99.7	0.2	0.1	0.3
23	99.2	0.4	0.4	0.8	23	99.5	0.4	0.1	0.5
24	98.9	0.6	0.5	1.1	24	99.4	0.5	0.2	0.6
25	98.7	0.8	0.6	1.3	25	99.2	0.6	0.2	0.8
26	98.4	0.9	0.7	1.6	26	99.0	0.8	0.2	1.0
27	98.1	1.1	0.8	1.9	27	98.8	0.9	0.3	1.2
28	97.8	1.3	0.9	2.2	28	98.6	1.1	0.3	1.4
29	97.5	1.5	1.0	2.5	29	98.4	1.3	0.3	1.6
30	97.3	1.7	1.0	2.7	30	98.2	1.5	0.4	1.8
31	97.0	1.9	1.1	3.0	31	97.9	1.7	0.4	2.1
32	96.6	2.2	1.2	3.4	32	97.7	1.9	0.5	2.3
33	96.3	2.4	1.3	3.7	33	97.4	2.1	0.5	2.6
34	95.9	2.7	1.4	4.1	34	97.1	2.4	0.6	2.9
35	95.5	3.0	1.4	4.5	35	96.7	2.6	0.6	3.3
36	95.1	3.3	1.5	4.9	36	96.4	2.9	0.7	3.6
37	94.7	3.7	1.6	5.3	37	96.0	3.2	0.8	4.0
38	94.2	4.1	1.7	5.8	38	95.6	3.6	0.8	4.4
39	93.7	4.4	1.9	6.3	39	95.1	4.0	0.9	4.9
40	93.2	4.8	2.0	6.8	40	94.7	4.3	1.0	5.3
41	92.7	5.2	2.1	7.3	41	94.2	4.7	1.1	5.8
42	92.1	5.7	2.3	7.9	42	93.7	5.2	1.2	6.3
43	91.5	6.1	2.4	8.5	43	93.1	5.6	1.3	6.9
44	90.8	6.6	2.6	9.2	44	92.6	6.1	1.3	7.4
45	90.2	7.1	2.8	9.8	45	92.0	6.6	1.4	8.0
46	89.5	7.6	2.9	10.5	46	91.4	7.1	1.5	8.6
47	88.7	8.1	3.1	11.3	47	90.7	7.6	1.6	9.3
48	88.0	8.7	3.4	12.0	48	90.1	8.2	1.8	9.9
49	87.2	9.3	3.6	12.8	49	89.3	8.8	1.9	10.7
50	86.2	10.0	3.8	13.8	50	88.5	9.6	2.0	11.5
51	85.1	10.9	4.0	14.9	51	87.5	10.4	2.1	12.5
52	84.1	11.7	4.2	15.9	52	86.6	11.2	2.2	13.4
53	83.1	12.6	4.4	16.9	53	85.6	12.1	2.3	14.4
54	81.9	13.5	4.6	18.1	54	84.6	13.0	2.4	15.4
55	80.5	14.8	4.8	19.5	55	83.4	14.1	2.5	16.6
56	78.9	16.1	5.0	21.1	56	82.1	15.3	2.7	17.9
57	77.4	17.4	5.2	22.6	57	80.7	16.4	2.8	19.3
58	75.8	18.8	5.4	24.2	58	79.4	17.6	3.0	20.6
59	74.0	20.3	5.7	26.0	59	78.0	18.9	3.1	22.0
60	72.2	21.9	5.9	27.8	60	76.5	20.2	3.3	23.5
61	70.2	23.6	6.1	29.8	61	75.1	21.4	3.5	24.9
62	68.4	25.2	6.4	31.6	62	73.9	22.5	3.7	26.1
63	66.8	26.6	6.6	33.2	63	72.7	23.4	3.9	27.3
64	65.4	27.7	6.9	34.6	64	71.7	24.1	4.2	28.3
65	64.1	28.5	7.4	35.9	65	70.7	24.7	4.6	29.3
66	63.0	29.0	7.9	37.0	66	69.9	25.0	5.1	30.1
67	62.1	29.3	8.6	37.9	67	69.2	25.2	5.6	30.8