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```
-- Result protocol
  From MECAN version 0.2
  Based on MINUIT2 version 5.27.02
  In file format version rec.1.0
  Parallelisation mode 'useOpenmpDefault'
  Operation mode 'regression & analysis'
  Group data mode 'use_raw_data'

-- Control files
  MINUIT2 file 'sigmoid.min'
  Control file 'par/leuk.par'

-- Optimisation time
  Optimisation started: Mi. Aug 15 14:39:09 2012
  Optimisation stopped: Mi. Aug 15 14:52:32 2012
  Elapsed time: 00:13:22 or 802 secs

-- Raw data summary
  Grouped data read from file 'lss14.csv'
  Created 53782 Poisson cells with 8 categories
    for organ/organ group 'leukemia'
  Counted      86611 persons
  Counted      3294282.3 person years
  Counted      318 cases
  Case counts pertain to end point(s) for 1 organ/organ groups
  End point no. 1 'Leukemia 204-208'
  Organ dose 'marrow10' with Id 9

-- Stratification summary
  Created 53782 Poisson cells with 5 categories
    for organ/organ group 'leukemia'
  Category 'city' with Id 0
  Category 'sex' with Id 1
  Category 'agexcat' with Id 4
  Category 'agecat' with Id 5
  Category 'marrow10' with Id 7

  Total mean age at exposure [yr] 22.4097
  Total mean age attained [yr] 50.4871
  Total mean age of cases (approx.) [yr] 58.3279
  Total mean dose [Gy] 0.133906

-- Additional used categories
  none

-- Optimisation results
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Optimisation strategy 'medium'
 Number of model calls: 169
 Initial deviance: 2670.77787
 Final deviance: 2670.77787
 Reduction: 5.84481e-06

Risk model 'elk_sigmoid_err'
 Objective function 'poisson'
 Error mode 'minos'
 MINUIT2 errdef: 1

Model parameter

no.	name	unit	value	eparab	eminus	eplus	var/fix	logtrans
0	b0	[-]	-9.49135	0.105473	-0.106413	0.104193	varbl	-
1	bsex	[-]	-0.321779	0.0571472	-0.0572087	0.0571117	varbl	-
2	bcity	[-]	-0.142683	0.0653611	-0.0660621	0.0647581	varbl	-
3	ba1	[-]	2.1012	0.265888	-0.265139	0.27049	varbl	-
4	ba2	[-]	1.08448	0.205288	-0.209822	0.199077	varbl	-
5	be1	[1/yr]	0.00640818	0.00458583	-0.00459153	0.00459849	varbl	-
6	be2	[1/yr^2]	-0.000717607	0.000227255	-0.000230825	0.000222595	varbl	-
7	B	[-]	-1.67301	0.873029	-1.45344	0.738449	varbl	log
8	C	[-]	0.71889	0.259234	-0.254308	0.266312	varbl	log
9	A	[1/Gy]	3.9354	1.15729	-0.973022	1.44146	varbl	-
10	pa	[-]	-1.60747	0.344396	-0.363427	0.33374	varbl	-
11	cen_a	[yr]	55	-	-	-	fixed	-
12	px	[1/yr]	0	-	-	-	fixed	-
13	cen_e	[yr]	30	-	-	-	fixed	-
14	msex	[-]	0	-	-	-	fixed	-

Model parameter (final vs. initial)

no.	name	unit	final	initial	change	rel. ch. [%]
0	b0	[-]	-9.49135	-9.49138	3.26371e-05	-0.000343861
1	bsex	[-]	-0.321779	-0.321775	-3.97722e-06	0.00123603
2	bcity	[-]	-0.142683	-0.142664	-1.85773e-05	0.0130217
3	ba1	[-]	2.1012	2.10121	-5.11886e-06	-0.000243615
4	ba2	[-]	1.08448	1.08446	1.93527e-05	0.00178455
5	be1	[1/yr]	0.00640818	0.00640958	-1.40434e-06	-0.0219101
6	be2	[1/yr^2]	-0.000717607	-0.000717631	2.43155e-08	-0.00338831
7	B	[-]	-1.67301	-1.67284	-0.000171094	0.0102278
8	C	[-]	0.71889	0.718865	2.47481e-05	0.00344266
9	A	[1/Gy]	3.9354	3.93519	0.000207338	0.00526882
10	pa	[-]	-1.60747	-1.60738	-9.24087e-05	0.00574903
11	cen_a	[yr]	fixed	55		
12	px	[1/yr]	fixed	0		
13	cen_e	[yr]	fixed	30		
14	msex	[-]	fixed	0		

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Correlation matrix (of 11 variable parameters)

0										
1	-0.051936362									
2	0.29234689	0.0088647651								
3	-0.38103917	-0.08096417	0.022293151							
4	-0.2329433	-0.049607672	0.007401158	0.39343666						
5	0.22133698	0.0087541277	0.074900179	-0.52123065	-0.17430951					
6	-0.52758393	0.13545952	-0.019806178	0.095353334	-0.1579745	-0.11931977				
7	0.041188378	-0.0025881854	-0.094555972	-0.053148358	0.046191385	-0.020112049	0.024921892			
8	0.13835474	0.016550779	-0.11473124	-0.11648001	0.085003016	-0.0067090814	0.022022683	0.77481407		
9	-0.27815138	0.014918316	-0.049372858	0.068264103	0.093734749	-0.018831014	0.048540709	0.77955197		
10	-0.069359846	0.025844934	-0.012590688	-0.34049766	0.53130867	0.020616121	0.0022440142	0.026504254		
	0.42943541									
	0.094185375	0.12543765								

-- O/E analysis

Checking sums for persons, person years and cases

	Stratification	O/E analysis
Total persons:	86611	86611
Total person years:	3.29428e+06	3.29428e+06
Total observed cases:	318	318
Total expected cases:	317.993	317.993
Deviance:	2670.78	36.8819

Cases

Excess:	92.9
Baseline:	225.1
Total:	318.0

Categories

name	unit	id	size	used
agexcat	yr	4	4	4
agecat	yr	5	4	4
marrow10	Gy	7	5	4

Number of Poisson cells

	Stratification	O/E analysis
Total cells:	27720	64
Used cells:	53782	40

Poisson cells

cell	subjects	pyr	cases	obs haz	ubnd 4	mean 4	ubnd 5	mean 5	ubnd 7	mean 7
0	13057	101123.29	1	9.88892e-06	20	4.46854	20	14.8023	0.5	0.0939403
1	3975	324053.35	15	4.62887e-05	20	9.1773	40	30.1791	0.5	0.0975599
2	8104	57092.47	3	5.25463e-05	40	25.0347	40	35.0642	0.5	0.107059
3	0	315836.96	12	3.79943e-05	20	9.39005	60	49.8374	0.5	0.0979589
4	3305	205804.81	6	2.91538e-05	40	30.2796	60	50.1692	0.5	0.107652

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5	9067	68352.41	6	8.77804e-05	60	44.8118	60	54.8787	0.5	0.109273
6	0	109490.15	13	0.000118732	20	13.5791	infty	65.7873	0.5	0.10176
7	0	209170.81	37	0.000176889	40	30.8783	infty	72.0007	0.5	0.107023
8	1997	191482.30	28	0.000146228	60	48.5002	infty	72.2454	0.5	0.108687
9	2786	27718.45	2	7.21541e-05	infty	65.2003	infty	77.626	0.5	0.102219
10	1207	8215.25	8	0.000973799	20	4.88333	20	15.0014	1.5	0.978151
11	737	36059.42	8	0.000221856	20	11.1884	40	30.3333	1.5	0.97297
12	969	7463.32	1	0.000133989	40	24.5702	40	34.8287	1.5	0.977193
13	0	35265.68	8	0.000226849	20	11.4733	60	49.8035	1.5	0.97049
14	378	24001.33	7	0.00029165	40	29.6972	60	50.1327	1.5	0.984573
15	1027	7870.86	2	0.000254102	60	44.6862	60	54.8289	1.5	0.967113
16	0	15045.50	4	0.00026586	20	14.8263	infty	66.3623	1.5	0.967312
17	0	22505.23	8	0.000355473	40	30.2714	infty	71.4529	1.5	0.982348
18	185	19764.19	11	0.000556562	60	48.1545	infty	71.7338	1.5	0.952927
19	195	1922.04	0	0	infty	64.4784	infty	77.0941	1.5	0.912676
20	348	2263.04	6	0.0026513	20	4.80715	20	14.9324	infty	2.60704
21	175	9511.55	5	0.000525677	20	11.1083	40	30.3187	infty	2.52412
22	226	1763.85	2	0.00113389	40	24.4504	40	34.77	infty	2.43736
23	0	8996.04	2	0.00022232	20	11.4226	60	49.6696	infty	2.51478
24	76	5225.31	8	0.00153101	40	29.2529	60	49.9794	infty	2.43729
25	209	1641.38	2	0.00121849	60	44.6789	60	54.7877	infty	2.43315
26	0	3341.08	4	0.00119722	20	14.7015	infty	66.0517	infty	2.46649
27	0	4238.19	5	0.00117975	40	29.4826	infty	70.5257	infty	2.42636
28	37	3425.07	4	0.00116786	60	47.9354	infty	70.7562	infty	2.46001
29	42	369.32	1	0.00270768	infty	63.679	infty	75.8466	infty	2.51524
Observed/expected comparison										
cell		pyr		cases		hazard		cell dev.		
		obs	exp	bsl	obs	exp	bsl			
0	101123.29	1	4.1	2.1	9.88892e-06	4.01147e-05	2.09731e-05	3.3124		
1	324053.35	15	9.4	7.6	4.62887e-05	2.89708e-05	2.3376e-05	2.83443		
2	57092.47	3	2.3	1.9	5.25463e-05	4.03502e-05	3.32632e-05	0.191977		
3	315836.96	12	15.8	14.3	3.79943e-05	5.00217e-05	4.53317e-05	0.996889		
4	205804.81	6	14.3	12.7	2.91538e-05	6.92806e-05	6.18449e-05	6.12963		
5	68352.41	6	5.8	5.3	8.77804e-05	8.5149e-05	7.69215e-05	0.00550185		
6	109490.15	13	10.8	10.1	0.000118732	9.85171e-05	9.21366e-05	0.425943		
7	209170.81	37	31.2	29.3	0.000176889	0.000149317	0.000140157	1.00488		
8	191482.30	28	28.7	26.9	0.000146228	0.000149952	0.000140552	0.0178625		
9	27718.45	2	2.9	2.8	7.21541e-05	0.000104663	9.92141e-05	0.314435		
10	8215.25	8	5.9	0.2	0.000973799	0.000715764	2.05526e-05	0.686027		
11	36059.42	8	8.1	0.8	0.000221856	0.000225648	2.33087e-05	0.00231115		
12	7463.32	1	1.9	0.2	0.000133989	0.000251941	3.2123e-05	0.497752		
13	35265.68	8	7.6	1.6	0.000226849	0.000214596	4.52133e-05	0.0242178		
14	24001.33	7	7.2	1.5	0.00029165	0.000299185	6.20422e-05	0.00459259		
15	7870.86	2	2.7	0.6	0.000254102	0.00034013	7.96439e-05	0.187862		
16	15045.50	4	4.5	1.3	0.00026586	0.000299254	8.94677e-05	0.0582754		
17	22505.23	8	9.7	3.1	0.000355473	0.000431606	0.000137473	0.321761		

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18	19764.19	11	8.5	2.8	0.000556562	0.000431122	0.000141764	0.660088
19	1922.04	0	0.5	0.2	0	0.000274252	0.000102944	1.05425
20	2263.04	6	5.7	0.0	0.0026513	0.00253921	2.04706e-05	0.0110364
21	9511.55	5	7.6	0.2	0.000525677	0.000795274	2.54066e-05	0.98857
22	1763.85	2	1.4	0.1	0.00113389	0.00078193	3.24175e-05	0.24497
23	8996.04	2	6.3	0.4	0.00022232	0.00069804	4.92852e-05	3.98255
24	5225.31	8	4.4	0.3	0.00153101	0.000847655	6.13612e-05	2.31786
25	1641.38	2	1.6	0.1	0.00121849	0.000972553	7.93646e-05	0.094421
26	3341.08	4	3.1	0.3	0.00119722	0.000932126	0.000101079	0.230916
27	4238.19	5	4.6	0.6	0.00117975	0.00109228	0.000132485	0.0289239
28	3425.07	4	4.0	0.5	0.00116786	0.00116531	0.000139211	1.90489e-05
29	369.32	1	0.3	0.0	0.00270768	0.000944079	0.000122068	0.80461