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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 'lq.min'
  Control file 'par/leuk.par'

-- Optimisation time
  Optimisation started: Mi. Aug 15 15:04:58 2012
  Optimisation stopped: Mi. Aug 15 15:12:53 2012
  Elapsed time: 00:07:55 or 475 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: 159
 Initial deviance: 2674.90962
 Final deviance: 2674.90962
 Reduction: 3.70649e-07

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

Model parameter

no.	name	unit	value	eparab	eminus	eplus	var/fix
0	b0	[-]	-9.51062	0.108478	-0.109504	0.106985	varbl
1	bsex	[-]	-0.321954	0.0571418	-0.0571957	0.0571152	varbl
2	bcity	[-]	-0.127091	0.0650619	-0.0657793	0.0644316	varbl
3	ba1	[-]	2.14537	0.272597	-0.272448	0.277593	varbl
4	ba2	[-]	1.05737	0.20938	-0.213776	0.203135	varbl
5	be1	[1/yr]	0.00661792	0.00458607	-0.00458527	0.00460542	varbl
6	be2	[1/yr^2]	-0.000734848	0.000227349	-0.000230586	0.000222978	varbl
7	os	[-]	0	-	-	-	fixed
8	err	[1/Gy]	1.37911	0.730497	-0.688486	0.790215	varbl
9	err2	[1/Gy^2]	1.3282	0.424152	-0.415872	0.443015	varbl
10	gam_e	[1/yr]	0	-	-	-	fixed
11	cen_e	[yr]	30	-	-	-	fixed
12	eps_a	[-]	-1.63408	0.366477	-0.385177	0.356668	varbl
13	cen_a	[yr]	55	-	-	-	fixed
14	nu_exp	[1/Gy]	0	-	-	-	fixed

Model parameter (final vs. initial)

no.	name	unit	final	initial	change	rel. ch. [%]
0	b0	[-]	-9.51062	-9.51061	-8.8842e-06	9.34135e-05
1	bsex	[-]	-0.321954	-0.321946	-7.58255e-06	0.00235522
2	bcity	[-]	-0.127091	-0.1271	8.81351e-06	-0.00693432
3	ba1	[-]	2.14537	2.14537	-2.38675e-06	-0.000111251
4	ba2	[-]	1.05737	1.05737	-4.30659e-06	-0.000407293
5	be1	[1/yr]	0.00661792	0.00661751	4.10253e-07	0.00619951
6	be2	[1/yr^2]	-0.000734848	-0.000734838	-1.00928e-08	0.00137347
7	os	[-]	fixed	0	-	-
8	err	[1/Gy]	1.37911	1.37917	-5.6182e-05	-0.00407361
9	err2	[1/Gy^2]	1.3282	1.32824	-3.8731e-05	-0.00291597
10	gam_e	[1/yr]	fixed	0	-	-
11	cen_e	[yr]	fixed	30	-	-
12	eps_a	[-]	-1.63408	-1.63408	-5.92354e-07	3.625e-05
13	cen_a	[yr]	fixed	55	-	-
14	nu_exp	[1/Gy]	fixed	0	-	-

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Correlation matrix (of 10 variable parameters)

0									
1	-0.050868613								
2	0.27521256	0.0084328087							
3	-0.3836162	-0.080576806	0.019391967						
4	-0.23189272	-0.049037666	0.015137025	0.33813065					
5	0.21512457	0.009790854	0.072645842	-0.51044751	-0.1704631				
6	-0.51520471	0.13490617	-0.017359916	0.094981939	-0.15511989	-0.11698794			
7	-0.36079863	-0.012473474	0.06950285	0.1634928	0.0064202555	-0.017453726	0.017786603		
8	-0.085138824	0.04858812	-0.03403968	-0.023324548	0.112168	0.019827804	0.022920313	-0.62777981	
9	-0.063671778	0.026180341	-0.0067275759	-0.38630651	0.55878077	0.019561527	0.0021218262	-0.0062184377	
0.18557031									

-- 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:	317.998	317.998
Deviance:	2674.91	40.6467

Cases

Excess:	99.7
Baseline:	218.3
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
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	infy	65.7873	0.5	0.10176

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7	0	209170.81	37	0.000176889	40	30.8783	infy	72.0007	0.5	0.107023
8	1997	191482.30	28	0.000146228	60	48.5002	infy	72.2454	0.5	0.108687
9	2786	27718.45	2	7.21541e-05	infy	65.2003	infy	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	infy	66.3623	1.5	0.967312
17	0	22505.23	8	0.000355473	40	30.2714	infy	71.4529	1.5	0.982348
18	185	19764.19	11	0.000556562	60	48.1545	infy	71.7338	1.5	0.952927
19	195	1922.04	0	0	infy	64.4784	infy	77.0941	1.5	0.912676
20	348	2263.04	6	0.0026513	20	4.80715	20	14.9324	infy	2.60704
21	175	9511.55	5	0.000525677	20	11.1083	40	30.3187	infy	2.52412
22	226	1763.85	2	0.00113389	40	24.4504	40	34.77	infy	2.43736
23	0	8996.04	2	0.00022232	20	11.4226	60	49.6696	infy	2.51478
24	76	5225.31	8	0.00153101	40	29.2529	60	49.9794	infy	2.43729
25	209	1641.38	2	0.00121849	60	44.6789	60	54.7877	infy	2.43315
26	0	3341.08	4	0.00119722	20	14.7015	infy	66.0517	infy	2.46649
27	0	4238.19	5	0.00117975	40	29.4826	infy	70.5257	infy	2.42636
28	37	3425.07	4	0.00116786	60	47.9354	infy	70.7562	infy	2.46001
29	42	369.32	1	0.00270768	infy	63.679	infy	75.8466	infy	2.51524
Observed/expected comparison										
cell		pyr		cases		hazard		cell dev.		
		obs	exp	bsl	obs	exp	bsl			
0	101123.29	1	5.1	1.8	9.88892e-06	4.99918e-05	1.78453e-05	4.86978		
1	324053.35	15	10.3	7.0	4.62887e-05	3.18454e-05	2.16683e-05	1.85934		
2	57092.47	3	2.5	1.8	5.25463e-05	4.38931e-05	3.14389e-05	0.0915607		
3	315836.96	12	16.5	13.7	3.79943e-05	5.20891e-05	4.34024e-05	1.33085		
4	205804.81	6	15.0	12.3	2.91538e-05	7.29763e-05	5.97537e-05	7.02718		
5	68352.41	6	6.1	5.1	8.77804e-05	8.9208e-05	7.45764e-05	0.00157001		
6	109490.15	13	11.1	9.8	0.000118732	0.000101293	8.95126e-05	0.311326		
7	209170.81	37	32.2	28.7	0.000176889	0.000153809	0.000137338	0.69068		
8	191482.30	28	29.5	26.3	0.000146228	0.000154139	0.000137446	0.0791196		
9	27718.45	2	2.9	2.7	7.21541e-05	0.000105984	9.60271e-05	0.337493		
10	8215.25	8	4.6	0.1	0.000973799	0.000557247	1.75521e-05	2.08698		
11	36059.42	8	6.9	0.8	0.000221856	0.000191516	2.17589e-05	0.164835		
12	7463.32	1	1.6	0.2	0.000133989	0.000218006	3.04774e-05	0.28056		
13	35265.68	8	6.7	1.5	0.000226849	0.000188767	4.35803e-05	0.254363		
14	24001.33	7	6.4	1.4	0.00029165	0.000264726	6.01412e-05	0.0636023		
15	7870.86	2	2.4	0.6	0.000254102	0.000301851	7.72861e-05	0.0628615		
16	15045.50	4	4.0	1.3	0.00026586	0.00026895	8.76225e-05	0.000536193		
17	22505.23	8	8.8	3.0	0.000355473	0.000390082	0.000135073	0.0712455		
18	19764.19	11	7.7	2.7	0.000556562	0.000388914	0.000138731	1.25839		
19	1922.04	0	0.5	0.2	0	0.000248904	9.97069e-05	0.956805		

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20	2263.04	6	6.3	0.0	0.0026513	0.00276618	1.74948e-05	0.0109499
21	9511.55	5	8.3	0.2	0.000525677	0.000870551	2.36465e-05	1.51618
22	1763.85	2	1.5	0.1	0.00113389	0.00084167	3.07014e-05	0.161224
23	8996.04	2	6.9	0.4	0.00022232	0.000771848	4.73422e-05	4.90847
24	5225.31	8	4.8	0.3	0.00153101	0.000927932	5.94821e-05	1.70905
25	1641.38	2	1.8	0.1	0.00121849	0.00106663	7.70308e-05	0.0339131
26	3341.08	4	3.4	0.3	0.00119722	0.00101299	9.83889e-05	0.105713
27	4238.19	5	5.0	0.6	0.00117975	0.00118926	0.000130342	0.000323517
28	3425.07	4	4.4	0.5	0.00116786	0.00128826	0.000136223	0.0397986
29	369.32	1	0.4	0.0	0.00270768	0.00103673	0.00011799	0.685814