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ERR-spline-a55-leuk.rec

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

-- Optimisation time
  Optimisation started: Mi. Aug 15 14:52:39 2012
  Optimisation stopped: Mi. Aug 15 15:04:50 2012
  Elapsed time: 00:12:11 or 731 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: 171
 Initial deviance: 2670.91385
 Final deviance: 2670.91385
 Reduction: 3.71096e-06

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

Model parameter

no.	name	unit	value	eparab	eminus	eplus	var/fix
0	b0	[-]	-9.49124	0.108256	-0.109529	0.106556	varbl
1	bsex	[-]	-0.321917	0.0571409	-0.0571794	0.0571278	varbl
2	bcity	[-]	-0.142548	0.0653043	-0.0660609	0.0646366	varbl
3	ba1	[-]	2.10991	0.270428	-0.27007	0.275135	varbl
4	ba2	[-]	1.07312	0.207564	-0.211356	0.201848	varbl
5	be1	[1/yr]	0.00642684	0.0045847	-0.00458582	0.00460188	varbl
6	be2	[1/yr^2]	-0.000720687	0.000227256	-0.000230395	0.00022298	varbl
7	errpd1	[1/Gy]	0.609022	0.820995	-0.731733	0.9081	varbl
8	dth	[Gy]	0.364909	0.0924305	-0.089404	0.155685	varbl
9	errpd2	[1/Gy]	5.14098	0.955362	-0.895951	1.0145	varbl
10	pa	[-]	-1.6349	0.353397	-0.371613	0.34316	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	[-]	-9.49124	-9.49119	-4.53212e-05	0.000477508
1	bsex	[-]	-0.321917	-0.321908	-9.02527e-06	0.00280368
2	bcity	[-]	-0.142548	-0.142564	1.55102e-05	-0.0108795
3	ba1	[-]	2.10991	2.10997	-5.84172e-05	-0.00276863
4	ba2	[-]	1.07312	1.07306	6.38583e-05	0.00595105
5	be1	[1/yr]	0.00642684	0.00642739	-5.5471e-07	-0.00863041
6	be2	[1/yr^2]	-0.000720687	-0.000720677	-1.04135e-08	0.00144496
7	errpd1	[1/Gy]	0.609022	0.60931	-0.000288369	-0.0473272
8	dth	[Gy]	0.364909	0.364875	3.44752e-05	0.00944849
9	errpd2	[1/Gy]	5.14098	5.14126	-0.000282251	-0.00548991
10	pa	[-]	-1.6349	-1.63495	4.78048e-05	-0.00292393
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	-0.053129807									
2	0.26947894	0.008844545								
3	-0.40306467	-0.078325787	0.031474253							
4	-0.20686757	-0.050219795	0.0050716855	0.36050601						
5	0.21499301	0.0090445639	0.073435081	-0.51289178	-0.17167312					
6	-0.51503516	0.13536433	-0.017249497	0.095401869	-0.15784814	-0.11864616				
7	-0.32379423	0.0036360068	0.10373654	0.21302329	-0.09213324	-0.0013154195	0.0055111397			
8	-0.10372576	0.021033529	0.034650101	0.078337267	-0.041028083	0.007613884	0.0028652683	0.57548046		
9	-0.42478742	0.051194884	0.012151625	0.13549553	0.1208261	0.0056966406	0.048707283	0.25884187		
10	-0.037141981	0.024175694	-0.020556908	-0.36133543	0.5465256	0.020236492	0.00087861095	-0.13080706		
	-0.058248783	0.20400457								

-- 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:	317.995	317.995
Deviance:	2670.91	36.8212

Cases

Excess:	93.2
Baseline:	224.8
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	infy	65.7873	0.5	0.10176	
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	3.9	2.0	9.88892e-06	3.8348e-05	2.01954e-05	3.04518			
1	324053.35	15	9.2	7.5	4.62887e-05	2.84748e-05	2.3118e-05	3.03105			
2	57092.47	3	2.3	1.9	5.25463e-05	3.97874e-05	3.30524e-05	0.211992			
3	315836.96	12	15.7	14.3	3.79943e-05	4.96888e-05	4.52183e-05	0.946863			
4	205804.81	6	14.1	12.7	2.91538e-05	6.87509e-05	6.17864e-05	6.00369			
5	68352.41	6	5.8	5.3	8.77804e-05	8.4677e-05	7.68893e-05	0.00768093			
6	109490.15	13	10.8	10.1	0.000118732	9.81952e-05	9.215e-05	0.440546			
7	209170.81	37	31.1	29.4	0.000176889	0.000148891	0.000140345	1.03809			
8	191482.30	28	28.6	26.9	0.000146228	0.000149555	0.000140652	0.014283			
9	27718.45	2	2.9	2.7	7.21541e-05	0.000104156	9.90622e-05	0.30575			
10	8215.25	8	6.0	0.2	0.000973799	0.000732	1.98065e-05	0.59391			
11	36059.42	8	8.4	0.8	0.000221856	0.000232836	2.30613e-05	0.0189708			
12	7463.32	1	1.9	0.2	0.000133989	0.000258895	3.19175e-05	0.547098			
13	35265.68	8	7.8	1.6	0.000226849	0.000219921	4.51129e-05	0.00761788			
14	24001.33	7	7.3	1.5	0.00029165	0.000305478	6.19855e-05	0.0152535			
15	7870.86	2	2.7	0.6	0.000254102	0.000347604	7.96126e-05	0.218569			
16	15045.50	4	4.6	1.3	0.00026586	0.000305382	8.95002e-05	0.0805075			
17	22505.23	8	9.8	3.1	0.000355473	0.000437276	0.000137661	0.368147			

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18	19764.19	11	8.7	2.8	0.000556562	0.000438342	0.00014187	0.580097
19	1922.04	0	0.5	0.2	0	0.000278928	0.000102803	1.07222
20	2263.04	6	5.8	0.0	0.0026513	0.00257575	1.97177e-05	0.00496609
21	9511.55	5	7.5	0.2	0.000525677	0.00079325	2.51391e-05	0.975554
22	1763.85	2	1.4	0.1	0.00113389	0.000772495	3.22072e-05	0.260247
23	8996.04	2	6.2	0.4	0.00022232	0.000691879	4.9177e-05	3.90717
24	5225.31	8	4.4	0.3	0.00153101	0.000836348	6.13025e-05	2.41456
25	1641.38	2	1.6	0.1	0.00121849	0.000958613	7.93333e-05	0.106407
26	3341.08	4	3.1	0.3	0.00119722	0.000914322	0.000101114	0.266228
27	4238.19	5	4.5	0.6	0.00117975	0.00107003	0.000132663	0.046132
28	3425.07	4	3.9	0.5	0.00116786	0.00114743	0.000139313	0.00123876
29	369.32	1	0.3	0.0	0.00270768	0.000928926	0.000121918	0.82578