Annex to:

EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain), Alexander J, Barregård L, Bignami M, Brüschweiler B, Ceccatelli S, Cottrill B, Dinovi M, Grasl-Kraupp B, Hogstrand C, Hoogenboom LR, Knutsen HK, Nebbia CS, Oswald IP, Petersen A, Rose M, Roudot A-C, Schwerdtle T, Vleminckx C, Vollmer G, Wallace H, De Saeger S, Sundstøl Eriksen G, Farmer P, Fremy J-M, Gong YY, Meyer K, Naegeli H, Parent-Massin D, Rietjens I, van Egmond H, Altieri A, Eskola M, Gergelova P, Ramos Bordajandi L, Benkova B, Dörr B, Gkrillas A, Gustavsson N, van Manen M and Edler L, 2017. Scientific opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed. EFSA Journal 2017;15(9):4718, 345 pp. doi:10.2903/j.efsa.2017.4718

Annex A – Supplementary information for the BMD calculations

Supplementary information IVERSONBW (Iverson et al., 1995)

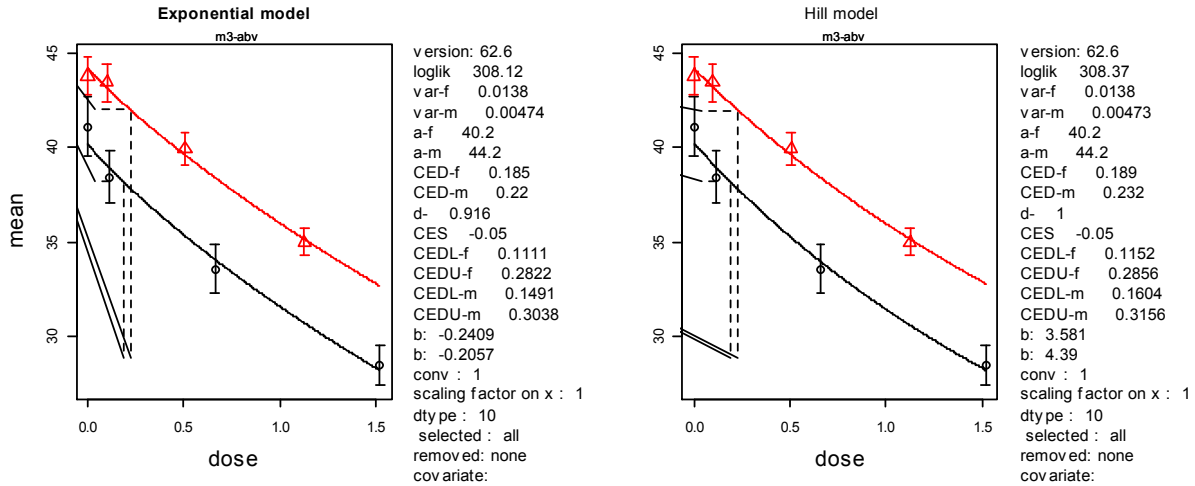
Details of the BMD Analysis of the body weight data of Iverson et al. (1995) reported in Appendix G, Section G.2.1 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

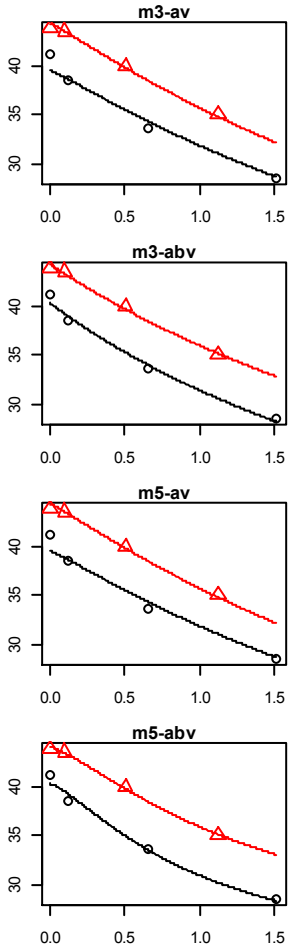
Filename: IVERSONBW Folder IVERSON-1995-mice

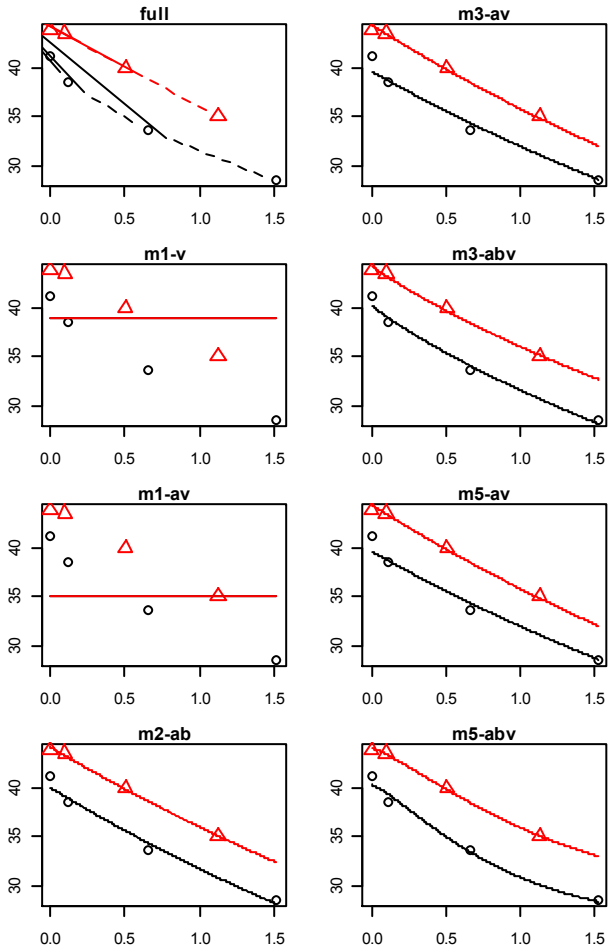
Output from PROAST 62.6 from 13 OCT 2016

BMD analysis of body weight data of females (f: black curve) and males (m: red curve) combined

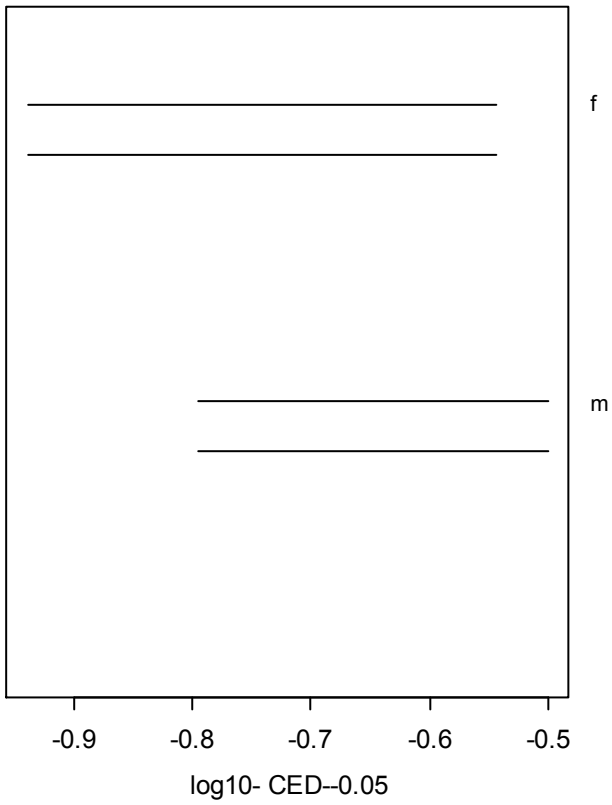
Graphical output




m3-av
m3-abv
m5-av
m5-abv
30
35
40
0.0
0.5
1.0
1.5


full
m3-av
m1-v
m3-abv
m1-av
m5-av
m2-ab
m5-abv
40
35
30
0.0
0.5
1.0
1.5

Graphic of the BMD- 90% confidence interval (C.I.) for female and male and for exponential and Hill models



Numerical output

Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	9	289.36	-560.72
full-v	1	10	310.36	-600.72
m1-v	1	3	135.59	-265.18
m1-av	1	4	162.95	-317.9
m2-ab	1	5	285.98	-561.96
m3-av	1	6	306.94	-601.88
m3-abv	1	7	308.12	-602.24
m5-av	1	7	306.94	-599.88
m5-abv	1	8	308.95	-601.9

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-abv.
However, m5-abv is a reasonable model as well, and so is m3-av.

Selected model: m3-abv

The CED – Critical Effect Dose (in original units) and the 90 % C.I. for group f is:
0.18484
0.1111
0.28222

The CED (in original units) and the 90 % C.I. for group m is:
0.21964
0.14911
0.30377

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-av	1	6	306.86	-601.72
m3-abv	1	7	308.37	-602.74
m5-av	1	7	306.86	-599.72
m5-abv	1	8	308.82	-601.64

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-abv.
However, m3-av is a reasonable model as well, and so is m5-abv.

Selected model: m3-abv

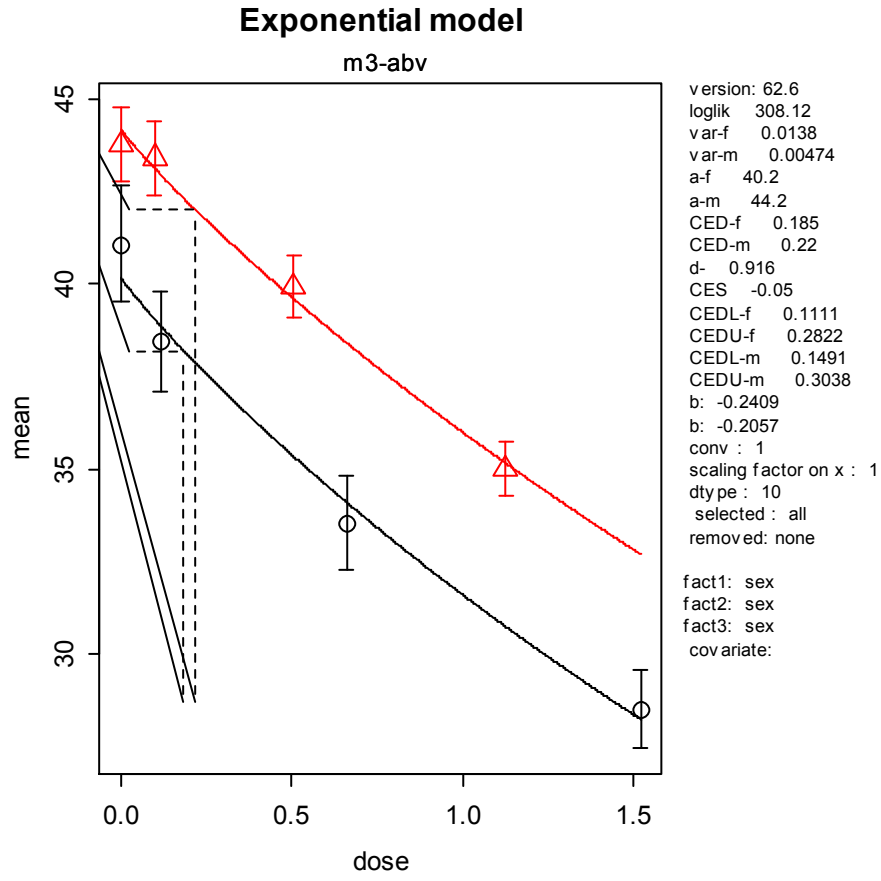
The CED (in original units) and the 90 % C.I. for group f is:
0.18929
0.11516
0.28557

The CED (in original units) and the 90 % C.I. for group m is:
0.23205
0.16044
0.31558

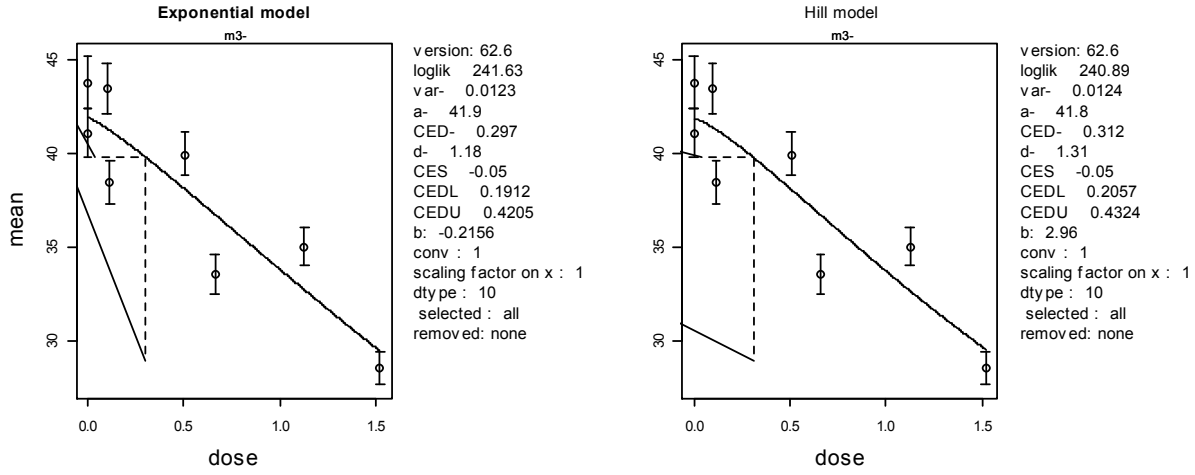
covar	**LB**	**UB**	**LB.H**	**UB.H**
1 f	0.11516	0.28557	0.11516	0.28557
2 m	0.16044	0.31558	0.16044	0.31558

f: female; m: male; LB: lower bound; UB: upper bound;

Model with the curve (black for females) showing the smallest BMDL of 0.1111



BMD analysis of the pooled data of females and males with smallest BMDL of 0.1912



File of Iverson data: IVERSONBW

5				
0	0	10	0	0
dose	n	mean	sd	sex
0	37	43.85	2.69	m
0.098	35	43.51	2.86	m
0.506	43	40.03	3.00	m
1.126	42	35.09	2.56	m
0	36	41.54	6.26	f
0.115	42	38.71	4.73	f
0.661	37	33.76	3.92	f
1.520	38	28.55	2.08	f

Supplementary information IVERSONFDC (Iverson et al., 1995):

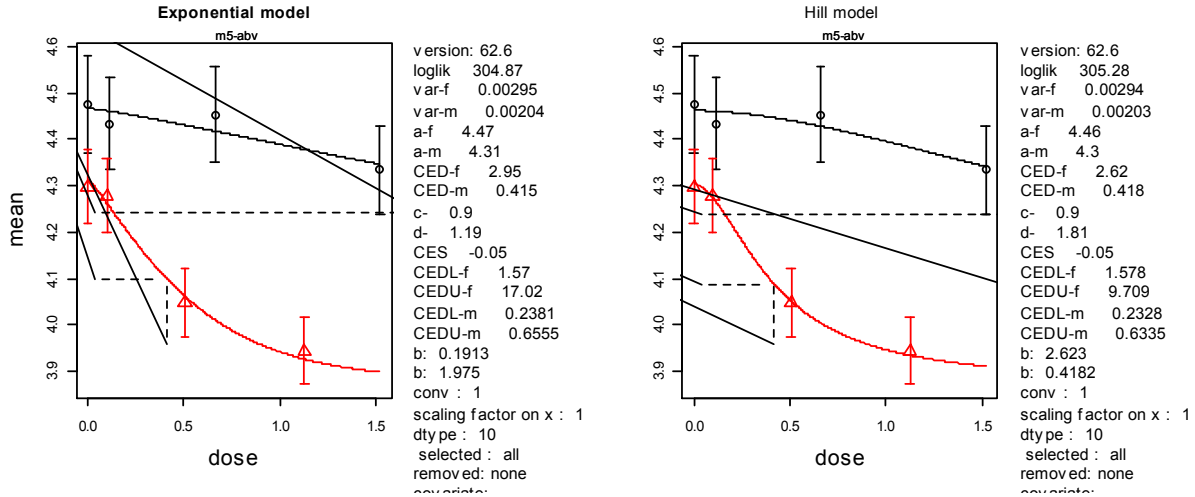
Details of the BMD Analysis of the feed intake data of Iverson et al. (1995) reported in Appendix G, Section G.2.1 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

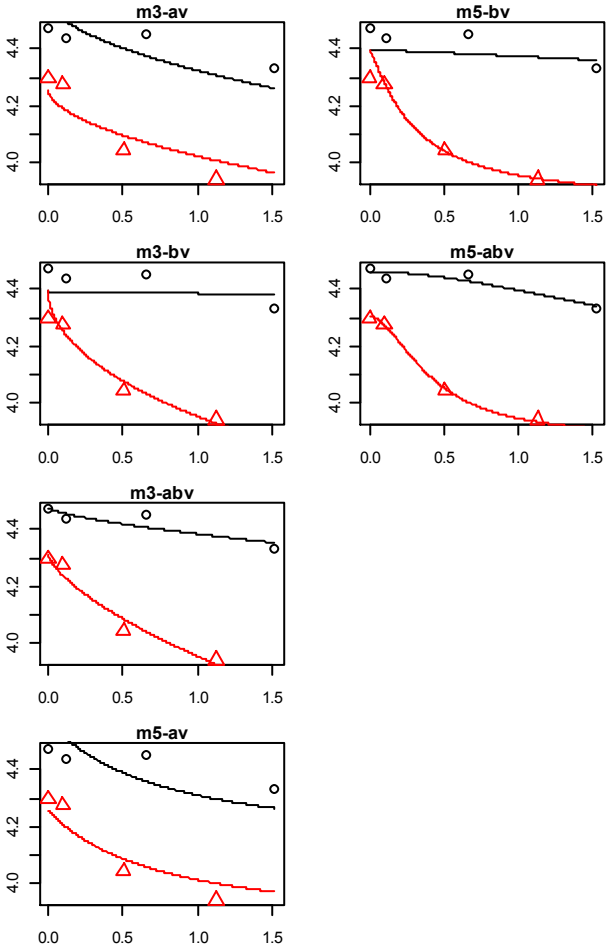
Filename: IVERSONFDC Folder IVERSON-1995-mice

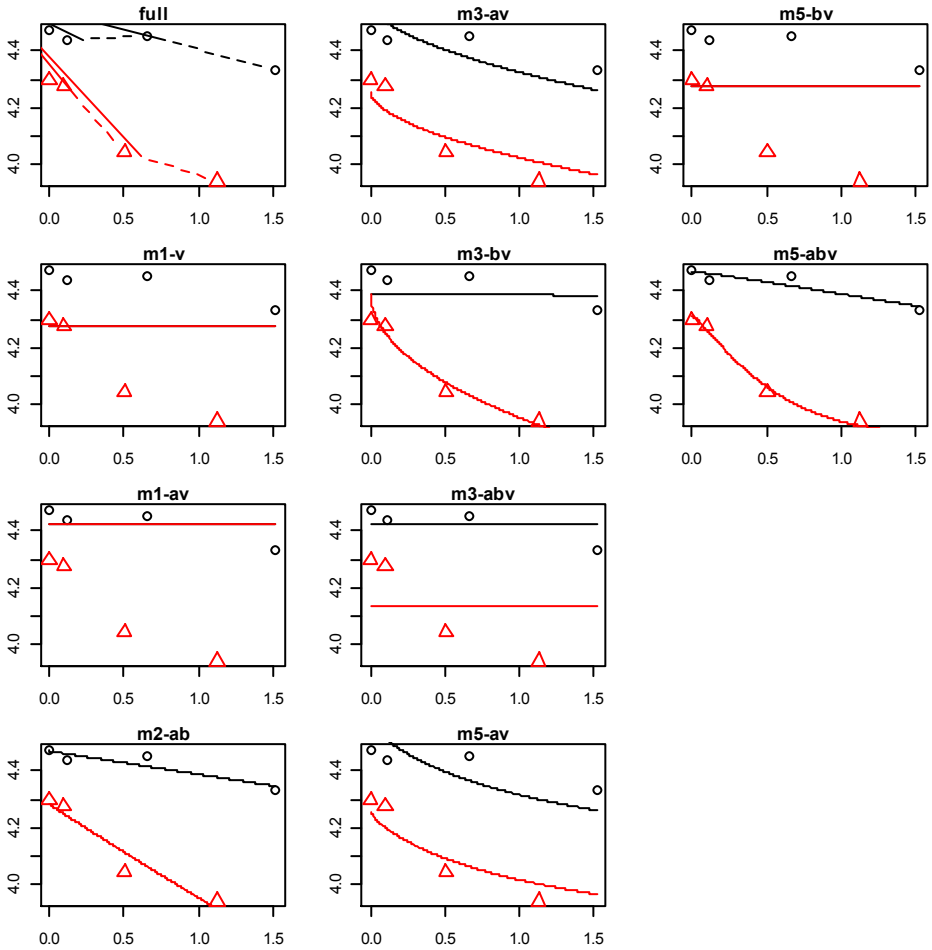
Output from PROAST 62.6 from 13 OCT 2016

BMD analysis of feed intake data of females (f: black curve) and males (m: red curve) combined

Graphical output




m3-av
m5-bv
m3-bv
m5-abv
m3-abv
m5-av
4.4
4.2
4.0
0.0
0.5
1.0
1.5



Numerical output

Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	9	304.03	-590.06
full-v	1	10	305.63	-591.26
m1-v	1	3	249.86	-493.72
m1-av	1	4	278.41	-548.82
m2-ab	1	5	301.65	-593.3
m3-av	1	6	295.5	-579
m3-bv	1	6	299.27	-586.54
m3-abv	1	7	278.41	-542.82
m5-av	1	7	295.96	-577.92
m5-bv	1	7	249.86	-485.72
m5-abv	1	8	304.87	-593.74

AIC: Akaike's Information Criterion.

Best model with covariates is: m5-abv.
However, m2-ab is a reasonable model as well.

Selected model: m5-abv

The CED (in original units) and the 90 % C.I. for group f is:
2.9472
1.5698
17.023

The CED (in orig. units) and the 90 % C.I. for group m is:
0.41508
0.23807
0.65547

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-av	1	6	295.53	-579.06
m3-bv	1	6	299.31	-586.62
m3-abv	1	7	303.85	-593.7
m5-av	1	7	296.24	-578.48
m5-bv	1	7	300.08	-586.16
m5-abv	1	8	305.28	-594.56

AIC: Akaike's Information Criterion.

Best model with covariates is: m5-abv.
However, m3-abv is a reasonable model as well.

Selected model: m5-abv

The CED (in original units) and the 90 % C.I. for group f is:
2.6228
1.5775
9.7092

The CED (in original units) and the 90 % C.I. for group m is:
0.4182
0.23281
0.63349

File of Iverson data: IVERSONFDC

5

0	0	10	0	0
dose	n	mean	sd	sex
0	24	4.30	0.16	m
0.098	24	4.28	0.17	m
0.506	25	4.05	0.17	m
1.126	25	3.95	0.24	m
0	22	4.48	0.25	f
0.115	24	4.44	0.23	f
0.661	23	4.46	0.26	f
1.520	25	4.34	0.24	f

Supplementary information IVERSON-concentration–response (Iverson et al., 1995)

Details of the BMD Analysis of the body weight data of Iverson et al. (1995) reported in Appendix G, Section G.2.2 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed - based on the concentration of DON. The data file is not shown below.

Folder IVERSON-1995-mice

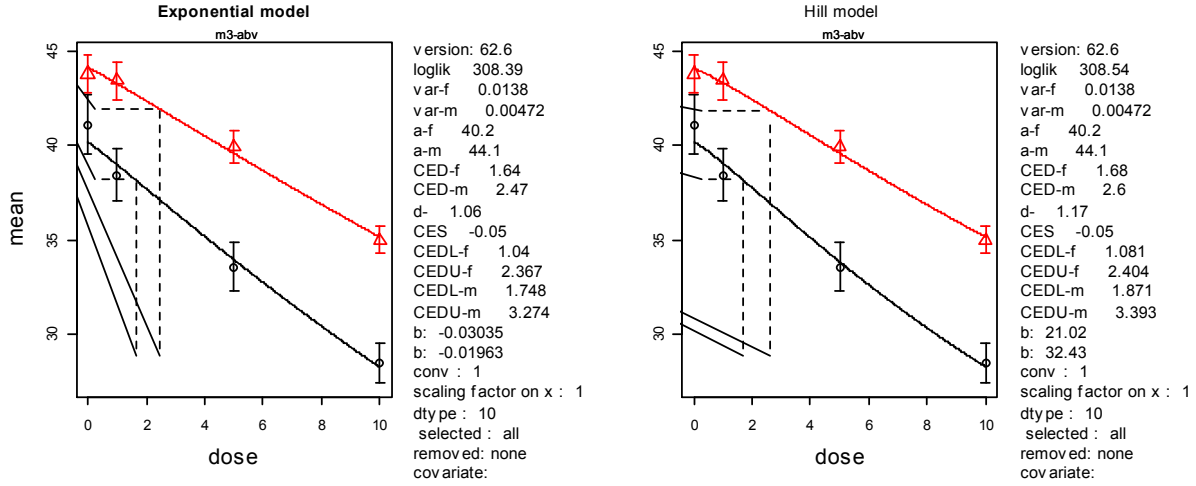
Output from PROAST 62.6 from 13 OCT 2016

BMD analysis of **body weight data** of females (f: black curve) and males (m: red curve) combined:

Concentration-response analyses

Graphical output

body weight



Numerical output

Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	9	289.36	-560.72
full-v	1	10	310.36	-600.72
m1-v	1	3	135.59	-265.18
m1-av	1	4	162.95	-317.9
m2-ab	1	5	287.47	-564.94
m3-av	1	6	298.84	-585.68
m3-abv	1	7	308.39	-602.78
m5-av	1	7	298.84	-583.68
m5-abv	1	8	308.8	-601.6

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-abv.
However, m5-abv is a reasonable model as well.

Selected model: m3-abv

The CED (in orig. units) and the 90 % C.I. for group f is:
1.6374
1.0404
2.3674

The CED (in orig. units) and the 90 % C.I. for group m is:
2.4671
1.7484
3.2742

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-av	1	6	298.81	-585.62
m3-abv	1	7	308.54	-603.08
m5-av	1	7	298.81	-583.62
m5-abv	1	8	308.7	-601.4

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-abv.
However, m5-abv is a reasonable model as well.

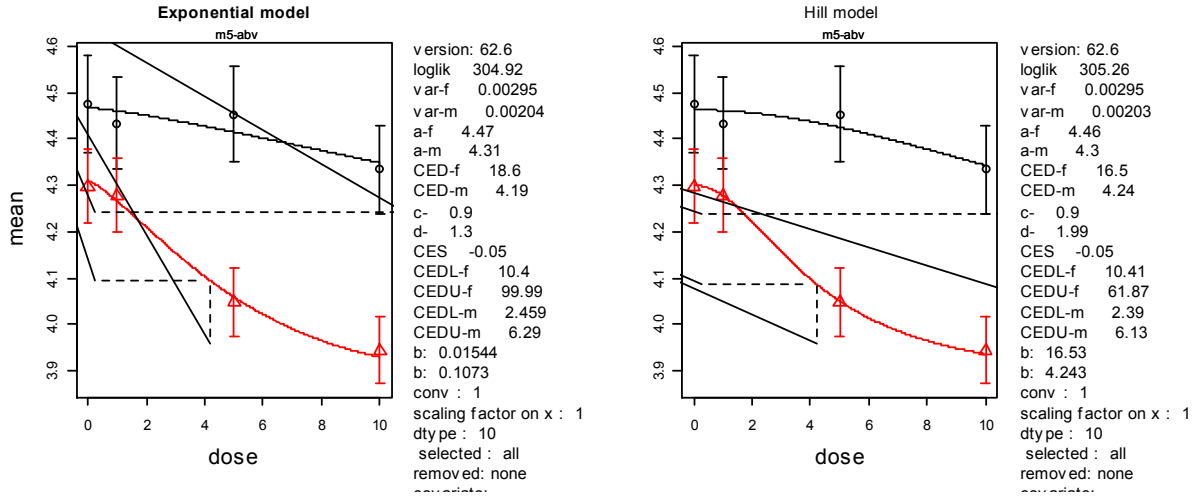
Selected model: m3-abv

The CED (in original units) and the 90 % C.I. for group f is:
1.6831
1.0813
2.4044

The CED (in original units) and the 90 % C.I. for group m is:
2.5968
1.8713
3.3931

BMD analysis of **feed intake data** of females (f: black curve) and males (m: red curve) combined:
Concentration-response analyses

Graphical output



Numerical output

Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	9	304.03	-590.06
full-v	1	10	305.63	-591.26
m1-v	1	3	249.86	-493.72
m1-av	1	4	278.41	-548.82
m2-ab	1	5	302.14	-594.28
m3-av	1	6	298.01	-584.02
m3-bv	1	6	299.47	-586.94
m3-abv	1	7	278.41	-542.82
m5-av	1	7	298.1	-582.2
m5-bv	1	7	249.86	-485.72
m5-abv	1	8	304.92	-593.84

AIC: Akaike's Information Criterion.

Best model with covariates is: m2-ab.
However, m5-abv is a reasonable model as well.

Selected model: m5-abv

The CED (in original units) and the 90 % C.I. for group f is:
18.589
10.397
99.99

The CED (in original units) and the 90 % C.I. for group m is:
4.1924
2.4587
6.2895

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-av	1	6	298.02	-584.04
m3-bv	1	6	299.5	-587
m3-abv	1	7	304.05	-594.1
m5-av	1	7	298.11	-582.22
m5-bv	1	7	300	-586
m5-abv	1	8	305.26	-594.52

AIC: Akaike's Information Criterion.

Best model with covariates is: m5-abv.
However, m3-abv is a reasonable model as well.

Selected model: m5-abv

The CED (in original units) and the 90 % C.I. for group f is:
16.535
10.409
61.874

The CED (in original units) and the 90 % C.I. for group m is:
4.2431
2.3905
6.1303

Supplementary information BONDY (Bondy et al., 2016)

Details of the BMD Analysis of the body weight data of Bondy et al. (2016) reported in Appendix G, Section G.2.3 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

Filename: bondy Folder bondy

The dose-response evaluation used the BMD approach for the body weight data reported as means and standard deviations (sd) of the two experiments on transgenic mice of type p53+/+ (hom) and p53+/- (het) genotypes (type), combined, as shown in the table below. The number of mice per dose group (n) was 10 except for the highest dose of the p53+/+ type.

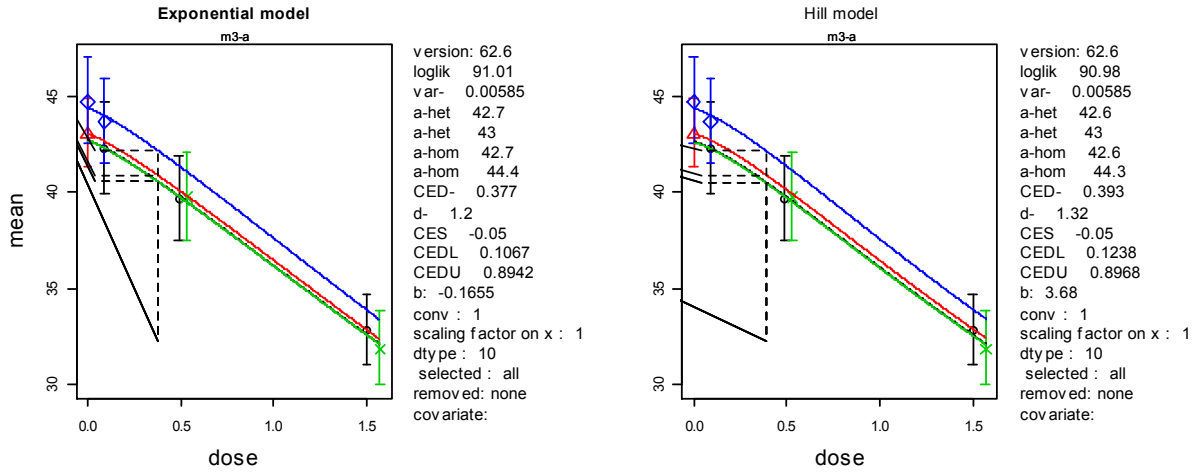
BONDYBW

dose mg/kg bw per day	n	mean	sd	type
0	10	44.8	2.9	hom
0.09	10	43.8	3.7	hom
0.53	10	39.9	3.4	hom
1.57	9	32.0	2.8	hom
0	10	43.1	2.5	het
0.09	10	42.5	4.9	het
0.49	10	39.7	2.6	het
1.5	10	32.9	2.3	het

Data set used for PROAST 62.6 from 31 OCT 2016

Data set name: BONDYBW

Graphical output



Numerical output

Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	9	91.24	-164.48
full-v	1	12	92.44	-160.88
m1-	1	2	42.26	-80.52
m1-a	1	5	59.09	-108.18
m2-ab	1	9	91.2	-164.4
m3-a	1	7	91.01	-168.02
m3-b	1	7	90.22	-166.44
m3-ab	1	10	91.24	-162.48
m5-a	1	8	91.01	-166.02
m5-b	1	8	90.22	-164.44
m5-ab	1	11	91.24	-160.48

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-a.
However, m3-b is a reasonable model as well, and so is m5-a.

Selected model: m3-a

The CED (in original units) and the 90 % C.I. is:
0.37725
0.1067
0.89421

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-a	1	7	90.98	-167.96
m3-b	0	7	90.16	-166.32
m3-ab	1	10	91.24	-162.48
m5-a	1	8	90.98	-165.96
m5-b	1	8	90.16	-164.32
m5-ab	1	11	91.24	-160.48

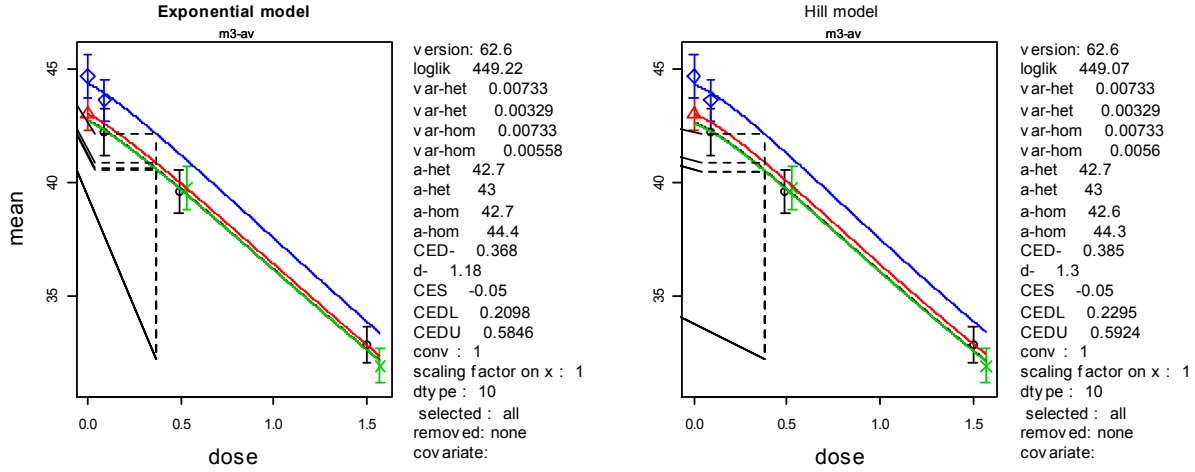
AIC: Akaike's Information Criterion.

Best model with covariates is: m3-a.
However, m3-b is a reasonable model as well, and so is m5-a.

Selected model: m3-a

The CED (in original units) and the 90 % C.I. is:
0.39322
0.12379
0.89682

Tentative BMD Analysis of the data of Bondy et al. (2016) assuming the same doses and responses in a design with N=400 animals



Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	9	444.14	-870.28
full-v	1	12	450.24	-876.48
m1-v	1	5	230.71	-451.42
m1-av	1	8	329.12	-642.24
m2-ab	1	9	443.99	-869.98
m3-av	1	10	449.22	-878.44
m3-bv	1	10	444.89	-869.78
m3-abv	1	13	378.3	-730.6
m5-av	1	11	449.22	-876.44
m5-bv	0	11	234.21	-446.42
m5-abv	1	14	450.24	-872.48

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-av.
However, m5-av is a reasonable model as well.

Selected model: m3-av

Calculating the confidence interval (C.I.)

The CED (in original units) and the 90 % C.I. is:
0.36775
0.20978
0.58456

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-av	1	10	449.07	-878.14
m3-bv	1	10	444.64	-869.28
m3-abv	1	13	450.24	-874.48
m5-av	1	11	449.07	-876.14
m5-bv	1	11	444.64	-867.28
m5-abv	1	14	450.24	-872.48

AIC: Akaike's Information Criterion.

Best model with covariates is: m3-av.
However, m5-av is a reasonable model as well.

Selected model: m3-av

Calculating the confidence interval (C.I.)

The CED (in original units) and the 90 % C.I. is:
0.38496
0.22948
0.5924

Supplementary information SPRANDO2005ALL (Sprando et al., 2005)

Details of the BMD Analysis of the body weight data of Sprando et al. (2005) reported in Appendix G, Section G.3.1 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed - in male SD rats

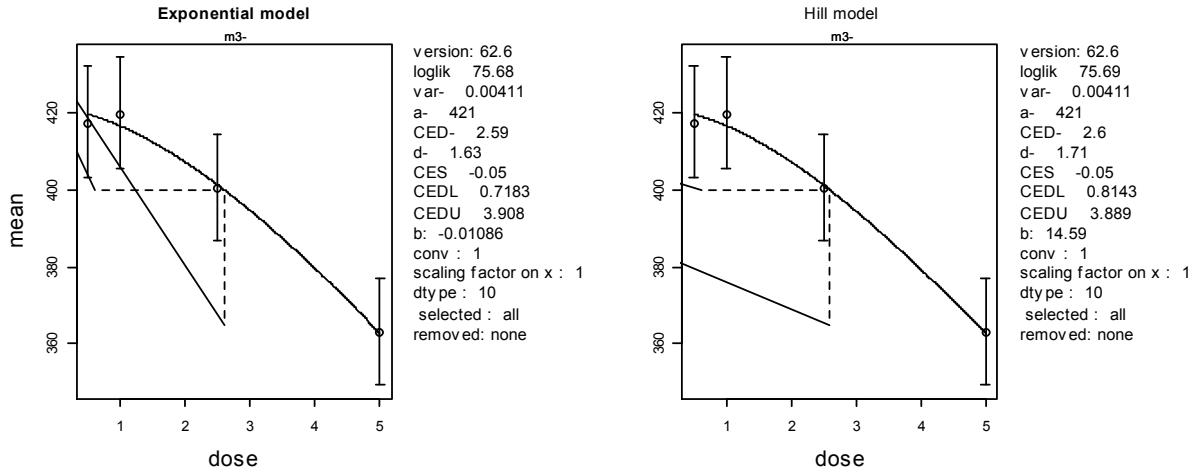
Filename: Sprando2005all Folder Sprando-2005

Output from PROAST 62.6 from 26 OCT 2016

Data, graphic and numerical output for body weight

SprandoBBWbis29
5

0	0	10	0	0
dose	n	mean	sem	sex
0	15	420.5	7.0	m
0.5	15	418.8	9.0	m
1	15	420.6	7.1	m
2.5	15	400.9	6.3	m
5	12	363.3	5.0	m



Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	5	75.85	-141.7
m1-	1	2	59.9	-115.8
m2-	1	3	75.16	-144.32
m3-	1	4	75.68	-143.36
m5-	1	5	75.82	-141.64

AIC: Akaike's Information Criterion.

Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.5946
0.7183
3.9081

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-	1	4	75.69	-143.38
m5-	1	5	75.82	-141.64

AIC: Akaike's Information Criterion.

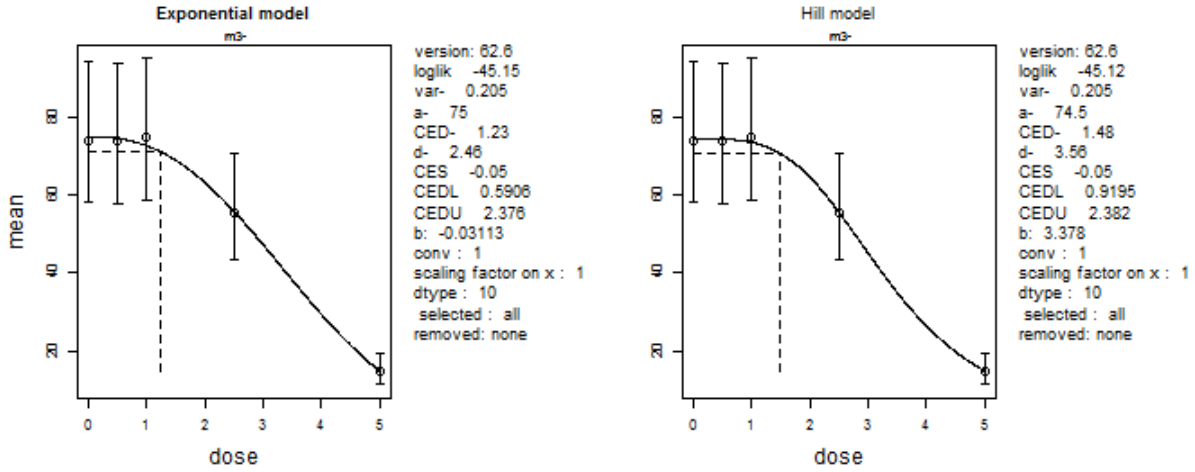
Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.6033
0.81428
3.8893

Data, graphic and numerical output for average body weight gain by day 29

SprandoBWbis29
5

0	0	10	0	0
dose	n	mean	sem	sex
0	15	77.4	6.1	m
0.5	15	77.3	6.2	m
1	15	78.5	6.5	m
2.5	15	59.5	6.0	m
5	12	22.1	7.1	m



Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	6	-45.11	102.22
m1-	1	2	-80.52	165.04
m2-	1	3	-51.49	108.98
m3-	1	4	-45.15	98.3
m5-	1	5	-45.11	100.22

AIC: Akaike's Information Criterion.

Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
1.2253
0.5906
2.3756

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-	1	4	-45.12	98.24
m5-	0	5	-45.11	100.22

AIC: Akaike's Information Criterion.

Selected model: m3-

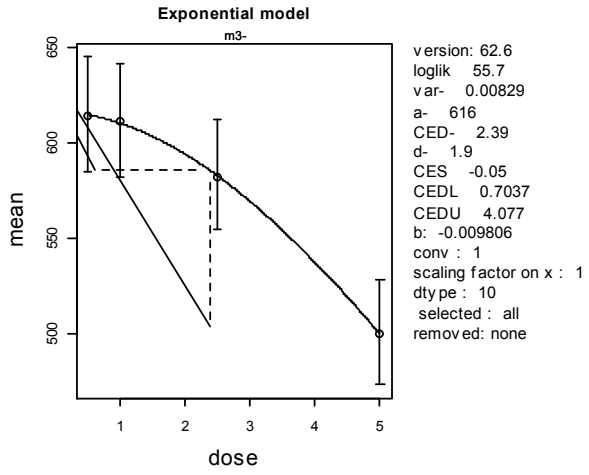
The CED (in original units) and the 90 % C.I. is:
1.4788
0.91953
2.3824

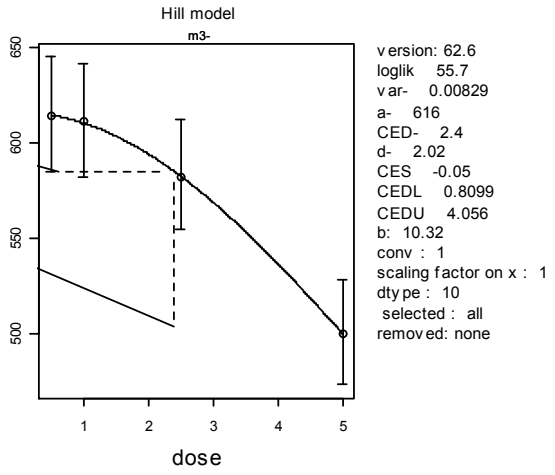
Data, graphic and numerical output for average feed consumption

SprandoAFbis29

5

0	0	10	0	0
dose	n	mean	sem	sex
0	15	621.3	14.7	m
0.5	15	617.5	17.0	m
1	15	613.6	15.0	m
2.5	15	584.7	13.2	m
5	12	502.1	12.6	m





Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	5	55.71	-101.42
m1-	1	2	39.84	-75.68
m2-	1	3	54.85	-103.7
m3-	1	4	55.7	-103.4
m5-	1	5	55.71	-101.42

AIC: Akaike's Information Criterion.

Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.3894
0.70372
4.0772

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-	1	4	55.7	-103.4
m5-	1	5	55.71	-101.42

AIC: Akaike's Information Criterion.

Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.405
0.80992
4.0561

Supplementary information COLLINS (Collins et al., 2006)

Details of the BMD Analysis of the data of Collins et al. (2006) reported in Appendix G, Section G.3.2 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

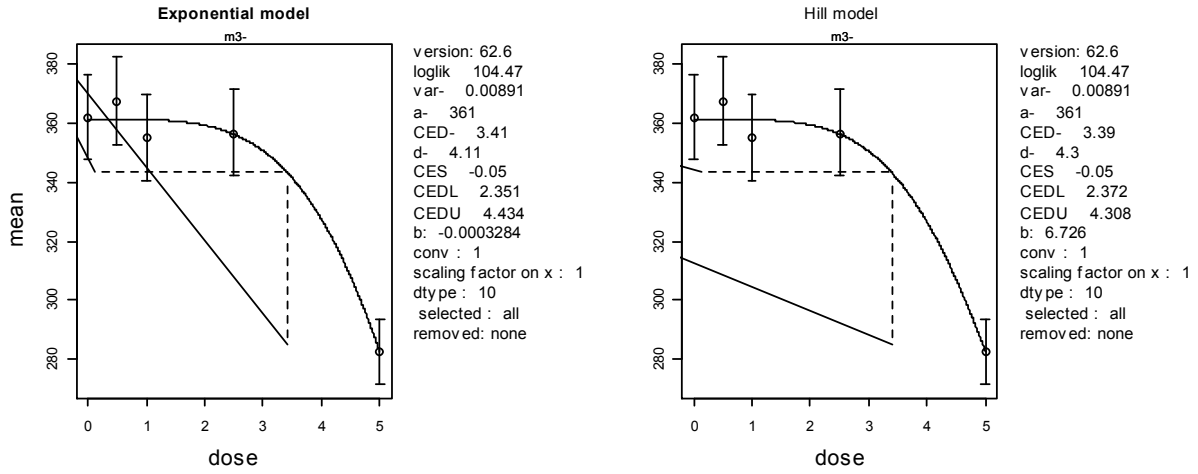
Filename: Collins Folder: Collins-2006

Output from PROAST 62.6 from 24 OCT 2016

Data, graphic and numerical output for body weight

COLLINSBW
5

0	0	10	0	0
dose	n	mean	sem	s
0	23	362.22	4.31	s
0.5	22	367.86	4.94	s
1	22	355.86	5.99	s
2.5	21	357.43	5.59	s
5	23	286.22	9.83	s



Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	6	105.2	-198.4
m1-	1	2	63.57	-123.14
m2-	1	3	96.12	-186.24
m3-	1	4	104.47	-200.94
m5-	1	5	104.47	-198.94

AIC: Akaike's Information Criterion.

Selected model: m3-

ATTENTION: jump in log-likelihood

The CED (in original units) and the 90 % C.I. is:
3.4145
2.3508
4.4344

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-	1	4	104.47	-200.94
m5-	1	5	104.47	-198.94

AIC: Akaike's Information Criterion.

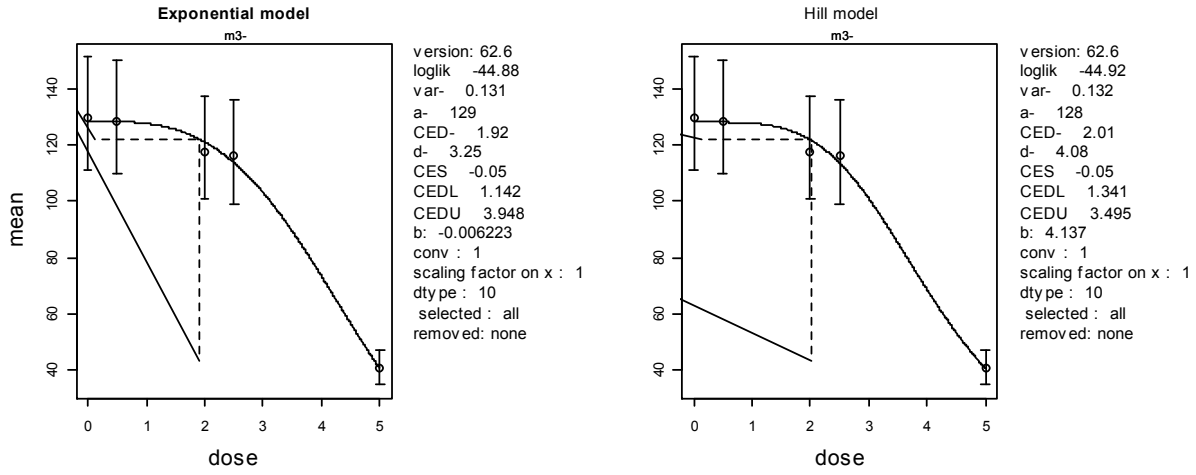
Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
3.393
2.3725
4.3085

Data, graphic and numerical output for body weight gain

COLLINSBWGAIN
5

0	0	10	0	0
dose	n	mean	SEM	s
0	23	130.7	3.1	s
0.5	22	130.4	4.9	s
2	22	120.8	6	s
2.5	21	118.1	4.9	s
5	23	52.9	9.3	s



Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	6	-44.76	101.52
m1-	1	2	-97.03	198.06
m2-	1	3	-58.7	123.4
m3-	1	4	-44.88	97.76
m5-	1	5	-44.88	99.76

AIC: Akaike's Information Criterion.

Selected model: m3-

ATTENTION: jump in log-likelihood

The CED (in original units) and the 90 % C.I. is:
1.9152
1.1416
3.9485

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-	1	4	-44.92	97.84
m5-	1	5	-44.92	99.84

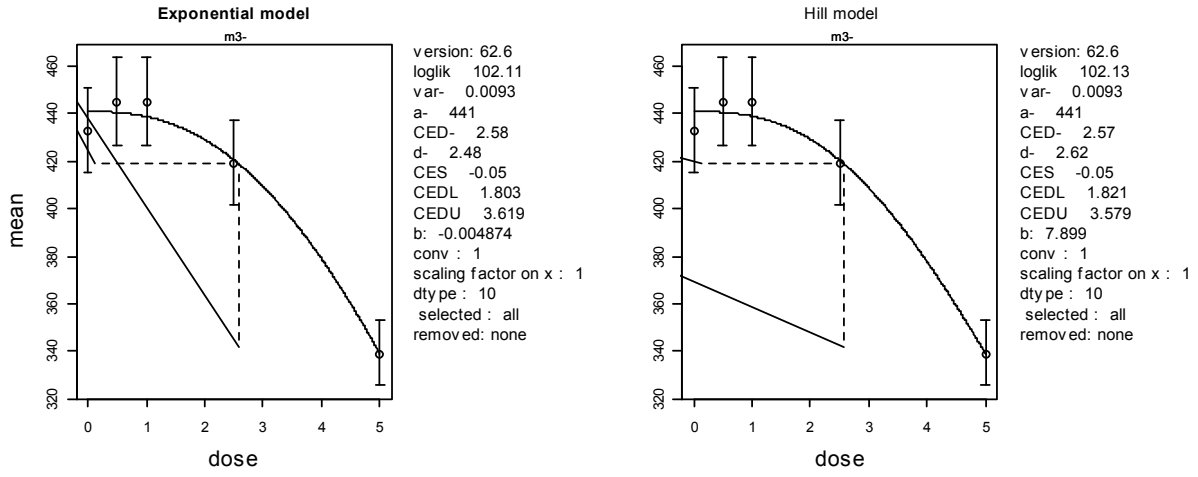
AIC: Akaike's Information Criterion.
Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.0099
1.3406
3.4947

a) Data, graphic and numerical output for feed intake

COLLINSFC
5

0	0	10	0	0
dose	n	mean	sem	s
0	23	434.3	7.7	s
0.5	22	445.3	5.3	s
1	22	446.1	7.2	s
2.5	21	421.0	9.3	s
5	23	342.6	10.5	s



Response: mean

ANALYSIS WITH EXPONENTIAL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
full	1	6	102.89	-193.78
m1-	1	2	59.84	-115.68
m2-	1	3	95.25	-184.5
m3-	1	4	102.11	-196.22
m5-	1	5	102.28	-194.56

AIC: Akaike's Information Criterion.

Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.5844
1.803
3.6194

Response: mean

ANALYSIS WITH HILL MODELS				
Model	**Converged**	**Number of parameters**	**Log-likelihood**	**AIC**
m3-	1	4	102.13	-196.26
m5-	1	5	102.28	-194.56

AIC: Akaike's Information Criterion.

Selected model: m3-

The CED (in original units) and the 90 % C.I. is:
2.5722
1.8213
3.5788

Supplementary information YOUNGBMC (Young et al., 1983)

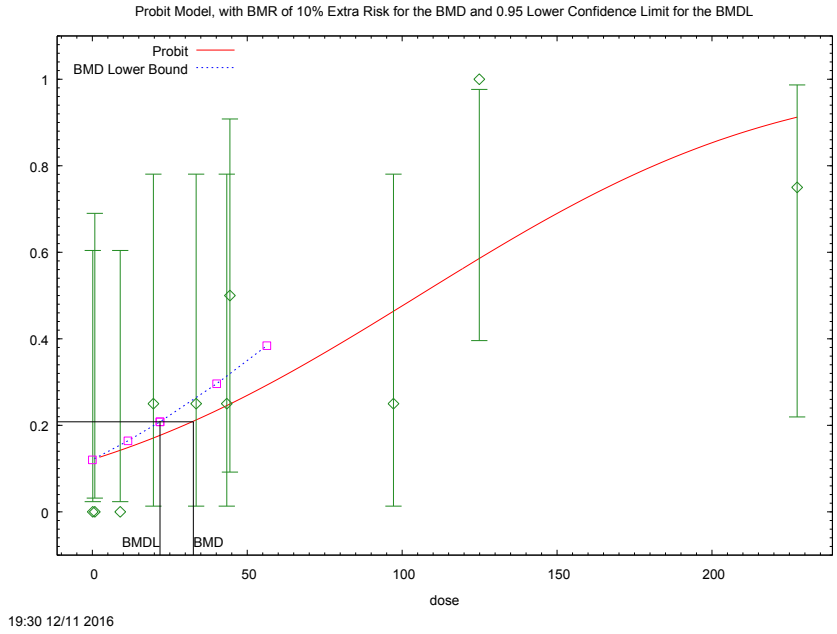
Details of the BMD Analysis of concentration-response data for vomiting in pigs of Young et al. (1983) trials 2 and 3 reported in Appendix G, Section G.4.1.1 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

Filename: YoungBMC Folder: PigsVomiting

Output from BMDS from 11 DEC 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

The output is ordered in the sequence used in the Table G11 of Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.

Occasionally, it was not possible to obtain the results of the Gamma model with the notebook used for the calculation HP844op or Lenovo 3508.




```
 ================================================================
        Probit Model. (Version: 3.3;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_DONYoungnew_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_DONYoungnew_Opt.plt
                                          Sun Dec 11 19:30:08 2016
 ================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),

   where CumNorm(.) is the cumulative normal distribution function
```
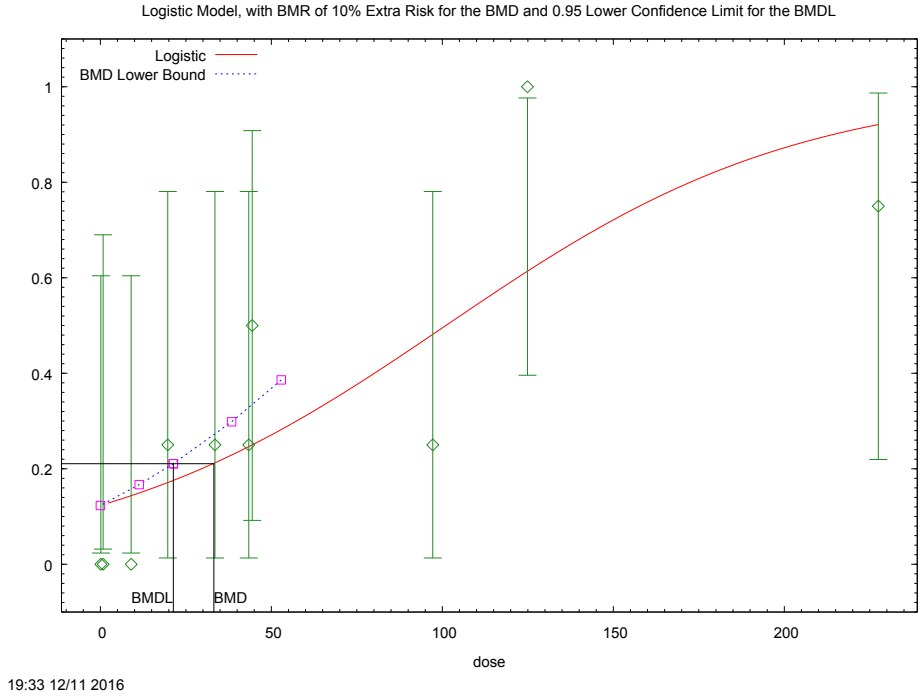

```
   Dependent variable = Effect
   Independent variable = concentration
   Slope parameter is not restricted

   Total number of observations = 10
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     background =            0   Specified
                      intercept =     -1.18699
                          slope =    0.0110622


          Asymptotic Correlation Matrix of Parameter Estimates

          ( *** The model parameter(s)  -background
                have been estimated at a boundary point, or have been specified by
the user,
                and do not appear in the correlation matrix )

             intercept        slope

 intercept           1        -0.72

     slope       -0.72            1



                                 Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept         -1.17418         0.332101           -1.82509            -
0.523277
          slope        0.0110833       0.00362131         0.00398569
0.018181



                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -14.0193        10
   Fitted model        -19.2082         2       10.3778      8          0.2395
  Reduced model        -24.8241         1       21.6095      9          0.0102

           AIC:         42.4163


                                  Goodness  of  Fit
                                                                 Scaled
     Dose     Est._Prob.    Expected    Observed     Size       Residual
  ------------------------------------------------------------------------
    0.1400     0.1205         0.482      0.000      4.000        -0.740
    9.0000     0.1413         0.565      0.000      4.000        -0.811
   19.7000     0.1696         0.678      1.000      4.000         0.429
   33.5000     0.2110         0.844      1.000      4.000         0.191
   43.4000     0.2441         0.976      1.000      4.000         0.027
   44.4000     0.2476         0.990      2.000      4.000         1.170
   97.2000     0.4614         1.846      1.000      4.000        -0.848
```

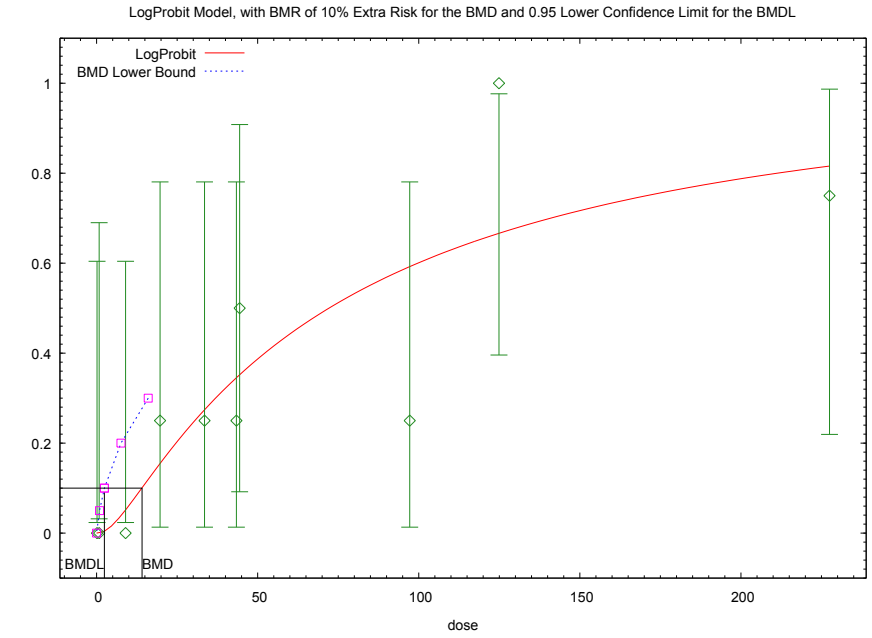
```
  124.9000      0.5832          2.333      4.000        4.000         1.691
  227.5000      0.9111          3.644      3.000        4.000        -1.132
    0.7900      0.1219          0.366      0.000        3.000        -0.645

 Chi^2 = 8.07       d.f. = 8         P-value = 0.4267


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        32.5992

            BMDL =        21.8348
```




```
 ================================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_DONYoungnew_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_DONYoungnew_Opt.plt
                                          Sun Dec 11 19:33:56 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = concentration
   Slope parameter is not restricted

   Total number of observations = 10
   Total number of records with missing values = 0
```

```
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     background =            0   Specified
                      intercept =     -1.55631
                          slope =    0.0147838


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1        -0.74

     slope        -0.74            1


                                Parameter Estimates

                                                                95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept         -1.96486         0.600604            -3.14202           -
0.787695
          slope        0.0194038       0.00719684           0.0052983
0.0335094


                        Analysis of Deviance Table

      Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
    Full model         -14.0193         10
  Fitted model         -19.1784          2       10.3182       8          0.2434
 Reduced model         -24.8241          1       21.6095       9          0.0102

           AIC:          42.3568


                                  Goodness  of  Fit
                                                                      Scaled
    Dose      Est._Prob.     Expected     Observed      Size        Residual
  ----------------------------------------------------------------------------
    0.1400      0.1232          0.493      0.000        4.000       -0.750
    9.0000      0.1430          0.572      0.000        4.000       -0.817
   19.7000      0.1704          0.682      1.000        4.000        0.423
   33.5000      0.2117          0.847      1.000        4.000        0.188
   43.4000      0.2455          0.982      1.000        4.000        0.021
   44.4000      0.2491          0.996      2.000        4.000        1.160
   97.2000      0.4803          1.921      1.000        4.000       -0.922
  124.9000      0.6127          2.451      4.000        4.000        1.590
  227.5000      0.9205          3.682      3.000        4.000       -1.261
    0.7900      0.1246          0.374      0.000        3.000       -0.653

 Chi^2 = 8.19       d.f. = 8         P-value = 0.4155
```

```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        33.1808

            BMDL =        21.3329
```




```
 ========================================================================
        Probit Model. (Version: 3.3;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_DONYoungnew_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_DONYoungnew_Opt.plt
                                          Sun Dec 11 19:35:38 2016
 ========================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = concentration
   Slope parameter is not restricted

   Total number of observations = 10
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

User has chosen the log transformed model

Default Initial (and Specified) Parameter Values
background = 0
intercept = -1.20344
slope = 0.261415

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.98
slope	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	-3.35488	1.20353	-5.71375	-0.996006
slope	0.783306	0.291705	0.211574	1.35504

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

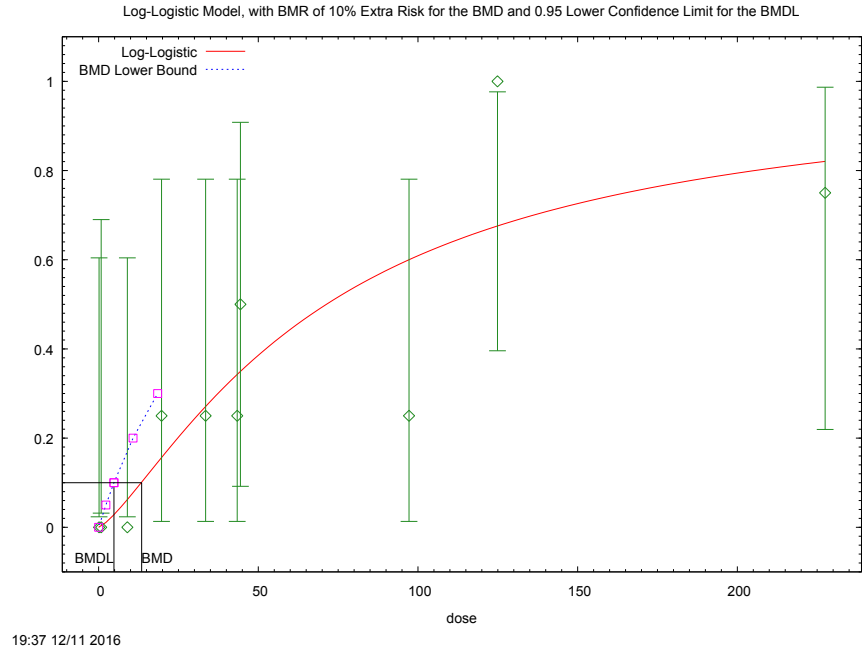
Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-14.0193	10			
Fitted model	-17.2699	2	6.50131	8	0.5913
Reduced model	-24.8241	1	21.6095	9	0.0102

AIC: 38.5399

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.1400	0.0000	0.000	0.000	4.000	-0.001
9.0000	0.0512	0.205	0.000	4.000	-0.464
19.7000	0.1538	0.615	1.000	4.000	0.533
33.5000	0.2728	1.091	1.000	4.000	-0.103
43.4000	0.3440	1.376	1.000	4.000	-0.396
44.4000	0.3506	1.403	2.000	4.000	0.626
97.2000	0.5910	2.364	1.000	4.000	-1.387
124.9000	0.6651	2.661	4.000	4.000	1.419
227.5000	0.8149	3.260	3.000	4.000	-0.334
0.7900	0.0002	0.001	0.000	3.000	-0.025

```
 Chi^2 = 5.11       d.f. = 8         P-value = 0.7458


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        14.1101

            BMDL =        2.41926

Log-Logistic restricted
```




```
 ================================================================
         Logistic Model. (Version: 2.14; Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_DONYoungnew_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_DONYoungnew_Opt.plt
                                              Sun Dec 11 19:37:27 2016
 ================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = concentration
   Slope parameter is restricted as slope >= 1

   Total number of observations = 10
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
```

Parameter Convergence has been set to: 1e-008

User has chosen the log transformed model

Default Initial Parameter Values
background = 0
intercept = -4.65793
slope = 1

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.98
slope	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	-5.59213	2.1062	-9.7202	-1.46407
slope	1.30533	0.507913	0.309842	2.30082

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-14.0193	10			
Fitted model	-17.316	2	6.5934	8	0.5811
Reduced model	-24.8241	1	21.6095	9	0.0102

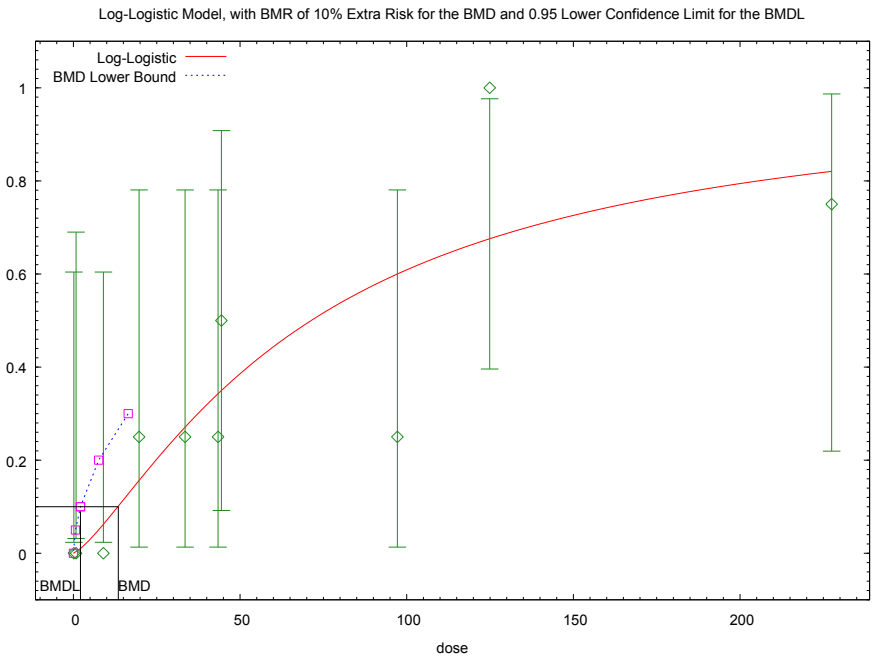
AIC: 38.632

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.1400	0.0003	0.001	0.000	4.000	-0.034
9.0000	0.0616	0.246	0.000	4.000	-0.512
19.7000	0.1543	0.617	1.000	4.000	0.530
33.5000	0.2673	1.069	1.000	4.000	-0.078
43.4000	0.3384	1.354	1.000	4.000	-0.374
44.4000	0.3451	1.380	2.000	4.000	0.652
97.2000	0.5944	2.377	1.000	4.000	-1.403
124.9000	0.6703	2.681	4.000	4.000	1.403

```
  227.5000      0.8164          3.266      3.000        4.000        -0.343
    0.7900      0.0027          0.008      0.000        3.000        -0.091

 Chi^2 = 5.18       d.f. = 8         P-value = 0.7386


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        13.4745

            BMDL =        4.79127
```

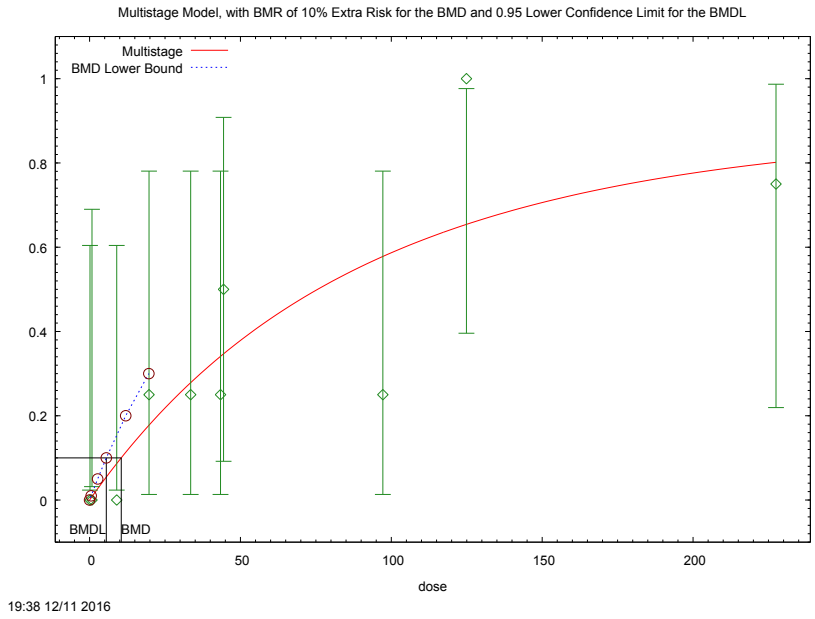
loglog unrestricted




```
 ========================================================================
         Logistic Model. (Version: 2.14; Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_DONYoungnew_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_DONYoungnew_Opt.plt
                                          Sun Dec 11 19:40:26 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = concentration
```

```
   Slope parameter is not restricted

   Total number of observations = 10
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                  Default Initial Parameter Values
                     background =            0
                      intercept =     -2.02702
                          slope =     0.444252


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

             intercept        slope

 intercept           1        -0.98

     slope       -0.98            1



                                 Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     background                0               NA
      intercept         -5.59213          2.10621             -9.72024            -
1.46403
          slope          1.30533         0.507918             0.309832
2.30083

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.



                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -14.0193        10
   Fitted model         -17.316         2        6.5934      8           0.5811
  Reduced model        -24.8241         1       21.6095      9           0.0102

           AIC:           38.632


                                  Goodness  of  Fit
                                                                  Scaled
     Dose       Est._Prob.     Expected    Observed     Size       Residual
  ------------------------------------------------------------------------
    0.1400     0.0003         0.001     0.000        4.000        -0.034
    9.0000     0.0616         0.246     0.000        4.000        -0.512
```

```
   19.7000      0.1543          0.617      1.000        4.000         0.530
   33.5000      0.2673          1.069      1.000        4.000        -0.078
   43.4000      0.3384          1.354      1.000        4.000        -0.374
   44.4000      0.3451          1.380      2.000        4.000         0.652
   97.2000      0.5944          2.377      1.000        4.000        -1.403
  124.9000      0.6703          2.681      4.000        4.000         1.403
  227.5000      0.8164          3.266      3.000        4.000        -0.343
    0.7900      0.0027          0.008      0.000        3.000        -0.091

 Chi^2 = 5.18       d.f. = 8         P-value = 0.7386


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        13.4745

            BMDL =        2.11548
```




```
 ================================================================================
        Multistage Model. (Version: 3.4;  Date: 05/02/2014)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_DONYoungnew_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_DONYoungnew_Opt.plt
                                              Sun Dec 11 19:38:57 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are not restricted
```

```
   Dependent variable = Effect
   Independent variable = concentration

 Total number of observations = 10
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     Background =            0
                        Beta(1) = 7.96559e+017
                        Beta(2) = -3.05595e+015


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(1)      Beta(2)

   Beta(1)            1        -0.86

   Beta(2)        -0.86            1


                                Parameter Estimates

                                                                  95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)        0.0101776       0.00478519         0.000798821
0.0195564
        Beta(2)    -1.35925e-005     3.28172e-005       -7.79131e-005
5.07281e-005

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model         -14.0193         10
   Fitted model         -17.3763          2       6.71407       8          0.5678
  Reduced model         -24.8241          1       21.6095       9          0.0102

           AIC:          38.7526
```

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.1400	0.0014	0.006	0.000	4.000	-0.076
9.0000	0.0865	0.346	0.000	4.000	-0.616
19.7000	0.1773	0.709	1.000	4.000	0.380
33.5000	0.2780	1.112	1.000	4.000	-0.125
43.4000	0.3404	1.362	1.000	4.000	-0.382
44.4000	0.3463	1.385	2.000	4.000	0.646
97.2000	0.5772	2.309	1.000	4.000	-1.325
124.9000	0.6532	2.613	4.000	4.000	1.457
227.5000	0.8005	3.202	3.000	4.000	-0.253
0.7900	0.0080	0.024	0.000	3.000	-0.156

Chi^2 = 5.07 d.f. = 8 P-value = 0.7496

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

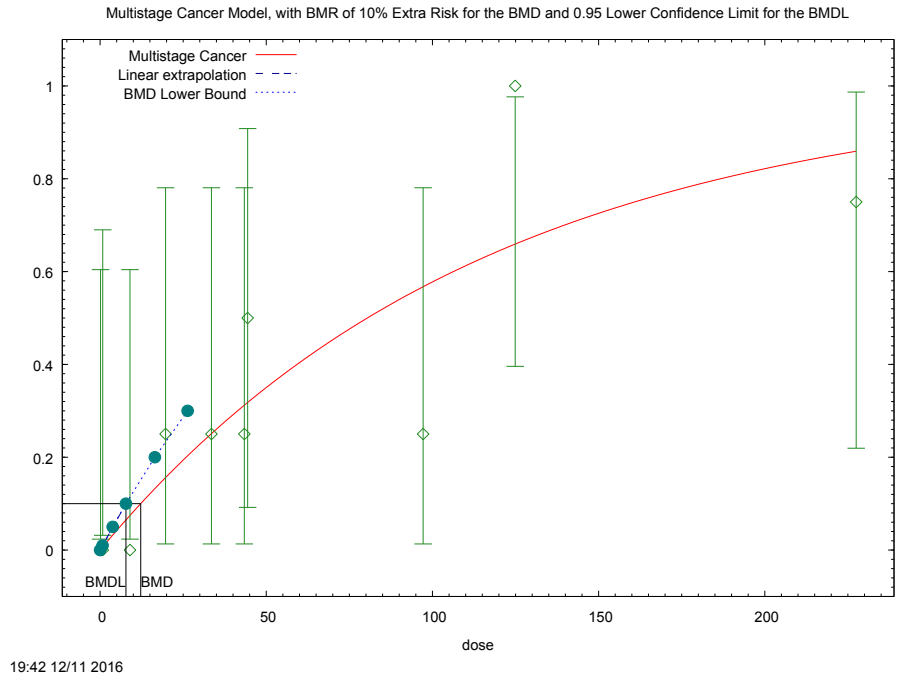
Confidence level = 0.95

BMD = 10.4994

BMDL = 5.53894

BMDU = 27.9637

Taken together, (5.53894, 27.9637) is a 90 % two-sided confidence interval for the BMD



Multistage Model. (Version: 3.4; Date: 05/02/2014)
Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_DONYoungnew_Opt.(d)
Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_DONYoungnew_Opt.plt
Sun Dec 11 19:42:25 2016

```
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = concentration

 Total number of observations = 10
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008



                  Default Initial Parameter Values
                     Background =            1
                        Beta(1) =   1.404e+017
                        Beta(2) =            0


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Beta(2)
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(1)

   Beta(1)            1


                                  Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)       0.00862046       0.00251679          0.00368764
0.0135533
        Beta(2)                0              NA

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.
```

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-14.0193	10			
Fitted model	-17.4576	1	6.87667	9	0.65
Reduced model	-24.8241	1	21.6095	9	0.0102

AIC: 36.9153

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.1400	0.0012	0.005	0.000	4.000	-0.070
9.0000	0.0747	0.299	0.000	4.000	-0.568
19.7000	0.1562	0.625	1.000	4.000	0.517
33.5000	0.2508	1.003	1.000	4.000	-0.004
43.4000	0.3121	1.248	1.000	4.000	-0.268
44.4000	0.3180	1.272	2.000	4.000	0.782
97.2000	0.5674	2.270	1.000	4.000	-1.281
124.9000	0.6593	2.637	4.000	4.000	1.438
227.5000	0.8593	3.437	3.000	4.000	-0.629
0.7900	0.0068	0.020	0.000	3.000	-0.143

Chi^2 = 5.40 d.f. = 9 P-value = 0.7980

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

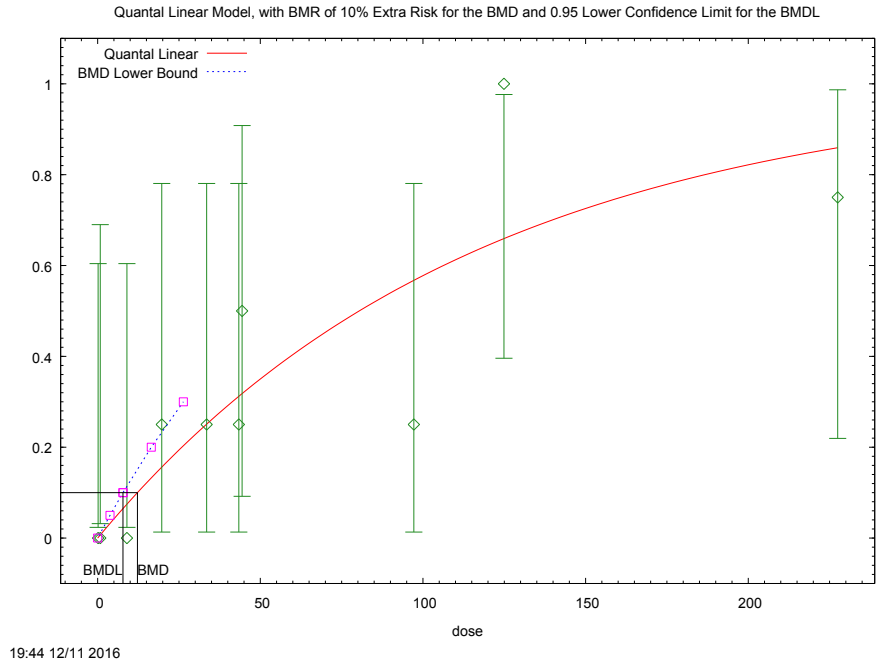
BMD = 12.2221

BMDL = 7.782

BMDU = 29.3638

Taken together, (7.782 , 29.3638) is a 90 % two-sided confidence interval for the BMD

Cancer Slope Factor = 0.0128502




```
 ================================================================
        Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_DONYoungnew_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_DONYoungnew_Opt.plt
                                          Sun Dec 11 19:44:37 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]


   Dependent variable = Effect
   Independent variable = concentration

   Total number of observations = 10
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =    0.0833333
                          Slope =    0.0044466
                          Power =            1   Specified


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Power
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )
```

Slope

Slope 1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	0.00862046	0.00251679	0.00368764	0.0135533

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-14.0193	10			
Fitted model	-17.4576	1	6.87667	9	0.65
Reduced model	-24.8241	1	21.6095	9	0.0102

AIC: 36.9153

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.1400	0.0012	0.005	0.000	4.000	-0.070
9.0000	0.0747	0.299	0.000	4.000	-0.568
19.7000	0.1562	0.625	1.000	4.000	0.517
33.5000	0.2508	1.003	1.000	4.000	-0.004
43.4000	0.3121	1.248	1.000	4.000	-0.268
44.4000	0.3180	1.272	2.000	4.000	0.782
97.2000	0.5674	2.270	1.000	4.000	-1.281
124.9000	0.6593	2.637	4.000	4.000	1.438
227.5000	0.8593	3.437	3.000	4.000	-0.629
0.7900	0.0068	0.020	0.000	3.000	-0.143

Chi^2 = 5.40 d.f. = 9 P-value = 0.7980

Benchmark Dose Computation

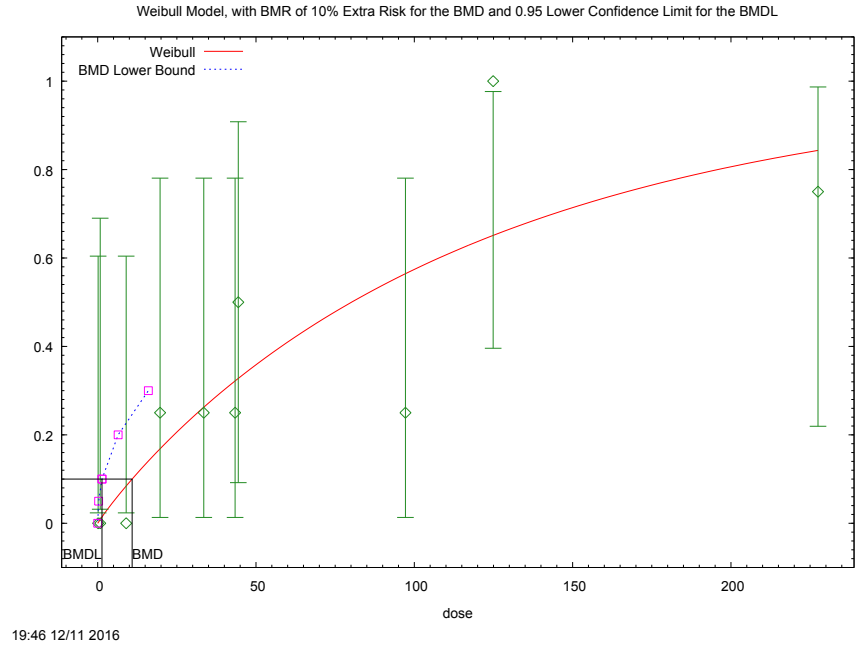
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 12.2221

BMDL = 7.78199




```
 ========================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_DONYoungnew_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_DONYoungnew_Opt.plt
                                                Sun Dec 11 19:46:05 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = concentration
   Power parameter is not restricted

   Total number of observations = 10
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =    0.0833333
                          Slope =    0.0415303
                          Power =     0.588314


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                  Slope        Power
```

Slope	1	-0.98
Power	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	0.0111071	0.0163896	-0.021016	0.0432303
Power	0.942577	0.329127	0.297501	1.58765

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-14.0193	10			
Fitted model	-17.4427	2	6.84678	8	0.5533
Reduced model	-24.8241	1	21.6095	9	0.0102

AIC: 38.8854

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.1400	0.0017	0.007	0.000	4.000	-0.083
9.0000	0.0843	0.337	0.000	4.000	-0.607
19.7000	0.1684	0.674	1.000	4.000	0.436
33.5000	0.2622	1.049	1.000	4.000	-0.056
43.4000	0.3217	1.287	1.000	4.000	-0.307
44.4000	0.3274	1.310	2.000	4.000	0.736
97.2000	0.5640	2.256	1.000	4.000	-1.266
124.9000	0.6506	2.602	4.000	4.000	1.466
227.5000	0.8428	3.371	3.000	4.000	-0.510
0.7900	0.0089	0.027	0.000	3.000	-0.164

Chi^2 = 5.24 d.f. = 8 P-value = 0.7313

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 10.8793

BMDL = 1.35813

Supplementary information WILLIAMSBMC (Williams et al., 1988)

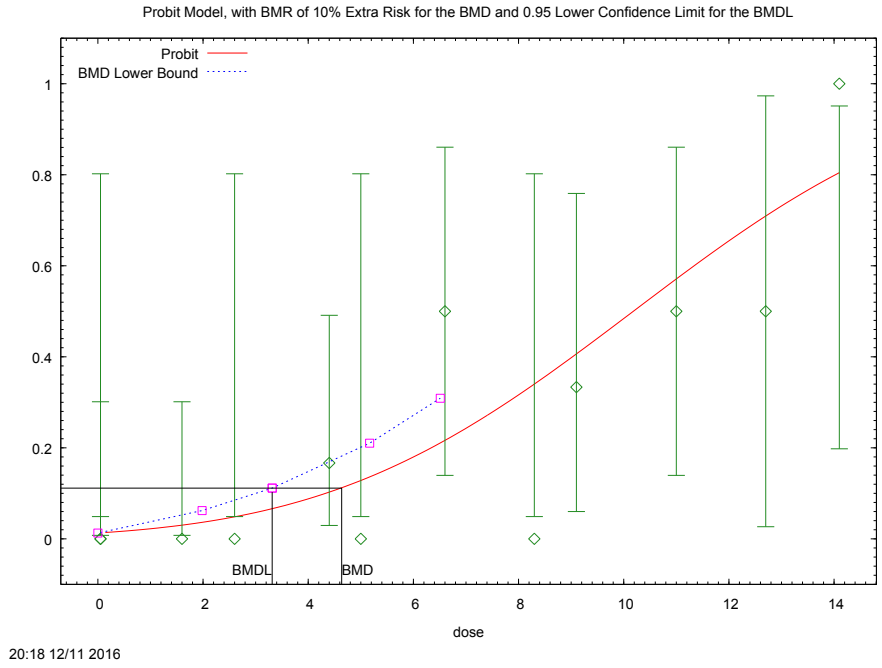
Details of the BMD Analysis of concentration-response data for vomiting in pigs of Williams et al. (1986) trials 1 and 2 reported in Appendix G, Section G.4.1.2 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

Filename: WilliamsBMC Folder: PigsVomiting

Output from BMDS from 11 DEC 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

The output is ordered in the sequence used in Table G12 shown in Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.

Occasionally, it was not possible to obtain the results of the Gamma model with the notebook used for the calculation HP844op or Lenovo 3508.




```
 ================================================================
        Probit Model. (Version: 3.3;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_williams_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_williams_Opt.plt
                                          Sun Dec 11 20:18:30 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),
```

where CumNorm(.) is the cumulative normal distribution function

Dependent variable = Effect
Independent variable = Dose
Slope parameter is not restricted

Total number of observations = 12
Total number of records with missing values = 0
Maximum number of iterations = 500
Relative Function Convergence has been set to: 1e-008
Parameter Convergence has been set to: 1e-008

Default Initial (and Specified) Parameter Values
background = 0 Specified
intercept = -2.14661
slope = 0.209647

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.89
slope	-0.89	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-2.23445	0.465752	-3.1473	-1.32159
slope	0.219064	0.0576327	0.106106	0.332022

Analysis of Deviance Table

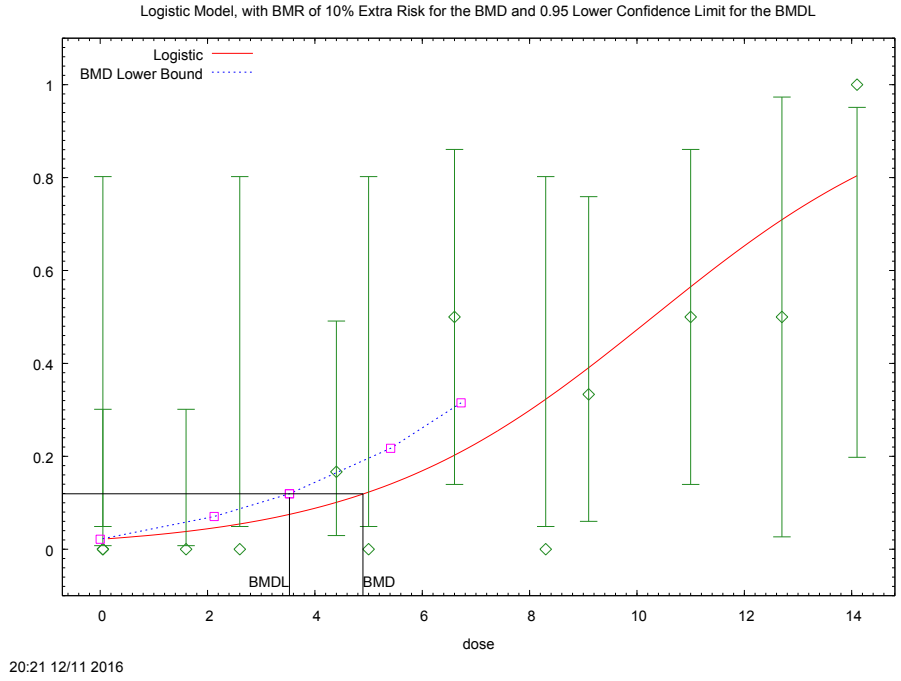
Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-18.9299	12			
Fitted model	-22.8382	2	7.81667	10	0.6467
Reduced model	-32.7474	1	27.635	11	0.003681

AIC: 49.6764

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0500	0.0131	0.157	0.000	12.000	-0.399
1.6000	0.0298	0.357	0.000	12.000	-0.607
4.4000	0.1019	1.223	2.000	12.000	0.741
6.6000	0.2152	1.291	3.000	6.000	1.698
9.1000	0.4048	2.429	2.000	6.000	-0.357

```
   11.0000      0.5696          3.417      3.000        6.000        -0.344
    0.0500      0.0131          0.026      0.000        2.000        -0.163
    2.6000      0.0480          0.096      0.000        2.000        -0.317
    5.0000      0.1273          0.255      0.000        2.000        -0.540
    8.3000      0.3386          0.677      0.000        2.000        -1.012
   12.7000      0.7080          1.416      1.000        2.000        -0.647
   14.1000      0.8035          1.607      2.000        2.000         0.699

 Chi^2 = 6.56      d.f. = 10        P-value = 0.7666


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        4.63617

            BMDL =        3.31477
```




```
 ================================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_williams_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_williams_Opt.plt
                                            Sun Dec 11 20:21:12 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
```

Slope parameter is not restricted

Total number of observations = 12
Total number of records with missing values = 0
Maximum number of iterations = 500
Relative Function Convergence has been set to: 1e-008
Parameter Convergence has been set to: 1e-008

Default Initial Parameter Values
background = 0 Specified
intercept = -2.6779
slope = 0.249614

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.91
slope	-0.91	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-3.81662	0.884678	-5.55056	-2.08269
slope	0.371464	0.103439	0.168728	0.574201

Analysis of Deviance Table

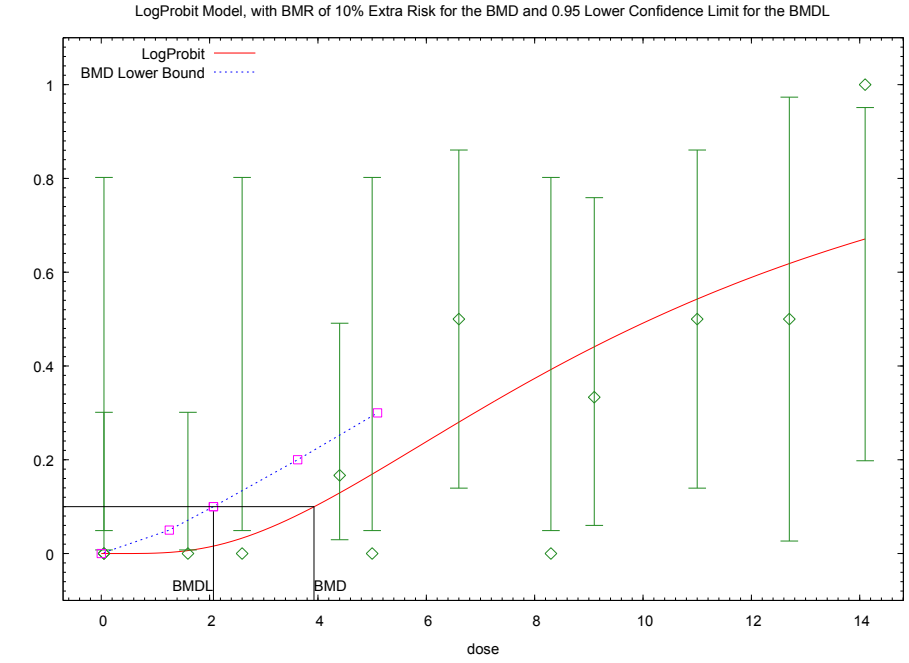
Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-18.9299	12			
Fitted model	-23.1391	2	8.41841	10	0.588
Reduced model	-32.7474	1	27.635	11	0.003681

AIC: 50.2782

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0500	0.0219	0.263	0.000	12.000	-0.519
1.6000	0.0383	0.460	0.000	12.000	-0.692
4.4000	0.1014	1.216	2.000	12.000	0.750
6.6000	0.2034	1.221	3.000	6.000	1.805
9.1000	0.3926	2.356	2.000	6.000	-0.297
11.0000	0.5670	3.402	3.000	6.000	-0.331
0.0500	0.0219	0.044	0.000	2.000	-0.212
2.6000	0.0546	0.109	0.000	2.000	-0.340
5.0000	0.1235	0.247	0.000	2.000	-0.531
8.3000	0.3244	0.649	0.000	2.000	-0.980

```
   12.7000      0.7111          1.422      1.000        2.000        -0.659
   14.1000      0.8055          1.611      2.000        2.000         0.695

 Chi^2 = 7.08       d.f. = 10         P-value = 0.7175


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        4.89486

            BMDL =        3.52599
```




```
 ================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_williams_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_williams_Opt.plt
                                          Sun Dec 11 20:23:39 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted
```

```
   Total number of observations = 12
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


   User has chosen the log transformed model


                 Default Initial (and Specified) Parameter Values
                    background =            0
                     intercept =     -1.11261
                         slope =     0.273357


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1        -0.97

     slope        -0.97            1


                                Parameter Estimates

                                                                  95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     background                0               NA
      intercept         -3.12961          0.93915            -4.97031           -
1.28891
          slope           1.3512         0.463634            0.442499
2.25991

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model        -18.9299         12
   Fitted model        -22.1758          2      6.49181     10          0.7724
  Reduced model        -32.7474          1       27.635     11        0.003681

           AIC:         48.3516


                                Goodness  of  Fit
                                                                      Scaled
     Dose      Est._Prob.     Expected     Observed      Size       Residual
  ---------------------------------------------------------------------------
    0.0500      0.0000         0.000      0.000      12.000       -0.000
    1.6000      0.0063         0.076      0.000      12.000       -0.276
    4.4000      0.1297         1.557      2.000      12.000        0.381
    6.6000      0.2810         1.686      3.000       6.000        1.193
```

9.1000	0.4420	2.652	2.000	6.000	-0.536
11.0000	0.5440	3.264	3.000	6.000	-0.216
0.0500	0.0000	0.000	0.000	2.000	-0.000
2.6000	0.0330	0.066	0.000	2.000	-0.261
5.0000	0.1698	0.340	0.000	2.000	-0.640
8.3000	0.3935	0.787	0.000	2.000	-1.139
12.7000	0.6197	1.239	1.000	2.000	-0.349
14.1000	0.6722	1.344	2.000	2.000	0.988

Chi^2 = 4.85 d.f. = 10 P-value = 0.9009

Benchmark Dose Computation

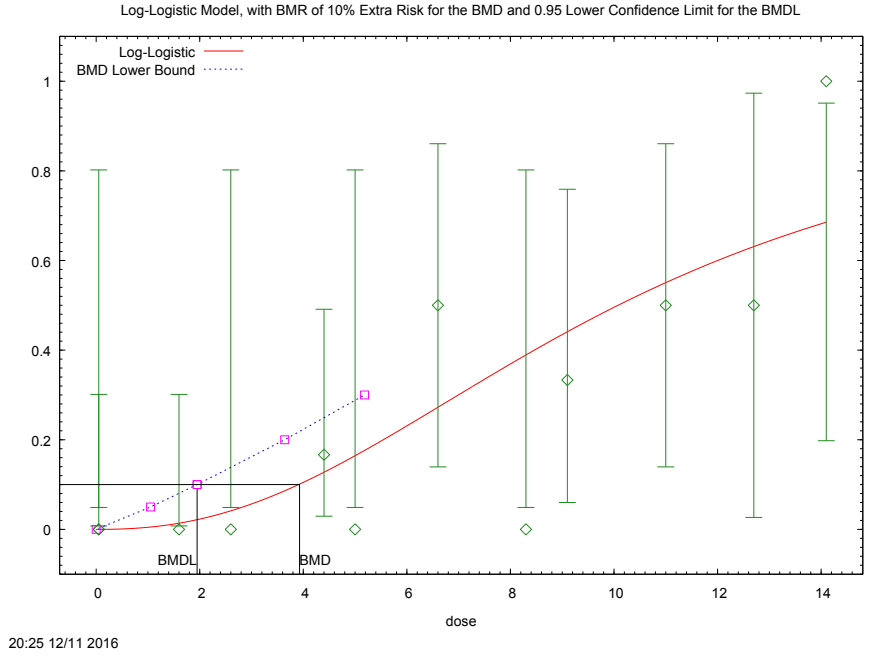
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 3.92637

BMDL = 2.07069



Logistic Model. (Version: 2.14; Date: 2/28/2013)
Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_williams_Opt.(d)
Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_williams_Opt.plt
Sun Dec 11 20:25:16 2016

BMDS_Model_Run

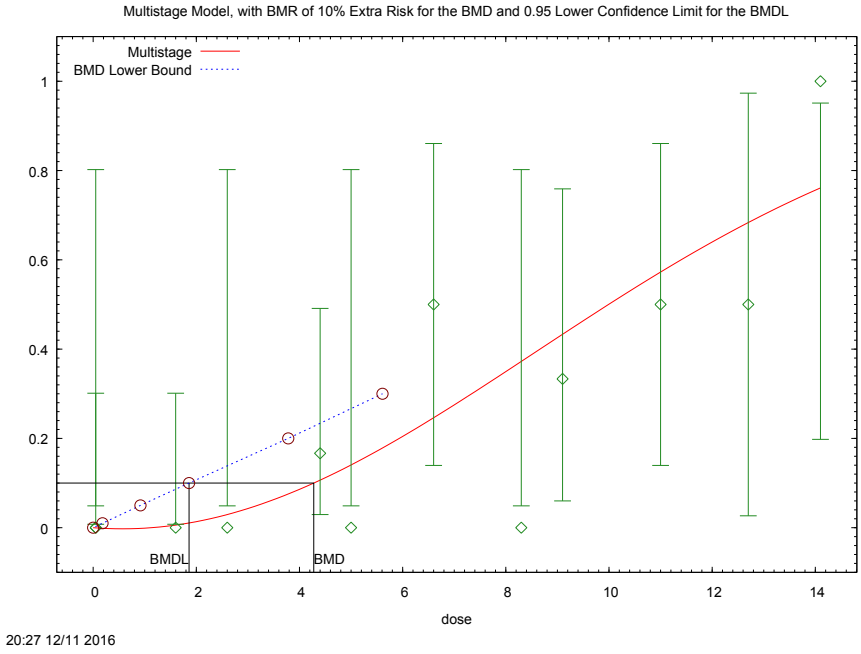
The form of the probability function is:

P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]

Dependent variable = Effect
Independent variable = Dose

```
   Slope parameter is not restricted

   Total number of observations = 12
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                  Default Initial Parameter Values
                     background =           0
                      intercept =     -1.59731
                          slope =     0.454382


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1        -0.98

     slope        -0.98            1



                                 Parameter Estimates

                                                       95.0% Wald Confidence
Interval
       Variable         Estimate         Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     background                0                NA
      intercept         -5.36433           1.70098            -8.69819            -
2.03048
          slope          2.31515          0.817445            0.712991
3.91732

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.



                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -18.9299        12
   Fitted model        -22.3001         2       6.74039     10          0.7497
  Reduced model        -32.7474         1        27.635     11        0.003681

           AIC:         48.6001


                                  Goodness  of  Fit
                                                                 Scaled
     Dose     Est._Prob.    Expected    Observed     Size       Residual
  ------------------------------------------------------------------------
   0.0500     0.0000         0.000     0.000      12.000        -0.007
   1.6000     0.0137         0.164     0.000      12.000        -0.408
```

```
    4.4000      0.1263          1.515      2.000       12.000         0.421
    6.6000      0.2698          1.619      3.000        6.000         1.270
    9.1000      0.4374          2.624      2.000        6.000        -0.514
   11.0000      0.5467          3.280      3.000        6.000        -0.230
    0.0500      0.0000          0.000      0.000        2.000        -0.003
    2.6000      0.0410          0.082      0.000        2.000        -0.292
    5.0000      0.1627          0.325      0.000        2.000        -0.623
    8.3000      0.3858          0.772      0.000        2.000        -1.121
   12.7000      0.6271          1.254      1.000        2.000        -0.372
   14.1000      0.6818          1.364      2.000        2.000         0.966

 Chi^2 = 5.08      d.f. = 10        P-value = 0.8860


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        3.92745

            BMDL =        1.94923
```




```
 ================================================================================
        Multistage Model. (Version: 3.4;  Date: 05/02/2014)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_williams_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_williams_Opt.plt
                                                Sun Dec 11 20:27:50 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]
```

```
   The parameter betas are not restricted


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 12
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     Background =            1
                        Beta(1) = -7.78141e+018
                        Beta(2) = 8.05238e+017


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(1)      Beta(2)

   Beta(1)            1        -0.93

   Beta(2)        -0.93            1


                                Parameter Estimates

                                                                95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)      -0.00886195        0.0343215          -0.0761308
0.0584069
        Beta(2)       0.00783137       0.00500266         -0.00197366
0.0176364

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model         -18.9299         12
   Fitted model          -22.261          2      6.66215     10          0.7569
  Reduced model         -32.7474          1       27.635     11        0.003681

           AIC:          48.5219
```

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0500	-0.0004	-0.005	0.000	12.000	0.005
1.6000	0.0059	0.070	0.000	12.000	-0.266
4.4000	0.1065	1.278	2.000	12.000	0.675
6.6000	0.2462	1.477	3.000	6.000	1.443
9.1000	0.4333	2.600	2.000	6.000	-0.494
11.0000	0.5726	3.436	3.000	6.000	-0.360
0.0500	-0.0004	-0.001	0.000	2.000	0.001
2.6000	0.0295	0.059	0.000	2.000	-0.246
5.0000	0.1406	0.281	0.000	2.000	-0.572
8.3000	0.3725	0.745	0.000	2.000	-1.090
12.7000	0.6835	1.367	1.000	2.000	-0.558
14.1000	0.7612	1.522	2.000	2.000	0.792

Chi^2 = 5.50 d.f. = 10 P-value = 0.8557

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

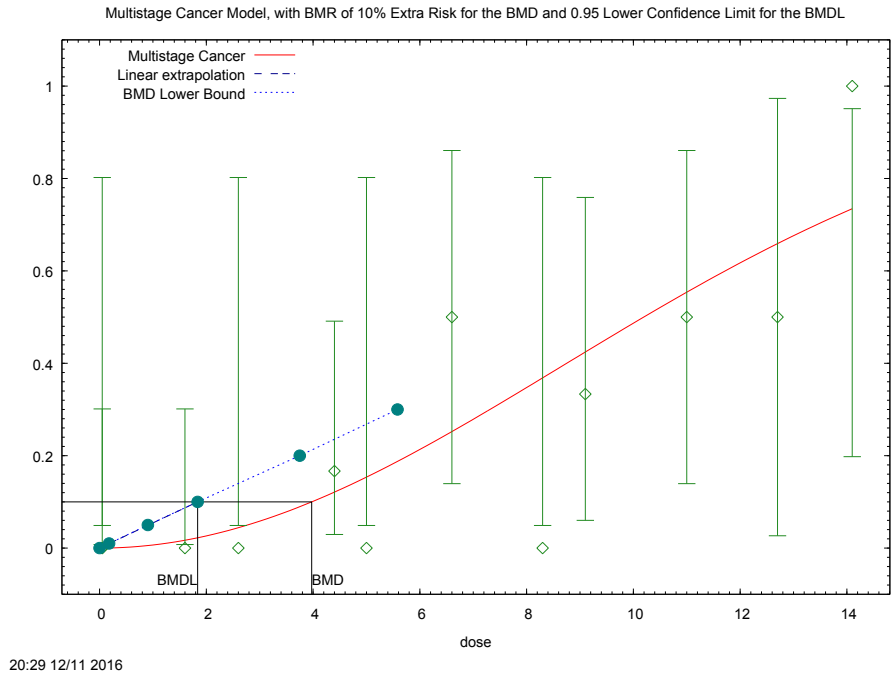
Confidence level = 0.95

BMD = 4.2771

BMDL = 1.85926

BMDU = 5.85534

Taken together, (1.85926, 5.85534) is a 90 % two-sided confidence interval for the BMD



Multistage Model. (Version: 3.4; Date: 05/02/2014)
Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_williams_Opt.(d)

```
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_williams_Opt.plt
                                                Sun Dec 11 20:29:44 2016
 ===============================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 12
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008



                  Default Initial Parameter Values
                     Background =            0
                        Beta(1) =            0
                        Beta(2) = 2.74191e+017


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Beta(1)
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(2)

   Beta(2)            1



                                  Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)                0              NA
        Beta(2)       0.00667323       0.00189447          0.00296013
0.0103863

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.
```

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-18.9299	12			
Fitted model	-22.2931	1	6.72636	11	0.8208
Reduced model	-32.7474	1	27.635	11	0.003681

AIC: 46.5861

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0500	0.0000	0.000	0.000	12.000	-0.014
1.6000	0.0169	0.203	0.000	12.000	-0.455
4.4000	0.1212	1.454	2.000	12.000	0.483
6.6000	0.2522	1.513	3.000	6.000	1.397
9.1000	0.4246	2.547	2.000	6.000	-0.452
11.0000	0.5540	3.324	3.000	6.000	-0.266
0.0500	0.0000	0.000	0.000	2.000	-0.006
2.6000	0.0441	0.088	0.000	2.000	-0.304
5.0000	0.1537	0.307	0.000	2.000	-0.603
8.3000	0.3685	0.737	0.000	2.000	-1.080
12.7000	0.6592	1.318	1.000	2.000	-0.475
14.1000	0.7346	1.469	2.000	2.000	0.850

Chi^2 = 5.24 d.f. = 11 P-value = 0.9191

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

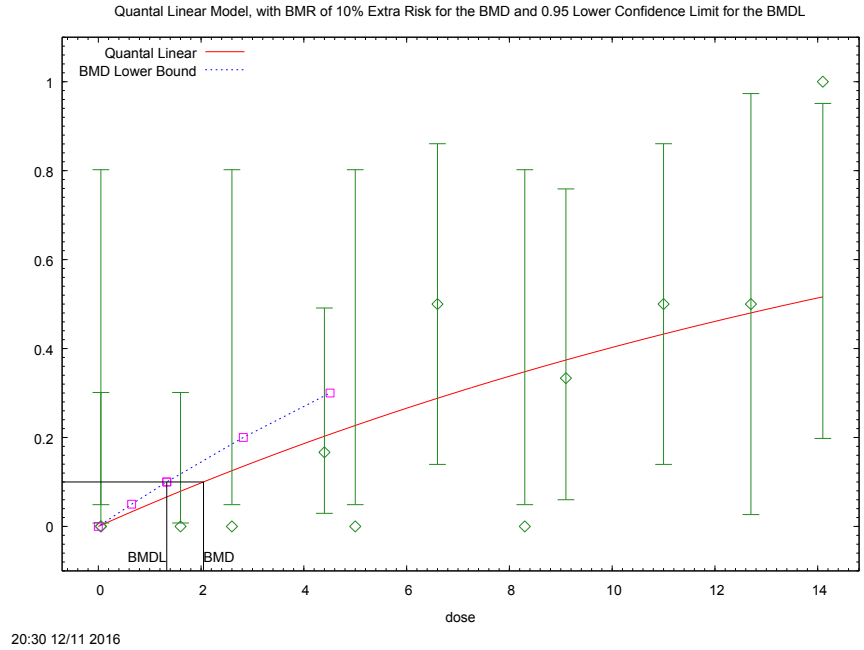
BMD = 3.97348

BMDL = 1.83708

BMDU = 5.1094

Taken together, (1.83708, 5.1094) is a 90 % two-sided confidence interval for the BMD

Cancer Slope Factor = 0.0544342




```
 ================================================================================
        Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_williams_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_williams_Opt.plt
                                                Sun Dec 11 20:30:59 2016
 ================================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose

   Total number of observations = 12
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
                          Slope =    0.0888484
                          Power =            1   Specified


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Power
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                  Slope
```

Slope 1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	0.0514667	0.0144263	0.0231916	0.0797417

NA - Indicates that this parameter has hit a bound implied by some inequality constraint and thus has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-18.9299	12			
Fitted model	-23.6376	1	9.4154	11	0.5836
Reduced model	-32.7474	1	27.635	11	0.003681

AIC: 49.2752

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0500	0.0026	0.031	0.000	12.000	-0.176
1.6000	0.0790	0.949	0.000	12.000	-1.015
4.4000	0.2026	2.432	2.000	12.000	-0.310
6.6000	0.2880	1.728	3.000	6.000	1.147
9.1000	0.3740	2.244	2.000	6.000	-0.206
11.0000	0.4323	2.594	3.000	6.000	0.335
0.0500	0.0026	0.005	0.000	2.000	-0.072
2.6000	0.1252	0.250	0.000	2.000	-0.535
5.0000	0.2269	0.454	0.000	2.000	-0.766
8.3000	0.3476	0.695	0.000	2.000	-1.032
12.7000	0.4798	0.960	1.000	2.000	0.057
14.1000	0.5160	1.032	2.000	2.000	1.370

Chi^2 = 6.45 d.f. = 11 P-value = 0.8417

Benchmark Dose Computation

Specified effect = 0.1

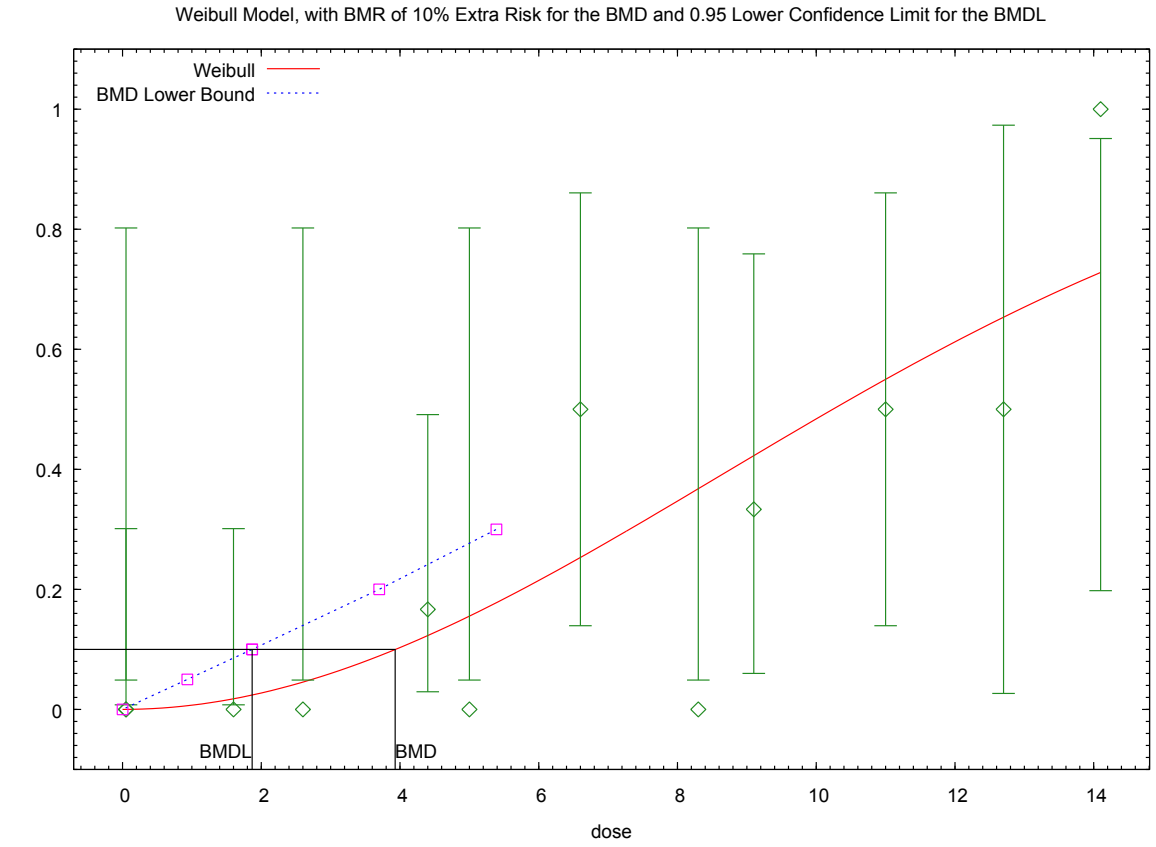
Risk Type = Extra risk

Confidence level = 0.95

BMD = 2.04716

BMDL = 1.33219

Output of Weibull model not shown.




```
 ================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_williams_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_williams_Opt.plt
                                              Wed Jun 28 09:25:29 2017
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 12
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
                          Slope =    0.0460466
                          Power =      1.24839
```

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Slope	Power
Slope	1	-0.98
Power	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	0.00708737	0.0104468	-0.0133879	0.0275626
Power	1.97194	0.674791	0.649375	3.29451

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-18.9299	12			
Fitted model	-22.2922	2	6.72465	10	0.7512
Reduced model	-32.7474	1	27.635	11	0.003681

AIC: 48.5844

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0500	0.0000	0.000	0.000	12.000	-0.015
1.6000	0.0177	0.213	0.000	12.000	-0.466
4.4000	0.1233	1.480	2.000	12.000	0.457
6.6000	0.2538	1.523	3.000	6.000	1.386
9.1000	0.4240	2.544	2.000	6.000	-0.449
11.0000	0.5515	3.309	3.000	6.000	-0.253
0.0500	0.0000	0.000	0.000	2.000	-0.006
2.6000	0.0456	0.091	0.000	2.000	-0.309
5.0000	0.1558	0.312	0.000	2.000	-0.608
8.3000	0.3688	0.738	0.000	2.000	-1.081
12.7000	0.6551	1.310	1.000	2.000	-0.461
14.1000	0.7297	1.459	2.000	2.000	0.861

Chi^2 = 5.20 d.f. = 10 P-value = 0.8775

Benchmark Dose Computation

Specified effect = 0.1

```
Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =         3.9304

            BMDL =        1.86814
```

Supplementary information for DOGSVOMIT (Hughes et al., 1999)

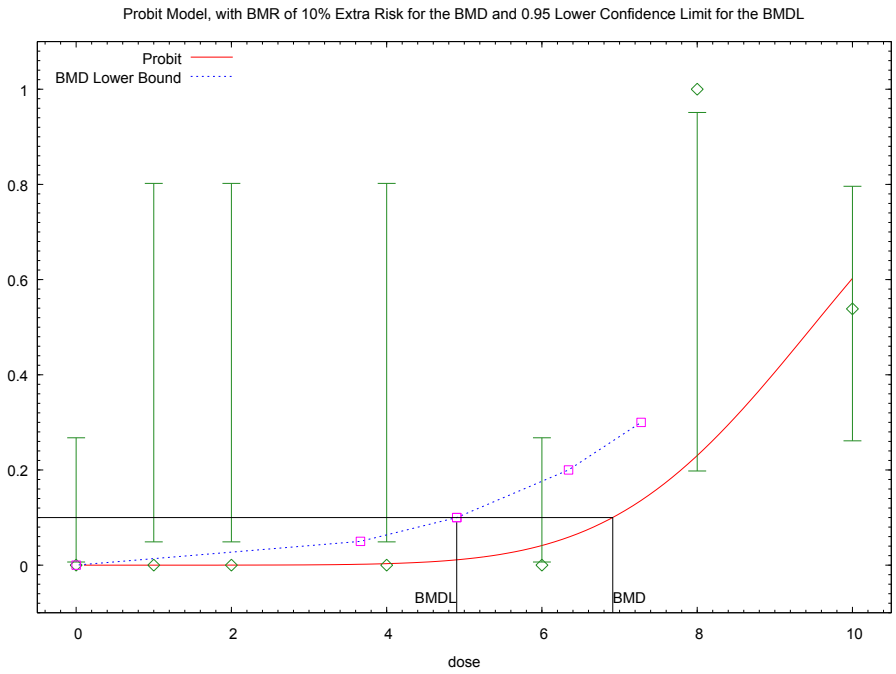
Details of the BMD Analysis of concentration-response data for vomiting in dogs of Hughes et al. (1999) reported in Appendix G, Section G.4.2.1 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

Filename: DogsVomiting Folder: HughesVomiting

Output from BMDS from 19 Oct 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

The output is ordered in the sequence used in the Table G14 shown in Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.

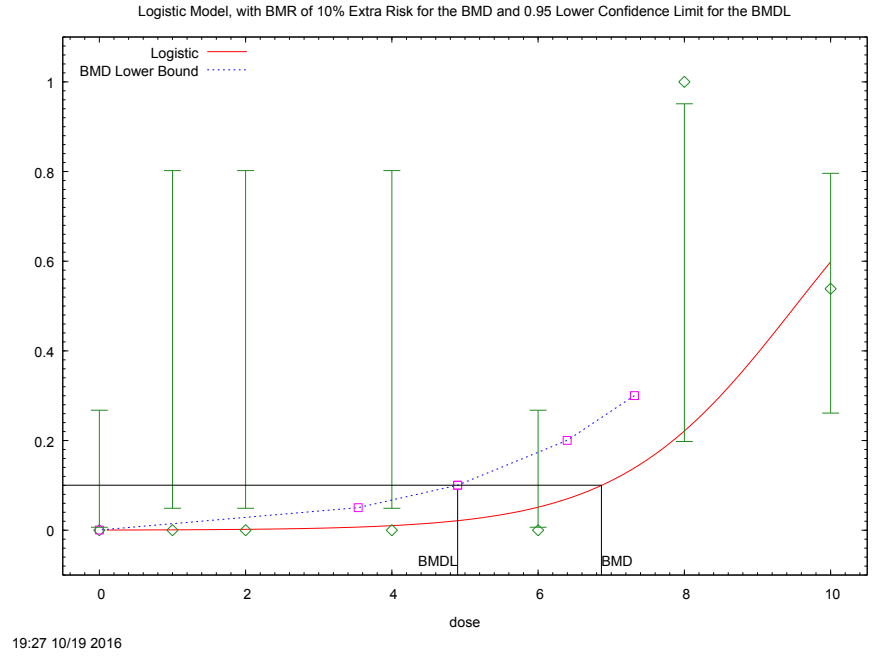
Occasionally, it was not possible to obtain graphic of the Gamma model with the notebook used for the calculation HP844op or Lenovo 3508.




```
 ========================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Hugehsdogsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Hugehsdogsvomit_Opt.plt
                                          Wed Oct 19 19:25:22 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),

   where CumNorm(.) is the cumulative normal distribution function
```

```
   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     background =            0   Specified
                      intercept =     -2.44048
                          slope =     0.212598


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1        -0.98

     slope        -0.98            1


                                Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept         -4.72924          1.59684            -7.85898           -
1.59949
          slope         0.498785         0.175706            0.154408
0.843161


                        Analysis of Deviance Table

      Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -8.97241         7
   Fitted model        -12.6161         2       7.28735      5          0.2001
  Reduced model         -23.369         1       28.7932      6         <.0001

          AIC:         29.2322


                                Goodness  of  Fit
                                                                    Scaled
    Dose      Est._Prob.     Expected     Observed      Size       Residual
  ----------------------------------------------------------------------
    0.0000      0.0000         0.000      0.000       14.000       -0.004
    1.0000      0.0000         0.000      0.000        2.000       -0.005
    2.0000      0.0001         0.000      0.000        2.000       -0.014
    4.0000      0.0031         0.006      0.000        2.000       -0.079
    6.0000      0.0412         0.577      0.000       14.000       -0.776
    8.0000      0.2300         0.460      2.000        2.000        2.588
```

```
   10.0000      0.6020          7.826      7.000       13.000        -0.468

 Chi^2 = 7.52       d.f. = 5         P-value = 0.1844


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =       Extra risk

Confidence level =            0.95

             BMD =         6.91218

            BMDL =         4.90252
```




```
 ================================================================================
         Logistic Model. (Version: 2.14; Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Hugehsdogsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Hugehsdogsvomit_Opt.plt
                                                Wed Oct 19 19:27:55 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

Default Initial Parameter Values
background = 0 Specified
intercept = -2.79186
slope = 0.313956

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.98
slope	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-7.88813	2.82024	-13.4157	-2.36055
slope	0.829423	0.304333	0.232942	1.4259

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-8.97241	7			
Fitted model	-12.8551	2	7.76543	5	0.1696
Reduced model	-23.369	1	28.7932	6	<.0001
AIC:	29.7103				

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0004	0.005	0.000	14.000	-0.072
1.0000	0.0009	0.002	0.000	2.000	-0.041
2.0000	0.0020	0.004	0.000	2.000	-0.063
4.0000	0.0102	0.020	0.000	2.000	-0.144
6.0000	0.0516	0.722	0.000	14.000	-0.873
8.0000	0.2222	0.444	2.000	2.000	2.646
10.0000	0.6002	7.802	7.000	13.000	-0.454

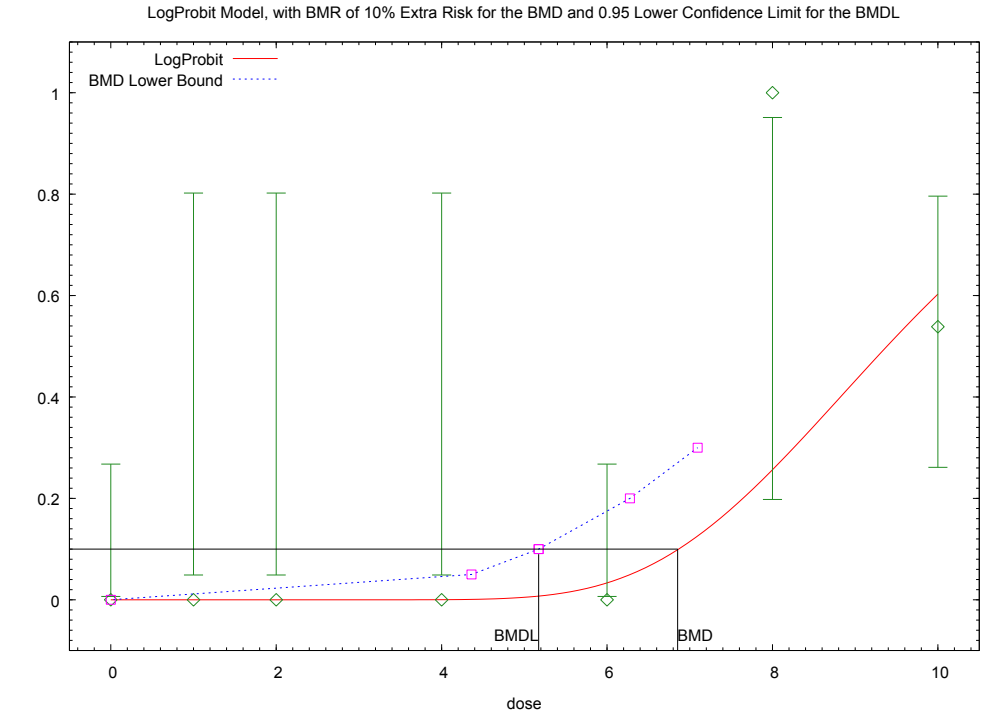
Chi^2 = 8.00 d.f. = 5 P-value = 0.1563

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

```
Confidence level =           0.95

             BMD =        6.86579

            BMDL =        4.89953
```




```
 ========================================================================
        Probit Model. (Version: 3.3;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Hugehsdogsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Hugehsdogsvomit_Opt.plt
                                          Wed Oct 19 19:29:07 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model
```

Default Initial (and Specified) Parameter Values
background = 0
intercept = -1.95857
slope = 0.635671

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-1
slope	-1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	-9.17682	3.25157	-15.5498	-2.80386
slope	4.10195	1.4833	1.19475	7.00916

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-8.97241	7			
Fitted model	-12.2795	2	6.61423	5	0.2509
Reduced model	-23.369	1	28.7932	6	<.0001

AIC: 28.5591

Goodness of Fit

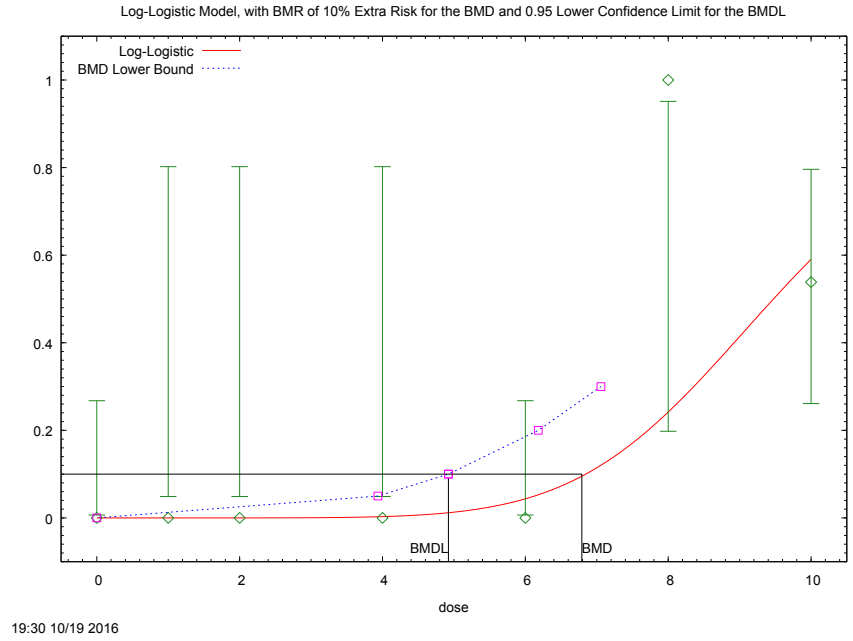
Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	14.000	0.000
1.0000	0.0000	0.000	0.000	2.000	-0.000
2.0000	0.0000	0.000	0.000	2.000	-0.000
4.0000	0.0002	0.000	0.000	2.000	-0.022
6.0000	0.0338	0.474	0.000	14.000	-0.700
8.0000	0.2588	0.518	2.000	2.000	2.393
10.0000	0.6058	7.875	7.000	13.000	-0.497

Chi^2 = 6.47 d.f. = 5 P-value = 0.2635

Benchmark Dose Computation

Specified effect = 0.1

```
Risk Type         =      Extra risk

Confidence level =           0.95

              BMD =        6.85349

             BMDL =         5.1729
```




```
 ================================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Hugehsdogsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Hugehsdogsvomit_Opt.plt
                                                  Wed Oct 19 19:30:34 2016
 ================================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                 Default Initial Parameter Values
                    background =             0
                     intercept =     -2.19376
```

slope = 0.815501

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-1
slope	-1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	-15.1551	5.82063	-26.5633	-3.74686
slope	6.76452	2.63088	1.60809	11.9209

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-8.97241	7			
Fitted model	-12.5076	2	7.07046	5	0.2155
Reduced model	-23.369	1	28.7932	6	<.0001

AIC: 29.0153

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	14.000	0.000
1.0000	0.0000	0.000	0.000	2.000	-0.001
2.0000	0.0000	0.000	0.000	2.000	-0.008
4.0000	0.0031	0.006	0.000	2.000	-0.079
6.0000	0.0459	0.642	0.000	14.000	-0.821
8.0000	0.2519	0.504	2.000	2.000	2.437
10.0000	0.6037	7.848	7.000	13.000	-0.481

Chi^2 = 6.85 d.f. = 5 P-value = 0.2319

Benchmark Dose Computation

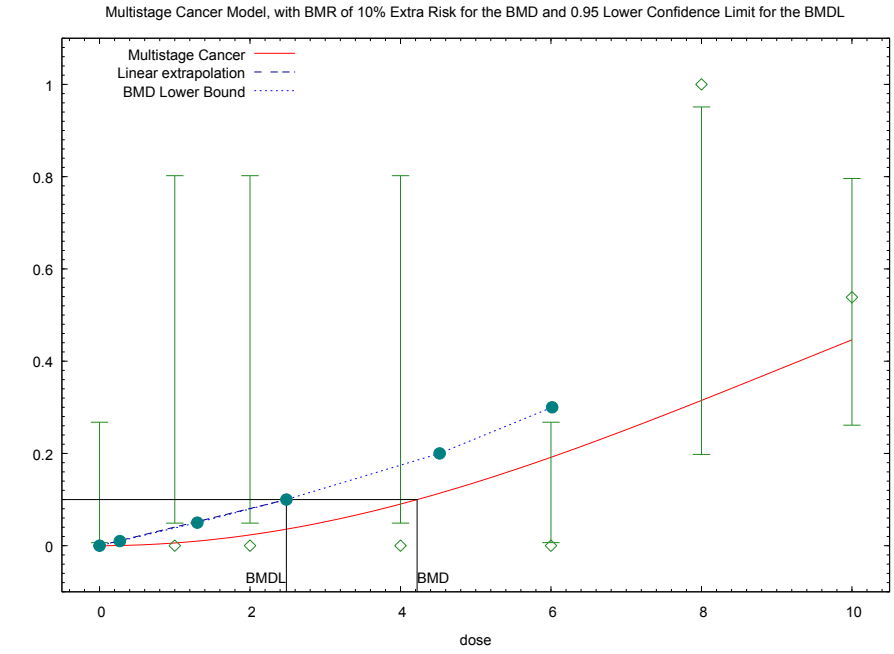
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

```
              BMD =         6.79077

             BMDL =         4.92267
```




```
 ================================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Hugehsdogsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Hugehsdogsvomit_Opt.plt
                                                Wed Oct 19 19:32:07 2016
 ================================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 7
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008
```

Default Initial Parameter Values
Background = 0
Beta(1) = 4.26621e+018
Beta(2) = 0

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background -Beta(1)
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Beta(2)
Beta(2)	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Beta(1)	0	NA		
Beta(2)	0.00591458	0.00199656	0.0020014	0.00982776

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-8.97241	7			
Fitted model	-14.7321	1	11.5194	6	0.07359
Reduced model	-23.369	1	28.7932	6	<.0001

AIC: 31.4643

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	14.000	-0.000
1.0000	0.0059	0.012	0.000	2.000	-0.109
2.0000	0.0234	0.047	0.000	2.000	-0.219
4.0000	0.0903	0.181	0.000	2.000	-0.446
6.0000	0.1918	2.685	0.000	14.000	-1.823
8.0000	0.3151	0.630	2.000	2.000	2.085
10.0000	0.4465	5.804	7.000	13.000	0.667

Chi^2 = 8.37 d.f. = 6 P-value = 0.2121

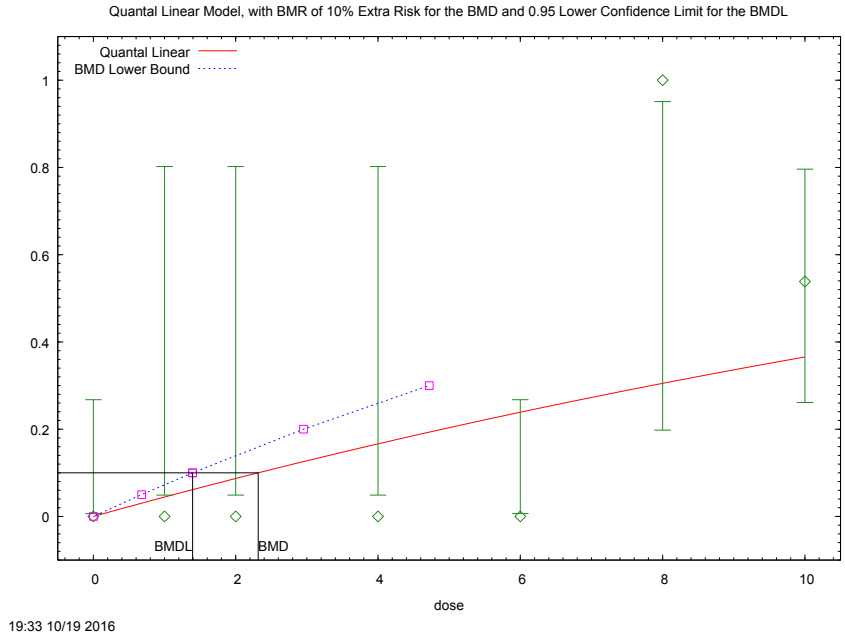
Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

```
              BMD =        4.22063

             BMDL =        2.48314

             BMDU =        5.72306

Taken together, (2.48314, 5.72306) is a 90     % two-sided confidence
interval for the BMD

Cancer Slope Factor =     0.0402716
```




```
 ================================================================
        Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Hugehsdogsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Hugehsdogsvomit_Opt.plt
                                          Wed Oct 19 19:33:30 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

Default Initial (and Specified) Parameter Values
Background = 0.0625
Slope = 0.0697602
Power = 1 Specified

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background -Power
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Slope
Slope	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	0.045484	0.0152818	0.0155322	0.0754358

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-8.97241	7			
Fitted model	-16.6076	1	15.2704	6	0.01825
Reduced model	-23.369	1	28.7932	6	<.0001

AIC: 35.2152

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	14.000	0.000
1.0000	0.0445	0.089	0.000	2.000	-0.305
2.0000	0.0870	0.174	0.000	2.000	-0.436
4.0000	0.1663	0.333	0.000	2.000	-0.632
6.0000	0.2388	3.344	0.000	14.000	-2.096
8.0000	0.3050	0.610	2.000	2.000	2.135
10.0000	0.3655	4.751	7.000	13.000	1.295

Chi^2 = 11.31 d.f. = 6 P-value = 0.0792

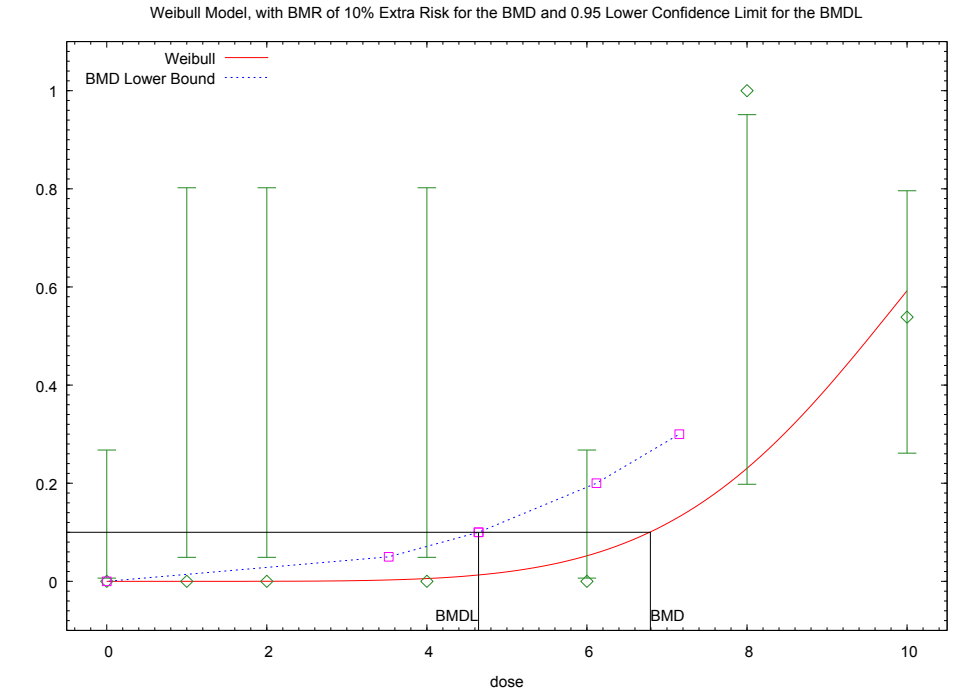
Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

```
              BMD =         2.31643

             BMDL =         1.39429
```




```
 ================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Hugehsdogsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Hugehsdogsvomit_Opt.plt
                                          Wed Oct 19 19:34:50 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =       0.0625
                          Slope =   0.00453905
                          Power =      2.18664
```

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Slope	Power
Slope	1	-1
Power	-1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	2.70866e-006	1.3905e-005	-2.45447e-005	2.9962e-005
Power	5.51646	2.27585	1.05589	9.97704

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-8.97241	7			
Fitted model	-12.7463	2	7.54776	5	0.183
Reduced model	-23.369	1	28.7932	6	<.0001

AIC: 29.4926

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	14.000	0.000
1.0000	0.0000	0.000	0.000	2.000	-0.002
2.0000	0.0001	0.000	0.000	2.000	-0.016
4.0000	0.0057	0.011	0.000	2.000	-0.107
6.0000	0.0517	0.724	0.000	14.000	-0.874
8.0000	0.2288	0.458	2.000	2.000	2.597
10.0000	0.5892	7.660	7.000	13.000	-0.372

Chi^2 = 7.66 d.f. = 5 P-value = 0.1763

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 6.79268

```
            BMDL =       4.64587
```

Gamma dogs

```
 ================================================================
        Gamma Model. (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/gam_Hugehsdogsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/gam_Hugehsdogsvomit_Opt.plt
                                          Thu Oct 27 11:29:08 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response]= background+(1-background)*CumGamma[slope*dose,power],
   where CumGamma(.) is the cummulative Gamma distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 7
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =       0.0625
                          Slope =    0.0710638
                          Power =          1.3


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Power
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                  Slope

     Slope            1


                                Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
          Slope          1.87644         0.13099              1.6197
2.13317
```

```
          Power                18                NA

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -8.97241         7
   Fitted model         -12.388         1       6.83117      6          0.3367
  Reduced model         -23.369         1       28.7932      6          <.0001

           AIC:          26.776


                                  Goodness  of  Fit
                                                                        Scaled
    Dose      Est._Prob.     Expected     Observed      Size          Residual
  ----------------------------------------------------------------------------
    0.0000      0.0000          0.000      0.000       14.000          0.000
    1.0000      0.0000          0.000      0.000        2.000         -0.000
    2.0000      0.0000          0.000      0.000        2.000         -0.000
    4.0000      0.0008          0.002      0.000        2.000         -0.040
    6.0000      0.0388          0.543      0.000       14.000         -0.751
    8.0000      0.2521          0.504      2.000        2.000          2.436
   10.0000      0.6011          7.814      7.000       13.000         -0.461

 Chi^2 = 6.71      d.f. = 6        P-value = 0.3484


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        6.83297

            BMDL =       5.05101
```

Supplementary information for CATSVOMIT (Hughes et al., 1999)

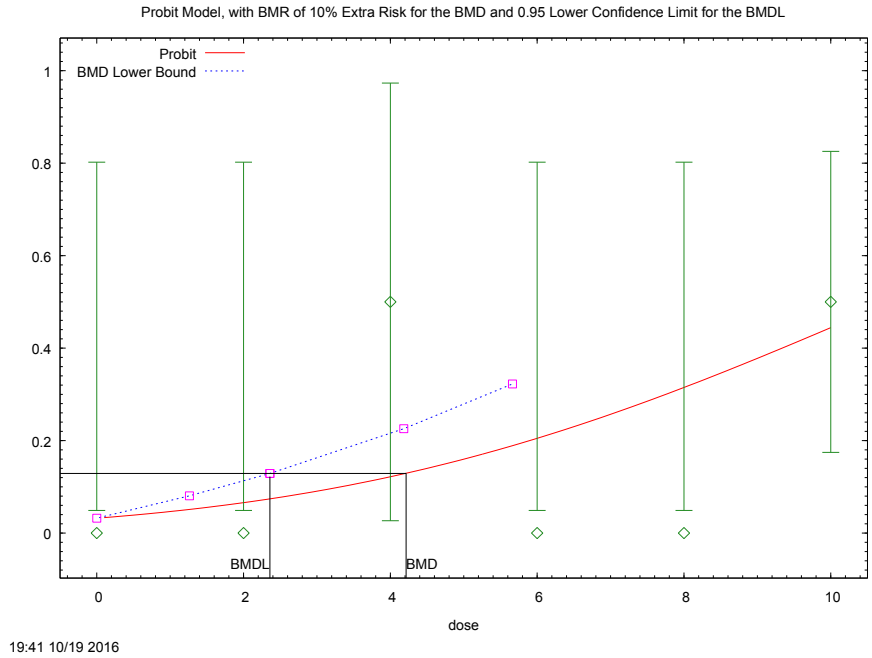
Details of the BMD Analysis of concentration-response data for vomiting in dogs of Hughes et al. (1999) reported in Appendix G, Section G.4.2.2 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed

Filename: CatsVomiting Folder: HughesVomiting

Output from BMDS from19 Oct 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

The output is ordered in the sequence used in the Table G15 shown in Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.

Occasionally, it was not possible to obtain graphic of the Gamma model with the notebook used for the calculation HP844op or Lenovo 3508.




```
 ========================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Hugehscatsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Hugehscatsvomit_Opt.plt
                                              Wed Oct 19 19:41:07 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
```

Slope parameter is not restricted

Total number of observations = 6
Total number of records with missing values = 0
Maximum number of iterations = 500
Relative Function Convergence has been set to: 1e-008
Parameter Convergence has been set to: 1e-008

Default Initial (and Specified) Parameter Values
background = 0 Specified
intercept = -1.49287
slope = 0.12796

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.94
slope	-0.94	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-1.85036	0.962378	-3.73659	0.0358636
slope	0.17058	0.114444	-0.053725	0.394886

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-6.93147	6			
Fitted model	-9.2468	2	4.63066	4	0.3273
Reduced model	-10.6352	1	7.40738	5	0.1921

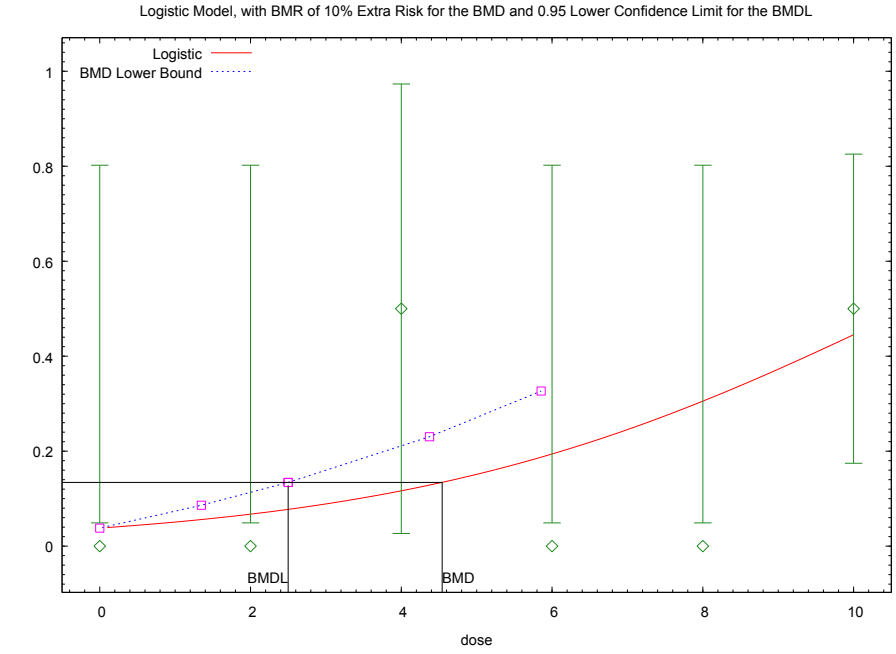
AIC: 22.4936

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0321	0.064	0.000	2.000	-0.258
2.0000	0.0656	0.131	0.000	2.000	-0.375
4.0000	0.1214	0.243	1.000	2.000	1.639
6.0000	0.2042	0.408	0.000	2.000	-0.716
8.0000	0.3136	0.627	0.000	2.000	-0.956
10.0000	0.4425	3.540	4.000	8.000	0.327

Chi^2 = 4.43 d.f. = 4 P-value = 0.3511

```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        4.21409

            BMDL =        2.35852
```




```
 ================================================================================
         Logistic Model. (Version: 2.14; Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Hugehscatsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Hugehscatsvomit_Opt.plt
                                              Wed Oct 19 19:42:20 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 6
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

Default Initial Parameter Values
background = 0 Specified
intercept = -1.5328
slope = 0.0919679

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.95
slope	-0.95	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-3.23272	1.90545	-6.96734	0.501899
slope	0.301159	0.217233	-0.124611	0.726928

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-6.93147	6			
Fitted model	-9.24436	2	4.62577	4	0.3279
Reduced model	-10.6352	1	7.40738	5	0.1921

AIC: 22.4887

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0380	0.076	0.000	2.000	-0.281
2.0000	0.0672	0.134	0.000	2.000	-0.380
4.0000	0.1163	0.233	1.000	2.000	1.693
6.0000	0.1938	0.388	0.000	2.000	-0.693
8.0000	0.3050	0.610	0.000	2.000	-0.937
10.0000	0.4449	3.560	4.000	8.000	0.313

Chi^2 = 4.55 d.f. = 4 P-value = 0.3372

Benchmark Dose Computation

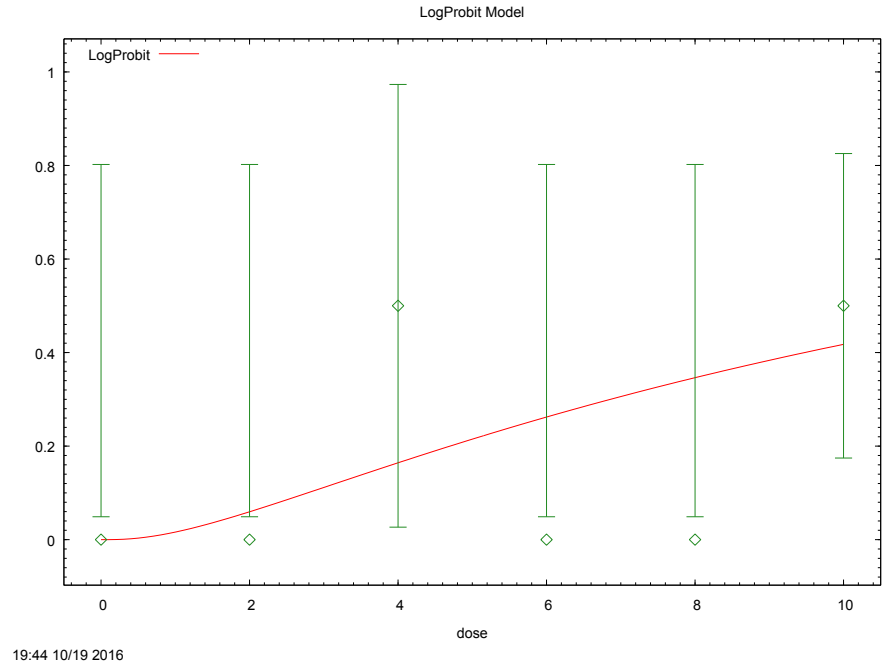
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 4.54256

```
            BMDL =         2.49929
```




```
 ================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Hugehscatsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Hugehscatsvomit_Opt.plt
                                              Wed Oct 19 19:44:39 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 6
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                 Default Initial (and Specified) Parameter Values
                    background =            0
                     intercept =     -1.21474
                         slope =      0.44955
```

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.98
slope	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	-2.1403	1.59369	-5.26388	0.983281
slope	0.839456	0.772106	-0.673844	2.35276

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-6.93147	6			
Fitted model	-9.22197	2	4.581	4	0.3331
Reduced model	-10.6352	1	7.40738	5	0.1921

AIC: 22.4439

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	2.000	0.000
2.0000	0.0596	0.119	0.000	2.000	-0.356
4.0000	0.1644	0.329	1.000	2.000	1.281
6.0000	0.2623	0.525	0.000	2.000	-0.843
8.0000	0.3465	0.693	0.000	2.000	-1.030
10.0000	0.4179	3.343	4.000	8.000	0.471

Chi^2 = 3.76 d.f. = 4 P-value = 0.4394

Benchmark Dose Computation

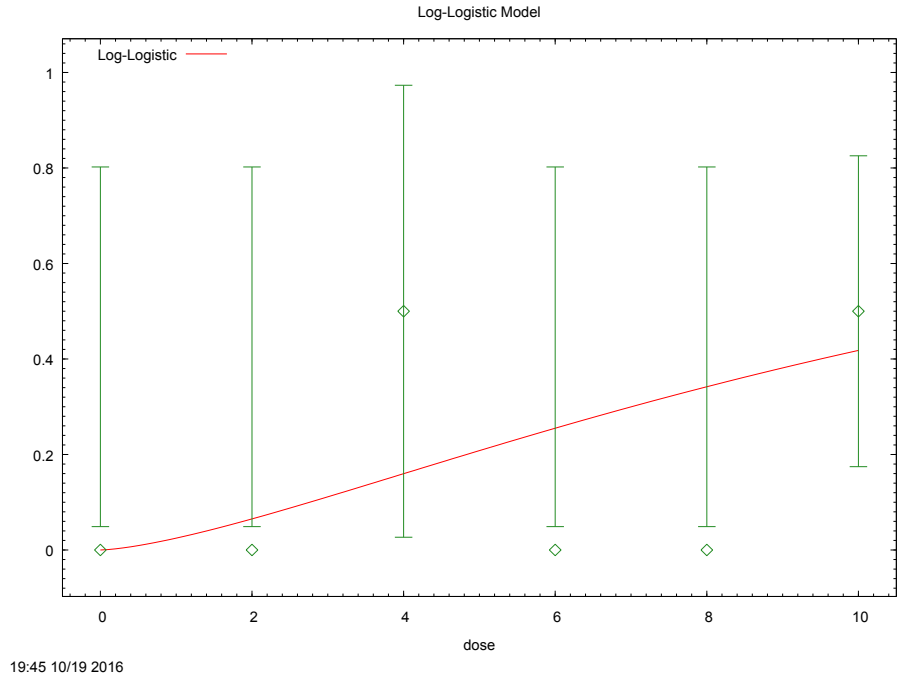
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 2.78147

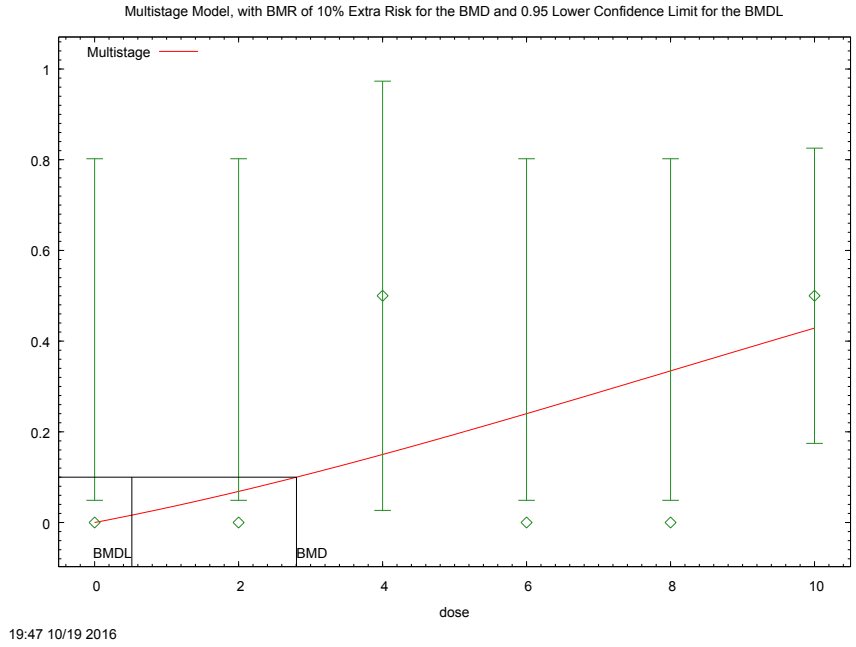
```
          Benchmark dose computation failed.  Lower limit
```




```
 ================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Hugehscatsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Hugehscatsvomit_Opt.plt
                                          Wed Oct 19 19:45:46 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 6
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                 Default Initial Parameter Values
                    background =           0
```

```
                    intercept =     -1.60304
                        slope =     0.386137


          Asymptotic Correlation Matrix of Parameter Estimates

          ( *** The model parameter(s)  -background
                have been estimated at a boundary point, or have been specified by
the user,
                and do not appear in the correlation matrix )

              intercept        slope

 intercept            1        -0.98

     slope        -0.98            1


                                Parameter Estimates

                                                                    95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     background                0              NA
      intercept         -3.67491          3.0079            -9.57029
2.22047
          slope          1.45434         1.42744            -1.34338
4.25207

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                      Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model        -6.93147         6
   Fitted model        -9.22265         2       4.58236      4          0.3329
  Reduced model        -10.6352         1       7.40738      5          0.1921

           AIC:         22.4453


                                Goodness  of  Fit
                                                                      Scaled
    Dose      Est._Prob.    Expected    Observed     Size        Residual
  ----------------------------------------------------------------------
    0.0000     0.0000         0.000     0.000       2.000         0.000
    2.0000     0.0650         0.130     0.000       2.000        -0.373
    4.0000     0.1599         0.320     1.000       2.000         1.312
    6.0000     0.2556         0.511     0.000       2.000        -0.829
    8.0000     0.3428         0.686     0.000       2.000        -1.021
   10.0000     0.4192         3.353     4.000       8.000         0.463

 Chi^2 = 3.81      d.f. = 4        P-value = 0.4330

 BMDL curve computation failed for BMR = 0.050000 .
 The BMDL curve appearing in the graph may not be accurate.
 BMDL curve computation failed for BMR = 0.100000 .
 The BMDL curve appearing in the graph may not be accurate.
 BMDL curve computation failed for BMR = 0.200000 .
 The BMDL curve appearing in the graph may not be accurate.
 BMDL curve computation failed for BMR = 0.300000 .
 The BMDL curve appearing in the graph may not be accurate.
```

```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        2.76226
```

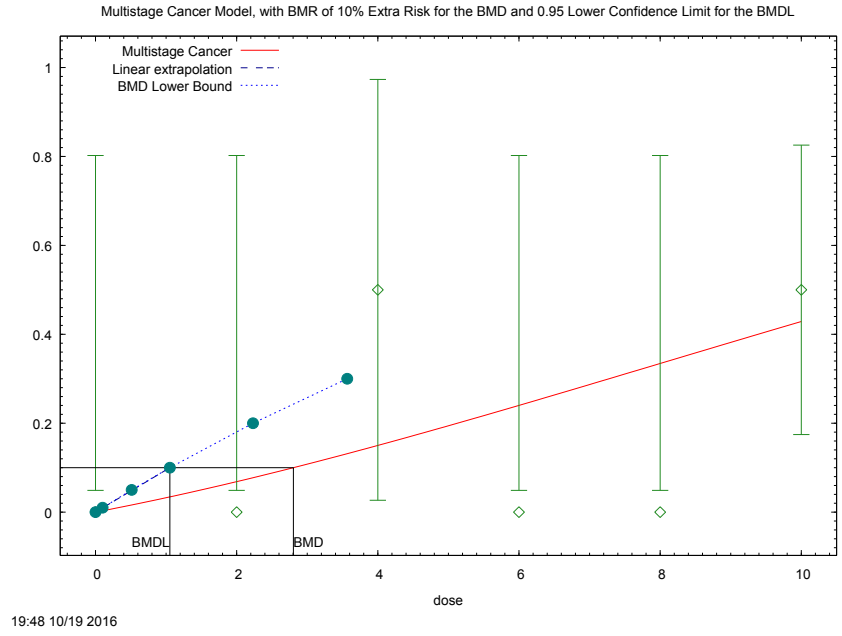



```
          Benchmark dose computation failed.  Lower li
```

```
 =================================================================
        Multistage Model. (Version: 3.4;  Date: 05/02/2014)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Hugehscatsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Hugehscatsvomit_Opt.plt
                                          Wed Oct 19 19:47:07 2016
 =================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are not restricted


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 6
 Total number of records with missing values = 0
 Total number of parameters in model = 3
```

```
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     Background =    0.0715751
                        Beta(1) =   0.00866434
                        Beta(2) =   0.00309441


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(1)      Beta(2)

   Beta(1)            1        -0.94

   Beta(2)        -0.94            1


                                Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)        0.0304085       0.0703757          -0.107525
0.168342
        Beta(2)        0.0025553      0.00826301         -0.0136399
0.0187505

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

      Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
    Full model        -6.93147         6
   Fitted model       -9.19187         2        4.5208      4          0.3401
  Reduced model       -10.6352         1       7.40738      5          0.1921

           AIC:         22.3837


                               Goodness  of  Fit
                                                                    Scaled
    Dose      Est._Prob.    Expected    Observed     Size        Residual
  ---------------------------------------------------------------------------
    0.0000     0.0000         0.000     0.000       2.000         0.000
    2.0000     0.0686         0.137     0.000       2.000        -0.384
    4.0000     0.1500         0.300     1.000       2.000         1.386
    6.0000     0.2400         0.480     0.000       2.000        -0.795
    8.0000     0.3342         0.668     0.000       2.000        -1.002
```

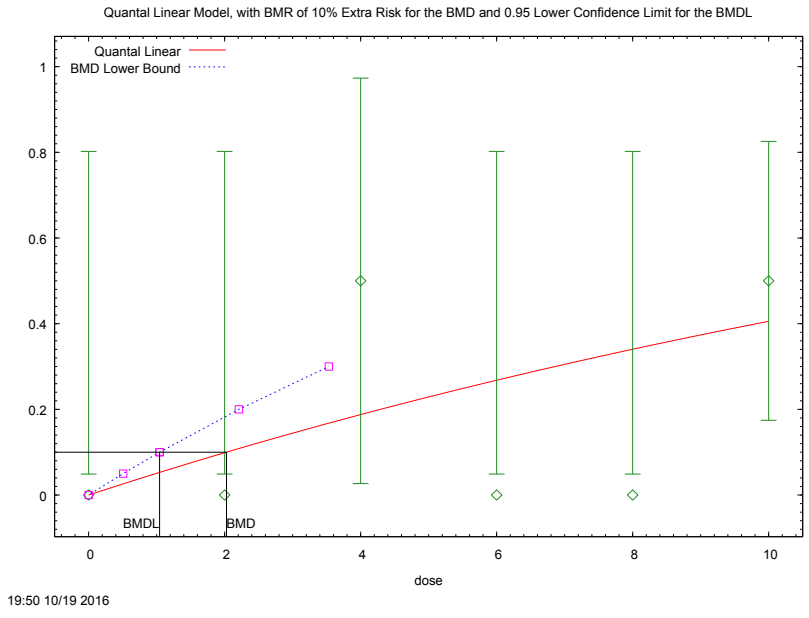
```
   10.0000      0.4286          3.429      4.000        8.000         0.408

 Chi^2 = 3.87       d.f. = 4         P-value = 0.4237


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        2.80409

            BMDL =       0.517005


BMDU did not converge for BMR = 0.100000
BMDU calculation failed
            BMDU =        2.80409
```




```
 ========================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Hugehscatsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Hugehscatsvomit_Opt.plt
                                          Wed Oct 19 19:48:54 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = Dose
```

```
Total number of observations = 6
Total number of records with missing values = 0
Total number of parameters in model = 3
Total number of specified parameters = 0
Degree of polynomial = 2


Maximum number of iterations = 500
Relative Function Convergence has been set to: 1e-008
Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     Background =    0.0715751
                        Beta(1) =   0.00866434
                        Beta(2) =   0.00309441


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(1)      Beta(2)

   Beta(1)            1        -0.94

   Beta(2)        -0.94            1


                               Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)        0.0304085       0.0703757          -0.107525
0.168342
        Beta(2)        0.0025553       0.00826301         -0.0136399
0.0187505

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -6.93147         6
   Fitted model        -9.19187         2        4.5208      4          0.3401
  Reduced model        -10.6352         1       7.40738      5          0.1921

           AIC:         22.3837


                               Goodness  of  Fit
                                                                    Scaled
     Dose      Est._Prob.    Expected    Observed     Size        Residual
  ---------------------------------------------------------------------------
    0.0000     0.0000         0.000     0.000       2.000        0.000
```

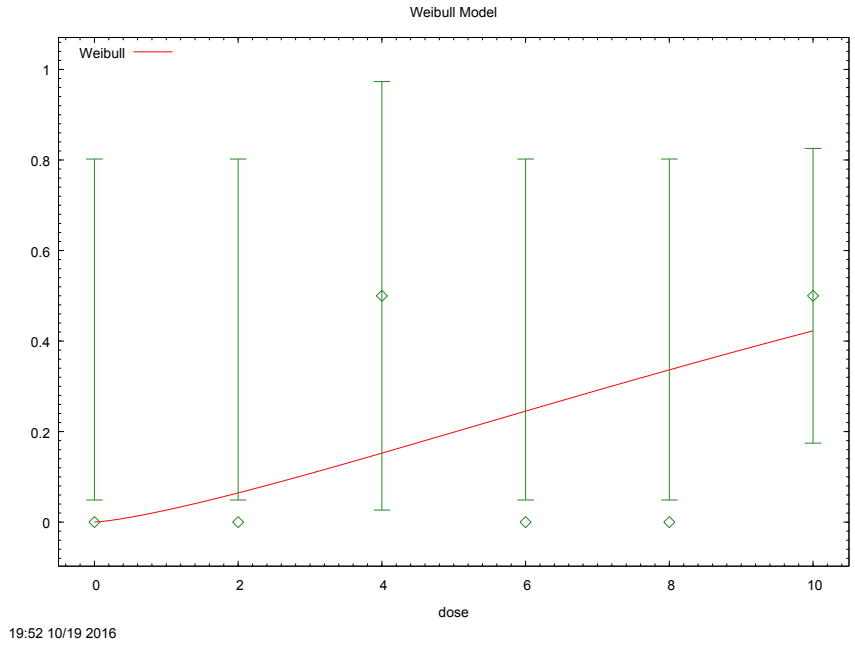
```
    2.0000      0.0686          0.137      0.000        2.000        -0.384
    4.0000      0.1500          0.300      1.000        2.000         1.386
    6.0000      0.2400          0.480      0.000        2.000        -0.795
    8.0000      0.3342          0.668      0.000        2.000        -1.002
   10.0000      0.4286          3.429      4.000        8.000         0.408

 Chi^2 = 3.87       d.f. = 4         P-value = 0.4237


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        2.80409

            BMDL =        1.05353

            BMDU =        44.3164

Taken together, (1.05353, 44.3164) is a 90      % two-sided confidence
interval for the BMD

Cancer Slope Factor =     0.0949188
```




```
 ========================================================================
         Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Hugehscatsvomit_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Hugehscatsvomit_Opt.plt
                                          Wed Oct 19 19:50:25 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]
```

```
   Dependent variable = Effect
   Independent variable = Dose

   Total number of observations = 6
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =         0.25
                          Slope =    0.0405465
                          Power =            1   Specified


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Power
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                  Slope

     Slope            1


                               Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
          Slope        0.0519717       0.0234603          0.00599037
0.0979531

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -6.93147         6
   Fitted model        -9.23515         1       4.60737      5          0.4656
  Reduced model        -10.6352         1       7.40738      5          0.1921

           AIC:         20.4703


                                  Goodness  of  Fit
                                                                      Scaled
     Dose      Est._Prob.    Expected    Observed     Size        Residual
  ----------------------------------------------------------------------
    0.0000      0.0000         0.000      0.000       2.000        0.000
    2.0000      0.0987         0.197      0.000       2.000       -0.468
    4.0000      0.1877         0.375      1.000       2.000        1.131
    6.0000      0.2679         0.536      0.000       2.000       -0.855
    8.0000      0.3402         0.680      0.000       2.000       -1.015
   10.0000      0.4053         3.242      4.000       8.000        0.546

 Chi^2 = 3.56      d.f. = 5        P-value = 0.6145
```

```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =        2.02727

            BMDL =        1.04345
```




```
 ================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Hugehscatsvomit_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Hugehscatsvomit_Opt.plt
                                          Wed Oct 19 19:52:16 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 6
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

Default Initial (and Specified) Parameter Values
Background = 0.25
Slope = 0.0879223
Power = 0.663855

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Slope	Power
Slope	1	-0.99
Power	-0.99	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	0.0269398	0.0764128	-0.122827	0.176706
Power	1.31346	1.32341	-1.28037	3.9073

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-6.93147	6			
Fitted model	-9.20446	2	4.54598	4	0.3371
Reduced model	-10.6352	1	7.40738	5	0.1921

AIC: 22.4089

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	2.000	0.000
2.0000	0.0648	0.130	0.000	2.000	-0.372
4.0000	0.1533	0.307	1.000	2.000	1.361
6.0000	0.2468	0.494	0.000	2.000	-0.810
8.0000	0.3387	0.677	0.000	2.000	-1.012
10.0000	0.4256	3.405	4.000	8.000	0.426

Chi^2 = 3.85 d.f. = 4 P-value = 0.4265

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

```
   BMD =        2.82444

Benchmark dose computation failed.  Lower limit i
```

Supplementary information for WUDON (Wu et al., 2013a)

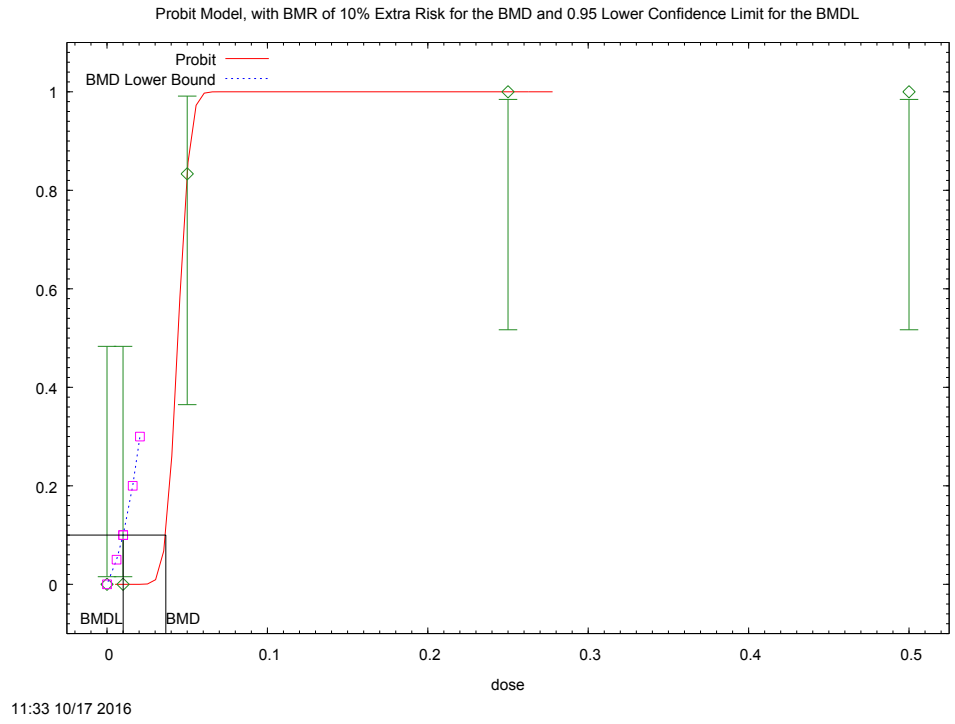
Details of the BMD Analysis of concentration-response data for vomiting in mink of Wu et al. (2013) reported in Appendix G, Section G.4.3.1 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed - for DON

Filename:WuDON Folder: Mink

Output from BMDS from19 Oct 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

The output is ordered in the sequence used in the Table G16 shown in Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.

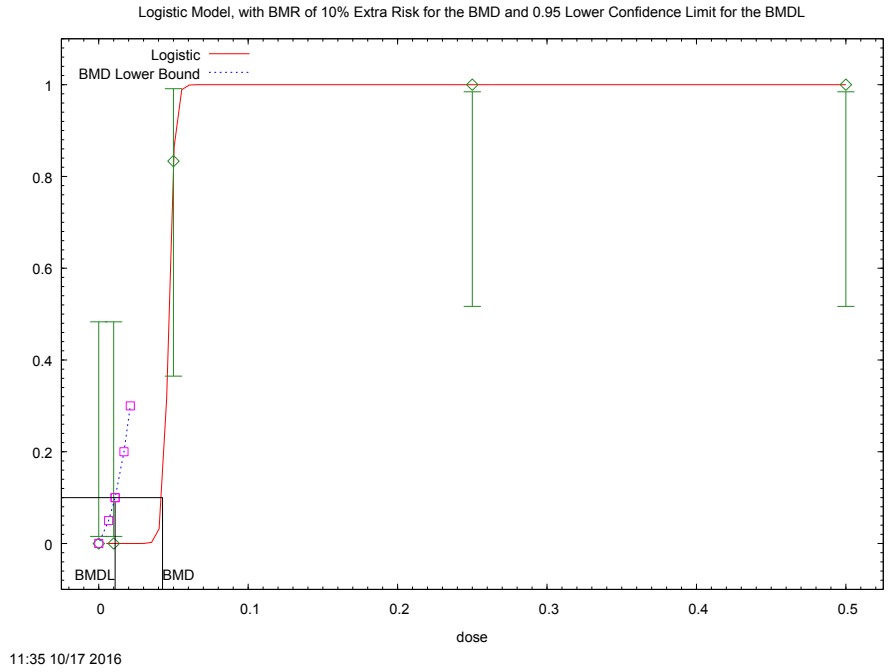
Gamma model not shown below.




```
 ================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Wu2013DONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Wu2013DONb_Opt.plt
                                          Mon Oct 17 11:33:07 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),

   where CumNorm(.) is the cumulative normal distribution function
```

```
   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     background =            0   Specified
                      intercept =    -0.977134
                          slope =      6.74251


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1           -1

     slope           -1            1


                                Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept         -7.46646          8633.95            -16929.7
16914.8
          slope          168.677           172679             -338276
338613


                        Analysis of Deviance Table

      Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -2.70337         5
   Fitted model        -2.70337         2  4.52377e-008      3             1
  Reduced model         -20.527         1       35.6472      4        <.0001

           AIC:         9.40673


                                Goodness  of  Fit
                                                                    Scaled
     Dose      Est._Prob.    Expected    Observed     Size       Residual
  ----------------------------------------------------------------------
    0.0000      0.0000         0.000      0.000       6.000       -0.000
    0.0100      0.0000         0.000      0.000       6.000       -0.000
    0.0500      0.8333         5.000      5.000       6.000        0.000
    0.2500      1.0000         6.000      6.000       6.000        0.000
    0.5000      1.0000         6.000      6.000       6.000        0.000
```

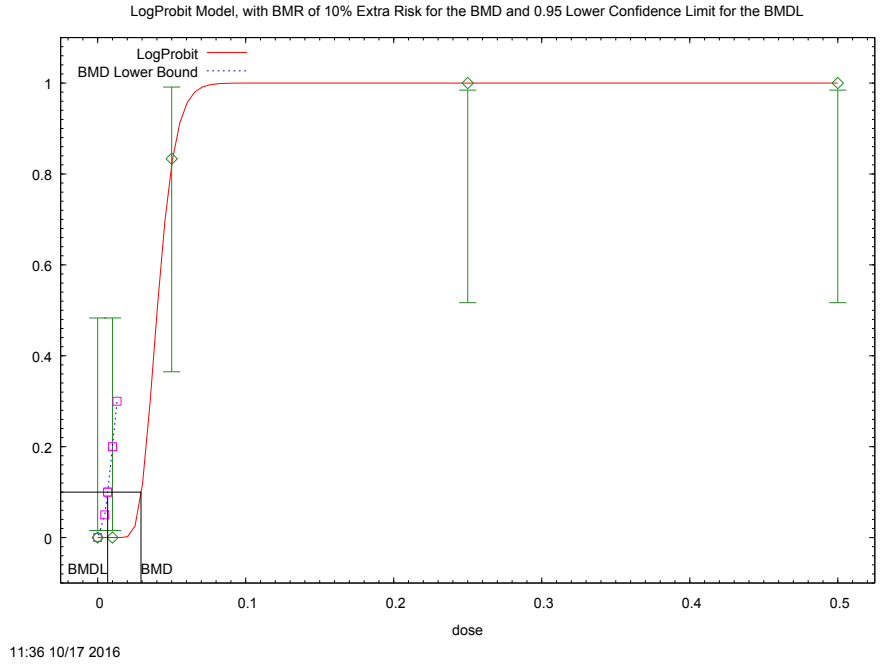
```
 Chi^2 = 0.00       d.f. = 3        P-value = 1.0000

   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =      0.0366671

            BMDL =      0.0100819
```




```
 ================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Wu2013DONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Wu2013DONb_Opt.plt
                                          Mon Oct 17 11:35:22 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
```

```
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     background =            0   Specified
                      intercept =     -1.28415
                          slope =      9.53091


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept      NA             NA

     slope      NA             NA


NA - This parameter's variance has been estimated as zero or less.
THE MODEL HAS PROBABLY NOT CONVERGED!!!


                                Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept         -24.4798              NA                   NA
NA
          slope          521.784              NA                   NA
NA

At least some variance estimates are negative.
THIS USUALLY MEANS THE MODEL HAS NOT CONVERGED!
Try again from another starting point.


                        Analysis of Deviance Table

      Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -2.70337         5
   Fitted model        -2.70337         2  5.29225e-008      3            1
  Reduced model         -20.527         1       35.6472      4       <.0001

           AIC:         9.40673


                               Goodness  of  Fit
                                                                    Scaled
    Dose      Est._Prob.     Expected     Observed      Size       Residual
  ------------------------------------------------------------------------
    0.0000      0.0000         0.000       0.000       6.000       -0.000
    0.0100      0.0000         0.000       0.000       6.000       -0.000
    0.0500      0.8333         5.000       5.000       6.000       -0.000
    0.2500      1.0000         6.000       6.000       6.000        0.000
    0.5000      1.0000         6.000       6.000       6.000        0.000
```

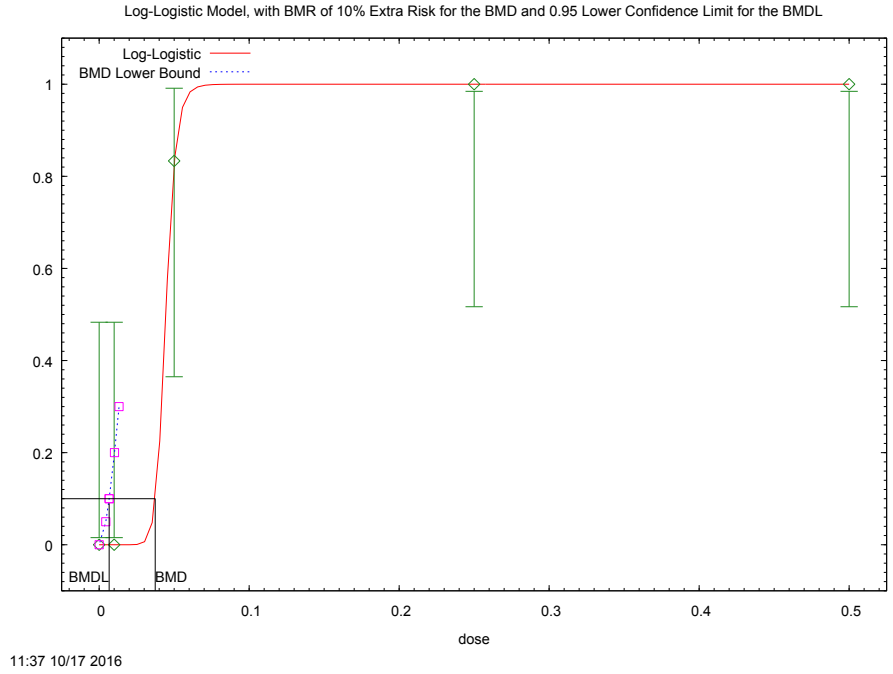
```
 Chi^2 = 0.00      d.f. = 3        P-value = 1.0000

   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =      0.0427045

            BMDL =      0.0109621
```




```
 ========================================================================
        Probit Model. (Version: 3.3;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Wu2013DONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Wu2013DONb_Opt.plt
                                          Mon Oct 17 11:36:24 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
```

```
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


   User has chosen the log transformed model


                 Default Initial (and Specified) Parameter Values
                    background =            0
                     intercept =      2.37622
                         slope =     0.730575


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1            1

     slope            1            1


                                Parameter Estimates

                                                                    95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     background                0               NA
      intercept          13.5474          2149.54            -4199.47
4226.56
          slope          4.19931          717.533            -1402.14
1410.54

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model         -2.70337          5
   Fitted model         -2.70337          2  4.23246e-008      3           1
  Reduced model          -20.527          1       35.6472      4      <.0001

           AIC:          9.40673


                                Goodness  of  Fit
                                                                      Scaled
     Dose      Est._Prob.    Expected    Observed     Size         Residual
  ----------------------------------------------------------------------
    0.0000      0.0000          0.000       0.000       6.000        0.000
    0.0100      0.0000          0.000       0.000       6.000       -0.000
    0.0500      0.8333          5.000       5.000       6.000        0.000
    0.2500      1.0000          6.000       6.000       6.000        0.000
    0.5000      1.0000          6.000       6.000       6.000        0.000
```

```
 Chi^2 = 0.00       d.f. = 3        P-value = 1.0000

   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =      0.0292672

            BMDL =     0.00672434
```




```
 ================================================================================
         Logistic Model. (Version: 2.14; Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Wu2013DONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Wu2013DONb_Opt.plt
                                                  Mon Oct 17 11:37:52 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

User has chosen the log transformed model

Default Initial Parameter Values
background = 0
intercept = 4.15144
slope = 1.28419

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	NA	NA
slope	NA	NA

NA - This parameter's variance has been estimated as zero or less.
THE MODEL HAS PROBABLY NOT CONVERGED!!!

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	40.8212	NA	NA	NA
slope	13.0892	NA	NA	NA

At least some variance estimates are negative.
THIS USUALLY MEANS THE MODEL HAS NOT CONVERGED!
Try again from another starting point.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-2.70337	2	4.56654e-008	3	1
Reduced model	-20.527	1	35.6472	4	<.0001

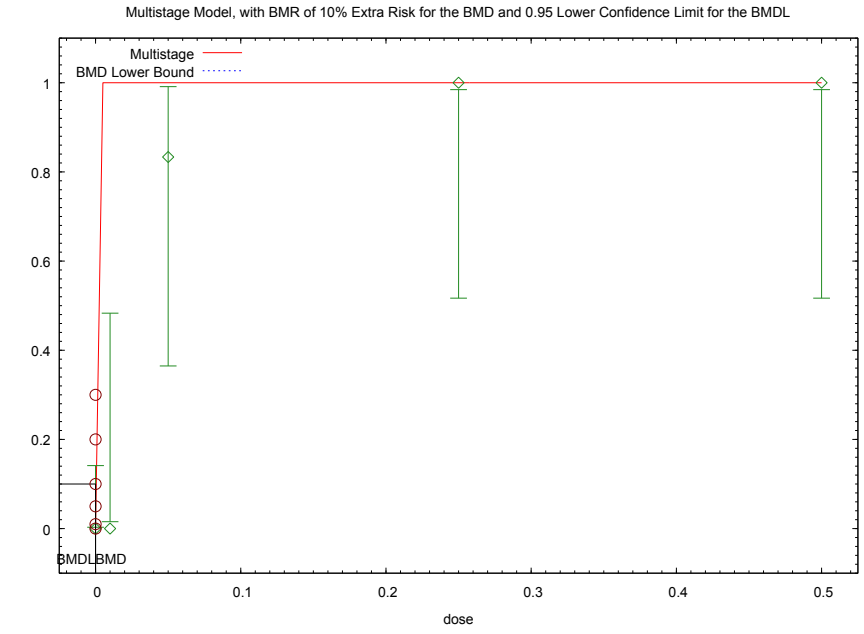
AIC: 9.40673

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.0000	0.000	0.000	6.000	-0.000
0.0500	0.8333	5.000	5.000	6.000	0.000
0.2500	1.0000	6.000	6.000	6.000	0.000
0.5000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 0.00 d.f. = 3 P-value = 1.0000

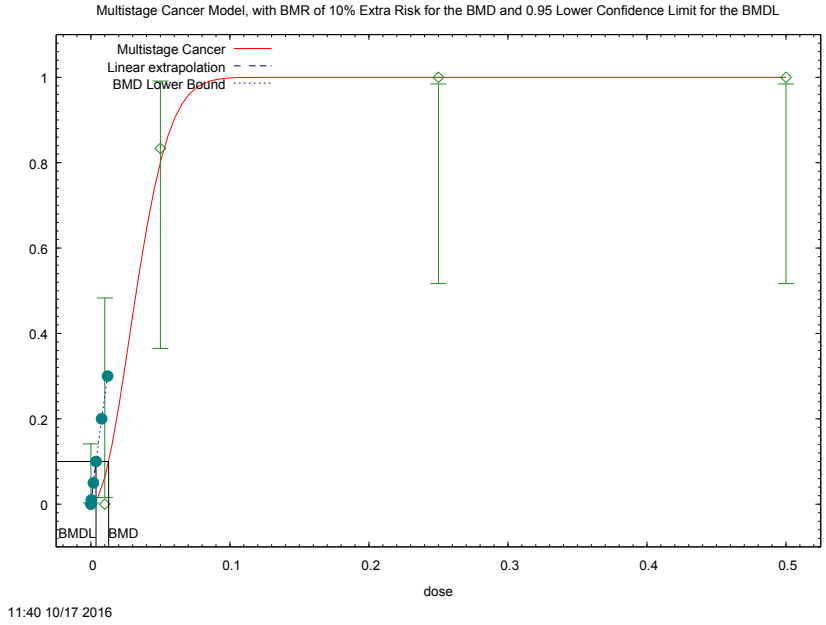
```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =      0.0373825

            BMDL =     0.00667249
```




```
 ========================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Wu2013DON_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Wu2013DON_Opt.plt
                                          Mon Oct 17 11:39:12 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are not restricted


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 5
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2
```

```
 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     Background =            0
                        Beta(1) = 6.04798e+020
                        Beta(2) = -7.64845e+020


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(1)      Beta(2)

   Beta(1)            1            0

   Beta(2)            0            1


                                Parameter Estimates

                                                        95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)     6.04985e+020               1        6.04985e+020
6.04985e+020
        Beta(2)     -7.6491e+020               1        -7.6491e+020        -
7.6491e+020

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model        -2.70337         5
   Fitted model           -4970         2       9934.59      3                    0
  Reduced model        -33.6365         1       61.8664      4          <.0001

           AIC:            9944


                                Goodness  of  Fit
                                                                      Scaled
     Dose      Est._Prob.    Expected    Observed     Size        Residual
  ---------------------------------------------------------------------------
    0.0000      0.0000          0.000      0.000      30.000        -0.008
    0.0100      1.0000          6.000      0.000       6.000        -6.000
    0.0500      1.0000          6.000      5.000       6.000        -1.000
    0.2500      1.0000          6.000      6.000       6.000         0.000
    0.5000      1.0000          6.000      6.000       6.000         0.000

 Chi^2 = 37.00     d.f. = 3        P-value = 0.0000
```

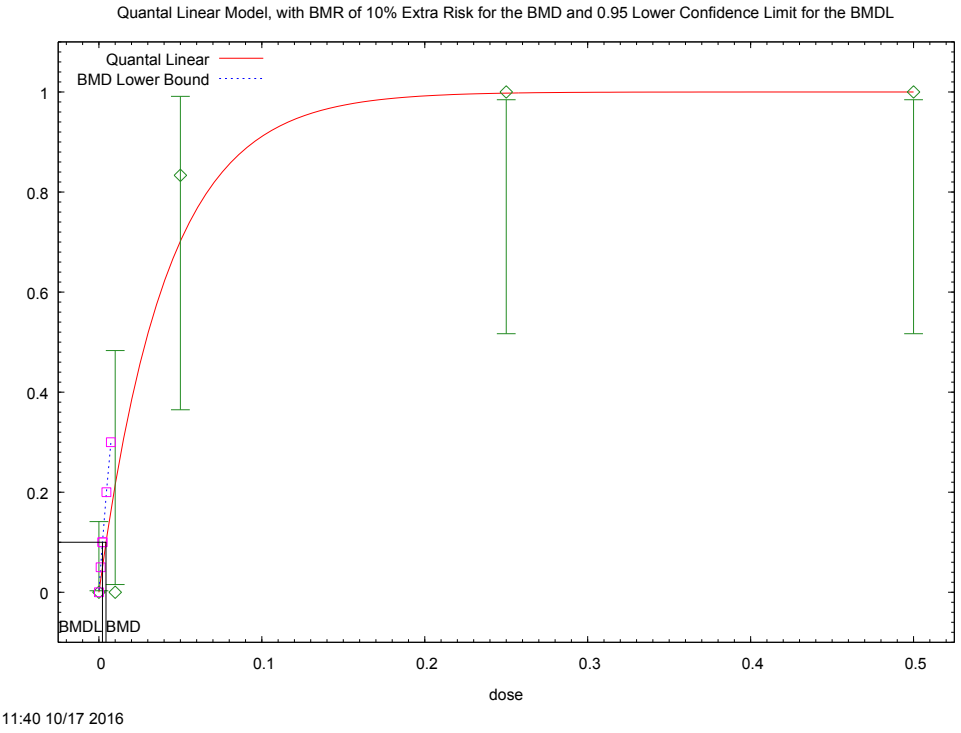
```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =   1.74154e-022

            BMDL =   1.74154e-022

            BMDU =   1.74154e-022

Taken together, (1.74154e-022, 1.74154e-022) is a 90     % two-sided confidence
interval for the BMD
```




```
 ======================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Wu2013DON_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Wu2013DON_Opt.plt
                                          Mon Oct 17 11:40:10 2016
 ======================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 5
 Total number of records with missing values = 0
 Total number of parameters in model = 3
```

```
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008



                  Default Initial Parameter Values
                     Background =            1
                        Beta(1) = 2.31673e+020
                        Beta(2) =            0


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Beta(1)
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

                Beta(2)

   Beta(2)            1


                                Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
        Beta(1)                0              NA
        Beta(2)          646.345         321.543             16.1312
1276.56

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model        -2.70337         5
   Fitted model        -3.11139         1     0.816043      4          0.9363
  Reduced model        -33.6365         1      61.8664      4         <.0001

           AIC:         8.22278


                                Goodness  of  Fit
                                                                      Scaled
     Dose      Est._Prob.    Expected    Observed     Size        Residual
  ---------------------------------------------------------------------------
    0.0000      0.0000         0.000      0.000      30.000         0.000
    0.0100      0.0626         0.376      0.000       6.000        -0.633
    0.0500      0.8013         4.808      5.000       6.000         0.197
    0.2500      1.0000         6.000      6.000       6.000         0.000
    0.5000      1.0000         6.000      6.000       6.000         0.000

 Chi^2 = 0.44      d.f. = 4        P-value = 0.9791
```

```
   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =      0.0127675

            BMDL =     0.00369355

            BMDU =       0.020009

Taken together, (0.00369355, 0.020009) is a 90     % two-sided confidence
interval for the BMD

Cancer Slope Factor =       27.0742
```




```
 ========================================================================
        Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Wu2013DON_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Wu2013DON_Opt.plt
                                          Mon Oct 17 11:40:55 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
```

Total number of observations = 5
Total number of records with missing values = 0
Maximum number of iterations = 500
Relative Function Convergence has been set to: 1e-008
Parameter Convergence has been set to: 1e-008

Default Initial (and Specified) Parameter Values
Background = 0.03125
Slope = 4.09539
Power = 1 Specified

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background -Power
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Slope
Slope	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	24.1749	10.8541	2.90119	45.4486

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-4.44671	1	3.48668	4	0.4799
Reduced model	-33.6365	1	61.8664	4	<.0001

AIC: 10.8934

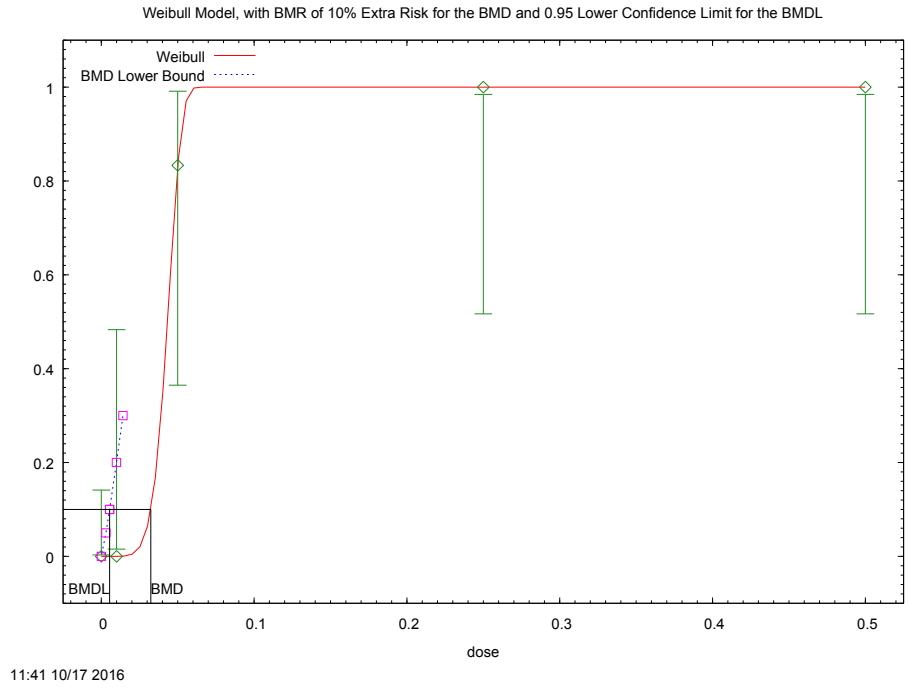
Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	30.000	0.000
0.0100	0.2147	1.288	0.000	6.000	-1.281
0.0500	0.7014	4.209	5.000	6.000	0.706
0.2500	0.9976	5.986	6.000	6.000	0.119
0.5000	1.0000	6.000	6.000	6.000	0.006

Chi^2 = 2.15 d.f. = 4 P-value = 0.7075

Benchmark Dose Computation

```
Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =     0.00435826

            BMDL =    0.00217173
```




```
 ========================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Wu2013DON_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Wu2013DON_Opt.plt
                                          Mon Oct 17 11:41:52 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
```

```
                    Background =      0.03125
                         Slope =      2.81431
                         Power =     0.458784


          Asymptotic Correlation Matrix of Parameter Estimates

          ( *** The model parameter(s)  -Background
                have been estimated at a boundary point, or have been specified by
the user,
                and do not appear in the correlation matrix )

                  Slope        Power

     Slope            1            1

     Power            1            1


                                Parameter Estimates

                                                                  95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0               NA
          Slope     5.71235e+008     3.91051e+010       -7.60734e+010
7.72159e+010
          Power          6.53604          22.8508            -38.2506
51.3227

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model         -2.70337          5
   Fitted model         -2.70366          2  0.000580701      3              1
  Reduced model         -33.6365          1       61.8664      4         <.0001

          AIC:          9.40732


                                Goodness  of  Fit
                                                                      Scaled
    Dose      Est._Prob.    Expected    Observed     Size       Residual
  ----------------------------------------------------------------------
    0.0000     0.0000         0.000     0.000      30.000        0.000
    0.0100     0.0000         0.000     0.000       6.000       -0.017
    0.0500     0.8333         5.000     5.000       6.000        0.000
    0.2500     1.0000         6.000     6.000       6.000        0.000
    0.5000     1.0000         6.000     6.000       6.000        0.000

 Chi^2 = 0.00      d.f. = 3        P-value = 1.0000


   Benchmark Dose Computation

Specified effect =           0.1

Risk Type        =      Extra risk

Confidence level =          0.95
```

```
BMD =       0.0324114

BMDL =     0.00546056
```

Supplementary information for WUDON3AC (Wu et al., 2013a)

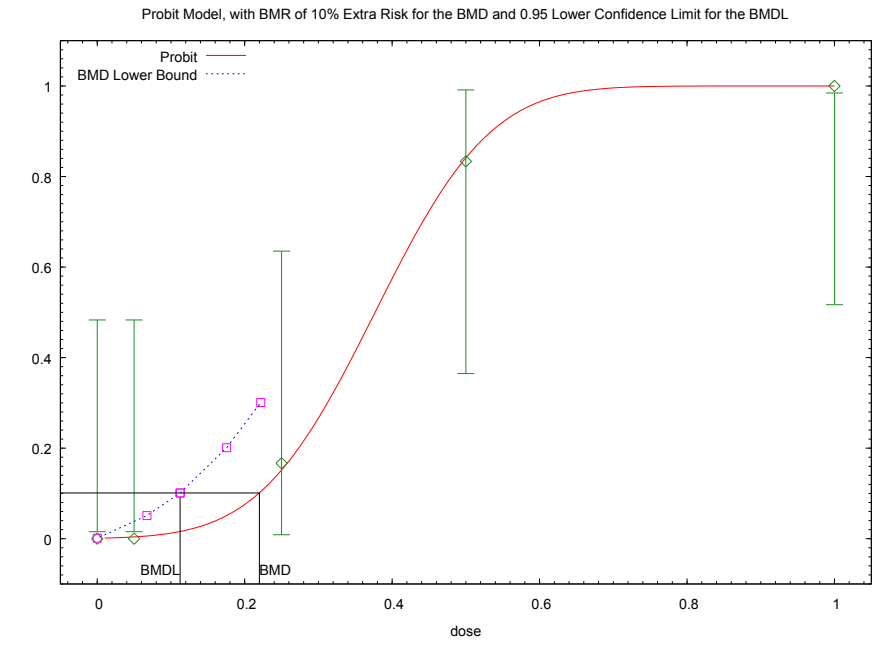
Details of the BMD Analysis of concentration-response data for vomiting in mink of Wu et al. (2013) reported in Appendix G, Section G.4.3.2 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed - for 3-Ac-DON

Filename:WuDON3Ac Folder: Mink

Output from BMDS from 19 Oct 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

The output is ordered in the sequence used in the Table G18 shown in Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.

Occasionally, it was not possible to obtain the results of the Gamma model with the notebook used for the calculation HP844op or Lenovo 3508. This was the case for the data of 3-Ac-DON. The Gamma model failed without any output. The Multistage model run but was considered to failed since a statistically impossible p-value of 2 was recorded.




```
 ========================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Wu2013-3AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Wu2013-3AcDONb_Opt.plt
                                          Mon Oct 17 17:29:49 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),
```

where CumNorm(.) is the cumulative normal distribution function

Dependent variable = Effect
Independent variable = Dose
Slope parameter is not restricted

Total number of observations = 5
Total number of records with missing values = 0
Maximum number of iterations = 500
Relative Function Convergence has been set to: 1e-008
Parameter Convergence has been set to: 1e-008

Default Initial (and Specified) Parameter Values
background = 0 Specified
intercept = -1.82112
slope = 3.90837

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.93
slope	-0.93	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-3.0611	1.16433	-5.34315	-0.779053
slope	8.11591	3.00731	2.22169	14.0101

Analysis of Deviance Table

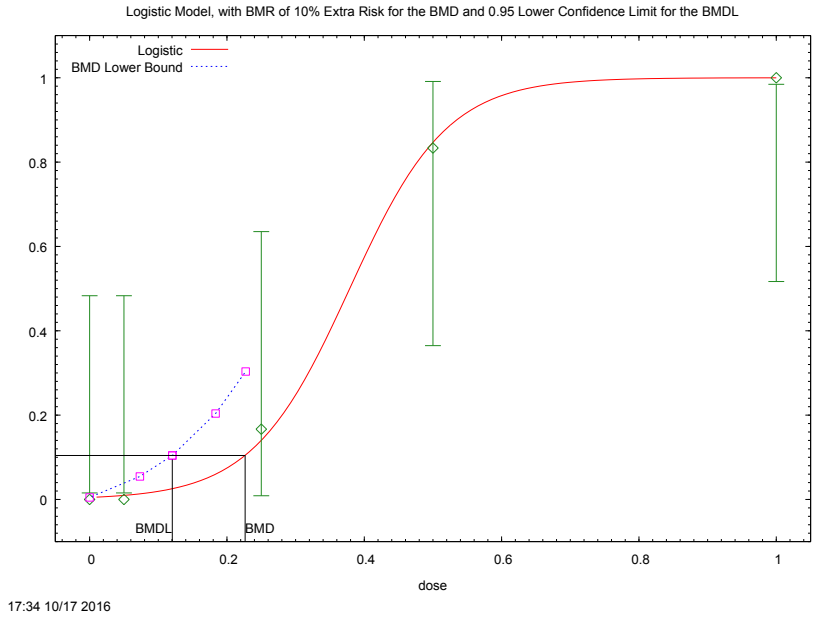
Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-5.40673	5			
Fitted model	-5.44392	2	0.0743692	3	0.9947
Reduced model	-20.1904	1	29.5672	4	<.0001

AIC: 14.8878

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0011	0.007	0.000	6.000	-0.081
0.0500	0.0040	0.024	0.000	6.000	-0.154
0.2500	0.1510	0.906	1.000	6.000	0.107
0.5000	0.8406	5.043	5.000	6.000	-0.049
1.0000	1.0000	6.000	6.000	6.000	0.001

```
 Chi^2 = 0.04       d.f. = 3         P-value = 0.9976

   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =       0.219961

            BMDL =       0.112409
```




```
 ================================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Wu2013-3AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Wu2013-3AcDONb_Opt.plt
                                                  Mon Oct 17 17:34:55 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008
```

Default Initial Parameter Values
background = 0 Specified
intercept = -2.50184
slope = 5.52459

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	-0.93
slope	-0.93	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
intercept	-5.34289	2.12811	-9.51391	-1.17188
slope	14.0965	5.45861	3.39782	24.7952

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-5.40673	5			
Fitted model	-5.51526	2	0.217047	3	0.9748
Reduced model	-20.1904	1	29.5672	4	<.0001

AIC: 15.0305

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0048	0.029	0.000	6.000	-0.169
0.0500	0.0096	0.058	0.000	6.000	-0.241
0.2500	0.1396	0.837	1.000	6.000	0.191
0.5000	0.8462	5.077	5.000	6.000	-0.088
1.0000	0.9998	5.999	6.000	6.000	0.031

Chi^2 = 0.13 d.f. = 3 P-value = 0.9877

Benchmark Dose Computation

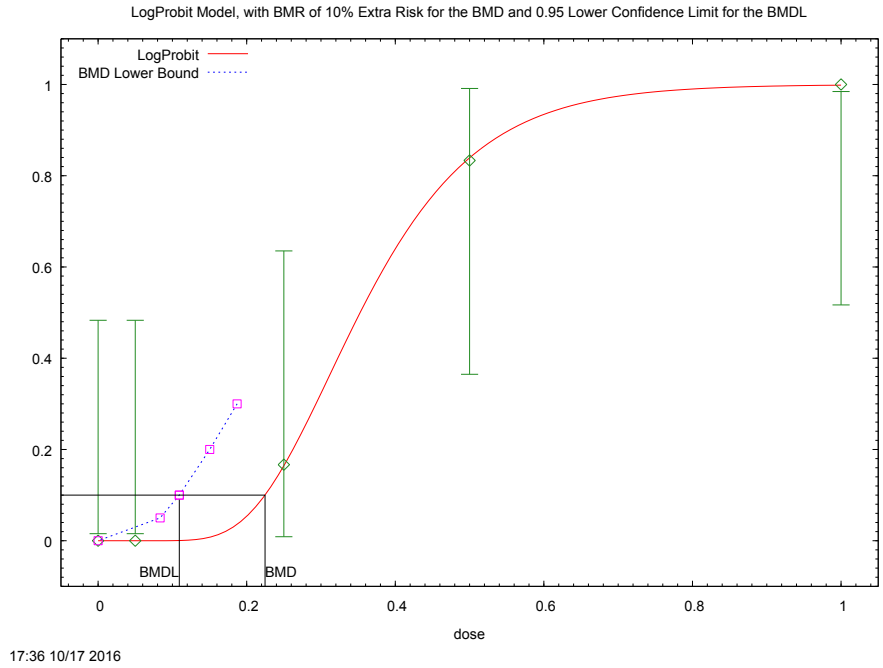
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.226466

BMDL = 0.120421




```
 ========================================================================
        Probit Model. (Version: 3.3;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Wu2013-3AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Wu2013-3AcDONb_Opt.plt
                                          Mon Oct 17 17:36:45 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                 Default Initial (and Specified) Parameter Values
                    background =            0
                     intercept =      1.30032
                         slope =      1.02485
```

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	0.94
slope	0.94	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	2.95845	1.26675	0.475665	5.44123
slope	2.84	1.16444	0.557738	5.12227

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-5.40673	5			
Fitted model	-5.41687	2	0.0202628	3	0.9992
Reduced model	-20.1904	1	29.5672	4	<.0001

AIC: 14.8337

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0500	0.0000	0.000	0.000	6.000	-0.000
0.2500	0.1639	0.983	1.000	6.000	0.018
0.5000	0.8389	5.033	5.000	6.000	-0.037
1.0000	0.9985	5.991	6.000	6.000	0.096

Chi^2 = 0.01 d.f. = 3 P-value = 0.9997

Benchmark Dose Computation

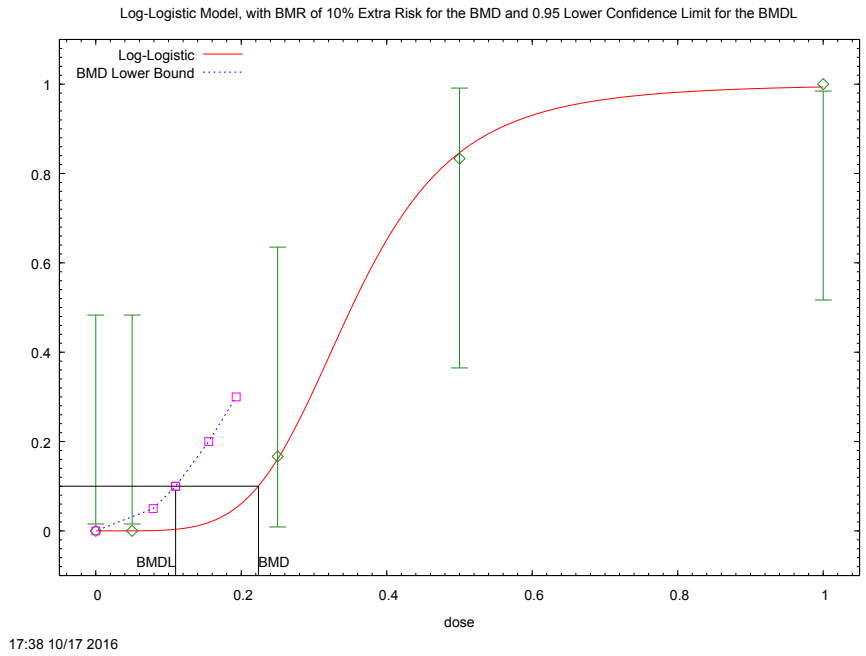
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.224708

BMDL = 0.109274




```
 ======================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Wu2013-3AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Wu2013-3AcDONb_Opt.plt
                                          Mon Oct 17 17:38:39 2016
 ======================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                 Default Initial Parameter Values
                    background =            0
                     intercept =      2.26129
                         slope =      1.78223


          Asymptotic Correlation Matrix of Parameter Estimates

          ( *** The model parameter(s)  -background
```

have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	0.94
slope	0.94	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	5.06531	2.25965	0.636483	9.49414
slope	4.8493	2.074	0.784331	8.91426

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-5.40673	5			
Fitted model	-5.44955	2	0.0856239	3	0.9935
Reduced model	-20.1904	1	29.5672	4	<.0001

AIC: 14.8991

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0500	0.0001	0.000	0.000	6.000	-0.022
0.2500	0.1601	0.961	1.000	6.000	0.044
0.5000	0.8461	5.076	5.000	6.000	-0.086
1.0000	0.9937	5.962	6.000	6.000	0.195

Chi^2 = 0.05 d.f. = 3 P-value = 0.9973

Benchmark Dose Computation

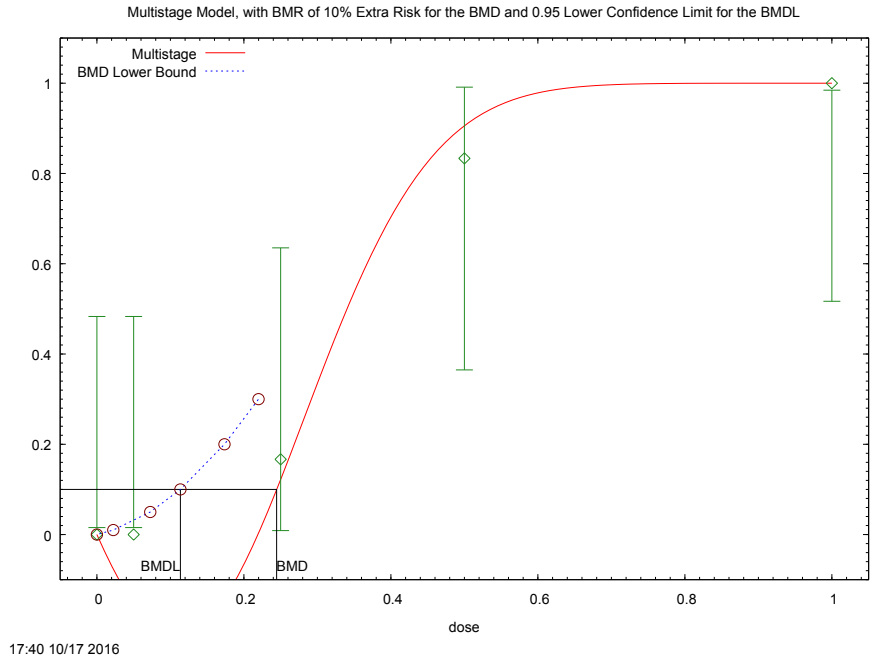
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.223656

BMDL = 0.109804




```
 ======================================================================
        Multistage Model. (Version: 3.4;  Date: 05/02/2014)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Wu2013-3AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Wu2013-3AcDONb_Opt.plt
                                          Mon Oct 17 17:40:08 2016
 ======================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are not restricted


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 5
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     Background =           1
                        Beta(1) = -8.69869e+019
                        Beta(2) = 1.82843e+020
```

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Beta(1)	Beta(2)
Beta(1)	1	-0.98
Beta(2)	-0.98	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Beta(1)	-3.679	2.81897	-9.20408	1.84608
Beta(2)	16.8077	10.6894	-4.1432	37.7586

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Warning: Likelihood for the fitted model larger than the Likelihood for the full model.
Error in computing chi-square; returning 2

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-5.40673	5			
Fitted model	-4.75841	2	-1.29665	3	2
Reduced model	-20.1904	1	29.5672	4	<.0001

AIC: 13.5168

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0500	-0.1525	-0.915	0.000	6.000	0.915
0.2500	0.1225	0.735	1.000	6.000	0.330
0.5000	0.9058	5.435	5.000	6.000	-0.608
1.0000	1.0000	6.000	6.000	6.000	0.003

Chi^2 = 1.32 d.f. = 3 P-value = 0.7255

Benchmark Dose Computation

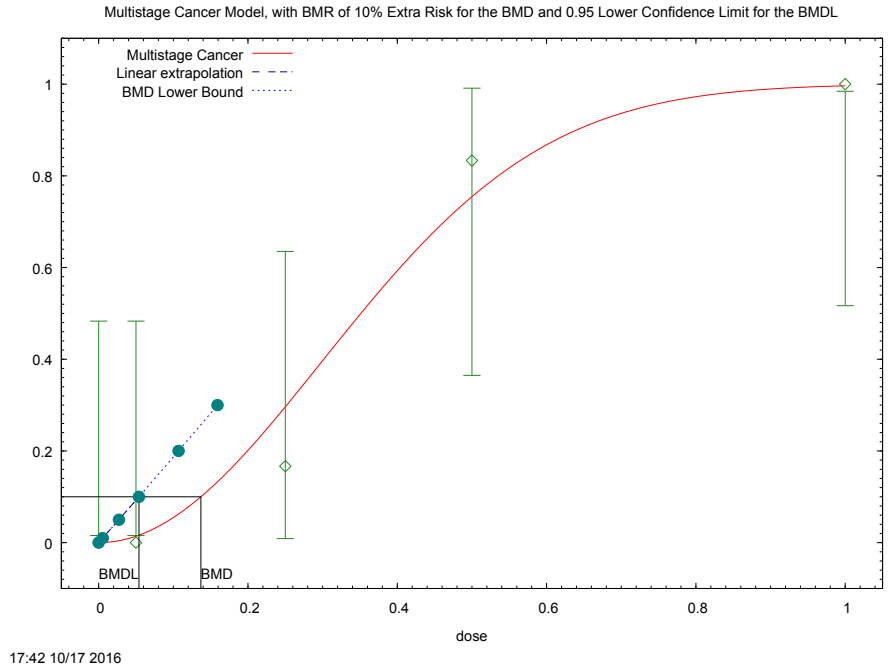
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.244523

```
            BMDL =        0.113603

            BMDU =         0.27287

Taken together, (0.113603, 0.27287) is a 90      % two-sided confidence
interval for the BMD
```




```
 ================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Wu2013-3AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Wu2013-3AcDONb_Opt.plt
                                              Mon Oct 17 17:42:48 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 5
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008
```

Default Initial Parameter Values
Background = 0
Beta(1) = 0
Beta(2) = 1.0228e+020

Asymptotic Correlation Matrix of Parameter Estimates

(*** The model parameter(s) -Background -Beta(1)
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	Beta(2)
Beta(2)	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Beta(1)	0	NA		
Beta(2)	5.61613	2.30489	1.09863	10.1336

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-5.40673	5			
Fitted model	-5.8917	1	0.969934	4	0.9143
Reduced model	-20.1904	1	29.5672	4	<.0001

AIC: 13.7834

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0500	0.0139	0.084	0.000	6.000	-0.291
0.2500	0.2960	1.776	1.000	6.000	-0.694
0.5000	0.7544	4.526	5.000	6.000	0.449
1.0000	0.9964	5.978	6.000	6.000	0.148

Chi^2 = 0.79 d.f. = 4 P-value = 0.9397

Benchmark Dose Computation

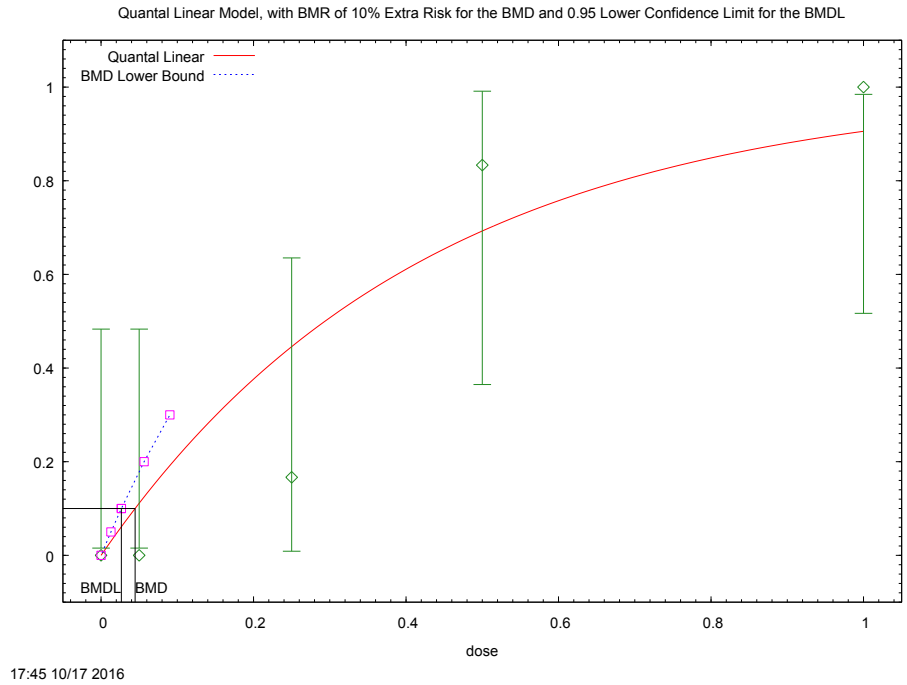
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

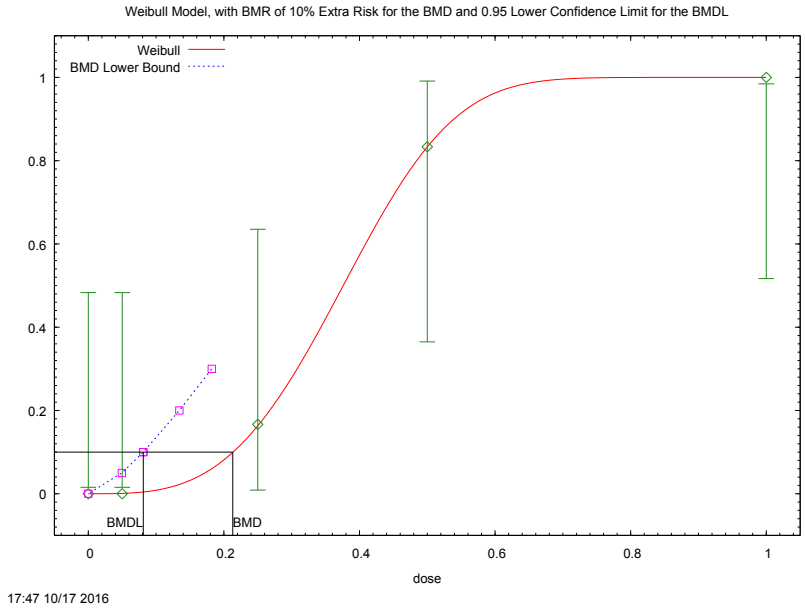
BMD = 0.136968

```
            BMDL =      0.0540174

            BMDU =       0.193732

Taken together, (0.0540174, 0.193732) is a 90      % two-sided confidence
interval for the BMD

Cancer Slope Factor =       1.85126
```




```
 ================================================================
        Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Wu2013-3AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Wu2013-3AcDONb_Opt.plt
                                          Mon Oct 17 17:45:28 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
```

```
                          Slope =      1.94591
                          Power =            1   Specified


          Asymptotic Correlation Matrix of Parameter Estimates

          ( *** The model parameter(s)  -Background    -Power
                have been estimated at a boundary point, or have been specified by
the user,
                and do not appear in the correlation matrix )

                 Slope

     Slope            1


                                Parameter Estimates

                                                          95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background               0              NA
          Slope          2.3573         0.773732            0.840811
3.87379

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                      Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model        -5.40673         5
   Fitted model        -8.07688         1       5.34029      4          0.2541
  Reduced model        -20.1904         1       29.5672      4         <.0001

          AIC:         18.1538


                                Goodness  of  Fit
                                                                      Scaled
    Dose     Est._Prob.    Expected    Observed     Size       Residual
  ---------------------------------------------------------------------------
    0.0000     0.0000         0.000     0.000       6.000        0.000
    0.0500     0.1112         0.667     0.000       6.000       -0.866
    0.2500     0.4453         2.672     1.000       6.000       -1.373
    0.5000     0.6923         4.154     5.000       6.000        0.748
    1.0000     0.9053         5.432     6.000       6.000        0.792

 Chi^2 = 3.82      d.f. = 4        P-value = 0.4303


   Benchmark Dose Computation

Specified effect =           0.1

Risk Type        =      Extra risk

Confidence level =          0.95

             BMD =      0.0446954

            BMDL =      0.026661
```




```
 ======================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Wu2013-3AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Wu2013-3AcDONb_Opt.plt
                                                Mon Oct 17 17:47:01 2016
 ======================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
                          Slope =      1.94591
                          Power =      1.27059


            Asymptotic Correlation Matrix of Parameter Estimates

            ( *** The model parameter(s)  -Background
                  have been estimated at a boundary point, or have been specified by
the user,
                  and do not appear in the correlation matrix )

                   Slope        Power
```

```
     Slope            1         0.95

     Power         0.95            1


                              Parameter Estimates

                                                                95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
     Background                0              NA
          Slope          18.0225          25.204            -31.3764
67.4214
          Power          3.32593          1.58233            0.224626
6.42723

NA - Indicates that this parameter has hit a bound
     implied by some inequality constraint and thus
     has no standard error.


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model         -5.40673         5
   Fitted model         -5.41199         2    0.0105094      3          0.9997
  Reduced model         -20.1904         1      29.5672      4         <.0001

           AIC:          14.824


                                Goodness  of  Fit
                                                                      Scaled
    Dose     Est._Prob.    Expected    Observed     Size        Residual
  ----------------------------------------------------------------------
    0.0000     0.0000         0.000     0.000       6.000         0.000
    0.0500     0.0008         0.005     0.000       6.000        -0.071
    0.2500     0.1641         0.985     1.000       6.000         0.017
    0.5000     0.8342         5.005     5.000       6.000        -0.006
    1.0000     1.0000         6.000     6.000       6.000         0.000

 Chi^2 = 0.01      d.f. = 3        P-value = 0.9999


   Benchmark Dose Computation

Specified effect =           0.1

Risk Type        =      Extra risk

Confidence level =          0.95

             BMD =       0.213092

            BMDL =     0.0810851
```

Gamma Model failed

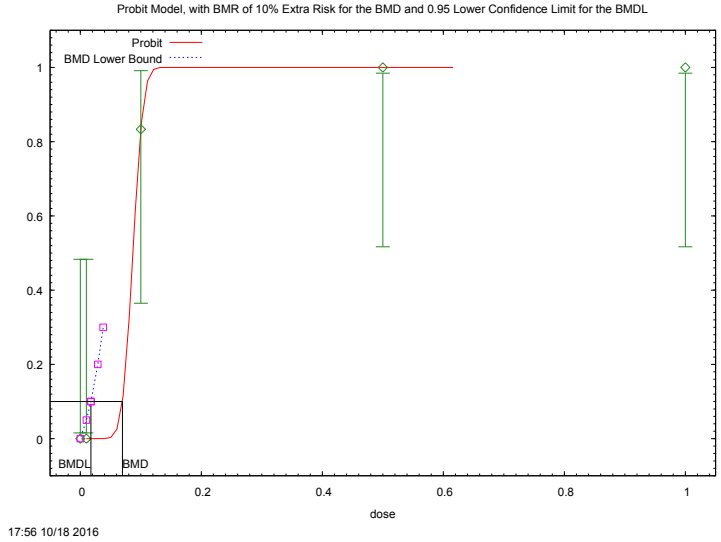
Supplementary information for WUDON15AC (Wu et al., 2013a)

Details of the BMD Analysis of concentration-response data for vomiting in mink of Wu et al. (2013) reported in Appendix G, Section G.4.3.3 of the Scientific Opinion on the risks to human and animal health related to the presence of deoxynivalenol and its acetylated and modified forms in food and feed - for 15-Ac-DON

Filename:WuDON15Ac Folder: Mink

Output from BMDS from19 Oct 2016 with the full information of the fit of all models of BMDS where a model fit was obtained in a reasonable duration of computing time.

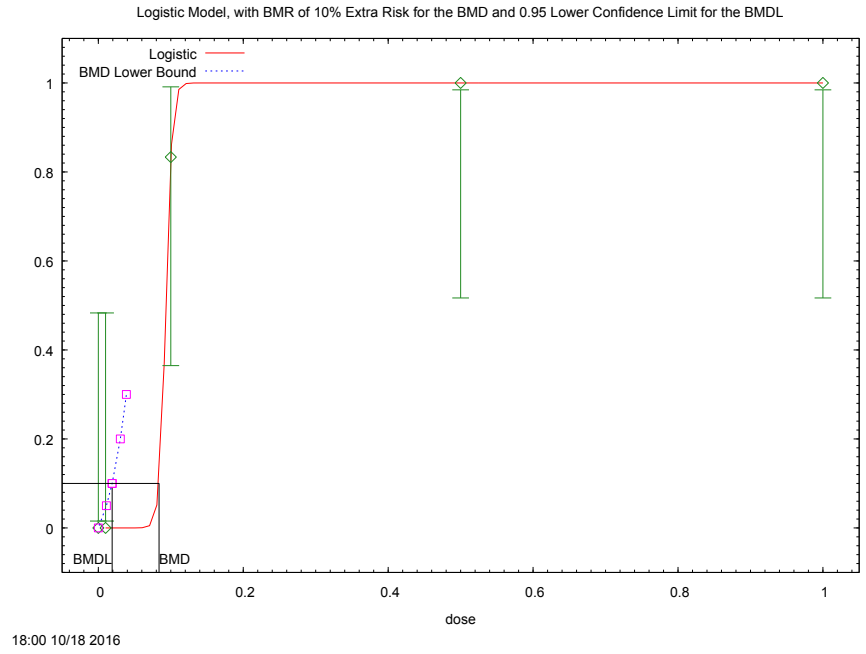
The output is ordered in the sequence used in the Table G19 shown in Appendix G which is based on an order of increasing mathematical complexity. The two less complex multistage models are nested under the multistage model which was used with the default assumption of the degree of the polynomial of BMDS.




```
 ================================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Wu2013-15AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/pro_Wu2013-15AcDONb_Opt.plt
                                                Tue Oct 18 17:56:08 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = CumNorm(Intercept+Slope*Dose),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
```

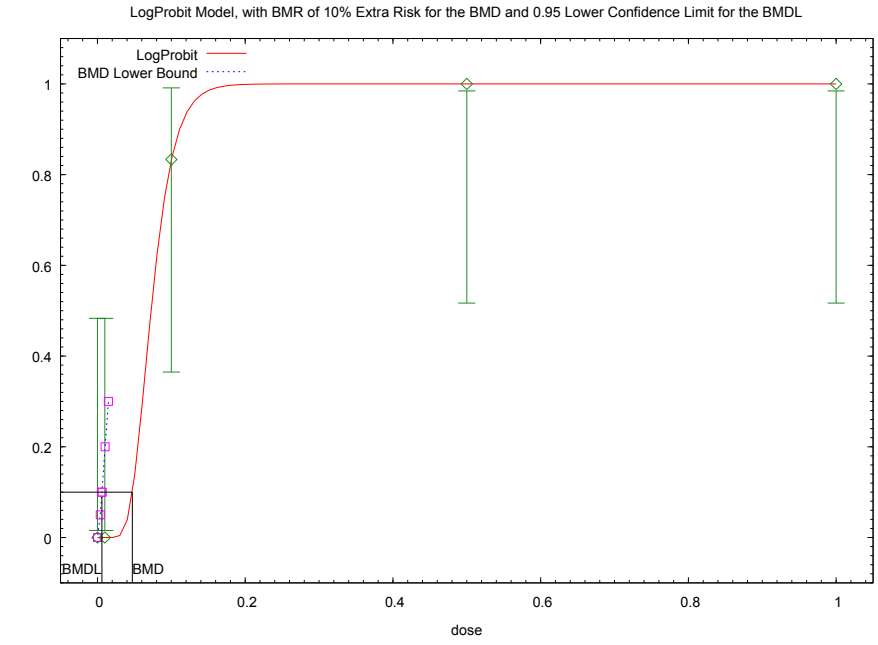
```
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     background =            0   Specified
                      intercept =    -0.970097
                          slope =      3.37034


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept            1           -1

     slope           -1            1


                                Parameter Estimates

                                                                95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept          -6.4392          1262.67            -2481.22
2468.34
          slope          74.0661          12626.7            -24673.8
24821.9


                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.    P-value
     Full model         -2.70337         5
   Fitted model         -2.70337         2  7.39017e-008      3             1
  Reduced model          -20.527         1       35.6472      4        <.0001

           AIC:         9.40673


                                Goodness  of  Fit
                                                                      Scaled
    Dose      Est._Prob.     Expected     Observed      Size        Residual
  ----------------------------------------------------------------------
    0.0000      0.0000         0.000      0.000       6.000       -0.000
    0.0100      0.0000         0.000      0.000       6.000       -0.000
    0.1000      0.8333         5.000      5.000       6.000        0.000
    0.5000      1.0000         6.000      6.000       6.000        0.000
    1.0000      1.0000         6.000      6.000       6.000        0.000

 Chi^2 = 0.00      d.f. = 3        P-value = 1.0000


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk
```

```
Confidence level =           0.95

             BMD =      0.0696358

            BMDL =      0.0175236
```




```
 ================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Wu2013-15AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/log_Wu2013-15AcDONb_Opt.plt
                                          Tue Oct 18 18:00:05 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = 1/[1+EXP(-intercept-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial Parameter Values
                     background =            0   Specified
                      intercept =     -1.27414
                          slope =      4.76396


           Asymptotic Correlation Matrix of Parameter Estimates
```

```
           ( *** The model parameter(s)  -background
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )

              intercept        slope

 intercept       NA             NA

     slope       NA             NA


NA - This parameter's variance has been estimated as zero or less.
THE MODEL HAS PROBABLY NOT CONVERGED!!!



                                 Parameter Estimates

                                                         95.0% Wald Confidence
Interval
       Variable         Estimate        Std. Err.     Lower Conf. Limit   Upper
Conf. Limit
      intercept         -21.8671              NA                   NA
NA
          slope          234.766              NA                   NA
NA

At least some variance estimates are negative.
THIS USUALLY MEANS THE MODEL HAS NOT CONVERGED!
Try again from another starting point.



                        Analysis of Deviance Table

       Model      Log(likelihood)  # Param's  Deviance  Test d.f.   P-value
     Full model         -2.70337         5
   Fitted model         -2.70337         2   4.47561e-008      3            1
  Reduced model          -20.527         1        35.6472      4         <.0001

           AIC:          9.40673


                                  Goodness  of  Fit
                                                                 Scaled
     Dose      Est._Prob.    Expected    Observed     Size       Residual
  ------------------------------------------------------------------------
    0.0000      0.0000          0.000      0.000        6.000      -0.000
    0.0100      0.0000          0.000      0.000        6.000      -0.000
    0.1000      0.8333          5.000      5.000        6.000      -0.000
    0.5000      1.0000          6.000      6.000        6.000       0.000
    1.0000      1.0000          6.000      6.000        6.000       0.000

 Chi^2 = 0.00      d.f. = 3        P-value = 1.0000


   Benchmark Dose Computation

Specified effect =            0.1

Risk Type        =      Extra risk

Confidence level =           0.95

             BMD =      0.0837851

            BMDL =      0.0190577
```




```
 ================================================================================
         Probit Model. (Version: 3.3;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Wu2013-15AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnp_Wu2013-15AcDONb_Opt.plt
                                                  Tue Oct 18 18:01:37 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = Background
               + (1-Background) * CumNorm(Intercept+Slope*Log(Dose)),

   where CumNorm(.) is the cumulative normal distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                 Default Initial (and Specified) Parameter Values
                    background =            0
                     intercept =      1.83904
                         slope =     0.647754


           Asymptotic Correlation Matrix of Parameter Estimates
```

(*** The model parameter(s) -background
have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	1
slope	1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	7.87447	1643.91	-3214.14	3229.89
slope	2.9997	713.943	-1396.3	1402.3

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-2.70337	2	5.81484e-008	3	1
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 9.40673

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.0000	0.000	0.000	6.000	-0.000
0.1000	0.8333	5.000	5.000	6.000	0.000
0.5000	1.0000	6.000	6.000	6.000	0.000
1.0000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 0.00 d.f. = 3 P-value = 1.0000

Benchmark Dose Computation

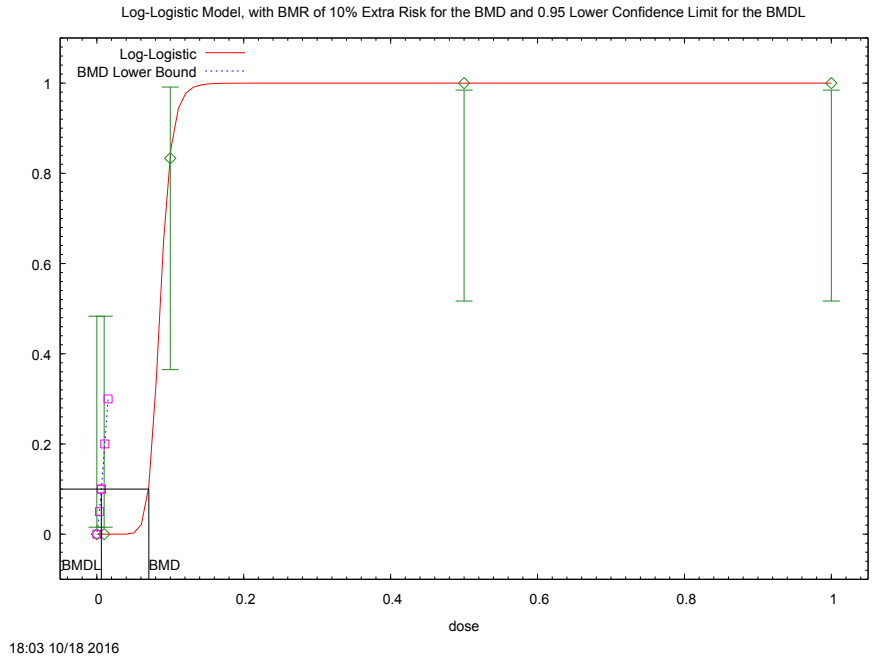
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.0472493

BMDL = 0.00603745




```
 ================================================================
        Logistic Model. (Version: 2.14; Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Wu2013-15AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/lnl_Wu2013-15AcDONb_Opt.plt
                                          Tue Oct 18 18:03:16 2016
 ================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background+(1-background)/[1+EXP(-intercept-slope*Log(dose))]


   Dependent variable = Effect
   Independent variable = Dose
   Slope parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008



   User has chosen the log transformed model


                Default Initial Parameter Values
                   background =            0
                    intercept =      3.20342
                        slope =      1.13661


          Asymptotic Correlation Matrix of Parameter Estimates

          ( *** The model parameter(s)  -background
```

have been estimated at a boundary point, or have been specified by the user,
and do not appear in the correlation matrix)

	intercept	slope
intercept	1	1
slope	1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
background	0	NA		
intercept	27.0242	8433.06	-16501.5	16555.5
slope	11.0375	3662.43	-7167.2	7189.27

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-2.70337	2	4.80546e-008	3	1
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 9.40673

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.0000	0.000	0.000	6.000	-0.000
0.1000	0.8333	5.000	5.000	6.000	0.000
0.5000	1.0000	6.000	6.000	6.000	0.000
1.0000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 0.00 d.f. = 3 P-value = 1.0000

Benchmark Dose Computation

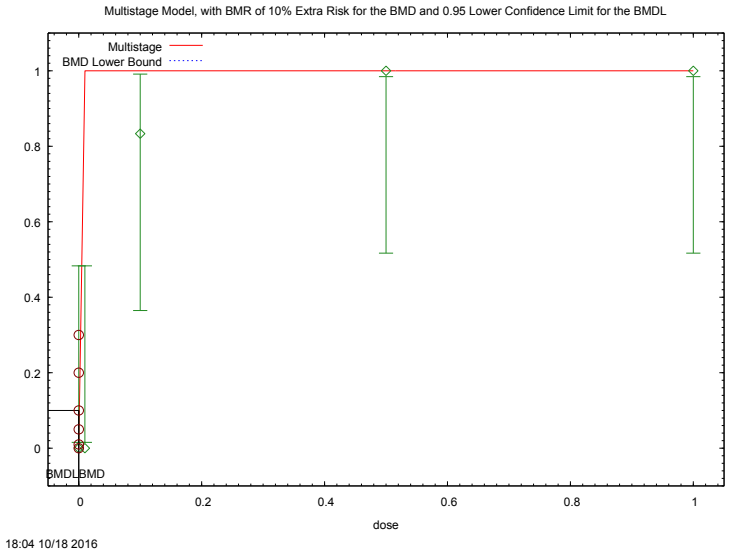
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.0708305

BMDL = 0.00614071




```
 ================================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Wu2013-15AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/mst_Wu2013-15AcDONb_Opt.plt
                                                  Tue Oct 18 18:04:46 2016
 ================================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are not restricted


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 5
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008



                  Default Initial Parameter Values
                     Background =            0
                        Beta(1) =  2.9711e+020
                        Beta(2) = -1.87103e+020


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
```

and do not appear in the correlation matrix)

	Beta(1)	Beta(2)
Beta(1)	1	0
Beta(2)	0	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Beta(1)	2.97202e+020	1	2.97202e+020	2.97202e+020
Beta(2)	-1.87119e+020	1	-1.87119e+020	-1.87119e+020

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-4970	2	9934.59	3	0
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 9944

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	-0.003
0.0100	1.0000	6.000	0.000	6.000	-6.000
0.1000	1.0000	6.000	5.000	6.000	-1.000
0.5000	1.0000	6.000	6.000	6.000	0.000
1.0000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 37.00 d.f. = 3 P-value = 0.0000

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

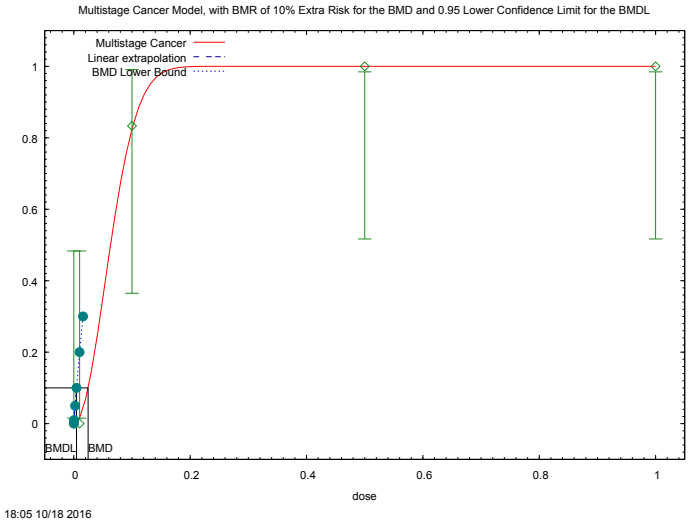
Confidence level = 0.95

BMD = 3.54508e-022

BMDL = 3.54508e-022

BMDU = 3.54508e-022

Taken together, (3.54508e-022, 3.54508e-022) is a 90 % two-sided confidence interval for the BMD




```
 ========================================================================
         Multistage Model. (Version: 3.4;  Date: 05/02/2014)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Wu2013-15AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/msc_Wu2013-15AcDONb_Opt.plt
                                                Tue Oct 18 18:05:55 2016
 ========================================================================

 BMDS_Model_Run
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(
                 -beta1*dose^1-beta2*dose^2)]

   The parameter betas are restricted to be positive


   Dependent variable = Effect
   Independent variable = Dose

 Total number of observations = 5
 Total number of records with missing values = 0
 Total number of parameters in model = 3
 Total number of specified parameters = 0
 Degree of polynomial = 2


 Maximum number of iterations = 500
 Relative Function Convergence has been set to: 1e-008
 Parameter Convergence has been set to: 1e-008



                  Default Initial Parameter Values
                     Background =            1
                        Beta(1) = 1.15414e+020
                        Beta(2) =            0


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background    -Beta(1)
                 have been estimated at a boundary point, or have been specified by
the user,
                 and do not appear in the correlation matrix )
```

	Beta(2)
Beta(2)	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Beta(1)	0	NA		
Beta(2)	174.344	88.2257	1.42469	347.263

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-2.80941	1	0.212079	4	0.9948
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 7.61881

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.0173	0.104	0.000	6.000	-0.325
0.1000	0.8251	4.950	5.000	6.000	0.053
0.5000	1.0000	6.000	6.000	6.000	0.000
1.0000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 0.11 d.f. = 4 P-value = 0.9986

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

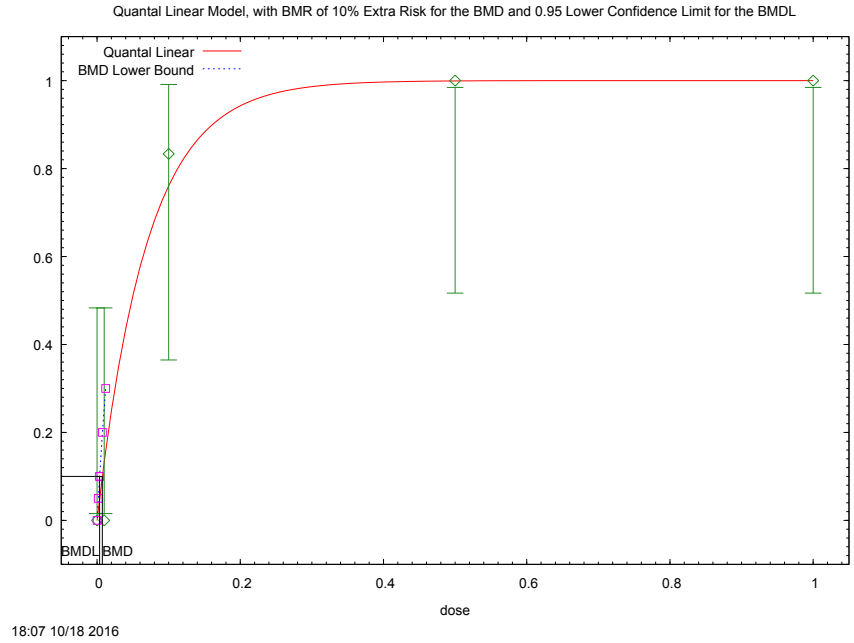
BMD = 0.024583

BMDL = 0.004672

BMDU = 0.0387137

Taken together, (0.004672, 0.0387137) is a 90 % two-sided confidence interval for the BMD

Cancer Slope Factor = 21.4041




```
 ================================================================================
         Quantal Linear Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
         Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Wu2013-15AcDONb_Opt.(d)
         Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/qln_Wu2013-15AcDONb_Opt.plt
                                          Tue Oct 18 18:07:27 2016
 ================================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose)]


   Dependent variable = Effect
   Independent variable = Dose

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
                          Slope =      1.94591
                          Power =            1   Specified


            Asymptotic Correlation Matrix of Parameter Estimates

            ( *** The model parameter(s)  -Background    -Power
                  have been estimated at a boundary point, or have been specified by
the user,
                  and do not appear in the correlation matrix )

                   Slope

     Slope            1
```

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	14.2843	6.7538	1.04714	27.5215

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-3.66035	1	1.91397	4	0.7516
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 9.3207

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.1331	0.799	0.000	6.000	-0.960
0.1000	0.7603	4.562	5.000	6.000	0.419
0.5000	0.9992	5.995	6.000	6.000	0.069
1.0000	1.0000	6.000	6.000	6.000	0.002

Chi^2 = 1.10 d.f. = 4 P-value = 0.8940

Benchmark Dose Computation

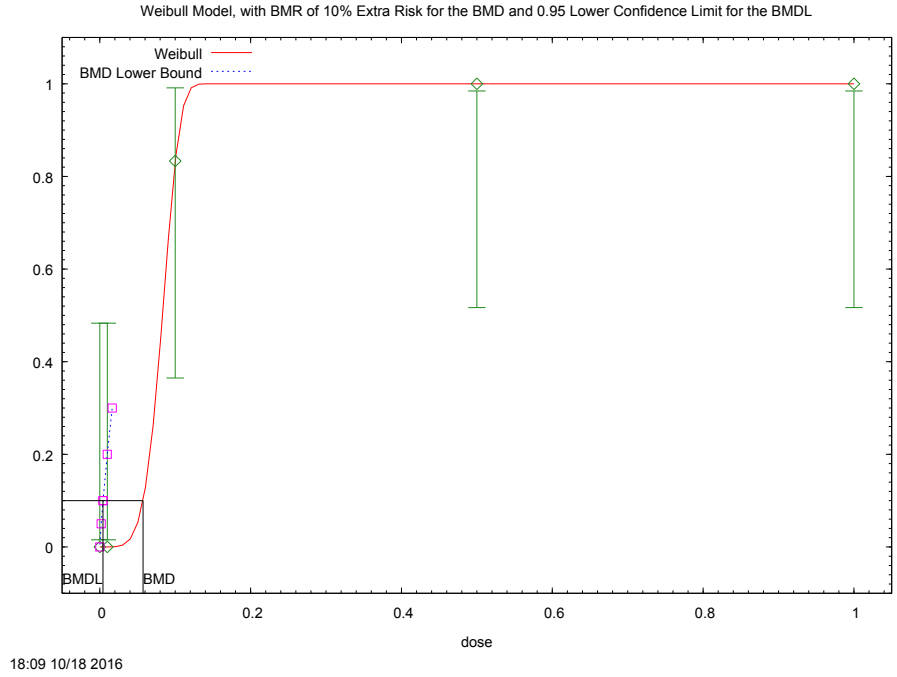
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.00737595

BMDL = 0.00354948




```
 ======================================================================
        Weibull Model using Weibull Model (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Wu2013-15AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/wei_Wu2013-15AcDONb_Opt.plt
                                          Tue Oct 18 18:09:12 2016
 ======================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response] = background + (1-background)*[1-EXP(-slope*dose^power)]


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
                          Slope =      1.94591
                          Power =     0.453362


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,
```

and do not appear in the correlation matrix)

	Slope	Power
Slope	1	1
Power	1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	224220	1.69921e+007	-3.30798e+007	3.35282e+007
Power	5.09741	32.9116	-59.4081	69.6029

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-2.70345	2	0.00017181	3	1
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 9.40691

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.0000	0.000	0.000	6.000	-0.009
0.1000	0.8333	5.000	5.000	6.000	0.000
0.5000	1.0000	6.000	6.000	6.000	0.000
1.0000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 0.00 d.f. = 3 P-value = 1.0000

Benchmark Dose Computation

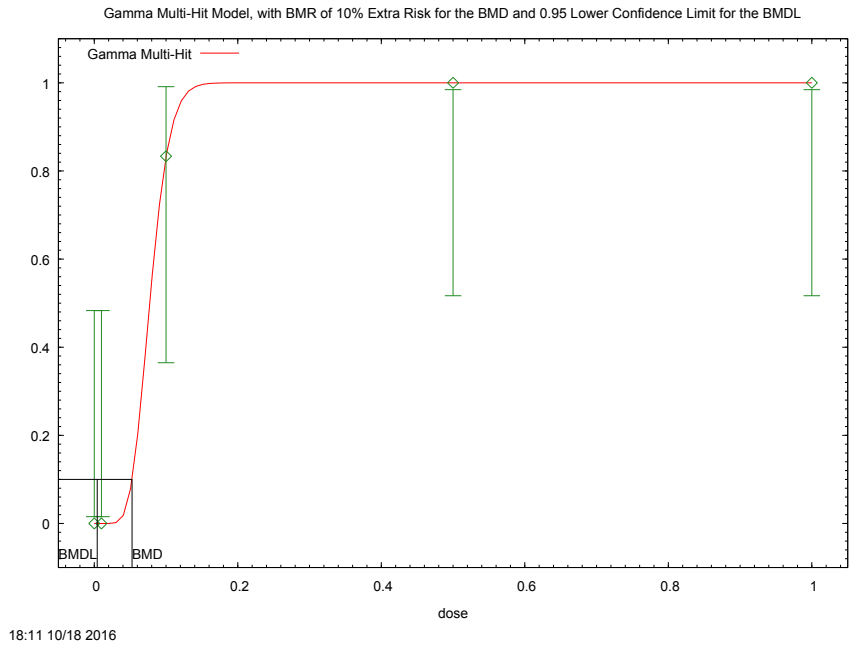
Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.0573571

BMDL = 0.00424741




```
 ================================================================
        Gamma Model. (Version: 2.16;  Date: 2/28/2013)
        Input Data File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/gam_Wu2013-15AcDONb_Opt.(d)
        Gnuplot Plotting File:
C:/Users/edler/Desktop/BMDS2601_20150629/BMDS2601/Data/gam_Wu2013-15AcDONb_Opt.plt
                                          Tue Oct 18 18:11:14 2016
 ================================================================

 BMDS_Model_Run
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   The form of the probability function is:

   P[response]= background+(1-background)*CumGamma[slope*dose,power],
   where CumGamma(.) is the cummulative Gamma distribution function


   Dependent variable = Effect
   Independent variable = Dose
   Power parameter is not restricted

   Total number of observations = 5
   Total number of records with missing values = 0
   Maximum number of iterations = 500
   Relative Function Convergence has been set to: 1e-008
   Parameter Convergence has been set to: 1e-008


                  Default Initial (and Specified) Parameter Values
                     Background =        0.125
                          Slope =      12.8562
                          Power =          1.3


           Asymptotic Correlation Matrix of Parameter Estimates

           ( *** The model parameter(s)  -Background
                 have been estimated at a boundary point, or have been specified by
the user,and do not appear in the correlation matrix )
```

	Slope	Power
Slope	1	1
Power	1	1

Parameter Estimates

Variable	Estimate	Std. Err.	95.0% Wald Confidence Interval Lower Conf. Limit	Upper Conf. Limit
Background	0	NA		
Slope	164.278	19326.5	-37715	38043.5
Power	13.0048	1701.5	-3321.87	3347.88

NA - Indicates that this parameter has hit a bound
implied by some inequality constraint and thus
has no standard error.

Analysis of Deviance Table

Model	Log(likelihood)	# Param's	Deviance	Test d.f.	P-value
Full model	-2.70337	5			
Fitted model	-2.70337	2	2.79202e-007	3	1
Reduced model	-20.527	1	35.6472	4	<.0001

AIC: 9.40673

Goodness of Fit

Dose	Est._Prob.	Expected	Observed	Size	Scaled Residual
0.0000	0.0000	0.000	0.000	6.000	0.000
0.0100	0.0000	0.000	0.000	6.000	-0.000
0.1000	0.8334	5.000	5.000	6.000	-0.000
0.5000	1.0000	6.000	6.000	6.000	0.000
1.0000	1.0000	6.000	6.000	6.000	0.000

Chi^2 = 0.00 d.f. = 3 P-value = 1.0000

Benchmark Dose Computation

Specified effect = 0.1

Risk Type = Extra risk

Confidence level = 0.95

BMD = 0.0526537

BMDL = 0.00408511