Phase 1 Drug Trial: IV Infusion Single Dose

Study ID: STUDY-002

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Figure 1: Summary of Observations vs Time

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Table 1: NCA Summary.

group	parameters	extrema	geomean	geomeanCV	geostd	mean	numsamples	std
1000 mg	aucinf_obs	(179.0, 402.0)	270.0	25.8	1.29	277.0	10	68.6
1000 mg	auclast	(179.0, 380.0)	262.0	24.8	1.28	270.0	10	64.4
1000 mg	cl_obs	(2.49, 5.58)	3.71	25.7	1.29	3.82	10	0.993
1000 mg	cmax	(8.75, 21.1)	13.4	25.0	1.28	13.8	10	3.43
1000 mg	half_life	(7.89, 18.7)	12.6	28.0	1.32	13.0	10	3.52
1000 mg	tmax	(2.0, 2.0)	2.0	0.0	1.0	2.0	10	0.0
1000 mg	vz_obs	(41.8, 107.0)	67.4	26.5	1.3	69.5	10	18.4
500 mg	aucinf_obs	(92.2, 162.0)	125.0	17.9	1.19	127.0	10	21.5
500 mg	auclast	(92.2, 162.0)	123.0	18.9	1.21	125.0	10	22.6
500 mg	cl_obs	(3.08, 5.42)	4.0	17.9	1.19	4.06	10	0.75
500 mg	cmax	(3.21, 11.8)	7.34	34.2	1.39	7.67	10	2.14
500 mg	half_life	(6.77, 22.7)	10.4	35.2	1.41	11.0	10	4.51
500 mg	tmax	(2.0, 2.0)	2.0	0.0	1.0	2.0	10	0.0
500 mg	vz_obs	(36.6, 148.0)	60.1	37.3	1.44	64.5	10	30.7
750 mg	aucinf_obs	(149.0, 249.0)	196.0	15.7	1.17	199.0	10	31.1
750 mg	auclast	(149.0, 245.0)	193.0	14.4	1.15	195.0	10	27.9
750 mg	cl_obs	(3.02, 5.02)	3.82	15.6	1.17	3.86	10	0.599
750 mg	cmax	(8.04, 16.3)	11.3	24.4	1.27	11.6	10	2.81
750 mg	half_life	(7.79, 19.9)	10.7	30.4	1.35	11.1	10	3.73
750 mg	tmax	(2.0, 2.0)	2.0	0.0	1.0	2.0	10	0.0
750 mg	vz_obs	(39.2, 87.9)	58.8	27.3	1.31	60.7	10	16.2

3 NCA parameters

Table 2: NCA parameters (doseamt to aucinf_pred)

id	group	doseamt	tmax	cmax	tlast	clast	clast_pred	auclast	kel	half_life	aucinf_obs	aucinf_pred
1	1000 mg	1000	2.0	21.1	72.0	0.178	0.178	348.0	0.0682	10.2	350.0	350.0
2	1000 mg	1000	2.0	8.75	72.0	0.65	0.65	234.0	0.0371	18.7	251.0	251.0
3	1000 mg	1000	2.0	14.5	72.0	0.108	0.108	234.0	0.07	9.91	235.0	235.0
4	1000 mg	1000	2.0	16.2	72.0	0.211	0.211	289.0	0.062	11.2	293.0	293.0
5	1000 mg	1000	2.0	13.5	72.0	0.0288	0.0288	179.0	0.0879	7.89	179.0	179.0
6	1000 mg	1000	2.0	9.95	72.0	0.164	0.164	186.0	0.0587	11.8	189.0	189.0
7	1000 mg	1000	2.0	12.4	72.0	0.608	0.608	297.0	0.0431	16.1	311.0	311.0
8	1000 mg	1000	2.0	12.4	72.0	0.476	0.476	279.0	0.0466	14.9	289.0	289.0
9	1000 mg	1000	2.0	13.6	72.0	0.292	0.292	269.0	0.0549	12.6	274.0	274.0
10	1000 mg	1000	2.0	15.1	72.0	0.901	0.901	380.0	0.0403	17.2	402.0	402.0
21	500 mg	500	2.0	11.8	72.0	0.0323	0.0323	162.0	0.0842	8.23	162.0	162.0
22	500 mg	500	2.0	8.03	72.0	0.00825	0.00825	96.7	0.0983	7.05	96.8	96.8
23	500 mg	500	2.0	7.93	72.0	0.00612	0.00612	92.2	0.102	6.77	92.2	92.2
24	500 mg	500	2.0	6.54	72.0	0.137	0.137	129.0	0.0552	12.6	131.0	131.0
25	500 mg	500	2.0	8.47	72.0	0.0709	0.0709	140.0	0.0683	10.1	141.0	141.0
26	500 mg	500	2.0	8.76	72.0	0.0675	0.0675	142.0	0.0695	9.97	143.0	143.0
27	500 mg	500	2.0	6.97	72.0	0.104	0.104	128.0	0.0601	11.5	130.0	130.0
28	500 mg	500	2.0	7.86	72.0	0.0753	0.0753	133.0	0.0664	10.4	134.0	134.0
29	500 mg	500	2.0	7.09	72.0	0.0899	0.0899	126.0	0.0624	11.1	128.0	128.0
30	500 mg	500	2.0	3.21	72.0	0.377	0.377	97.9	0.0306	22.7	110.0	110.0
11	750 mg	750	2.0	8.04	72.0	0.701	0.701	225.0	0.0349	19.9	245.0	245.0
12	750 mg	750	2.0	10.8	72.0	0.0768	0.0768	173.0	0.0707	9.81	174.0	174.0
13	750 mg	750	2.0	16.3	72.0	0.0321	0.0321	214.0	0.089	7.79	215.0	215.0
14	750 mg	750	2.0	13.4	72.0	0.0457	0.0457	190.0	0.0811	8.54	191.0	191.0
15	750 mg	750	2.0	9.57	72.0	0.25	0.25	197.0	0.0521	13.3	202.0	202.0
16	750 mg	750	2.0	15.0	72.0	0.0308	0.0308	198.0	0.0884	7.84	199.0	199.0
17	750 mg	750	2.0	10.8	72.0	0.0904	0.0904	177.0	0.0683	10.2	179.0	179.0
18	750 mg	750	2.0	13.5	72.0	0.192	0.192	245.0	0.0607	11.4	249.0	249.0
19	750 mg	750	2.0	10.2	72.0	0.0421	0.0421	149.0	0.0784	8.85	149.0	149.0
20	750 mg	750	2.0	8.39	72.0	0.248	0.248	178.0	0.0503	13.8	183.0	183.0

Table 3: NCA parameters (vz_obs to auclast_dn)

id	group	vz_obs	cl_obs	vz_pred	cl_pred	vss_obs	vss_pred	n_samples	cmax_dn	auclast_dn
1	1000 mg	41.8	2.85	41.8	2.85	39.7	39.7	9	0.0211	0.348
2	1000 mg	107.0	3.98	107.0	3.98	103.0	103.0	9	0.00875	0.234
3	1000 mg	60.7	4.25	60.7	4.25	57.8	57.8	9	0.0145	0.234
4	1000 mg	55.1	3.42	55.1	3.42	52.2	52.2	9	0.0162	0.289
5	1000 mg	63.5	5.58	63.5	5.58	61.1	61.1	9	0.0135	0.179
6	1000 mg	90.2	5.29	90.2	5.29	85.5	85.5	9	0.00995	0.186
7	1000 mg	74.5	3.21	74.5	3.21	70.9	70.9	9	0.0124	0.297
8	1000 mg	74.2	3.45	74.2	3.45	70.4	70.4	9	0.0124	0.279
9	1000 mg	66.5	3.65	66.5	3.65	63.0	63.0	9	0.0136	0.269
10	1000 mg	61.7	2.49	61.7	2.49	58.9	58.9	9	0.0151	0.38
21	500 mg	36.6	3.08	36.6	3.08	35.1	35.1	9	0.0235	0.324
22	500 mg	52.6	5.17	52.6	5.17	51.0	51.0	9	0.0161	0.193
23	500 mg	52.9	5.42	52.9	5.42	51.5	51.5	9	0.0159	0.184
24	500 mg	69.1	3.82	69.1	3.82	65.5	65.5	9	0.0131	0.257
25	500 mg	52.1	3.56	52.1	3.56	49.5	49.5	9	0.0169	0.279
26	500 mg	50.3	3.49	50.3	3.49	47.8	47.8	9	0.0175	0.284
27	500 mg	64.2	3.86	64.2	3.86	60.8	60.8	9	0.0139	0.256
28	500 mg	56.3	3.74	56.3	3.74	53.5	53.5	9	0.0157	0.265
29	500 mg	62.8	3.92	62.8	3.92	59.6	59.6	9	0.0142	0.252
30	500 mg	148.0	4.54	148.0	4.54	143.0	143.0	9	0.00641	0.196
11	750 mg	87.9	3.06	87.9	3.06	84.4	84.4	9	0.0107	0.299
12	750 mg	60.9	4.3	60.9	4.3	57.9	57.9	9	0.0144	0.231
13	750 mg	39.2	3.49	39.2	3.49	37.8	37.8	9	0.0218	0.286
14	750 mg	48.5	3.93	48.5	3.93	46.4	46.4	9	0.0178	0.254
15	750 mg	71.2	3.71	71.2	3.71	67.5	67.5	9	0.0128	0.263
16	750 mg	42.7	3.77	42.7	3.77	41.1	41.1	9	0.02	0.264
17	750 mg	61.5	4.2	61.5	4.2	58.5	58.5	9	0.0143	0.236
18	750 mg	49.7	3.02	49.7	3.02	47.1	47.1	9	0.018	0.327
19	750 mg	64.1	5.02	64.1	5.02	61.3	61.3	9	0.0135	0.198
20	750 mg	81.6	4.1	81.6	4.1	77.3	77.3	9	0.0112	0.237

Table 4: NCA parameters (aucinf_dn_obs to aumcinf_obs)

id	group	aucinf_dn_obs	auc_extrap_obs	aucinf_dn_pred	auc_extrap_pred	aumclast	aumcinf_obs
1	1000 mg	0.35	0.743	0.35	0.743	5000.0	5230.0
2	1000 mg	0.251	6.97	0.251	6.97	4990.0	6720.0
3	1000 mg	0.235	0.656	0.235	0.656	3300.0	3430.0
4	1000 mg	0.293	1.16	0.293	1.16	4470.0	4760.0
5	1000 mg	0.179	0.183	0.179	0.183	2120.0	2140.0
6	1000 mg	0.189	1.48	0.189	1.48	2990.0	3240.0
7	1000 mg	0.311	4.53	0.311	4.53	5840.0	7180.0
8	1000 mg	0.289	3.53	0.289	3.53	5230.0	6190.0
9	1000 mg	0.274	1.94	0.274	1.94	4530.0	5010.0
10	1000 mg	0.402	5.56	0.402	5.56	7760.0	9930.0
21	500 mg	0.325	0.236	0.325	0.236	1980.0	2010.0
22	500 mg	0.194	0.0867	0.194	0.0867	1040.0	1050.0
23	500 mg	0.184	0.0648	0.184	0.0648	964.0	969.0
24	500 mg	0.262	1.89	0.262	1.89	2150.0	2380.0
25	500 mg	0.281	0.739	0.281	0.739	2010.0	2100.0
26	500 mg	0.286	0.679	0.286	0.679	2020.0	2100.0
27	500 mg	0.259	1.33	0.259	1.33	2020.0	2170.0
28	500 mg	0.267	0.848	0.267	0.848	1950.0	2050.0
29	500 mg	0.255	1.13	0.255	1.13	1940.0	2070.0
30	500 mg	0.22	11.2	0.22	11.2	2300.0	3590.0
11	750 mg	0.326	8.22	0.326	8.22	4950.0	6980.0
12	750 mg	0.232	0.624	0.232	0.624	2430.0	2520.0
13	750 mg	0.286	0.168	0.286	0.168	2510.0	2540.0
14	750 mg	0.254	0.295	0.254	0.295	2390.0	2440.0
15	750 mg	0.27	2.38	0.27	2.38	3440.0	3880.0
16	750 mg	0.265	0.175	0.265	0.175	2330.0	2360.0
17	750 mg	0.238	0.742	0.238	0.742	2550.0	2660.0
18	750 mg	0.332	1.27	0.332	1.27	3850.0	4130.0
19	750 mg	0.199	0.36	0.199	0.36	1920.0	1970.0
20	750 mg	0.244	2.7	0.244	2.7	3170.0	3630.0

Table 5: NCA parameters (aumc_extrap_obs to n_samples_kel)

id	group	aumc_extrap_obs	aumcinf_pred	aumc_extrap_pred	mrtlast	mrtinf_obs	mrtinf_pred	n_samples_kel
1	1000 mg	4.31	5230.0	4.31	13.4	13.9	13.9	7
2	1000 mg	25.8	6720.0	25.8	20.4	25.8	25.8	7
3	1000 mg	3.88	3430.0	3.88	13.1	13.6	13.6	7
4	1000 mg	6.28	4760.0	6.28	14.4	15.3	15.3	7
5	1000 mg	1.27	2140.0	1.27	10.8	11.0	11.0	7
6	1000 mg	7.67	3240.0	7.67	15.1	16.1	16.1	7
7	1000 mg	18.7	7180.0	18.7	18.6	22.1	22.1	7
8	1000 mg	15.4	6190.0	15.4	17.7	20.4	20.4	7
9	1000 mg	9.6	5010.0	9.6	15.8	17.3	17.3	7
10	1000 mg	21.8	9930.0	21.8	19.4	23.7	23.7	7
21	500 mg	1.6	2010.0	1.6	11.2	11.4	11.4	7
22	500 mg	0.655	1050.0	0.655	9.81	9.87	9.87	7
23	500 mg	0.505	969.0	0.505	9.46	9.5	9.5	7
24	500 mg	9.4	2380.0	9.4	15.8	17.2	17.2	7
25	500 mg	4.29	2100.0	4.29	13.4	13.9	13.9	7
26	500 mg	3.99	2100.0	3.99	13.2	13.7	13.7	7
27	500 mg	7.05	2170.0	7.05	14.8	15.8	15.8	7
28	500 mg	4.83	2050.0	4.83	13.7	14.3	14.3	7
29	500 mg	6.14	2070.0	6.14	14.4	15.2	15.2	7
30	500 mg	36.0	3590.0	36.0	22.5	31.5	31.5	7
11	750 mg	29.0	6980.0	29.0	21.1	27.5	27.5	7
12	750 mg	3.72	2520.0	3.72	13.0	13.5	13.5	7
13	750 mg	1.18	2540.0	1.18	10.7	10.8	10.8	7
14	750 mg	1.94	2440.0	1.94	11.6	11.8	11.8	7
15	750 mg	11.3	3880.0	11.3	16.4	18.2	18.2	7
16	750 mg	1.23	2360.0	1.23	10.8	10.9	10.9	7
17	750 mg	4.31	2660.0	4.31	13.4	13.9	13.9	7
18	750 mg	6.78	4130.0	6.78	14.7	15.6	15.6	7
19	750 mg	2.31	1970.0	2.31	11.9	12.2	12.2	7
20	750 mg	12.5	3630.0	12.5	16.8	18.8	18.8	7

Table 6: NCA parameters (rsq_kel to route)

id	group	rsq_kel	rsq_adj_kel	corr_kel	intercept_kel	kel_t_low	kel_t_high	span	route
1	1000 mg	1.0	1.0	1.0	3.19	2.0	72.0	6.89	IVInfusion
2	1000 mg	1.0	1.0	1.0	2.24	2.0	72.0	3.75	IVInfusion
3	1000 mg	1.0	1.0	1.0	2.81	2.0	72.0	7.07	IVInfusion
4	1000 mg	1.0	1.0	1.0	2.91	2.0	72.0	6.26	IVInfusion
5	1000 mg	1.0	1.0	1.0	2.78	2.0	72.0	8.87	IVInfusion
6	1000 mg	1.0	1.0	1.0	2.41	2.0	72.0	5.93	IVInfusion
7	1000 mg	1.0	1.0	1.0	2.61	2.0	72.0	4.35	IVInfusion
8	1000 mg	1.0	1.0	1.0	2.61	2.0	72.0	4.7	IVInfusion
9	1000 mg	1.0	1.0	1.0	2.72	2.0	72.0	5.54	IVInfusion
10	1000 mg	1.0	1.0	1.0	2.79	2.0	72.0	4.07	IVInfusion
21	500 mg	1.0	1.0	1.0	2.63	2.0	72.0	8.51	IVInfusion
22	500 mg	1.0	1.0	1.0	2.28	2.0	72.0	9.93	IVInfusion
23	500 mg	1.0	1.0	1.0	2.28	2.0	72.0	10.3	IVInfusion
24	500 mg	1.0	1.0	1.0	1.99	2.0	72.0	5.58	IVInfusion
25	500 mg	1.0	1.0	1.0	2.27	2.0	72.0	6.9	IVInfusion
26	500 mg	1.0	1.0	1.0	2.31	2.0	72.0	7.02	IVInfusion
27	500 mg	1.0	1.0	1.0	2.06	2.0	72.0	6.07	IVInfusion
28	500 mg	1.0	1.0	1.0	2.19	2.0	72.0	6.71	IVInfusion
29	500 mg	1.0	1.0	1.0	2.08	2.0	72.0	6.3	IVInfusion
30	500 mg	1.0	1.0	1.0	1.23	2.0	72.0	3.09	IVInfusion
11	750 mg	1.0	1.0	1.0	2.15	2.0	72.0	3.52	IVInfusion
12	750 mg	1.0	1.0	1.0	2.52	2.0	72.0	7.14	IVInfusion
13	750 mg	1.0	1.0	1.0	2.97	2.0	72.0	8.99	IVInfusion
14	750 mg	1.0	1.0	1.0	2.76	2.0	72.0	8.19	IVInfusion
15	750 mg	1.0	1.0	1.0	2.36	2.0	72.0	5.26	IVInfusion
16	750 mg	1.0	1.0	1.0	2.89	2.0	72.0	8.93	IVInfusion
17	750 mg	1.0	1.0	1.0	2.51	2.0	72.0	6.89	IVInfusion
18	750 mg	1.0	1.0	1.0	2.72	2.0	72.0	6.13	IVInfusion
19	750 mg	1.0	1.0	1.0	2.47	2.0	72.0	7.91	IVInfusion
20	750 mg	1.0	1.0	1.0	2.23	2.0	72.0	5.08	IVInfusion

4 Parameter Distribution

Figure 2: Parameter (aucinf_obs) Distribution

Figure 3: Parameter (auclast) Distribution
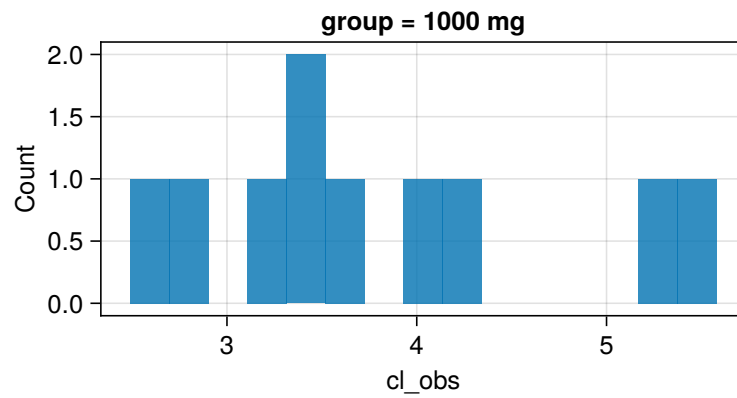
Figure 4: Parameter (cl_obs) Distribution
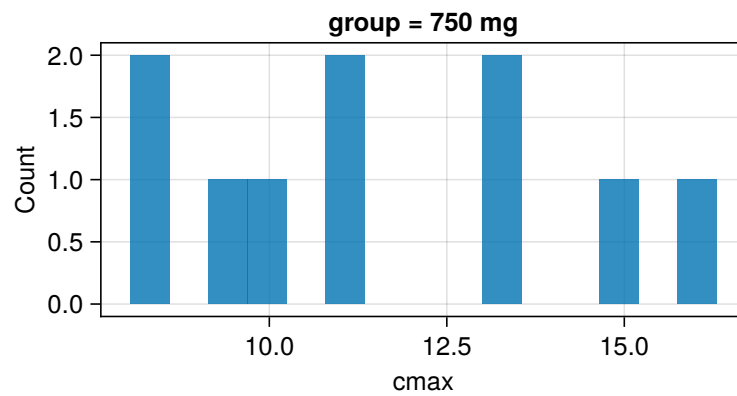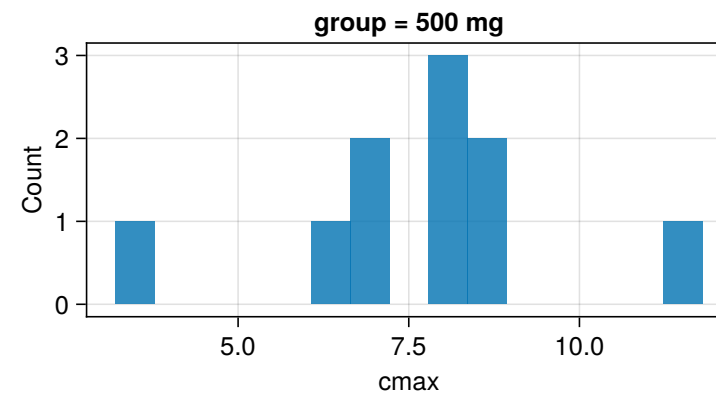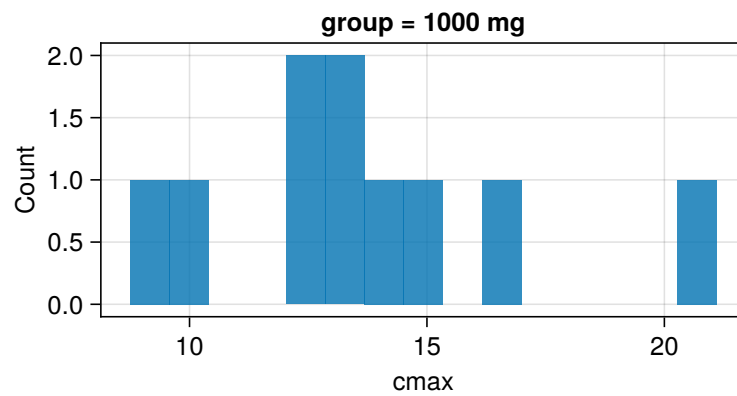
Figure 5: Parameter (cmax) Distribution
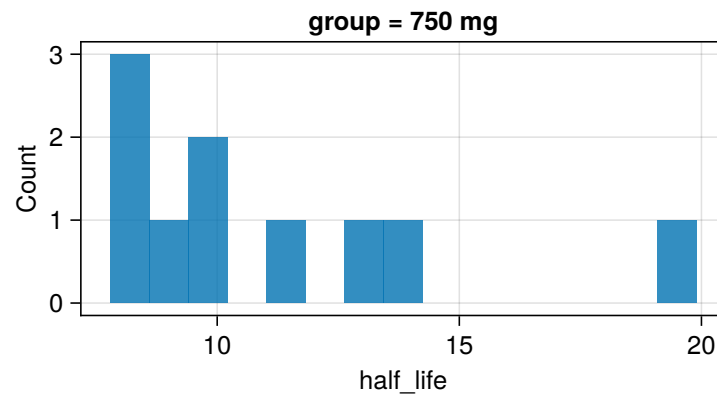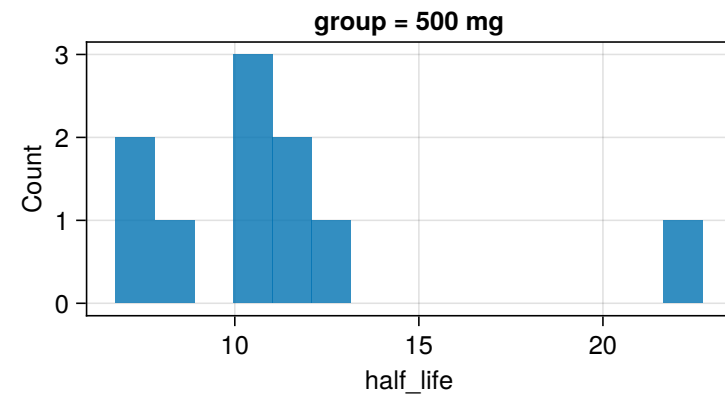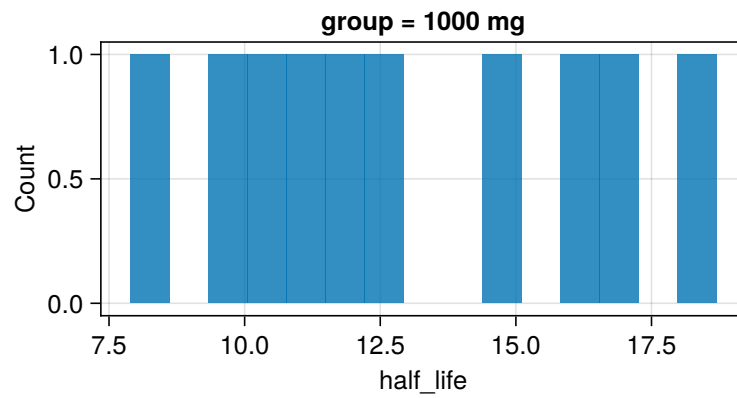
Figure 6: Parameter (half_life) Distribution
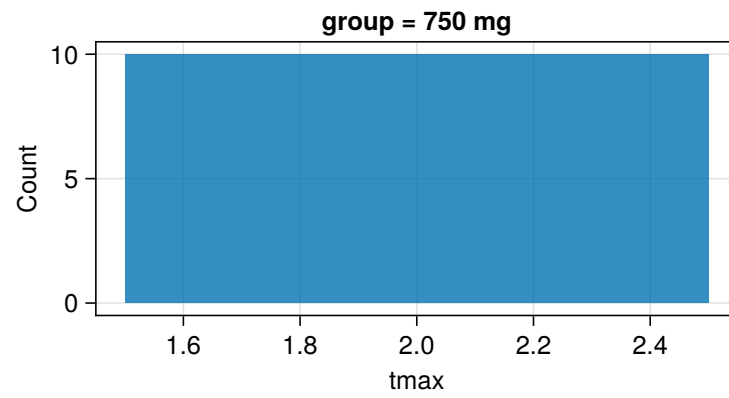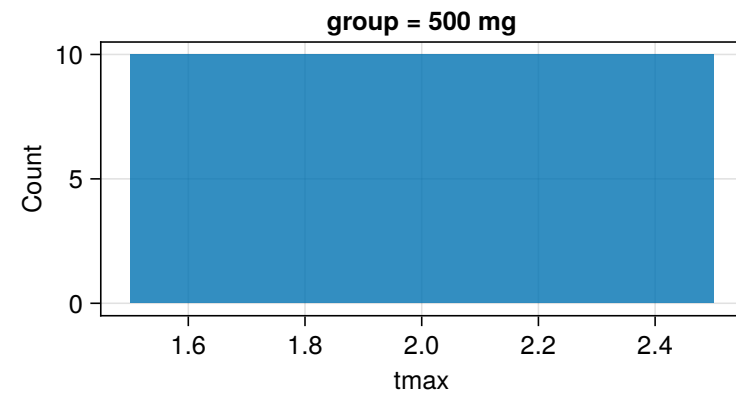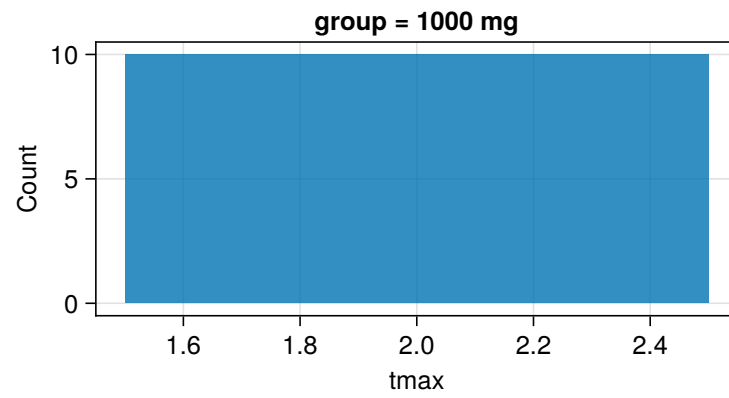
Figure 7: Parameter (tmax) Distribution
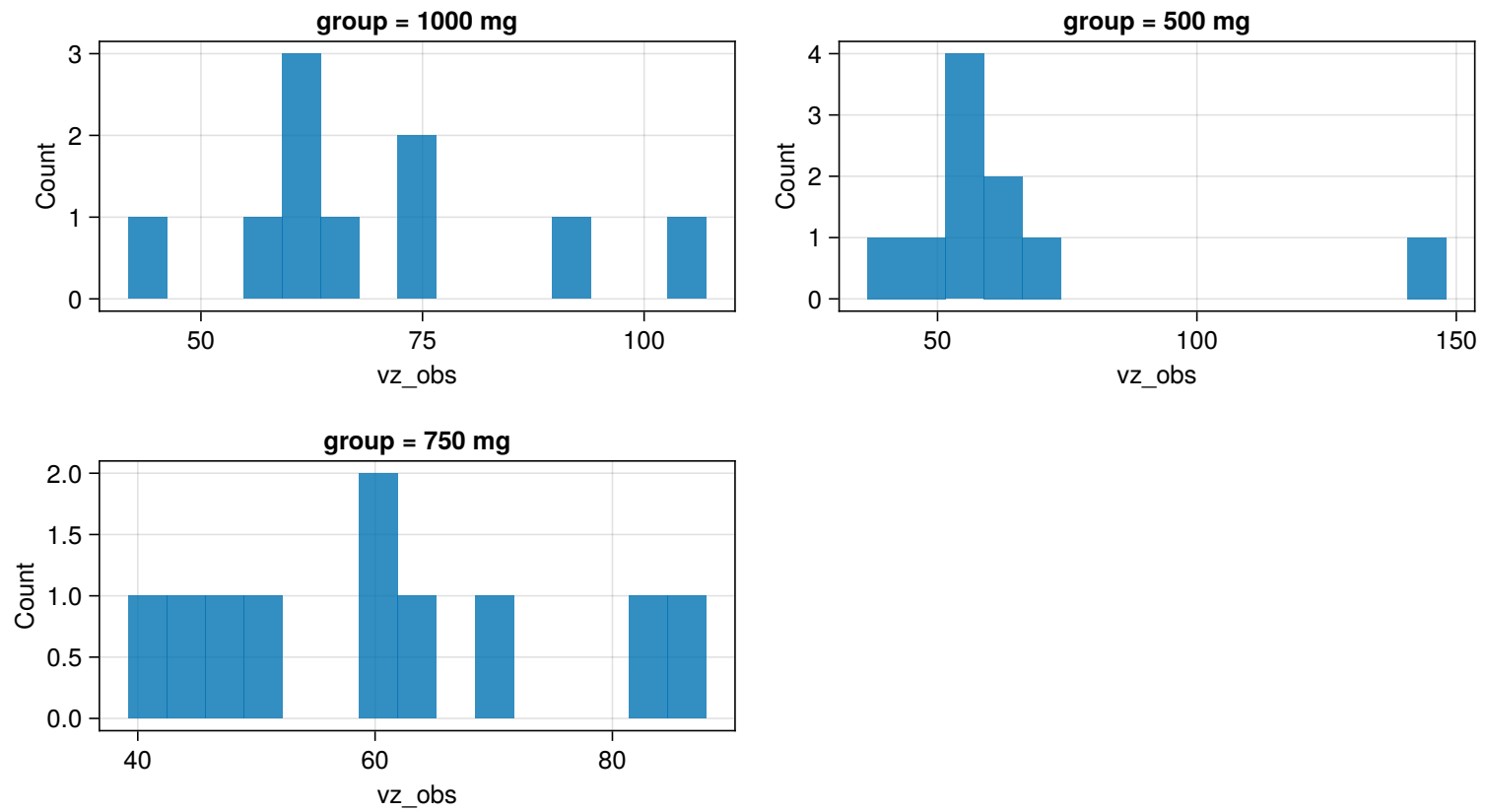
Figure 8: Parameter (vz_obs) Distribution
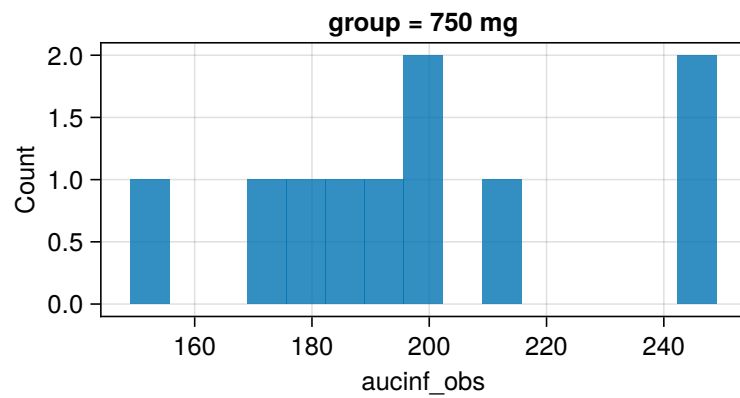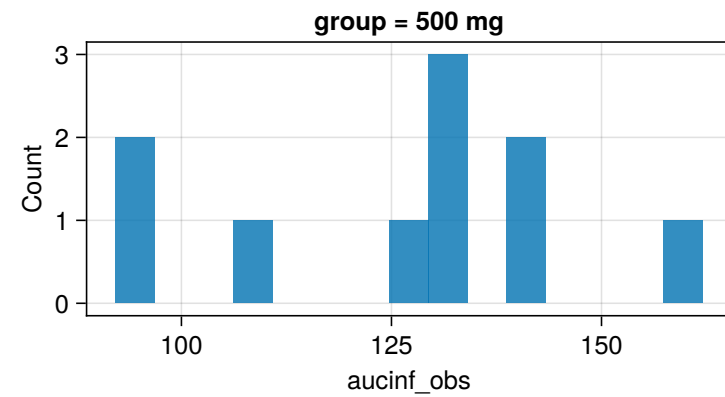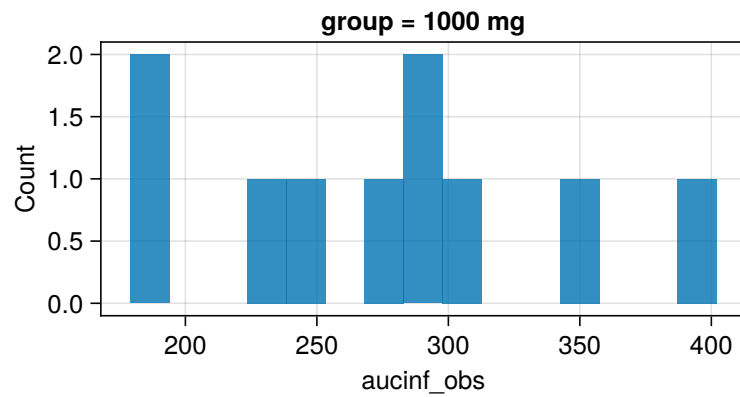
Figure 9: Parameter (aucinf_obs) Distribution
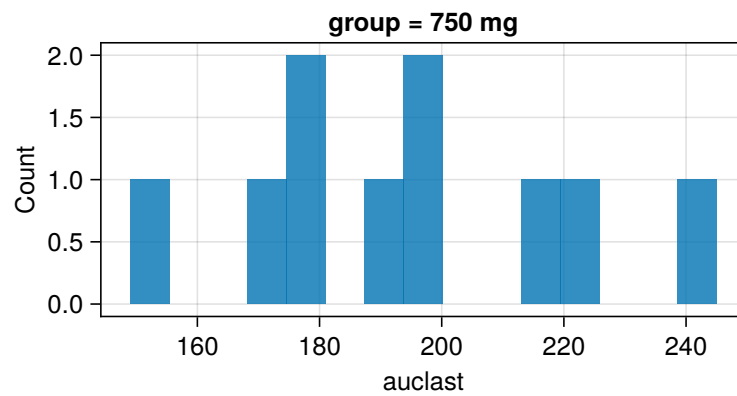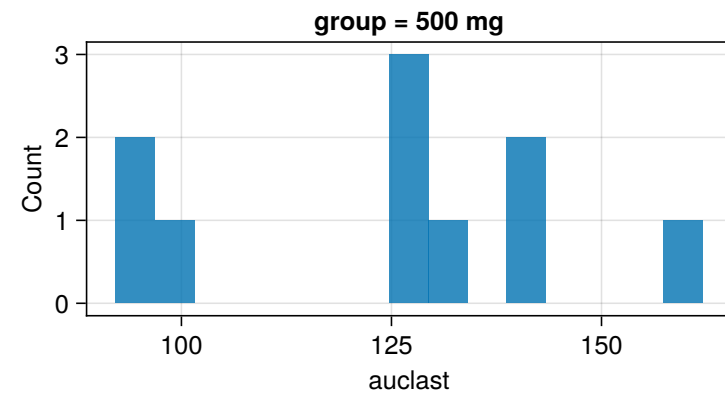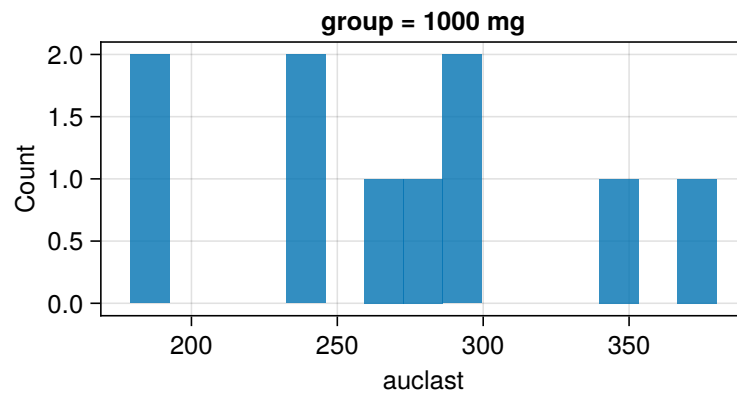
Figure 10: Parameter (auclast) Distribution
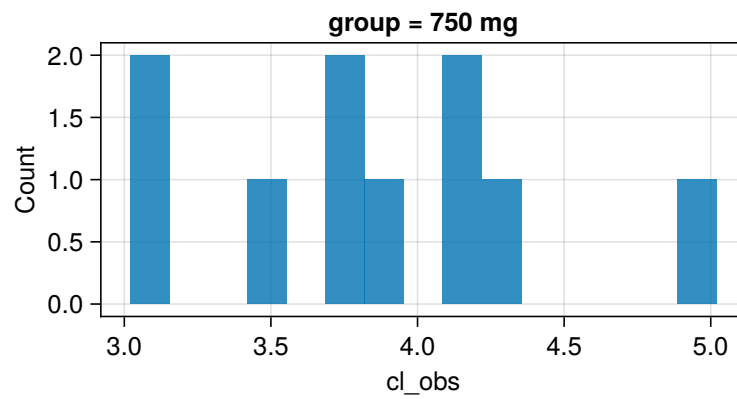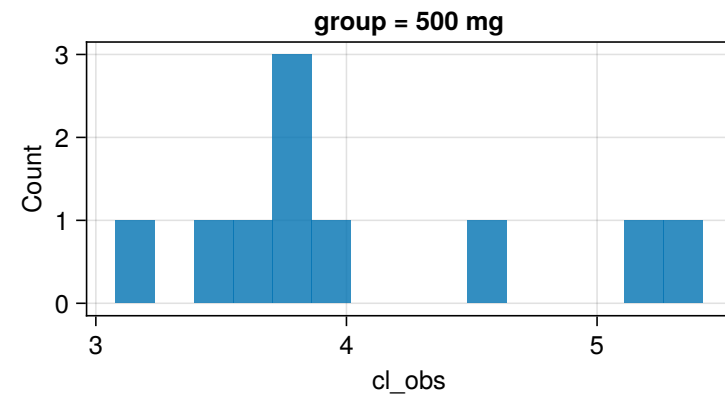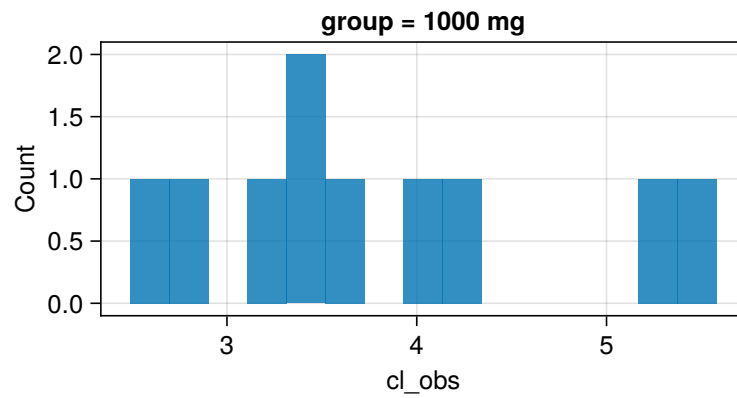
Figure 11: Parameter (cl_obs) Distribution
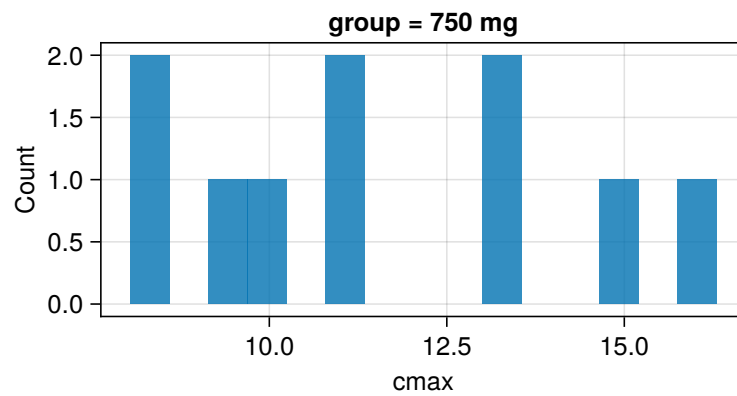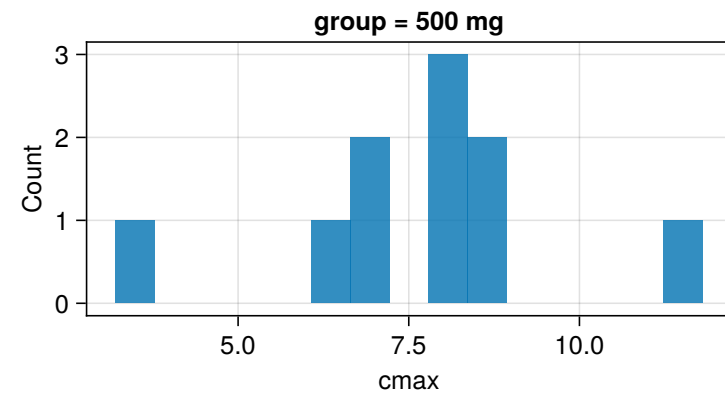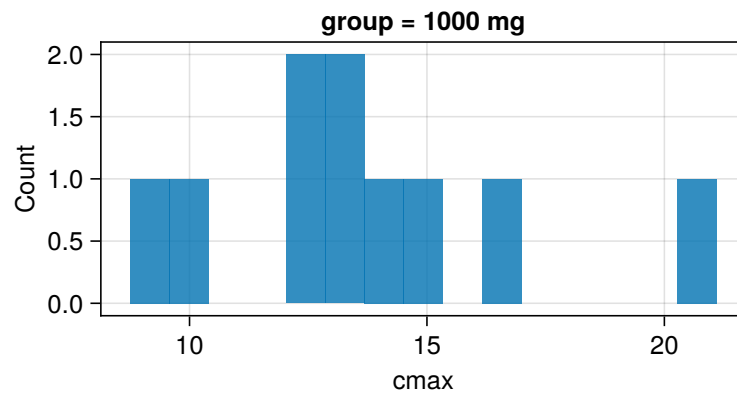
Figure 12: Parameter (cmax) Distribution
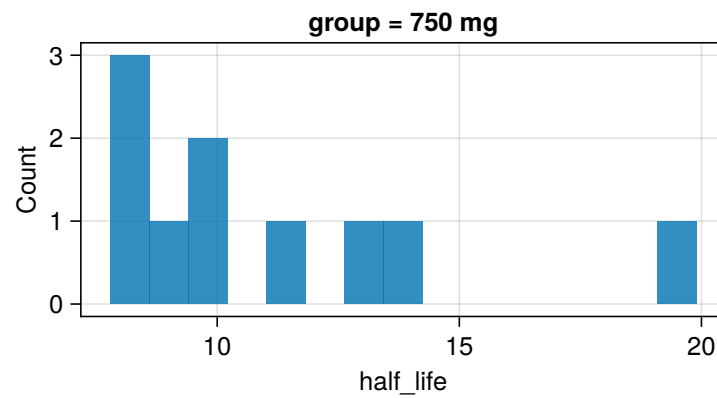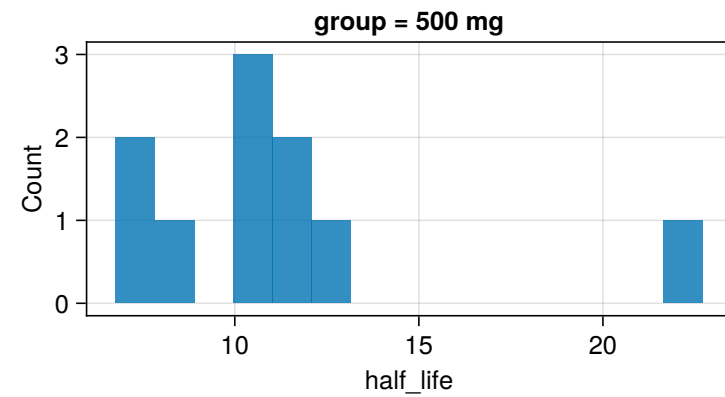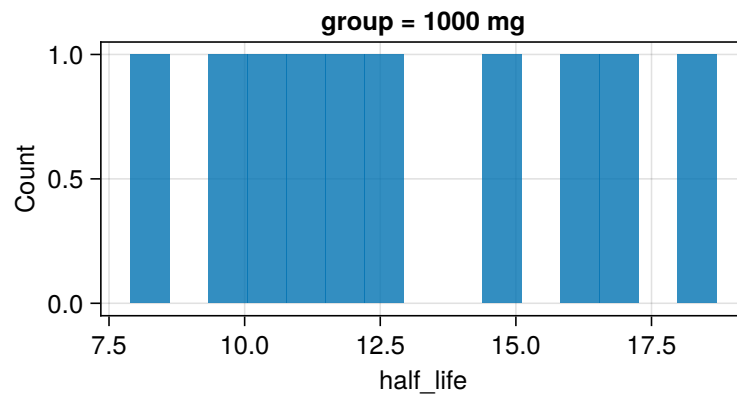
Figure 13: Parameter (half_life) Distribution
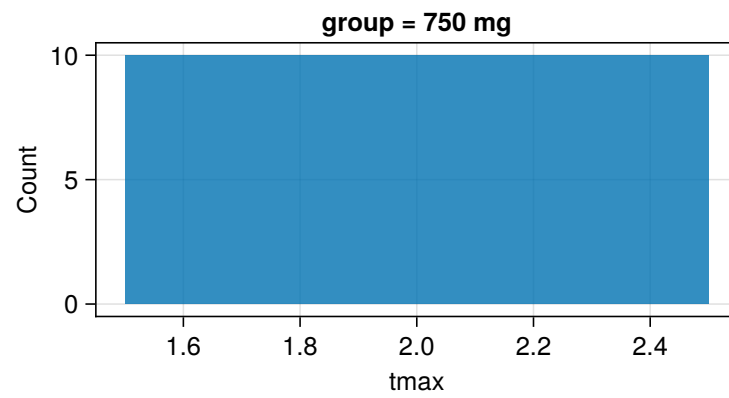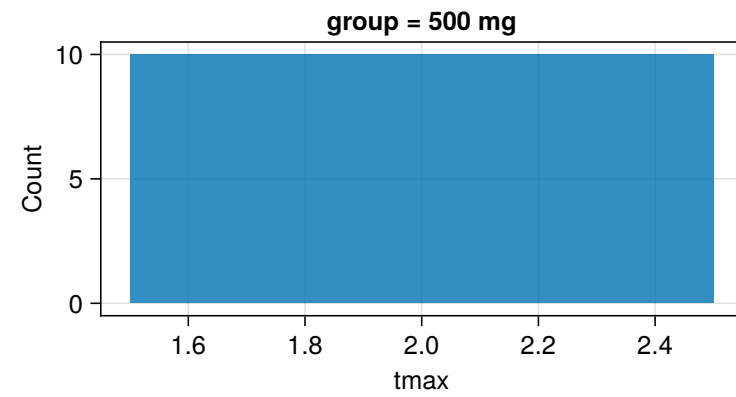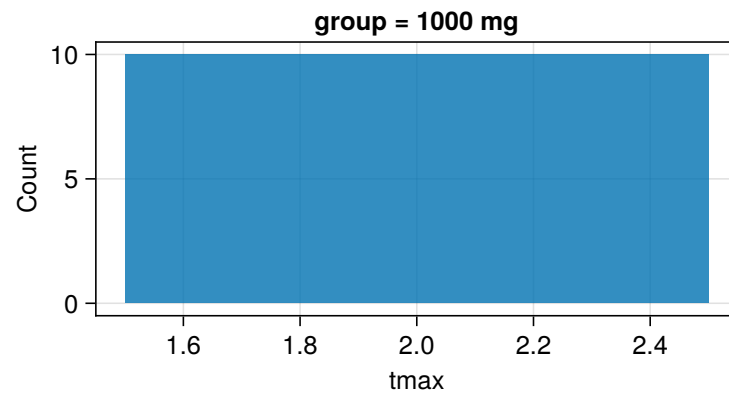
Figure 14: Parameter (tmax) Distribution
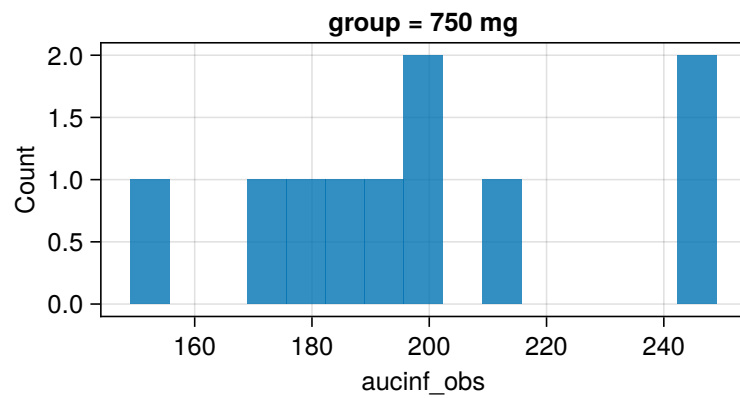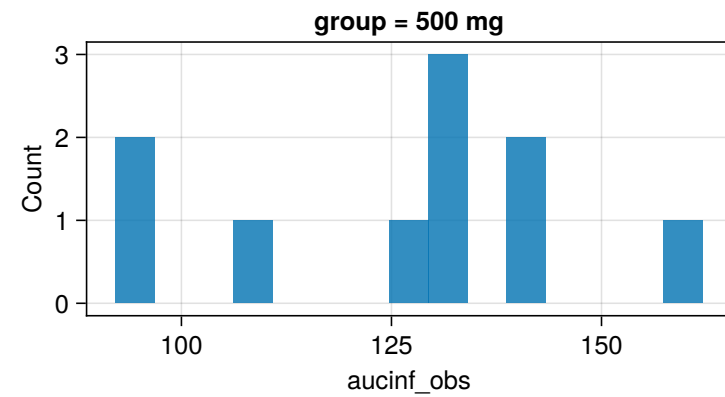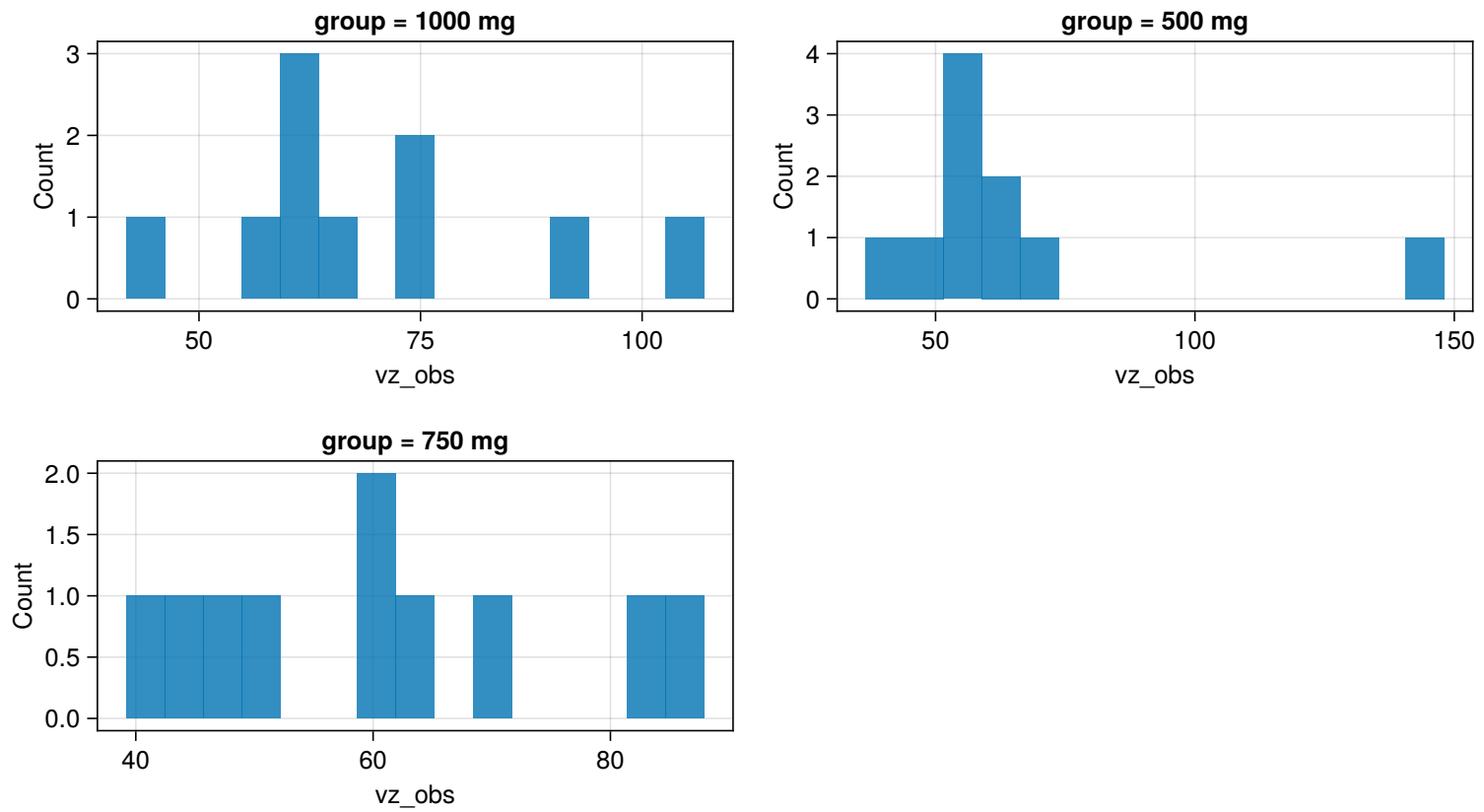
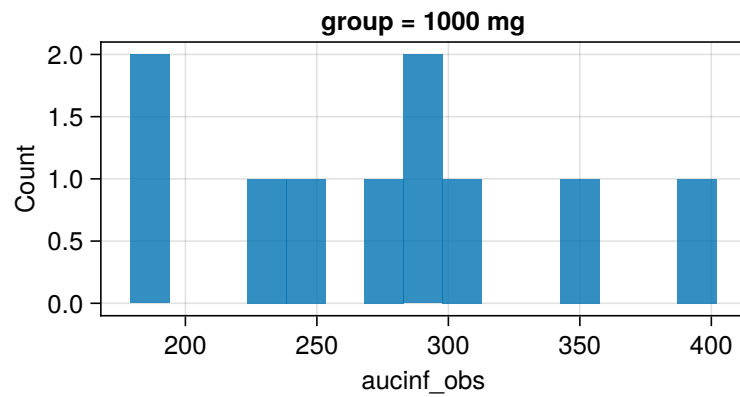Figure 15: Parameter (vz_obs) Distribution
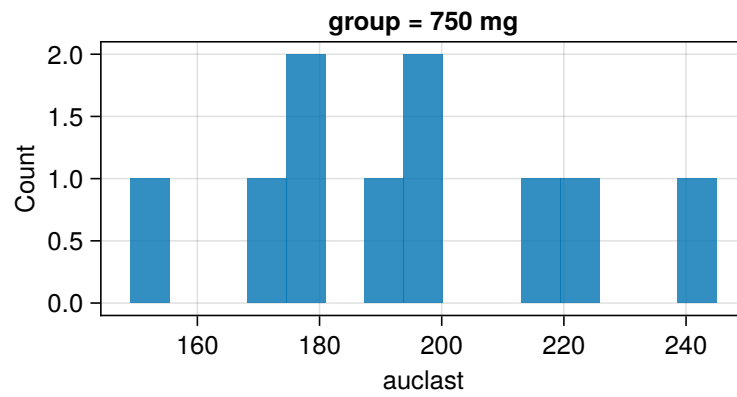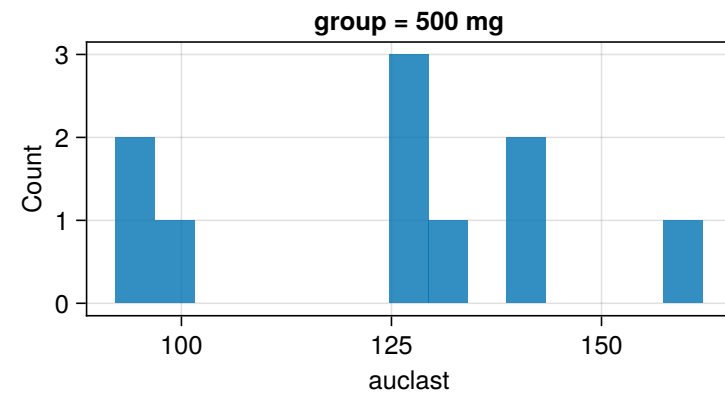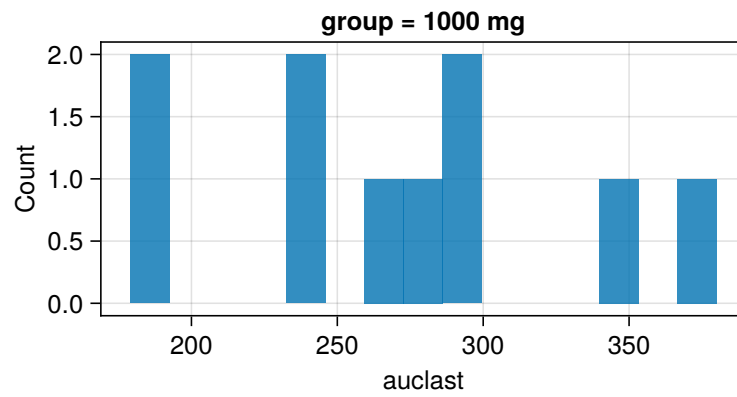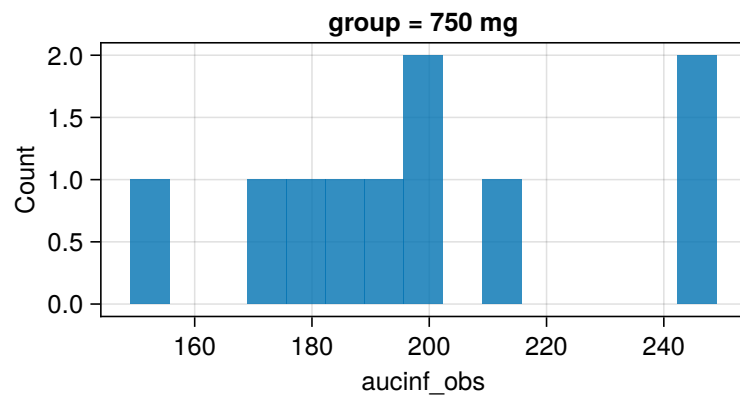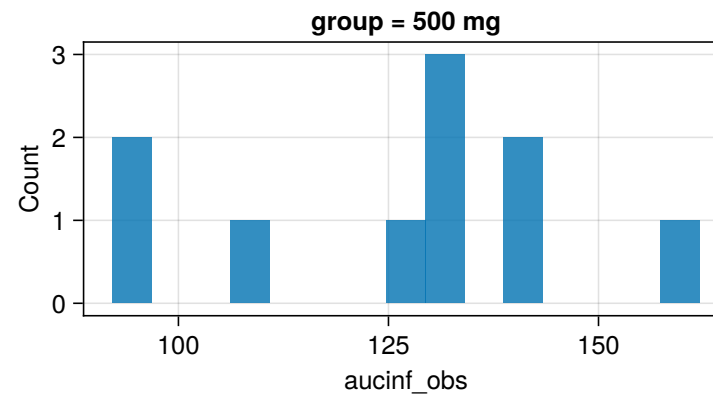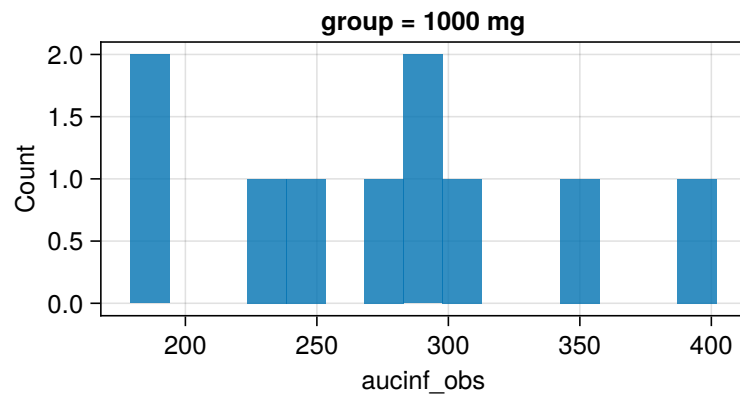
Figure 16: Parameter (aucinf_obs) Distribution
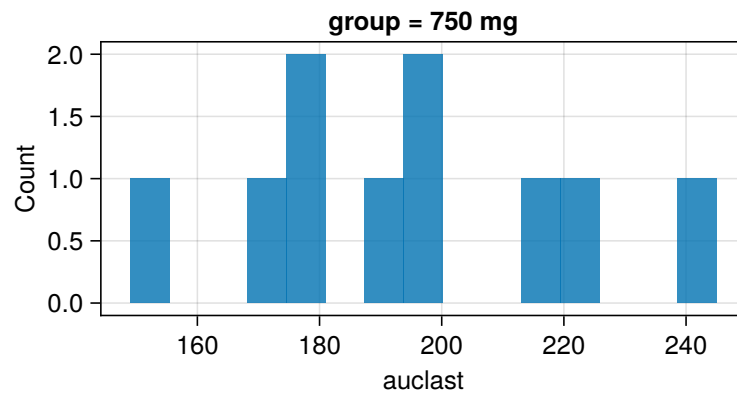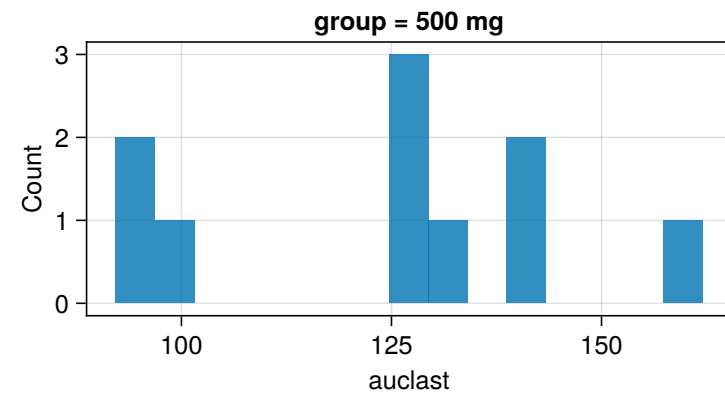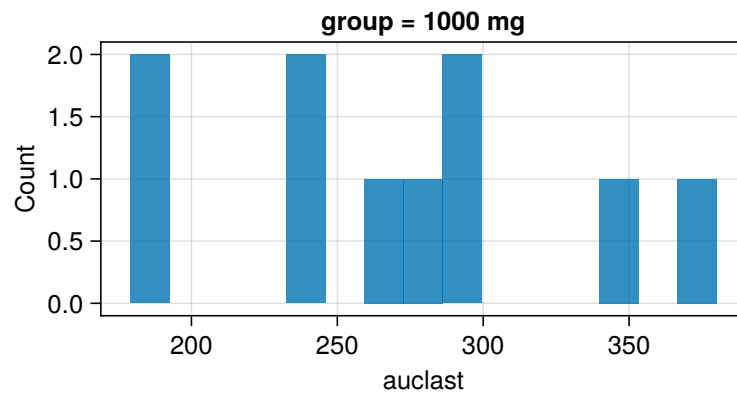
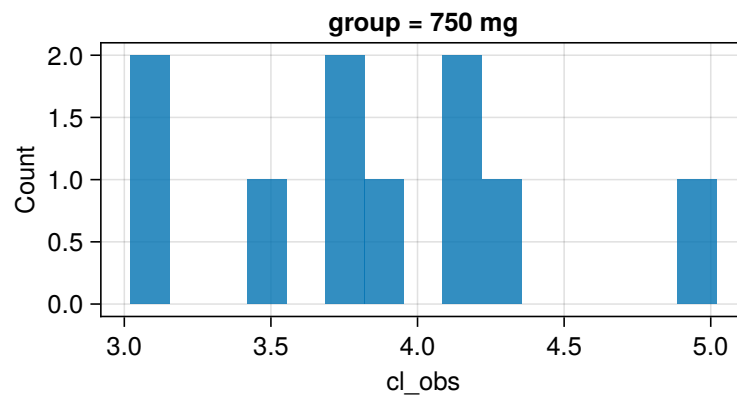Figure 17: Parameter (auclast) Distribution
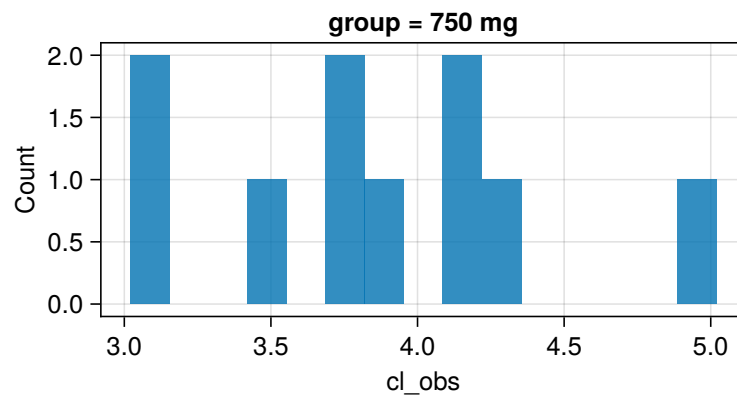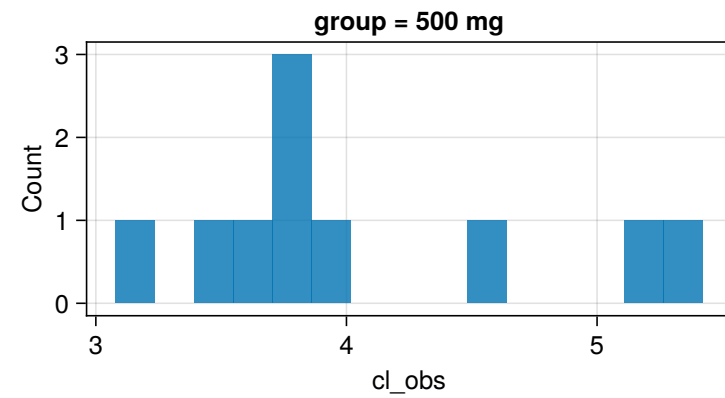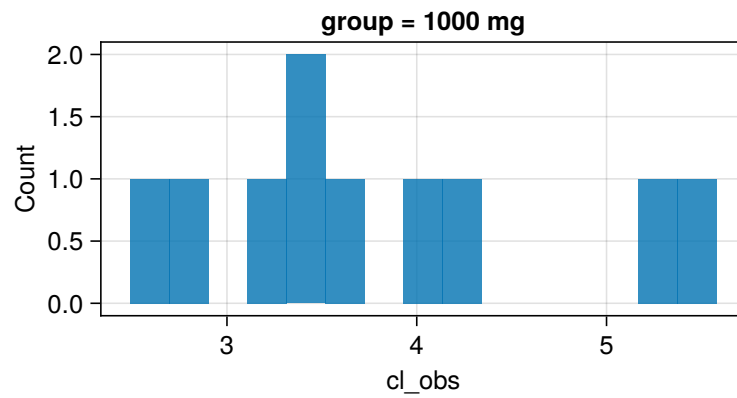
Figure 18: Parameter (cl_obs) Distribution
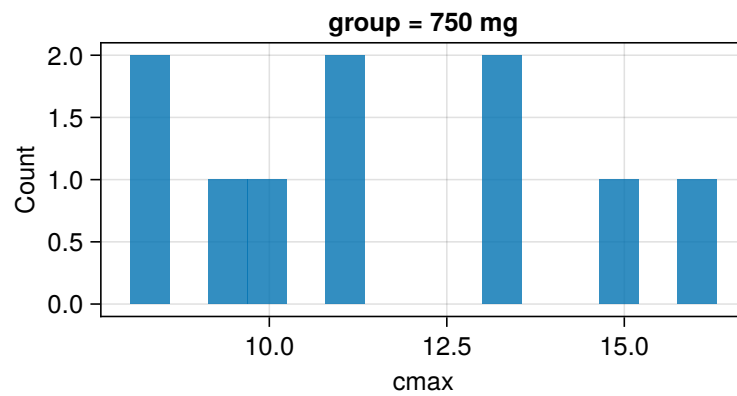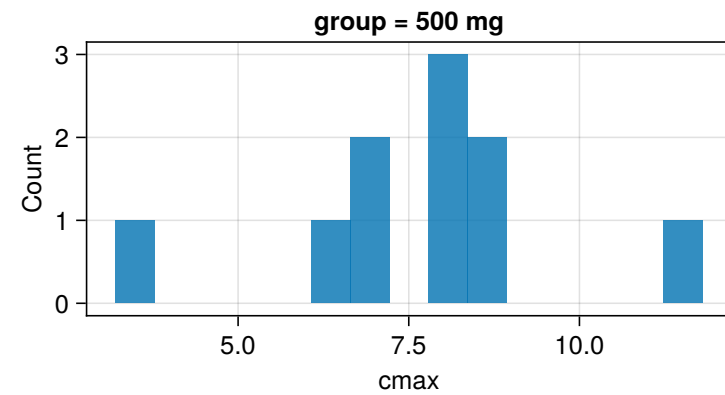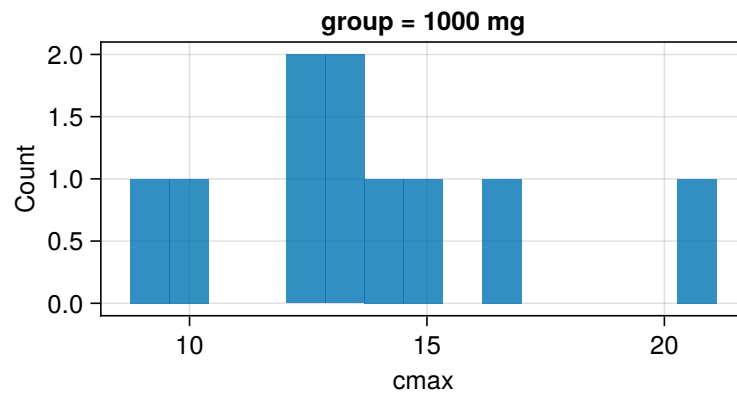
Figure 19: Parameter (cmax) Distribution

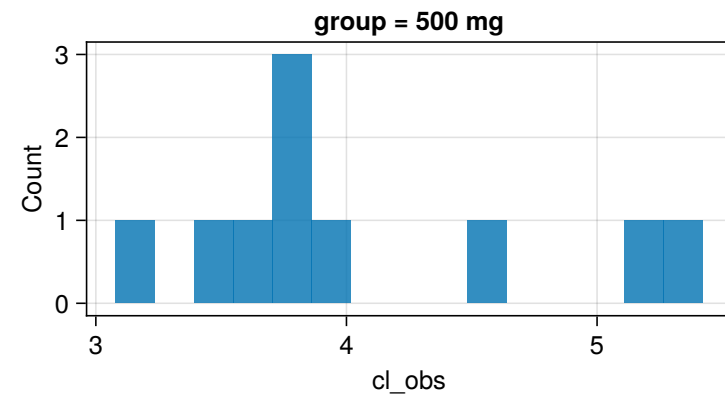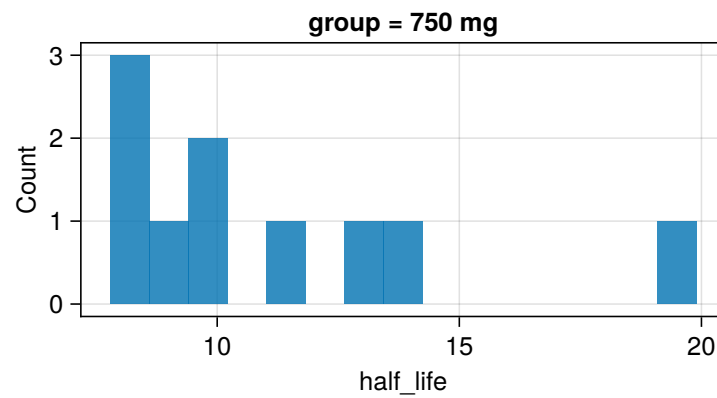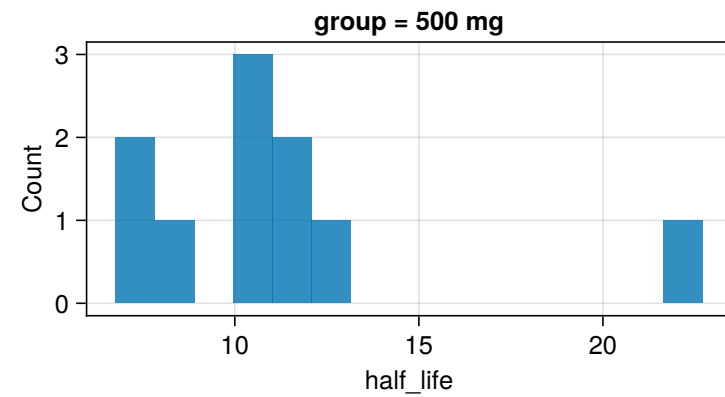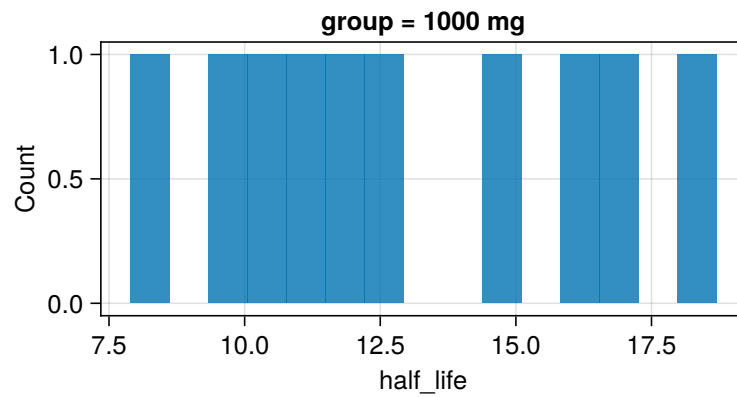Figure 20: Parameter (half_life) Distribution
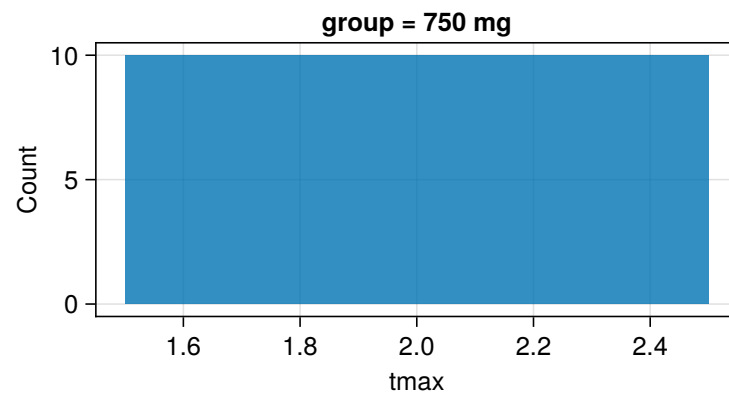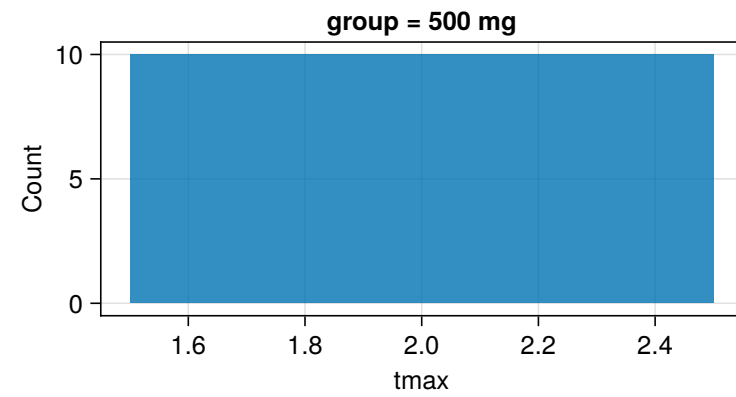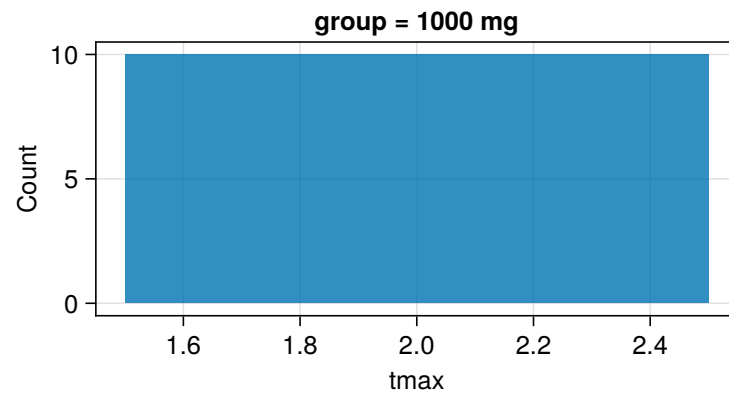
Figure 21: Parameter (tmax) Distribution
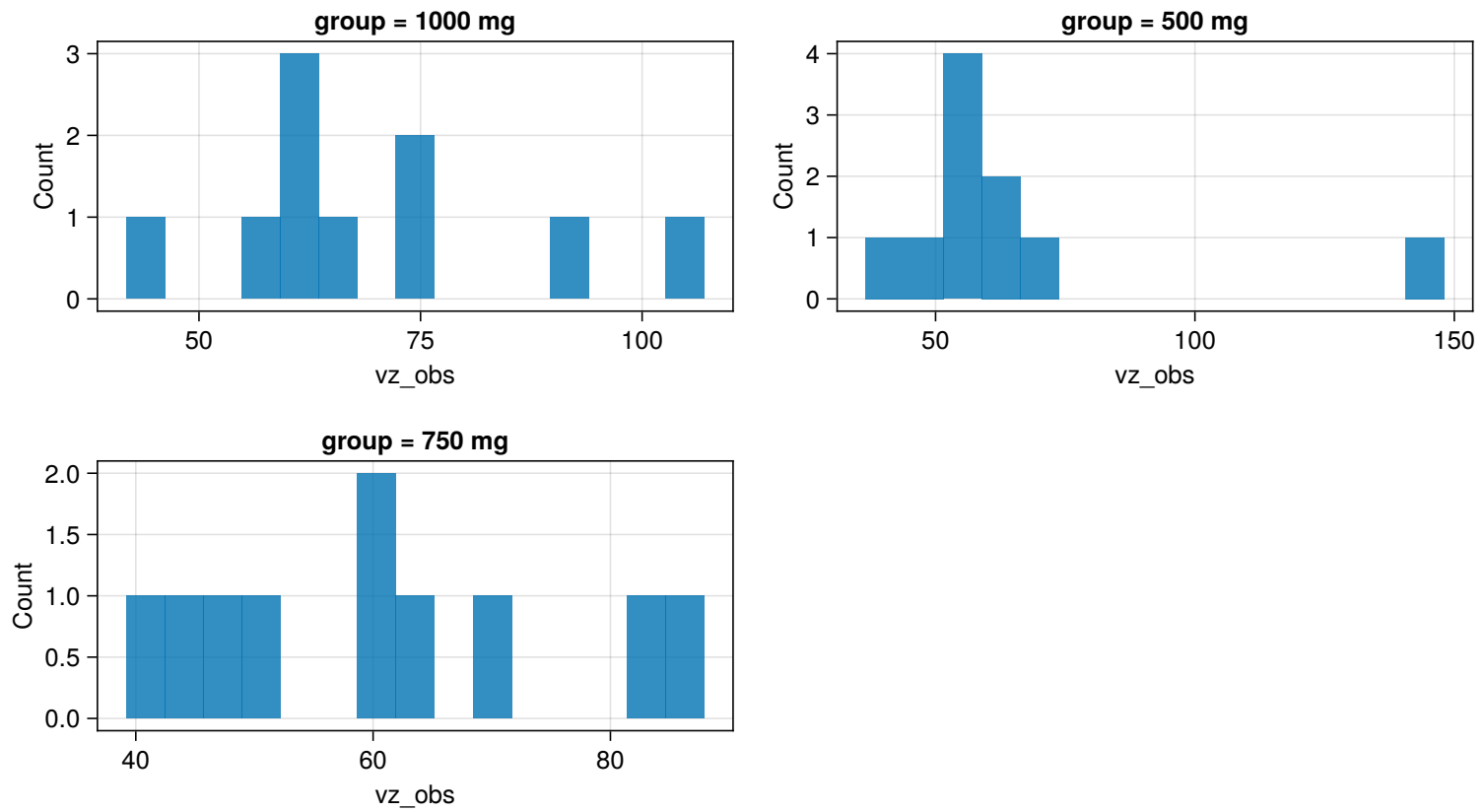
Figure 22: Parameter (vz_obs) Distribution

5 Parameters vs Group
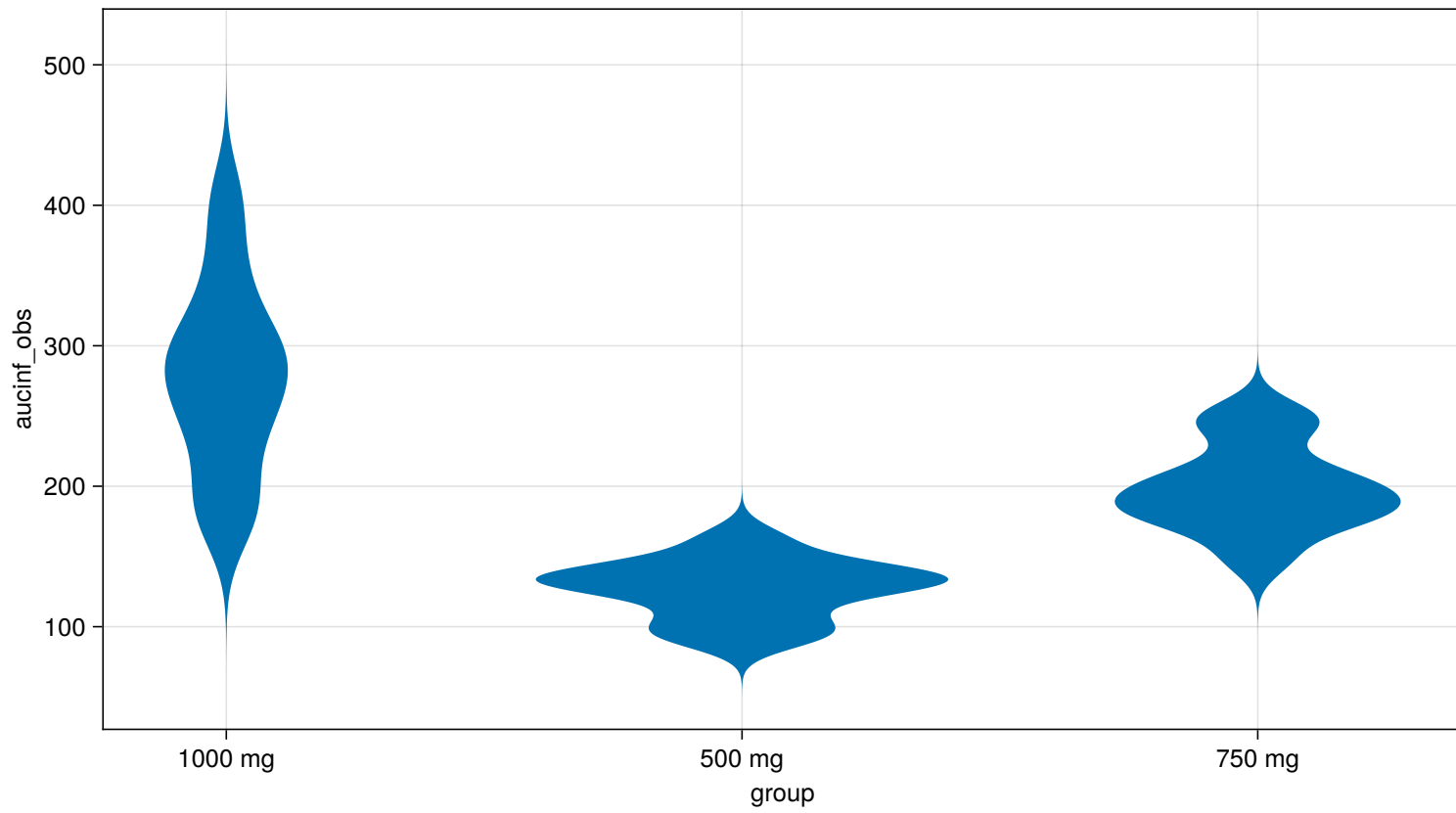
Figure 23: Parameter (aucinf_obs) vs Group
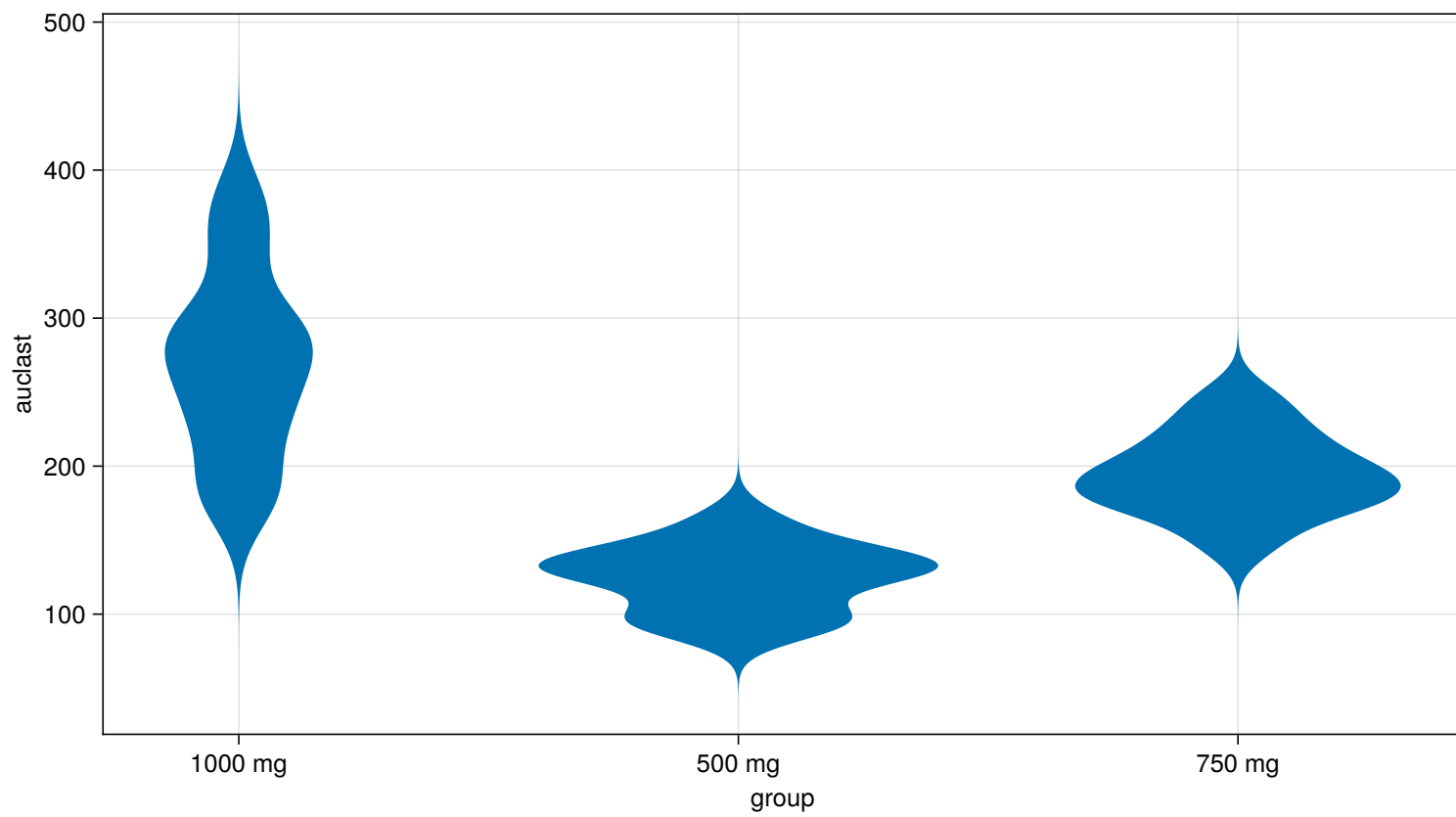
Figure 24: Parameter (auclast) vs Group
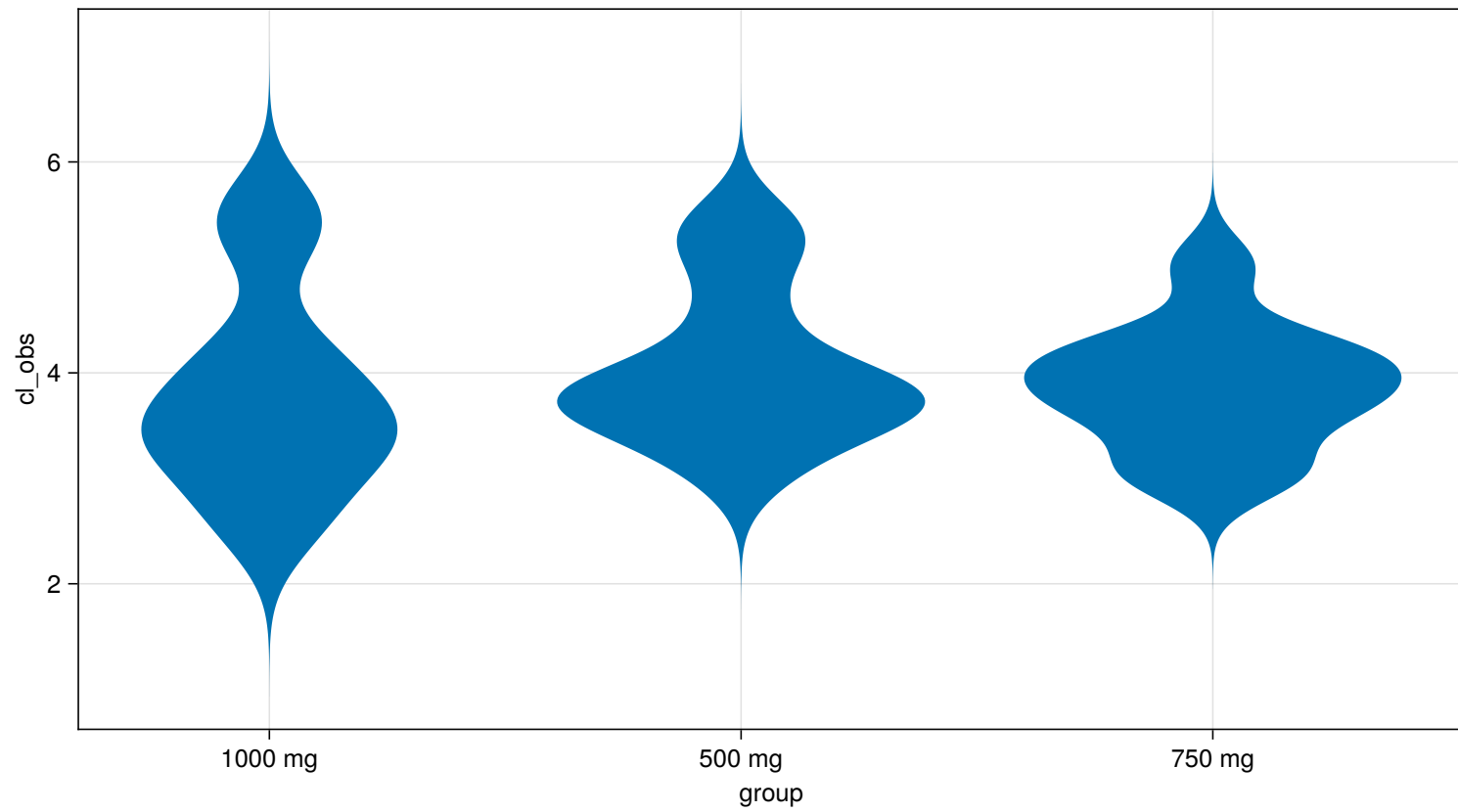
Figure 25: Parameter (cl_obs) vs Group
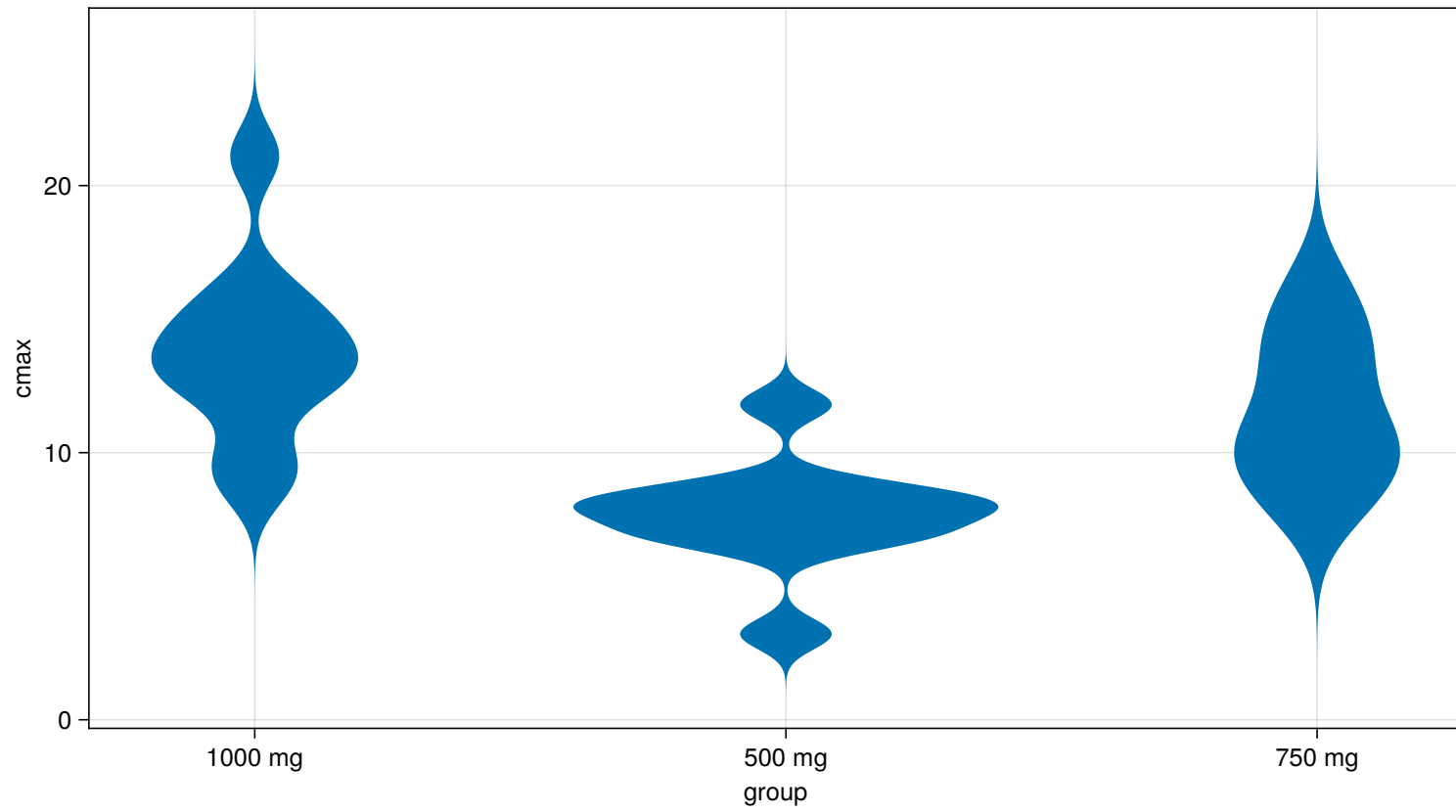
Figure 26: Parameter (cmax) vs Group
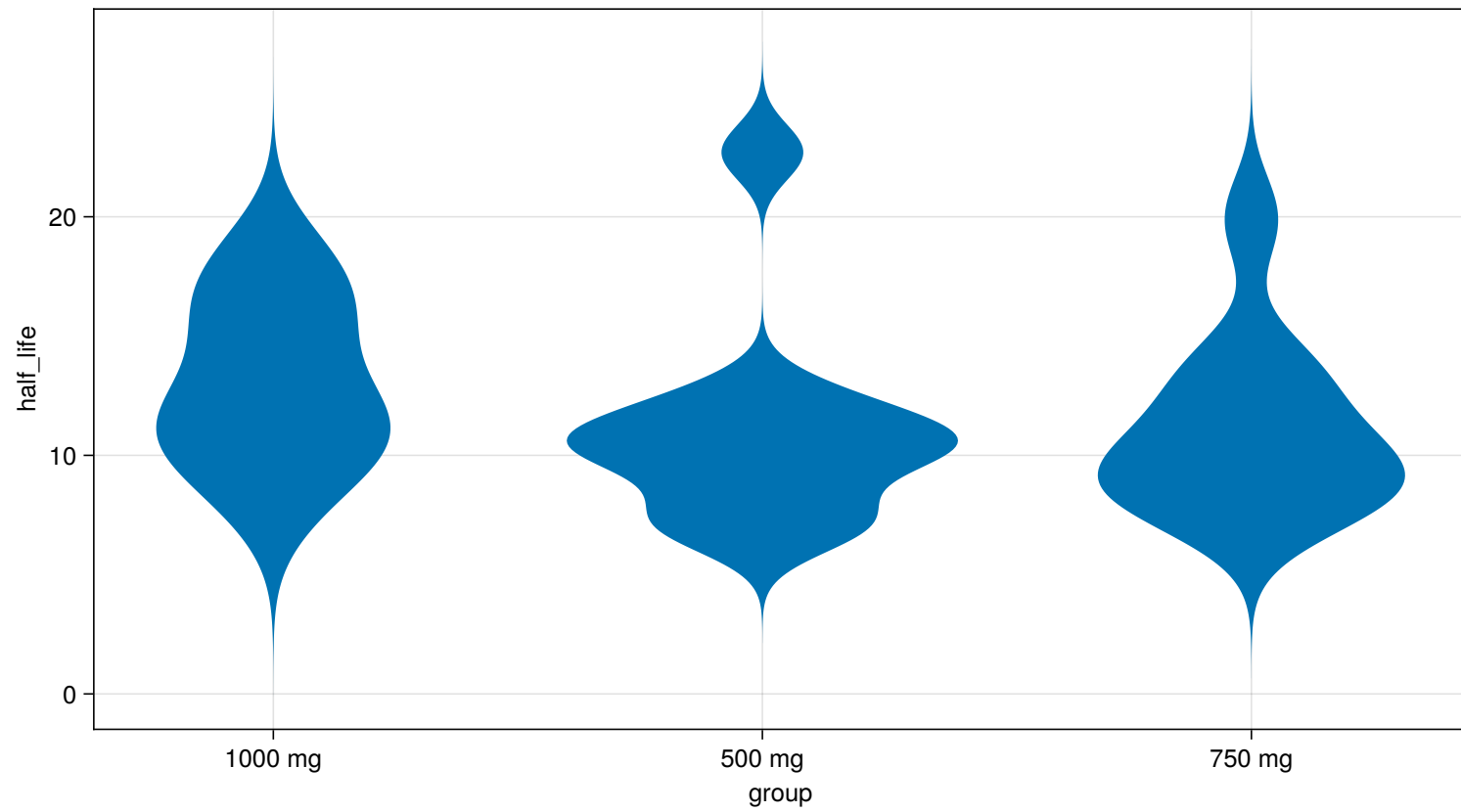
Figure 27: Parameter (half_life) vs Group
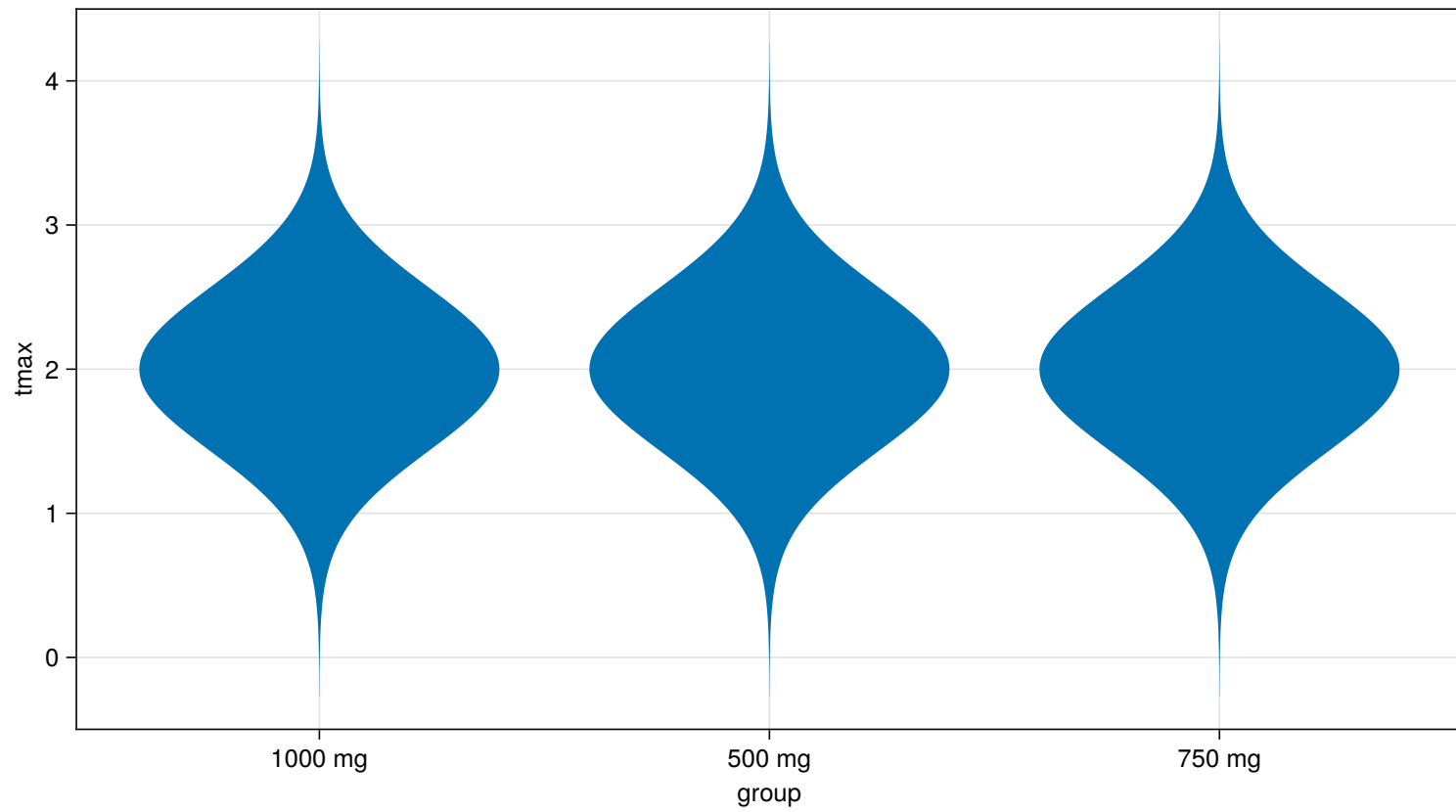
Figure 28: Parameter (tmax) vs Group
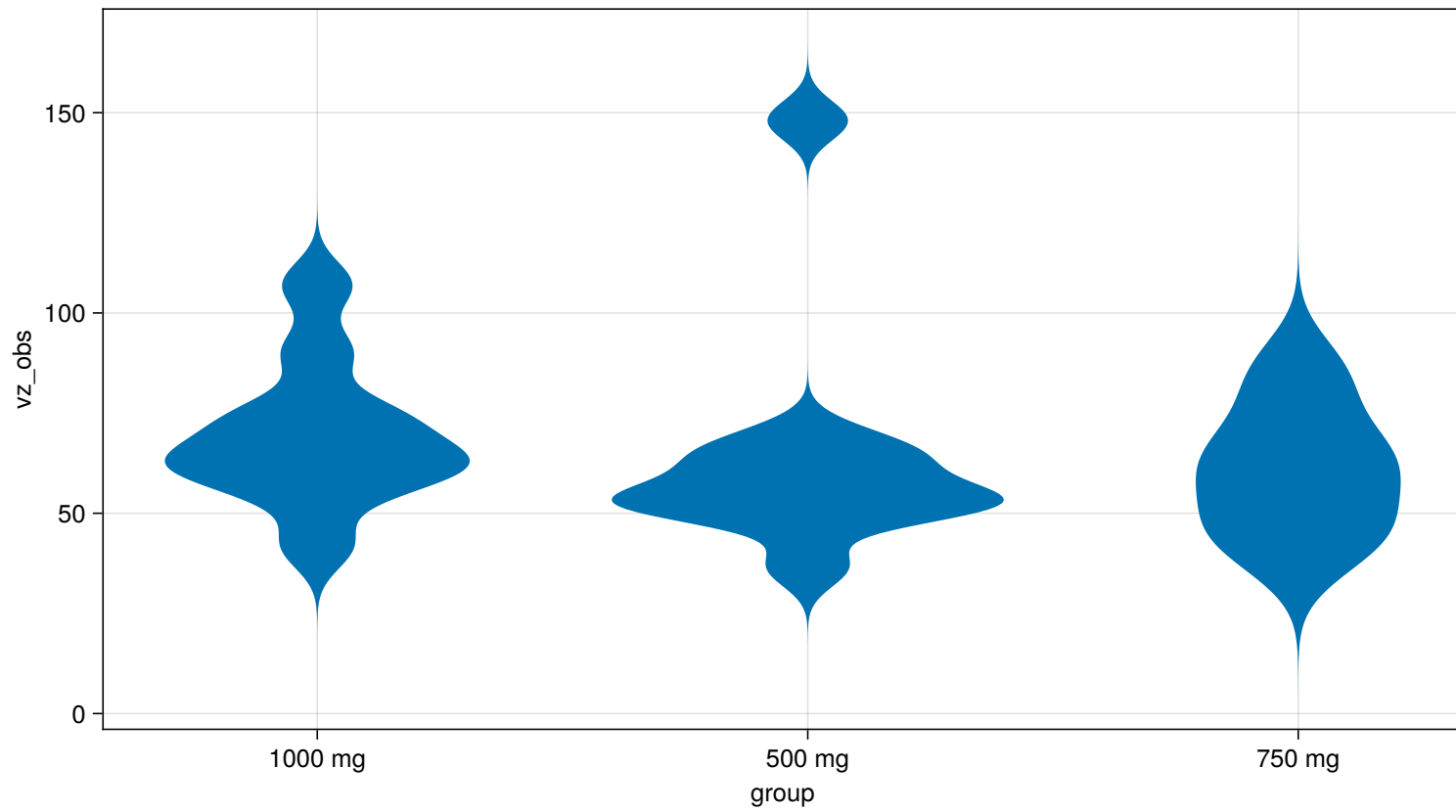
Figure 29: Parameter (vz_obs) vs Group
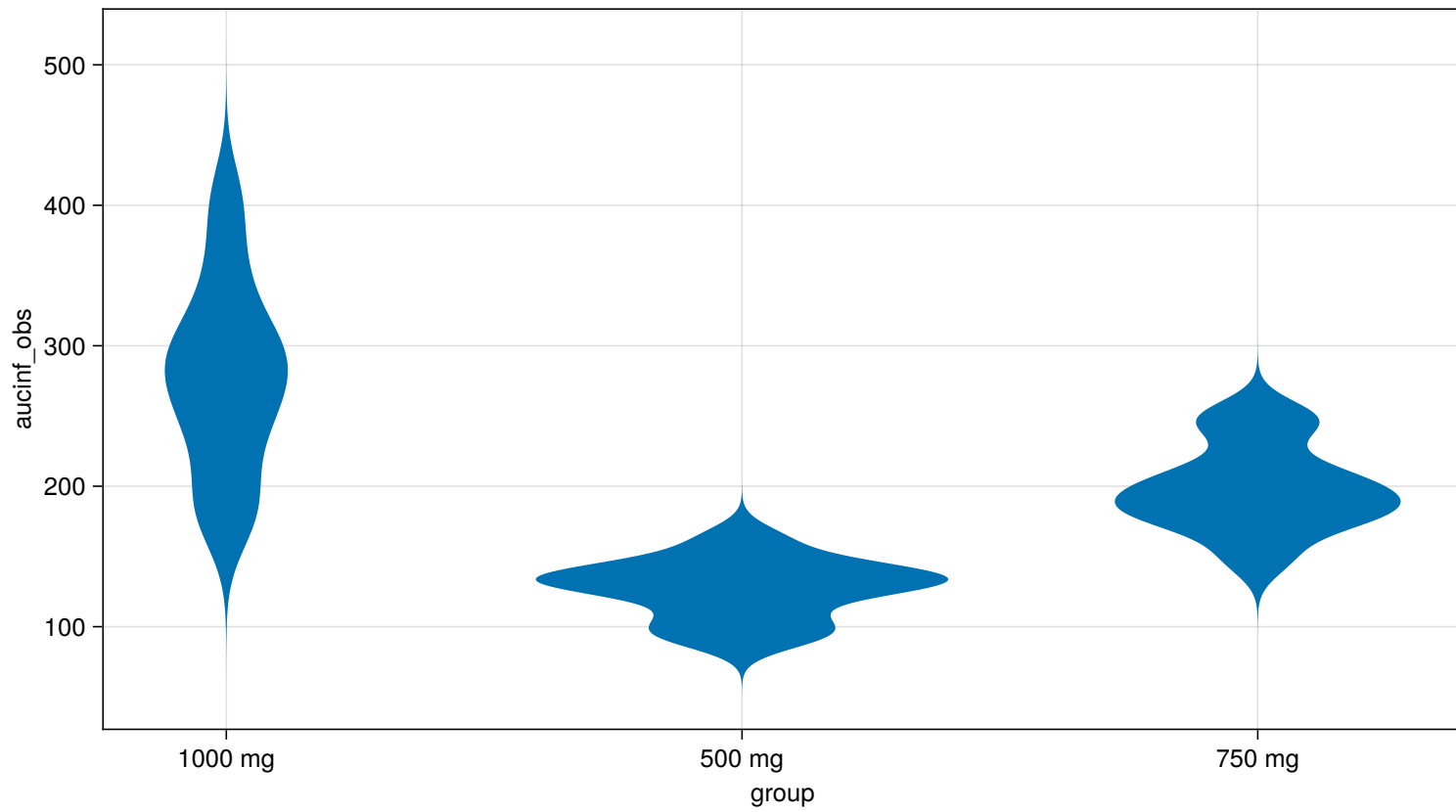
Figure 30: Parameter (aucinf_obs) vs Group
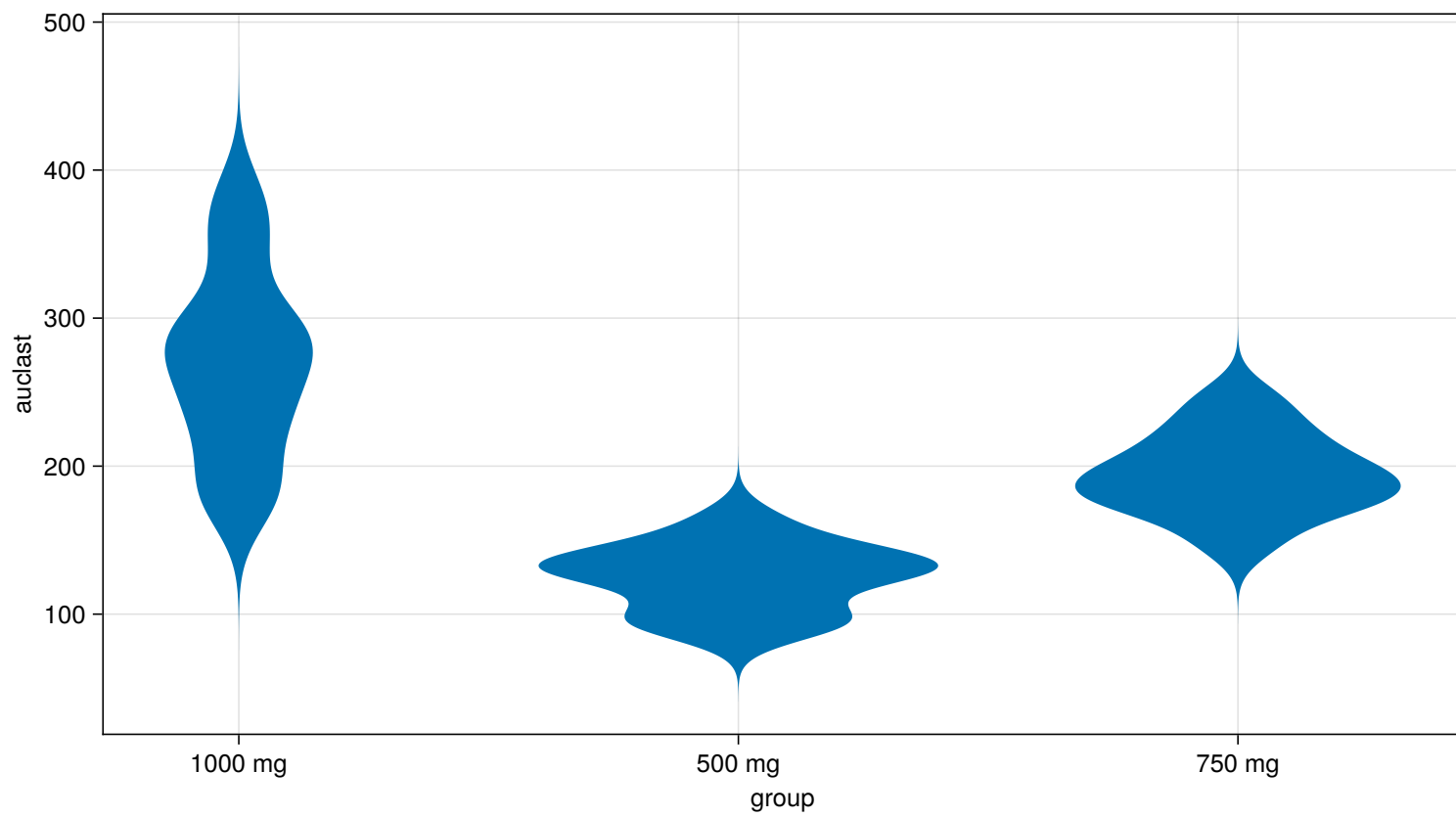
Figure 31: Parameter (auclast) vs Group
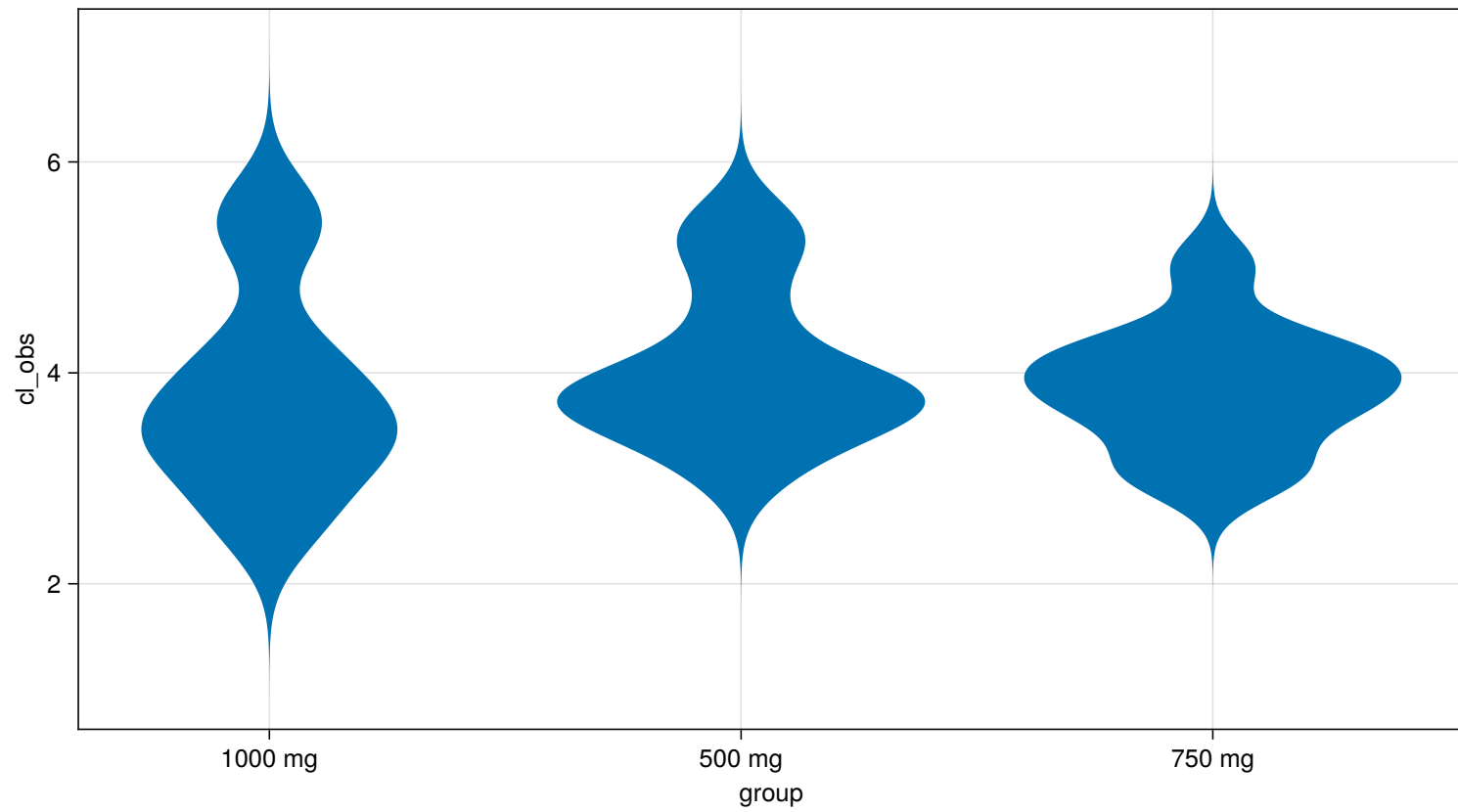
Figure 32: Parameter (cl_obs) vs Group
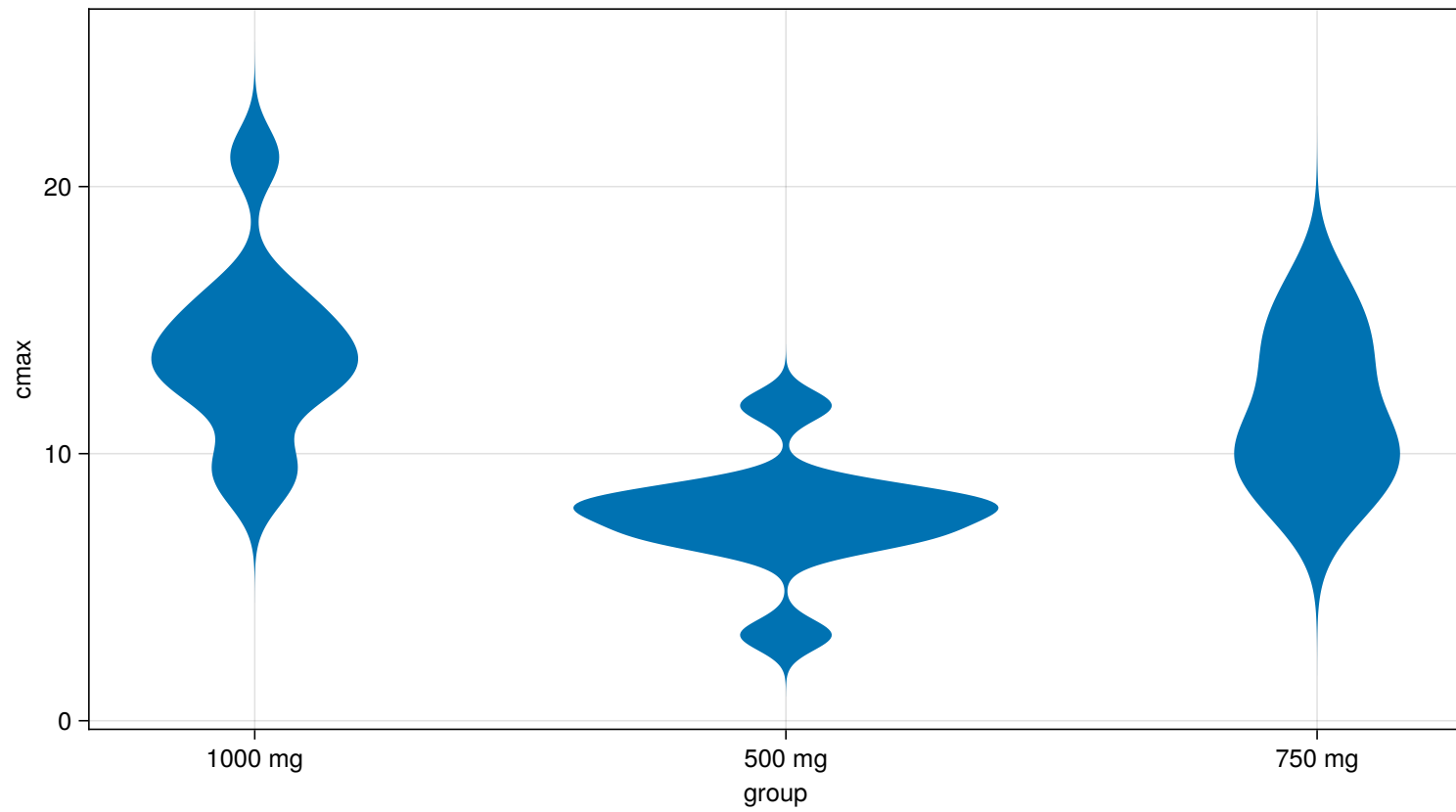
Figure 33: Parameter (cmax) vs Group
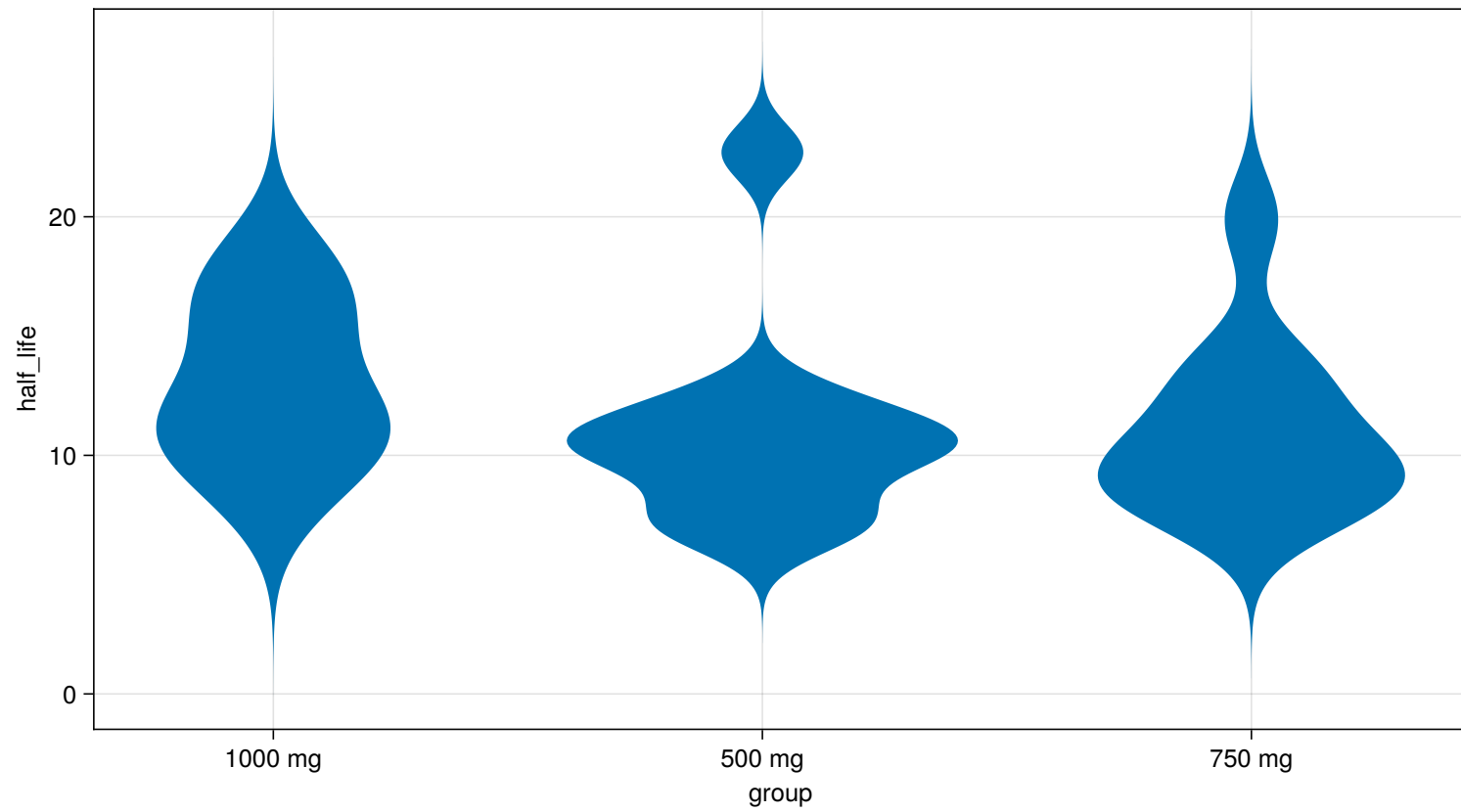
Figure 34: Parameter (half_life) vs Group
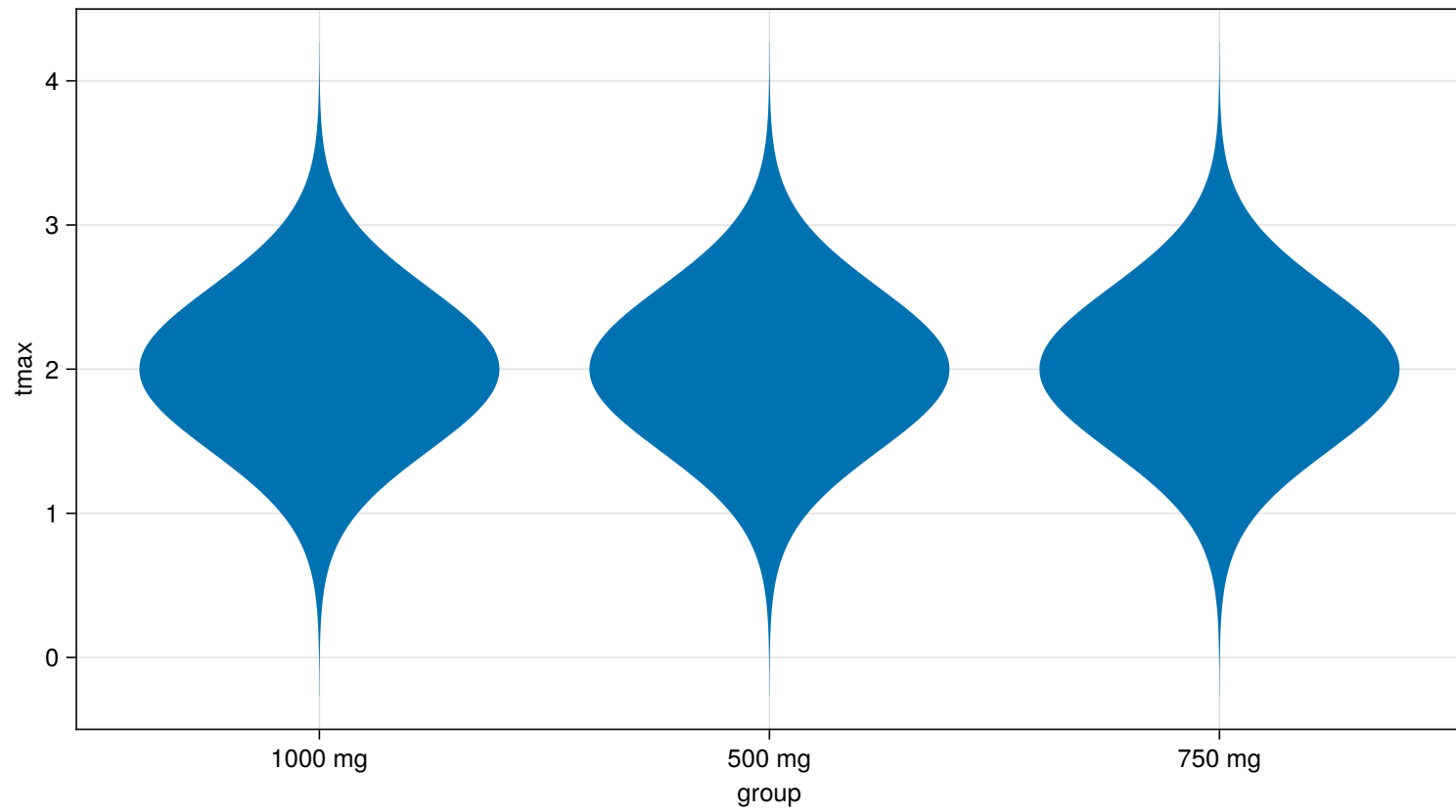
Figure 35: Parameter (tmax) vs Group
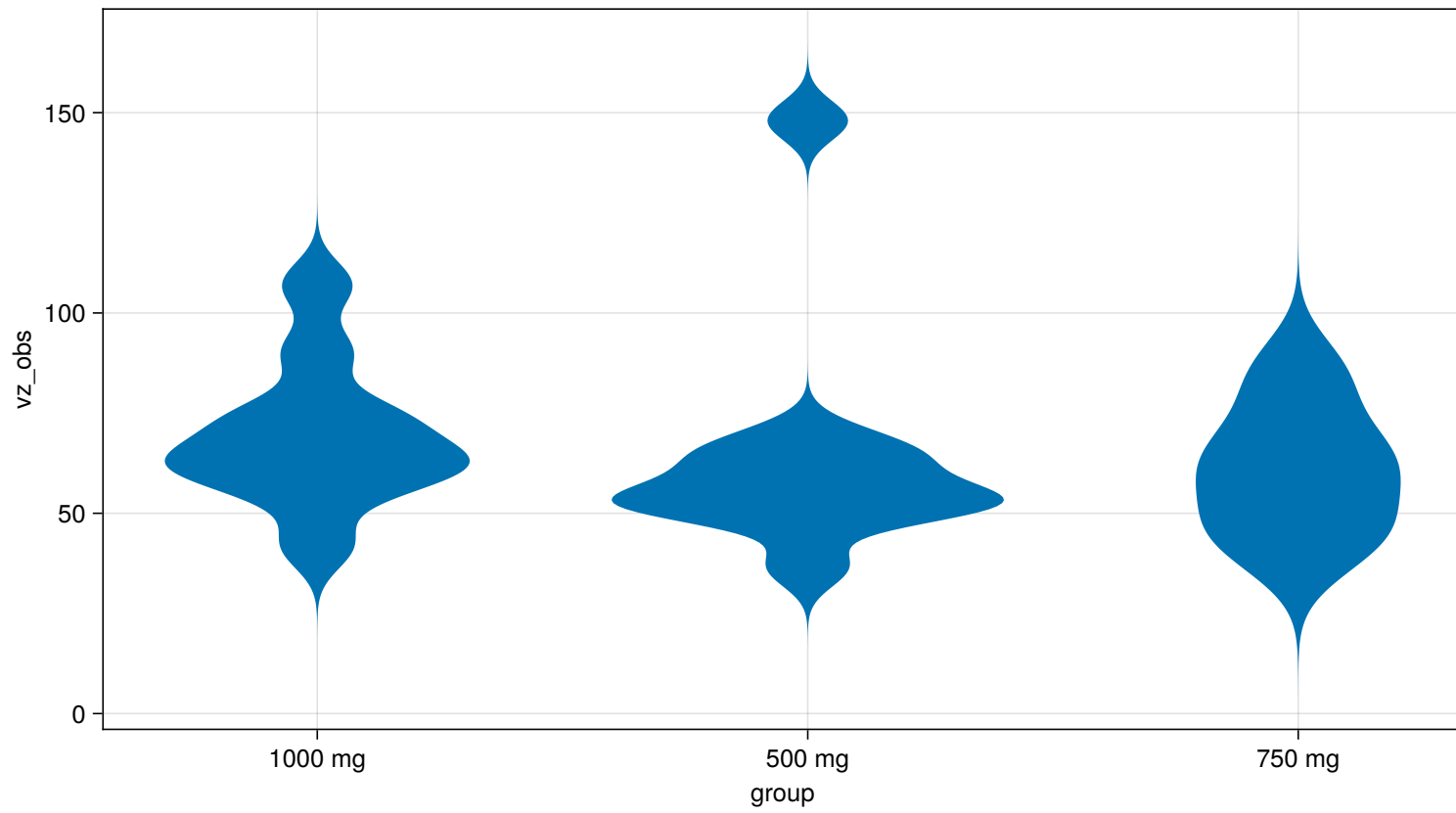
Figure 36: Parameter (vz_obs) vs Group
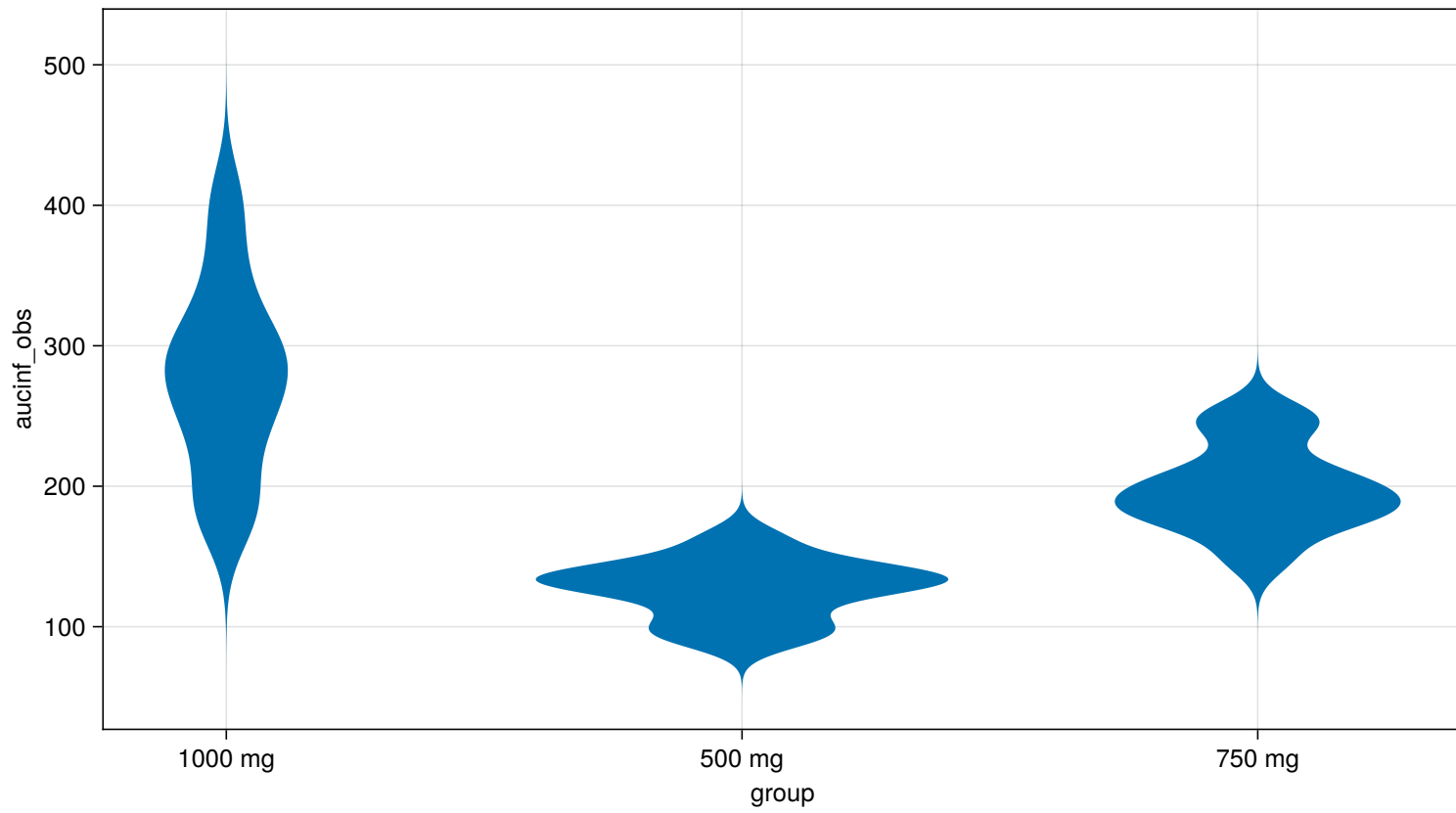
Figure 37: Parameter (aucinf_obs) vs Group
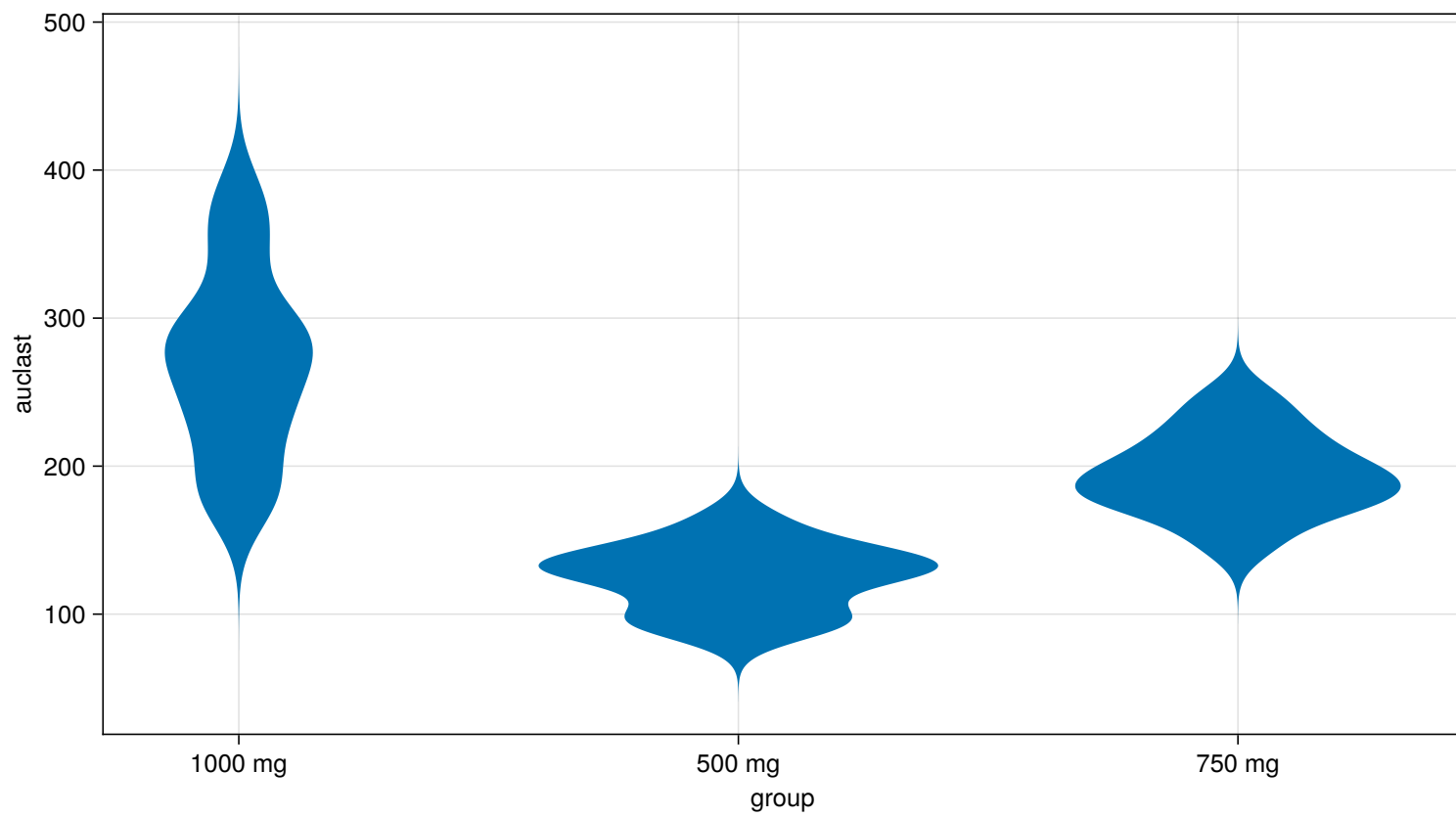
Figure 38: Parameter (auclast) vs Group
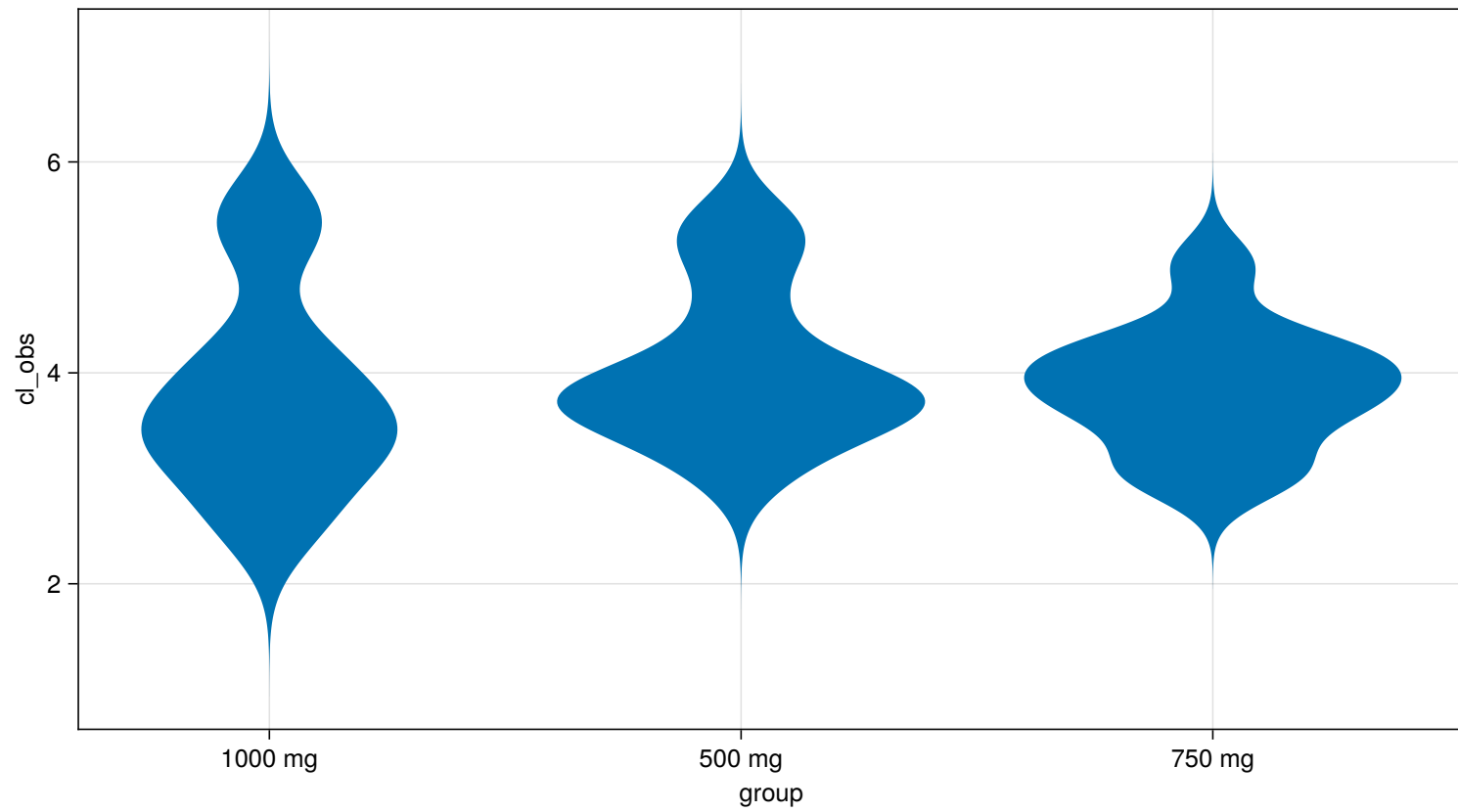
Figure 39: Parameter (cl_obs) vs Group
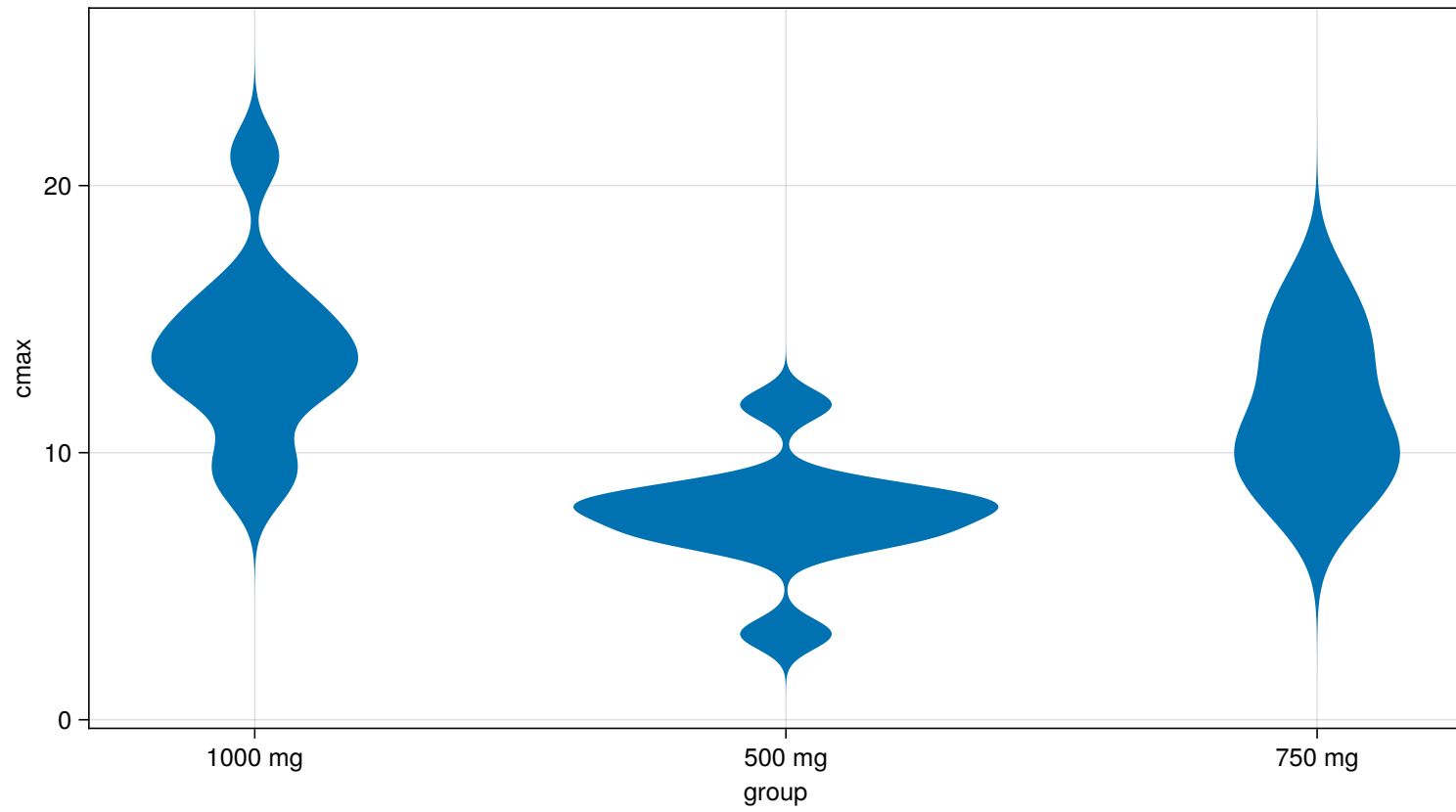
Figure 40: Parameter (cmax) vs Group
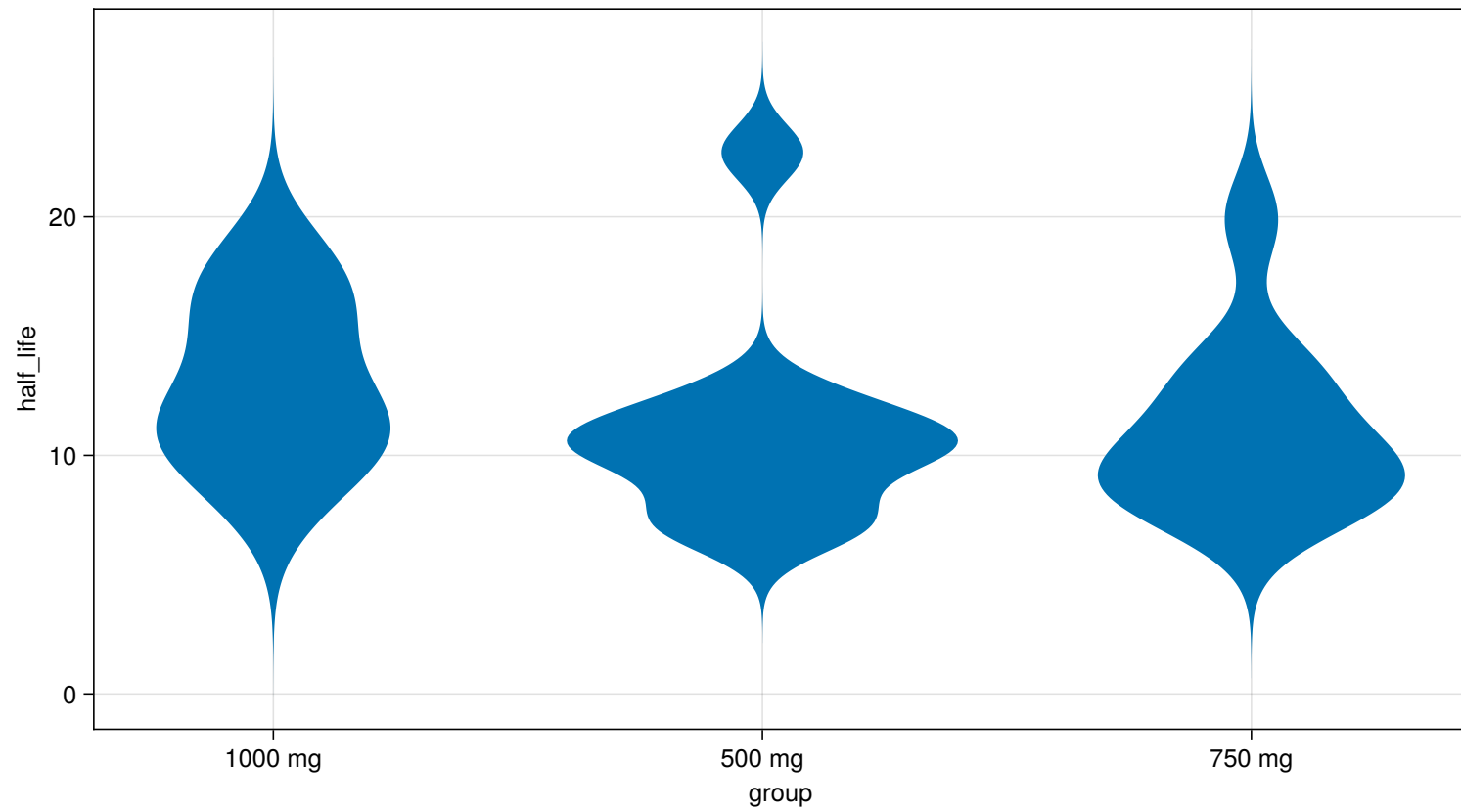
Figure 41: Parameter (half_life) vs Group
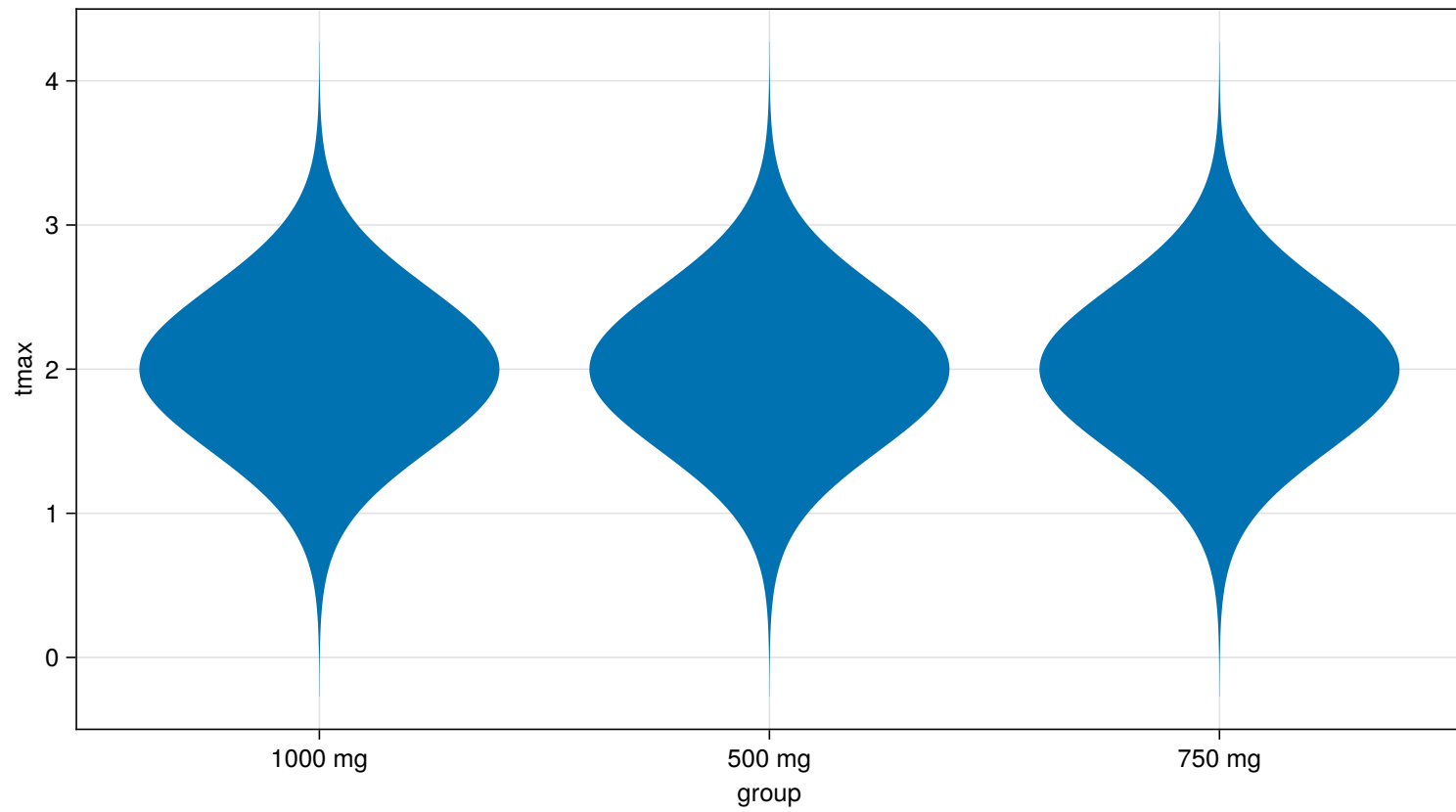
Figure 42: Parameter (tmax) vs Group
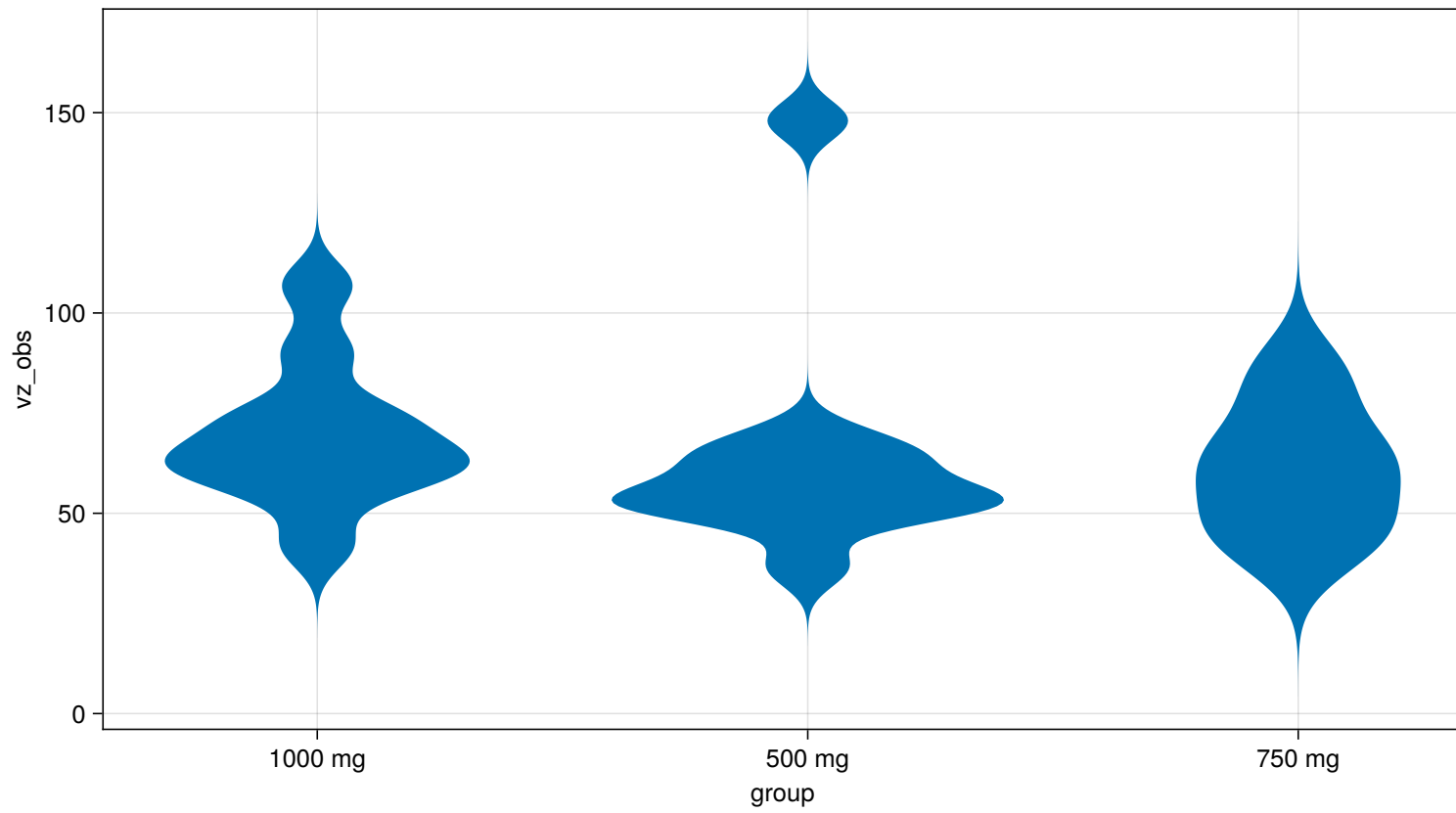
Figure 43: Parameter (vz_obs) vs Group

A   Subject Fits
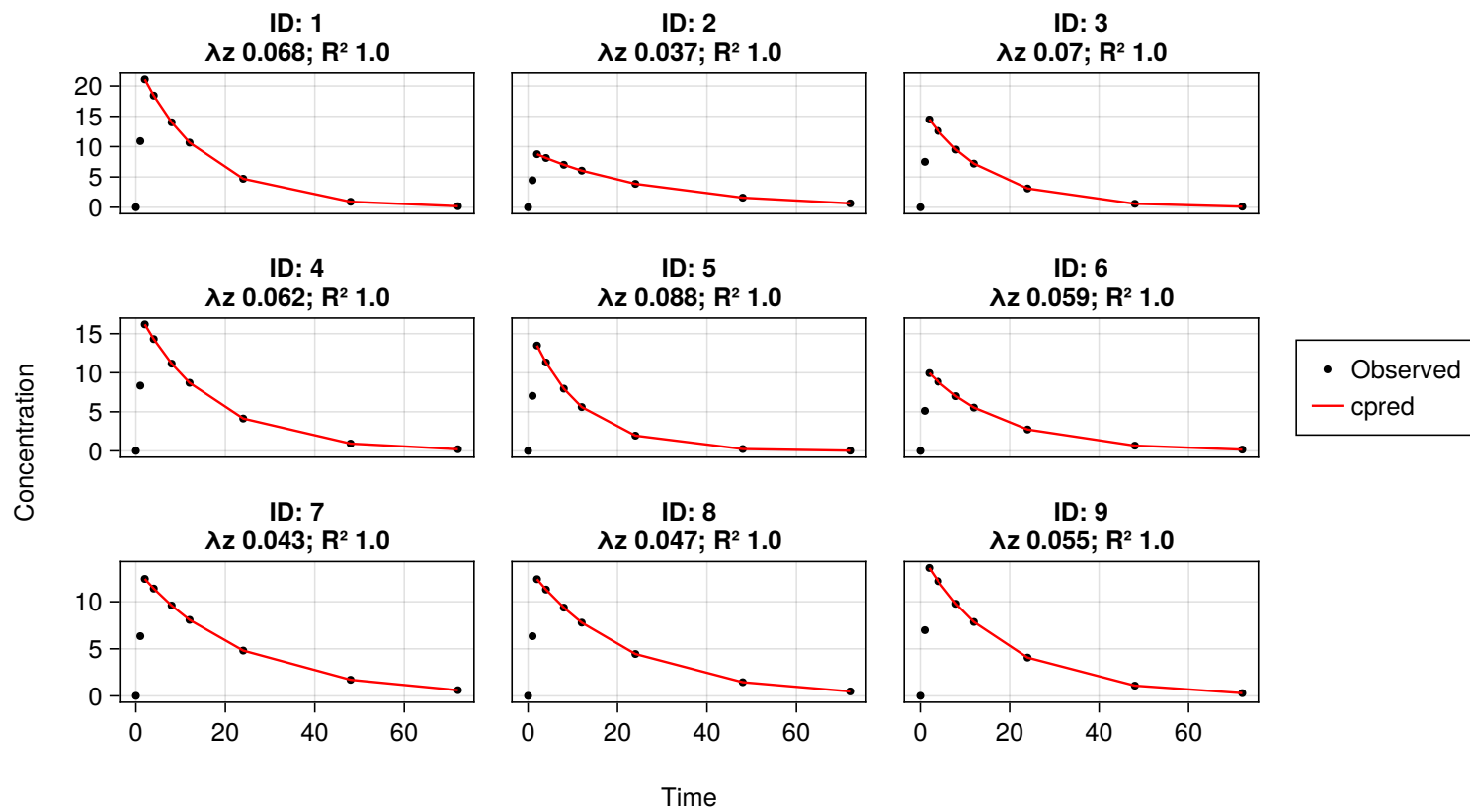
Figure 44: Subject Fits (1 of 4).
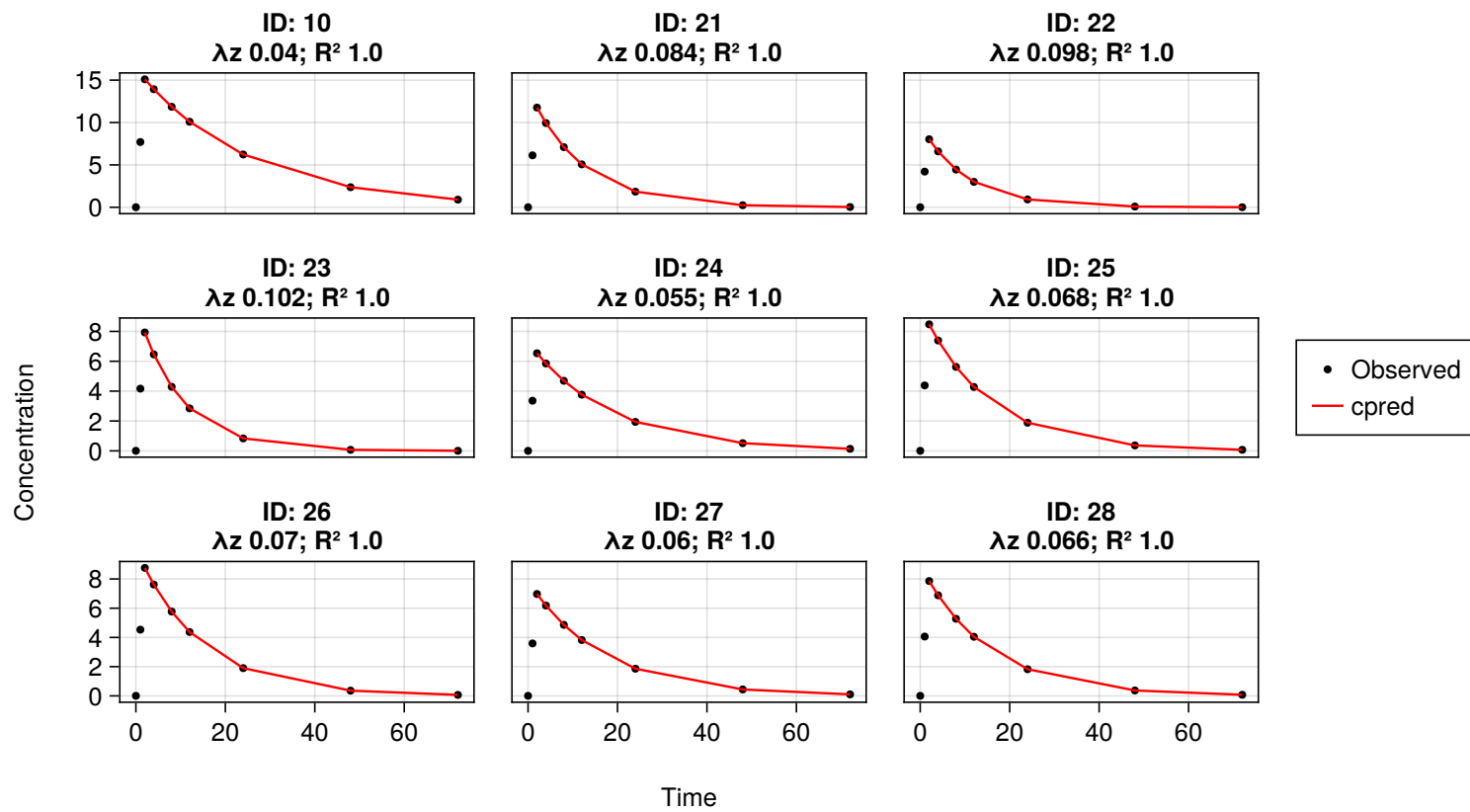
Figure 45: Subject Fits (2 of 4).
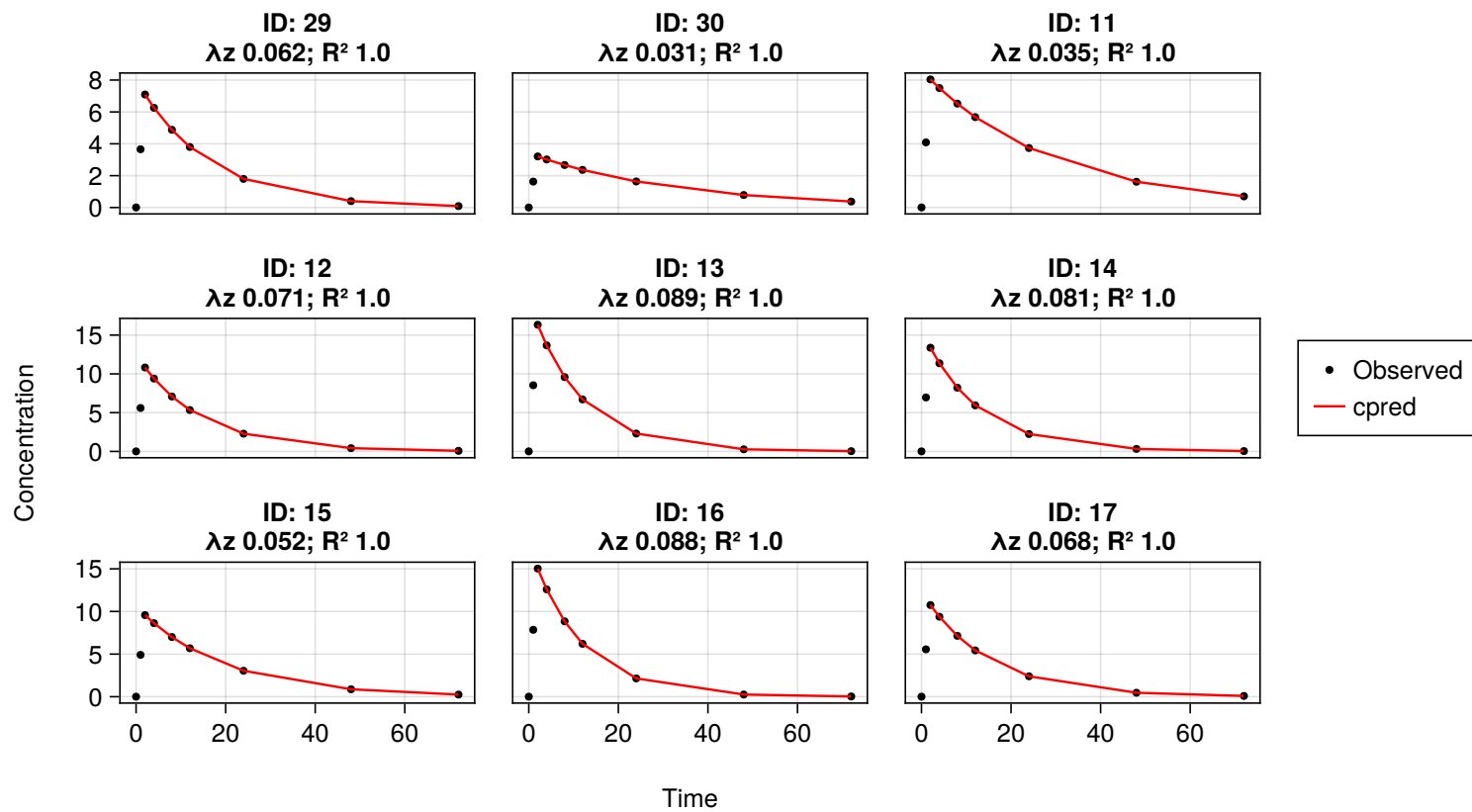
Figure 46: Subject Fits (3 of 4).
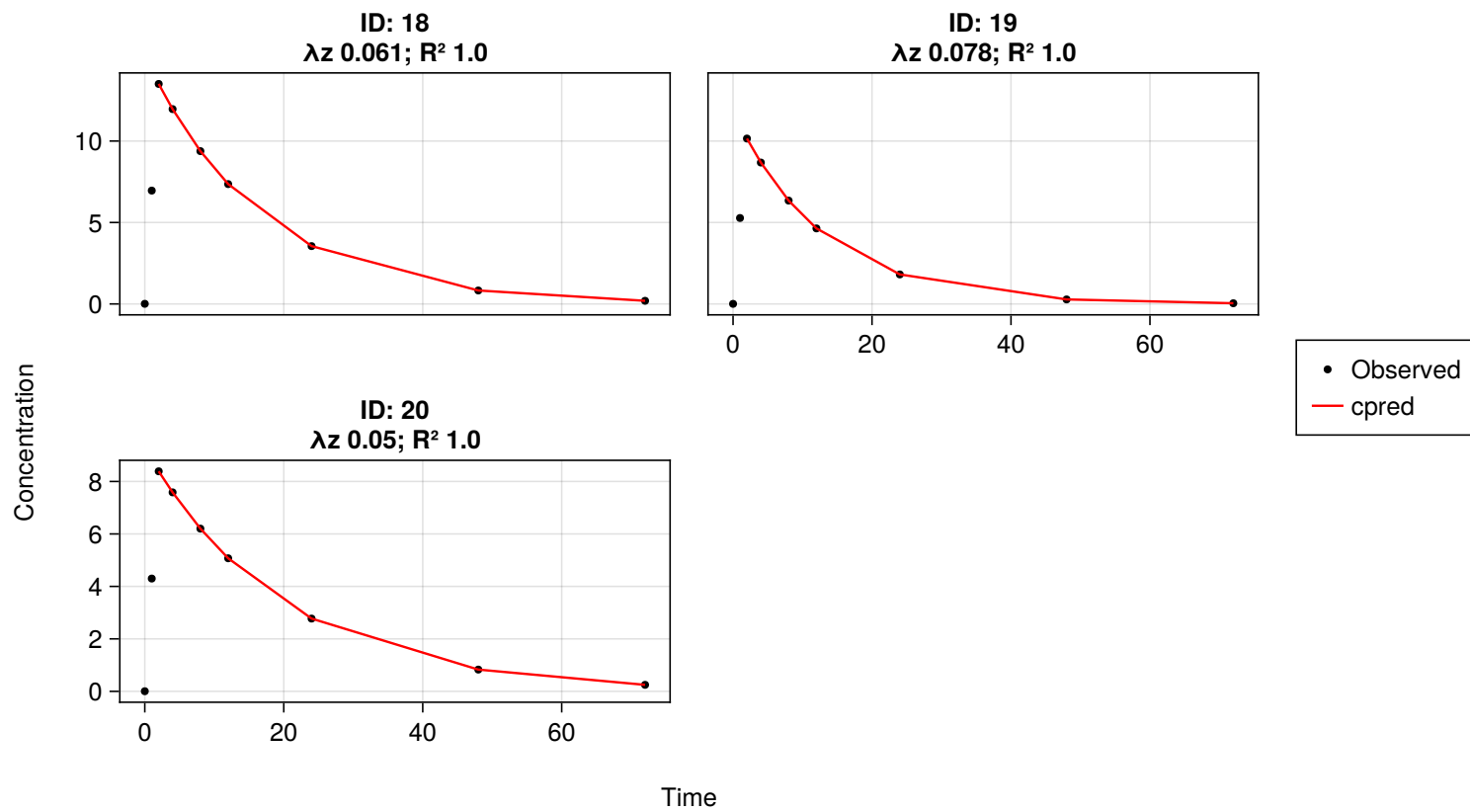
Figure 47: Subject Fits (4 of 4).

B System Information

```
Julia Version 1.7.3
Commit 742b9abb4d (2022-05-06 12:58 UTC)
Platform Info:
  OS: Linux (x86_64-pc-linux-gnu)
  uname: Linux 5.10.135 #1 SMP Thu Nov 24 00:49:35 UTC 2022 x86_64 x86_64
  CPU: Intel(R) Xeon(R) Platinum 8375C CPU @ 2.90GHz:
            speed         user        nice          sys         idle       irq
      #1  3496 MHz    1310912 s      9057 s     266583 s   49369037 s      0 s
      #2  3499 MHz    1441489 s     14380 s     292640 s   49212574 s      0 s
      #3  3501 MHz    1420301 s     16924 s     289591 s   49236414 s      0 s
      #4  3509 MHz    1480734 s     10228 s     292976 s   49178830 s      0 s
      #5  3499 MHz    1610742 s     27518 s     325348 s   49000264 s      0 s
      #6  3497 MHz    1485129 s     16833 s     304428 s   49153194 s      0 s
      #7  3500 MHz    1573180 s     25340 s     315276 s   49043788 s      0 s
      #8  3499 MHz    1463710 s     10310 s     294363 s   49188435 s      0 s

  Memory: 30.835060119628906 GB (10271.74609375 MB free)
  Uptime: 5.10353295e6 sec
  Load Avg:  0.46  0.28  0.17
  WORD_SIZE: 64
  LIBM: libopenlibm
  LLVM: libLLVM-12.0.1 (ORCJIT, icelake-server)
Environment:
  JULIAHUB_USEREMAIL = tchamzas@gmail.com
  JULIA_WORKER_TIMEOUT = 360.0
  JULIA_PKG_USE_CLI_GIT = true
  JULIA_GR_PROVIDER = BinaryBuilder
  JULIA_LOAD_PATH = @:@v#.#:@stdlib:/opt/juliahub/projects/default:/opt/juliahub/projects/
      ↪ default:/opt/juliahub/projects/datasets
  JULIA_DATASETS_PATH = /var/run/secrets/jr-q9psnzh7wpsecret/DATA_TOML:/opt/juliahub/
      ↪ JuliaHubDataDriver.toml:@:
  JULIAHUB_USERNAME = tchamzas
  JULIAHUB_APP_URL = https://y8hd4.apps.umb.juliahub.com/
  JULIA_DEPOT_PATH = /home/jrun/data/.julia:/home/jrun/.julia:/opt/juliahub/projects/
      ↪ internal_depot
  JULIA_HOME = /home/jrun/data/.julia
  JULIA_PKG_SERVER = umb.juliahub.com
  JULIA_NUM_THREADS = 8
  JULIA_EDITOR = code
  INTERNAL_DEPOT_PATH = /opt/juliahub/projects/internal_depot
  JULIA_LOAD_PATH = @:@v#.#:@stdlib:/opt/juliahub/projects/default:/opt/juliahub/projects/
      ↪ default:/opt/juliahub/projects/datasets
  HOME = /home/jrun
  JULIA_DATASETS_PATH = /var/run/secrets/jr-q9psnzh7wpsecret/DATA_TOML:/opt/juliahub/
      ↪ JuliaHubDataDriver.toml:@:
  TERM = xterm-256color
  JULIA_DEPOT_PATH = /home/jrun/data/.julia:/home/jrun/.julia:/opt/juliahub/projects/
      ↪ internal_depot
  LD_LIBRARY_PATH = :/opt/codeserver/lib
  JULIA_HOME = /home/jrun/data/.julia
  PATH = /opt/codeserver/lib/code-server/lib/vscode/bin/remote-cli:/opt/PsN/current/bin:/usr
      ↪ /local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
  NODE_EXEC_PATH = /opt/codeserver/lib/code-server/lib/node
  FONTCONFIG_PATH = /home/jrun/.julia/artifacts/69ab5e1318fa87cac480350ccc9faffff3b00c5b/etc
      ↪ /fonts
```

B.1 NCA Version

```
    Status `~/_work/PumasSystemImages/PumasSystemImages/sysimage_env/Manifest.toml`
[29142fd5] NCA v2.4.1
[b07d0016] NCAUtilities v0.7.10
```

B.2 Project Manifest

```
    Status `~/.julia/environments/v1.7/Manifest.toml`
[a4c015fc] ANSIColoredPrinters v0.0.1 ⚲
[fbe9abb3] AWS v1.77.0
[1c724243] AWSS3 v0.10.1
[c3fe647b] AbstractAlgebra v0.27.5 ⚲
[621f4979] AbstractFFTs v1.2.1 ⚲
[80f14c24] AbstractMCMC v3.3.1 ⚲
[6e696c72] AbstractPlutoDingetjes v1.1.4 ⚲
[1520ce14] AbstractTrees v0.3.4 ⚲
[7d9f7c33] Accessors v0.1.20 ⚲
[79e6a3ab] Adapt v3.4.0 ⚲
[0bf59076] AdvancedHMC v0.3.6 ⚲
[cbdf2221] AlgebraOfGraphics v0.6.11 ⚲
[27a7e980] Animations v0.4.1 ⚲
[dce04be8] ArgCheck v2.3.0 ⚲
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[aacddb02] JpegTurbo_jll v2.1.2+0 ♀
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[c1c5ebd0] LAME_jll v3.100.1+0 ⚲
[dad2f222] LLVMExtra_jll v0.0.16+0 ⚲
[1d63c593] LLVMOpenMP_jll v14.0.4+0 ⚲
[dd4b983a] LZO_jll v2.10.1+0 ⚲
[dd192d2f] LibVPX_jll v1.10.0+0 ⚲
[e9f186c6] Libffi_jll v3.2.2+1 ⚲
[d4300ac3] Libgcrypt_jll v1.8.7+0 ⚲
[7add5ba3] Libgpg_error_jll v1.42.0+0 ⚲
[94ce4f54] Libiconv_jll v1.16.1+1 ⚲
[4b2f31a3] Libmount_jll v2.35.0+0 ⚲
[38a345b3] Libuuid_jll v2.36.0+0 ⚲
[5ced341a] Lz4_jll v1.9.3+0 ⚲
[d00139f3] METIS_jll v5.1.1+0 ⚲
[856f044c] MKL_jll v2021.1.1+2 ⚲
[d7ed1dd3] MUMPS_seq_jll v5.4.1+0 ⚲
[079eb43e] NLopt_jll v2.7.1+0 ⚲
[e7412a2a] Ogg_jll v1.3.5+1 ⚲
[656ef2d0] OpenBLAS32_jll v0.3.17+0 ⚲
[18a262bb] OpenEXR_jll v3.1.1+0 ⚲
[458c3c95] OpenSSL_jll v1.1.17+0 ⚲
[efe28fd5] OpenSpecFun_jll v0.5.5+0 ⚲
[91d4177d] Opus_jll v1.3.2+0 ⚲
[7da25872] Osi_jll v0.10800.600+0 ⚲
[36c8627f] Pango_jll v1.42.4+10 ⚲
[30392449] Pixman_jll v0.40.1+0 ⚲
[a4dc8951] ReadStat_jll v1.1.8+0 ⚲
[f50d1b31] Rmath_jll v0.3.0+0 ⚲
[a5c6f535] XGBoost_jll v1.6.2+0 ⚲
[02c8fc9c] XML2_jll v2.9.14+0 ⚲
[aed1982a] XSLT_jll v1.1.34+0 ⚲
[4f6342f7] Xorg_libX11_jll v1.6.9+4 ⚲
[0c0b7dd1] Xorg_libXau_jll v1.0.9+4 ⚲
[a3789734] Xorg_libXdmcp_jll v1.1.3+4 ⚲
[1082639a] Xorg_libXext_jll v1.3.4+4 ⚲
[ea2f1a96] Xorg_libXrender_jll v0.9.10+4 ⚲
[14d82f49] Xorg_libpthread_stubs_jll v0.1.0+3 ⚲
[c7cfdc94] Xorg_libxcb_jll v1.13.0+3 ⚲
[c5fb5394] Xorg_xtrans_jll v1.4.0+3 ⚲
[3161d3a3] Zstd_jll v1.5.2+0 ⚲
[9a68df92] isoband_jll v0.2.3+0 ⚲
[0ac62f75] libass_jll v0.14.0+4 ⚲
[f638f0a6] libfdk_aac_jll v0.1.6+4 ⚲
[b53b4c65] libpng_jll v1.6.38+0 ⚲
[075b6546] libsixel_jll v1.10.3+0 ⚲
[a9144af2] libsodium_jll v1.0.20+0
[f27f6e37] libvorbis_jll v1.3.7+1 ⚲
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[dfaa095f] x265_jll v3.0.0+3 ⚲
[197a6dec] AppServer v0.4.0 ⚲
[0dad84c5] ArgTools
[56f22d72] Artifacts
[2a0f44e3] Base64
[4ece37e6] Bioequivalence v0.1.18 ⚲
[ade2ca70] Dates
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[7b1f6079] FileWatching
[9fa8497b] Future
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[b77e0a4c] InteractiveUtils
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[8f399da3] Libdl
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[b07d0016] NCAUtilities v0.7.10 ♀
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[c743b482] PumasReports v0.5.4 ♀
[148d11e5] PumasUtilities v0.7.0 ♀
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[6462fe0b] Sockets
[2f01184e] SparseArrays
[10745b16] Statistics
[4607b0f0] SuiteSparse
[6ce4ecf0] SummaryTables v0.4.0 ♀
[fa267f1f] TOML
[a4e569a6] Tar
[8dfed614] Test
[cf7118a7] UUIDs
[4ec0a83e] Unicode
[e66e0078] CompilerSupportLibraries_jll
[deac9b47] LibCURL_jll
[29816b5a] LibSSH2_jll
[ea2c2f5b] LicenseSpring_jll v7.16.0+1 ♀
[c8ffd9c3] MbedTLS_jll
[14a3606d] MozillaCACerts_jll
[4536629a] OpenBLAS_jll
[05823500] OpenLibm_jll
[efcefdf7] PCRE2_jll
[bea87d4a] SuiteSparse_jll
[83775a58] Zlib_jll
[8e850b90] libblastrampoline_jll
[8e850ede] nghttp2_jll
[3f19e933] p7zip_jll
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