Web-based Supplementary Materials for "Motivating Sample Sizes in Adaptive Phase I Trials via Bayesian Posterior Credible Intervals" by Thomas M. Braun

Web Appendix A

Three files of R code, used for the simulations and the example discussed in Section 2.3, have been provided.

Web Table 1

Results for $\gamma_\ell = 0.6$. Each row is a setting defined by: θ = target DLT rate, K = number of doses, (p_{min}, p_{max}) = range of DLT rates, ν = MTD dose number, R = approximate odds ratio of DLT rates around θ, and ϕ = half-width of interval of acceptable DLT rates around θ. N_B = sample size via proposed methods. Last six columns summarize empirical performance of CRM starting at either the median dose or the lowest dose and enrolling N_B patients: % Cov = average posterior mass in $\theta \pm \phi$; $\widehat{PCS}$ = average probability of correct selection of MTD; N_C = suggested sample size of Cheung (2013b) based upon $\widehat{PCS}$.

$\theta = 0.20$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.40)	2	1.85	0.12	18	0.69	0.45	7	0.68	0.42	5
4	(0.10, 0.50)	2	2.00	0.13	13	0.71	0.43	5	0.71	0.45	6
5	(0.05, 0.50)	2	1.82	0.11	20	0.68	0.45	11	0.67	0.44	10
5	(0.10, 0.60)	2	1.93	0.12	15	0.70	0.45	10	0.70	0.45	10
5	(0.05, 0.60)	2	2.04	0.14	12	0.73	0.44	8	0.72	0.44	8
6	(0.05, 0.60)	2	1.80	0.11	21	0.66	0.44	14	0.65	0.42	11
6	(0.10, 0.70)	2	1.88	0.12	16	0.69	0.46	14	0.69	0.44	12
6	(0.05, 0.70)	2	1.97	0.13	14	0.73	0.48	14	0.73	0.48	14

$\theta = 0.25$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.10, 0.50)	2	1.86	0.13	15	0.65	0.44	6	0.65	0.45	7
4	(0.05, 0.50)	2	2.00	0.15	13	0.70	0.45	6	0.69	0.45	6
4	(0.15, 0.60)	2	2.00	0.15	13	0.71	0.45	6	0.70	0.43	5
5	(0.10, 0.60)	2	1.80	0.12	18	0.65	0.47	13	0.65	0.50	16
5	(0.05, 0.60)	2	1.90	0.14	17	0.67	0.42	6	0.66	0.42	7
5	(0.15, 0.70)	2	1.90	0.14	15	0.68	0.46	10	0.67	0.44	8
5	(0.10, 0.70)	2	2.00	0.15	12	0.71	0.46	9	0.71	0.49	11
6	(0.05, 0.70)	3	1.84	0.13	18	0.67	0.43	11	0.66	0.42	9

$\theta = 0.30$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.50)	3	1.91	0.15	14	0.67	0.44	5	0.68	0.47	7
4	(0.15, 0.60)	2	1.91	0.15	13	0.66	0.49	9	0.66	0.49	9
4	(0.10, 0.60)	2	2.04	0.17	11	0.69	0.46	5	0.68	0.45	5
4	(0.20, 0.70)	2	2.04	0.17	12	0.71	0.45	5	0.71	0.46	6
5	(0.05, 0.60)	3	1.81	0.14	16	0.65	0.48	12	0.65	0.49	13
5	(0.15, 0.70)	2	1.81	0.14	16	0.64	0.49	14	0.64	0.47	12
5	(0.10, 0.70)	2	1.91	0.15	15	0.65	0.44	7	0.65	0.45	8
5	(0.05, 0.70)	3	2.01	0.16	13	0.69	0.41	5	0.70	0.41	5

Web Table 2

Results for $\gamma_\ell = 0.7$. Each row is a setting defined by: θ = target DLT rate, K = number of doses, (p_{min}, p_{max}) = range of DLT rates, ν = MTD dose number, R = approximate odds ratio of DLT rates around θ, and ϕ = half-width of interval of acceptable DLT rates around θ. N_B = sample size via proposed methods. Last six columns summarize empirical performance of CRM starting at either the median dose or the lowest dose and enrolling N_B patients: % Cov = average posterior mass in $\theta \pm \phi$; $\widehat{PCS}$ = average probability of correct selection of MTD; N_C = suggested sample size of Cheung (2013b) based upon $\widehat{PCS}$.

$\theta = 0.20$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.40)	2	1.85	0.12	26	0.76	0.51	15	0.76	0.50	13
4	(0.10, 0.50)	2	2.00	0.13	20	0.79	0.52	13	0.79	0.52	12
5	(0.05, 0.50)	2	1.82	0.11	29	0.75	0.49	16	0.75	0.49	17
5	(0.10, 0.60)	2	1.93	0.12	22	0.77	0.51	16	0.77	0.49	14
5	(0.05, 0.60)	2	2.04	0.14	17	0.80	0.52	16	0.79	0.48	11
6	(0.05, 0.60)	2	1.80	0.11	32	0.75	0.49	21	0.75	0.47	18
6	(0.10, 0.70)	2	1.88	0.12	24	0.77	0.53	24	0.76	0.49	18
6	(0.05, 0.70)	2	1.97	0.13	20	0.80	0.52	20	0.79	0.49	16

$\theta = 0.25$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.10, 0.50)	2	1.86	0.13	22	0.74	0.52	14	0.74	0.55	16
4	(0.05, 0.50)	2	2.00	0.15	20	0.79	0.49	9	0.78	0.51	10
4	(0.15, 0.60)	2	2.00	0.15	20	0.78	0.52	11	0.77	0.47	7
5	(0.10, 0.60)	2	1.80	0.12	26	0.72	0.50	16	0.72	0.51	18
5	(0.05, 0.60)	2	1.90	0.14	27	0.75	0.48	12	0.75	0.47	11
5	(0.15, 0.70)	2	1.90	0.14	23	0.75	0.53	17	0.75	0.50	14
5	(0.10, 0.70)	2	2.00	0.15	17	0.78	0.54	17	0.77	0.56	18
6	(0.05, 0.70)	3	1.84	0.13	32	0.76	0.50	18	0.75	0.47	14

$\theta = 0.30$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.50)	3	1.91	0.15	23	0.76	0.53	13	0.77	0.57	16
4	(0.15, 0.60)	2	1.91	0.15	20	0.74	0.57	17	0.74	0.57	16
4	(0.10, 0.60)	2	2.04	0.17	17	0.77	0.54	11	0.76	0.53	10
4	(0.20, 0.70)	2	2.04	0.17	20	0.79	0.51	9	0.78	0.50	9
5	(0.05, 0.60)	3	1.81	0.14	25	0.73	0.56	22	0.74	0.57	23
5	(0.15, 0.70)	2	1.81	0.14	24	0.71	0.55	20	0.71	0.55	21
5	(0.10, 0.70)	2	1.91	0.15	22	0.73	0.52	14	0.72	0.52	15
5	(0.05, 0.70)	3	2.01	0.16	23	0.78	0.50	11	0.78	0.50	11

Web Table 3

Results for $\gamma_\ell = 0.8$. Each row is a setting defined by: θ = target DLT rate, K = number of doses, (p_{min}, p_{max}) = range of DLT rates, ν = MTD dose number, R = approximate odds ratio of DLT rates around θ, and ϕ = half-width of interval of acceptable DLT rates around θ. N_B = sample size via proposed methods. Last six columns summarize empirical performance of CRM starting at either the median dose or the lowest dose and enrolling N_B patients: % Cov = average posterior mass in $\theta \pm \phi$; $\widehat{PCS}$ = average probability of correct selection of MTD; N_C = suggested sample size of Cheung (2013b) based upon $\widehat{PCS}$.

$\theta = 0.20$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.40)	2	1.85	0.12	40	0.85	0.57	23	0.85	0.59	27
4	(0.10, 0.50)	2	2.00	0.13	33	0.87	0.58	20	0.87	0.59	21
5	(0.05, 0.50)	2	1.82	0.11	45	0.84	0.58	32	0.84	0.56	28
5	(0.10, 0.60)	2	1.93	0.12	35	0.85	0.59	28	0.85	0.60	30
5	(0.05, 0.60)	2	2.04	0.14	26	0.88	0.59	24	0.88	0.57	21
6	(0.05, 0.60)	2	1.80	0.11	49	0.84	0.58	36	0.83	0.57	35
6	(0.10, 0.70)	2	1.88	0.12	37	0.85	0.61	38	0.85	0.62	40
6	(0.05, 0.70)	2	1.97	0.13	29	0.87	0.59	30	0.86	0.59	30

$\theta = 0.25$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.10, 0.50)	2	1.86	0.13	34	0.83	0.62	27	0.83	0.62	29
4	(0.05, 0.50)	2	2.00	0.15	30	0.86	0.55	14	0.86	0.56	16
4	(0.15, 0.60)	2	2.00	0.15	34	0.85	0.58	18	0.85	0.57	17
5	(0.10, 0.60)	2	1.80	0.12	40	0.81	0.61	34	0.81	0.61	34
5	(0.05, 0.60)	2	1.90	0.14	44	0.84	0.52	16	0.84	0.51	15
5	(0.15, 0.70)	2	1.90	0.14	37	0.84	0.59	26	0.83	0.59	25
5	(0.10, 0.70)	2	2.00	0.15	26	0.85	0.60	23	0.85	0.62	26
6	(0.05, 0.70)	3	1.84	0.13	63	0.85	0.54	23	0.84	0.53	22

$\theta = 0.30$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.50)	3	1.91	0.15	39	0.84	0.62	23	0.85	0.62	23
4	(0.15, 0.60)	2	1.91	0.15	30	0.82	0.63	26	0.82	0.64	26
4	(0.10, 0.60)	2	2.04	0.17	25	0.84	0.59	17	0.84	0.61	19
4	(0.20, 0.70)	2	2.04	0.17	36	0.87	0.57	15	0.87	0.58	16
5	(0.05, 0.60)	3	1.81	0.14	38	0.82	0.66	40	0.82	0.65	38
5	(0.15, 0.70)	2	1.81	0.14	36	0.80	0.63	35	0.80	0.62	32
5	(0.10, 0.70)	2	1.91	0.15	35	0.81	0.57	20	0.81	0.57	21
5	(0.05, 0.70)	3	2.01	0.16	45	0.86	0.53	14	0.86	0.54	15

Web Table 4

Results for $\gamma_\ell = 0.9$. Each row is a setting defined by: θ = target DLT rate, K = number of doses, (p_{min}, p_{max}) = range of DLT rates, ν = MTD dose number, R = approximate odds ratio of DLT rates around θ, and ϕ = half-width of interval of acceptable DLT rates around θ. N_B = sample size via proposed methods. Last six columns summarize empirical performance of CRM starting at either the median dose or the lowest dose and enrolling N_B patients: % Cov = average posterior mass in $\theta \pm \phi$; $\widehat{PCS}$ = average probability of correct selection of MTD; N_C = suggested sample size of Cheung (2013b) based upon $\widehat{PCS}$.

$\theta = 0.20$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.40)	2	1.85	0.12	67	0.93	0.67	45	0.93	0.67	45
4	(0.10, 0.50)	2	2.00	0.13	64	0.95	0.70	43	0.95	0.72	47
5	(0.05, 0.50)	2	1.82	0.11	78	0.93	0.64	46	0.92	0.63	42
5	(0.10, 0.60)	2	1.93	0.12	65	0.94	0.71	55	0.94	0.71	56
5	(0.05, 0.60)	2	2.04	0.14	41	0.94	0.70	47	0.94	0.68	42
6	(0.05, 0.60)	2	1.80	0.11	86	0.92	0.61	44	0.92	0.60	43
6	(0.10, 0.70)	2	1.88	0.12	67	0.93	0.71	65	0.93	0.72	68
6	(0.05, 0.70)	2	1.97	0.13	47	0.94	0.69	51	0.94	0.68	49

$\theta = 0.25$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.10, 0.50)	2	1.86	0.13	55	0.91	0.71	49	0.91	0.72	51
4	(0.05, 0.50)	2	2.00	0.15	51	0.94	0.60	21	0.93	0.62	23
4	(0.15, 0.60)	2	2.00	0.15	72	0.94	0.67	32	0.94	0.65	28
5	(0.10, 0.60)	2	1.80	0.12	65	0.90	0.68	52	0.90	0.69	55
5	(0.05, 0.60)	2	1.90	0.14	82	0.92	0.54	19	0.92	0.53	17
5	(0.15, 0.70)	2	1.90	0.14	72	0.92	0.68	44	0.92	0.68	43
5	(0.10, 0.70)	2	2.00	0.15	43	0.93	0.72	46	0.93	0.74	50
6	(0.05, 0.70)	3	1.84	0.13	147	0.93	0.57	28	0.93	0.57	27

$\theta = 0.30$

						Median Dose			Lowest Dose		
K	(p_{min}, p_{max})	ν	R	ϕ	N_B	% Cov	$\widehat{PCS}$	N_C	% Cov	$\widehat{PCS}$	N_C
4	(0.05, 0.50)	3	1.91	0.15	78	0.92	0.69	35	0.92	0.68	34
4	(0.15, 0.60)	2	1.91	0.15	49	0.91	0.75	51	0.91	0.77	55
4	(0.10, 0.60)	2	2.04	0.17	41	0.92	0.70	32	0.92	0.69	30
4	(0.20, 0.70)	2	2.04	0.17	78	0.94	0.64	23	0.94	0.63	22
5	(0.05, 0.60)	3	1.81	0.14	67	0.90	0.74	63	0.90	0.74	60
5	(0.15, 0.70)	2	1.81	0.14	58	0.89	0.74	61	0.89	0.73	59
5	(0.10, 0.70)	2	1.91	0.15	61	0.90	0.64	31	0.89	0.64	31
5	(0.05, 0.70)	3	2.01	0.16	102	0.95	0.57	18	0.95	0.57	18