Simulation Result 1: C~Exp(0.2)

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Table 1: Summary of the estimated SAUC for Biomarker1 when the true censoring is distributed as $Exp(0.2)$.

			$p = 0.7$	$p = 0.5$	$p = 0.3$
Patients	N	Method	Median (Q1, Q3)	Median (Q1, Q3)	Median (Q1, Q3)
50-150	20	HZ_P	0.00 (73.32, 76.39)	0.00 (73.57, 75.97)	0.00 (73.67, 75.65)
		HZ_O	1.11 (74.27, 78.11)	1.70 (74.53, 78.27)	3.71 (75.47, 80.57)
		Proposed	0.47 (73.10, 77.71)	0.14 (72.28, 77.38)	-0.87 (70.19, 77.74)
		Succuess	63.9	59.9	46.8
	30	HZ_P	0.00 (73.56, 75.96)	0.00 (73.60, 75.73)	0.00 (73.84, 75.42)
		HZ_O	1.14 (74.40, 77.38)	1.72 (74.84, 77.92)	3.06 (75.45, 79.64)
		Proposed	0.47 (73.30, 77.14)	0.33 (72.89, 77.01)	-0.60 (71.13, 76.75)
		Succuess	73.2	67.8	58.8
	50	HZ_P	0.00 (73.66, 75.57)	0.00 (73.74, 75.33)	0.00 (73.86, 75.17)
		HZ_O	1.10 (74.52, 76.90)	1.51 (74.89, 77.23)	3.10 (75.97, 78.95)
		Proposed	0.49 (73.57, 76.51)	0.00 (72.95, 76.38)	-0.35 (71.92, 76.30)
		Succuess	82.9	77	66.5
	100	HZ_P	0.00 (73.81, 75.23)	0.00 (73.94, 75.02)	0.00 (73.99, 74.81)
		HZ_O	1.04 (74.74, 76.43)	1.59 (75.33, 76.96)	2.87 (76.19, 78.22)
		Proposed	0.49 (73.96, 76.26)	0.14 (73.51, 75.90)	-0.46 (72.31, 75.44)
		Succuess	91.2	87.8	77.1
50-300	20	HZ_P	0.00 (74.78, 77.07)	0.00 (74.91, 76.94)	0.00 (75.04, 76.59)
		HZ_O	0.92 (75.30, 78.29)	1.55 (75.76, 78.97)	3.15 (77.01, 80.92)
		Proposed	-0.14 (72.97, 77.61)	-0.62 (71.77, 77.40)	-0.58 (67.89, 77.83)
		Succuess	61.7	56.8	19.3
	30	HZ_P	0.00 (75.01, 76.87)	0.00 (75.00, 76.59)	0.00 (75.07, 76.28)
		HZ_O	0.74 (75.58, 78.00)	1.31 (75.79, 78.46)	2.86 (76.73, 80.25)
		Proposed	-0.09 (74.15, 77.50)	-0.10 (73.62, 77.28)	-0.03 (72.77, 78.26)
		Succuess	70.5	67	20.8
	50	HZ_P	0.00 (74.93, 76.40)	0.00 (74.98, 76.19)	0.00 (75.15, 76.18)
		HZ_O	0.78 (75.52, 77.38)	1.14 (75.76, 77.79)	2.59 (76.82, 79.75)
		Proposed	0.30 (74.82, 77.24)	0.06 (74.35, 76.89)	0.05 (73.83, 77.44)
		Succuess	79.7	74.5	26.1
	100	HZ_P	0.00 (73.81, 75.23)	0.00 (73.94, 75.02)	0.00 (73.99, 74.81)
		HZ_O	1.04 (74.74, 76.43)	1.59 (75.33, 76.96)	2.87 (76.19, 78.22)
		Proposed	0.49 (73.96, 76.26)	0.14 (73.51, 75.90)	-0.46 (72.31, 75.44)
		Succuess	91.2	87.8	77.1

Median with 25th and 75th empirical quartiles (Q1, Q3) of the SAUC at $t = 2$ are reported. N denotes the number of the published studies. Proposed denotes the proposed sensitivity analysis method; HZ_P denotes the HZ model using the population (published and unpublished) studies; HZ_O denotes the HZ model using the observed (published) studies. CR denotes the proportion of convergence among 1000 repetition All the entries are multiplied by 100.

Table 2: Summary of the estimated SAUC for Biomarker2 when the true censoring is distributed as $Exp(0.2)$.

			$p = 0.7$	$p = 0.5$	$p = 0.3$
Patients	N	Method	Median (Q1, Q3)	Median (Q1, Q3)	Median (Q1, Q3)
50-150	20	HZ_P	0.00 (56.67, 58.73)	0.00 (56.85, 58.57)	0.00 (57.08, 58.37)
		HZ_O	0.61 (57.05, 59.51)	1.50 (57.88, 60.58)	3.57 (59.29, 62.95)
		Proposed	-0.02 (56.11, 59.03)	-0.84 (55.27, 58.88)	-0.38 (54.85, 61.24)
		Succuess	78.7	75.1	70
	30	HZ_P	0.00 (56.93, 58.46)	0.00 (57.07, 58.44)	0.00 (57.19, 58.24)
		HZ_O	0.65 (57.28, 59.33)	1.51 (58.24, 60.24)	3.70 (59.81, 62.90)
		Proposed	-0.19 (56.22, 58.64)	-1.19 (55.19, 58.08)	-1.56 (54.30, 60.57)
		Succuess	83.5	83.3	76.7
	50	HZ_P	0.00 (57.12, 58.36)	0.00 (57.16, 58.24)	0.00 (57.34, 58.14)
		HZ_O	0.73 (57.67, 59.17)	1.49 (58.36, 59.94)	3.46 (60.08, 62.34)
		Proposed	-0.30 (56.52, 58.32)	-1.56 (55.22, 57.10)	-2.58 (54.12, 56.73)
		Succuess	88.1	89.2	82.5
	100	HZ_P	0.00 (57.25, 58.18)	0.00 (57.36, 58.09)	0.00 (57.46, 58.03)
		HZ_O	0.67 (57.89, 58.93)	1.38 (58.57, 59.67)	3.51 (60.45, 62.06)
		Proposed	-0.50 (56.59, 57.88)	-1.71 (55.43, 56.65)	-2.95 (54.05, 55.66)
		Succuess	94.2	96.2	93.6
50-300	20	HZ_P	0.00 (57.15, 58.63)	0.00 (57.29, 58.56)	0.00 (57.44, 58.43)
		HZ_O	0.77 (57.71, 59.59)	1.54 (58.37, 60.38)	3.32 (59.86, 62.55)
		Proposed	-0.10 (56.88, 58.79)	-0.36 (56.07, 59.15)	1.74 (55.91, 62.10)
		Succuess	64.7	66	65.3
	30	HZ_P	0.00 (57.30, 58.55)	0.00 (57.38, 58.45)	0.00 (57.49, 58.27)
		HZ_O	0.77 (57.93, 59.43)	1.50 (58.60, 60.15)	3.23 (59.95, 62.16)
		Proposed	-0.15 (56.89, 58.60)	-0.75 (56.04, 58.34)	-0.30 (55.30, 61.31)
		Succuess	71.4	73.4	71.8
	50	HZ_P	0.00 (57.38, 58.37)	0.00 (57.51, 58.33)	0.00 (57.60, 58.21)
		HZ_O	0.74 (58.00, 59.13)	1.49 (58.83, 60.01)	3.23 (60.30, 61.93)
		Proposed	-0.30 (56.85, 58.21)	-0.99 (56.15, 57.78)	-1.56 (54.94, 60.64)
		Succuess	79.2	81.7	78.7
	100	HZ_P	0.00 (57.25, 58.18)	0.00 (57.36, 58.09)	0.00 (57.46, 58.03)
		HZ_O	0.67 (57.89, 58.93)	1.38 (58.57, 59.67)	3.51 (60.45, 62.06)
		Proposed	-0.50 (56.59, 57.88)	-1.71 (55.43, 56.65)	-2.95 (54.05, 55.66)
		Succuess	94.2	96.2	93.6

Median with 25th and 75th empirical quartiles (Q1, Q3) of the SAUC at $t = 2$ are reported. N denotes the number of the published studies. Proposed denotes the proposed sensitivity analysis method; HZ_P denotes the HZ model using the population (published and unpublished) studies; HZ_O denotes the HZ model using the observed (published) studies. CR denotes the proportion of convergence among 1000 repetition All the entries are multiplied by 100.

Table 3: Summary of the estimated SAUC for Biomarker1 when the true censoring is distributed as $U(1,4)$, but a misspecified exponential distribution is fitted.

			$p = 0.7$	$p = 0.5$	$p = 0.3$
Patients	N	Method	Median (Q1, Q3)	Median (Q1, Q3)	Median (Q1, Q3)
50-150	20	HZ_P	0.00 (73.89, 76.74)	0.00 (73.80, 76.42)	0.00 (73.99, 75.85)
		HZ_O	1.02 (74.45, 78.03)	1.76 (74.98, 78.94)	3.55 (76.11, 80.88)
		Proposed	0.25 (73.37, 78.12)	0.36 (72.80, 78.08)	-1.66 (69.64, 77.41)
		Succuess	41.5	39.6	32.2
	30	HZ_P	0.00 (73.86, 76.22)	0.00 (73.95, 75.90)	0.00 (74.13, 75.57)
		HZ_O	1.24 (74.75, 77.70)	1.73 (75.20, 78.06)	3.25 (76.14, 80.12)
		Proposed	0.68 (73.74, 78.05)	-0.23 (72.69, 77.04)	-1.10 (71.08, 76.80)
		Succuess	49.2	42.2	38.4
	50	HZ_P	0.00 (73.99, 75.83)	0.00 (74.08, 75.52)	0.00 (74.15, 75.29)
		HZ_O	0.98 (74.90, 77.10)	1.54 (75.33, 77.50)	2.84 (76.20, 79.14)
		Proposed	0.73 (74.08, 77.21)	-0.01 (73.26, 76.52)	-1.09 (71.51, 75.56)
		Succuess	58.9	52.5	46.2
	100	HZ_P	0.00 (74.16, 75.42)	0.00 (74.24, 75.26)	0.00 (74.34, 75.14)
		HZ_O	1.01 (75.01, 76.61)	1.55 (75.47, 77.11)	2.76 (76.42, 78.50)
		Proposed	0.84 (74.50, 76.67)	0.36 (73.92, 76.38)	-1.10 (72.13, 75.32)
		Succuess	72.5	64	55.2
50-300	20	HZ_P	0.00 (75.03, 77.25)	0.00 (75.15, 77.16)	0.00 (75.20, 76.68)
		HZ_O	0.85 (75.59, 78.53)	1.59 (76.01, 79.29)	2.98 (77.06, 80.85)
		Proposed	-0.46 (73.61, 78.01)	-1.07 (67.19, 77.43)	-6.39 (34.05, 75.87)
		Succuess	31.2	30.4	4.7
	30	HZ_P	0.00 (75.07, 77.03)	0.00 (75.18, 76.74)	0.00 (75.21, 76.42)
		HZ_O	0.85 (75.77, 78.13)	1.44 (76.05, 78.70)	3.12 (77.29, 80.30)
		Proposed	0.01 (74.48, 77.57)	-0.13 (73.99, 77.17)	-1.52 (35.72, 77.07)
		Succuess	35.5	30.7	4.3
	50	HZ_P	0.00 (75.17, 76.62)	0.00 (75.27, 76.49)	0.00 (75.34, 76.26)
		HZ_O	0.79 (75.74, 77.66)	1.28 (76.16, 78.07)	2.70 (77.04, 79.91)
		Proposed	0.30 (75.04, 77.23)	-0.12 (74.60, 76.89)	-1.53 (72.28, 76.58)
		Succuess	41.1	34.7	5.6
	100	HZ_P	0.00 (74.16, 75.42)	0.00 (74.24, 75.26)	0.00 (74.34, 75.14)
		HZ_O	1.01 (75.01, 76.61)	1.55 (75.47, 77.11)	2.76 (76.42, 78.50)
		Proposed	0.84 (74.50, 76.67)	0.36 (73.92, 76.38)	-1.10 (72.13, 75.32)
		Succuess	72.5	64	55.2

Median with 25th and 75th empirical quartiles (Q1, Q3) of the SAUC at $t = 2$ are reported. N denotes the number of the published studies. Proposed denotes the proposed sensitivity analysis method; HZ_P denotes the HZ model using the population (published and unpublished) studies; HZ_O denotes the HZ model using the observed (published) studies. CR denotes the proportion of convergence among 1000 repetition All the entries are multiplied by 100.

Table 4: Summary of the estimated SAUC for Biomarker2 when the true censoring is distributed as $U(1,4)$, but a misspecified exponential distribution is fitted.

			$p = 0.7$	$p = 0.5$	$p = 0.3$
Patients	N	Method	Median (Q1, Q3)	Median (Q1, Q3)	Median (Q1, Q3)
50-150	20	HZ_P	0.00 (56.85, 58.76)	0.00 (57.01, 58.60)	0.00 (57.26, 58.42)
		HZ_O	0.95 (57.68, 59.94)	1.87 (58.42, 60.98)	4.50 (60.53, 64.08)
		Proposed	0.13 (56.50, 59.30)	-0.40 (55.49, 59.64)	2.76 (55.19, 63.38)
		Succuess	55.5	52.7	54.5
	30	HZ_P	0.00 (57.02, 58.60)	0.00 (57.10, 58.34)	0.00 (57.31, 58.27)
		HZ_O	1.04 (57.89, 59.71)	2.01 (58.82, 60.84)	4.57 (60.88, 63.76)
		Proposed	0.11 (56.68, 58.95)	-0.92 (55.49, 58.71)	-0.85 (54.49, 62.82)
		Succuess	61.2	58	56.9
	50	HZ_P	0.00 (57.19, 58.34)	0.00 (57.31, 58.33)	0.00 (57.46, 58.20)
		HZ_O	1.01 (58.02, 59.47)	1.98 (59.02, 60.53)	4.50 (61.26, 63.30)
		Proposed	-0.16 (56.55, 58.37)	-1.30 (55.50, 57.62)	-2.38 (53.93, 61.43)
		Succuess	66	63.1	64.4
	100	HZ_P	0.00 (57.40, 58.22)	0.00 (57.47, 58.14)	0.00 (57.54, 58.07)
		HZ_O	0.98 (58.31, 59.32)	2.01 (59.28, 60.33)	4.39 (61.42, 62.95)
		Proposed	-0.40 (56.83, 57.95)	-1.45 (55.75, 57.05)	-3.14 (53.53, 55.92)
		Succuess	64.8	69.6	69.7
50-300	20	HZ_P	0.00 (57.16, 58.66)	0.00 (57.31, 58.51)	0.00 (57.45, 58.45)
		HZ_O	0.99 (58.00, 59.81)	1.94 (58.91, 60.77)	3.79 (60.49, 62.83)
		Proposed	0.06 (56.80, 59.20)	0.26 (56.38, 60.25)	2.93 (57.56, 62.40)
		Succuess	41.6	42.8	51.9
	30	HZ_P	0.00 (57.39, 58.57)	0.00 (57.48, 58.45)	0.00 (57.59, 58.33)
		HZ_O	0.95 (58.28, 59.67)	1.89 (59.12, 60.63)	3.83 (60.82, 62.68)
		Proposed	-0.22 (56.93, 58.84)	-0.49 (56.38, 59.09)	2.66 (56.10, 62.44)
		Succuess	46.5	46.1	55.1
	50	HZ_P	0.00 (57.48, 58.39)	0.00 (57.55, 58.30)	0.00 (57.64, 58.23)
		HZ_O	1.01 (58.36, 59.51)	1.94 (59.30, 60.35)	3.81 (60.98, 62.47)
		Proposed	-0.27 (56.95, 58.35)	-0.78 (56.32, 58.02)	-0.30 (55.66, 61.83)
		Succuess	49.5	49.4	60.2
	100	HZ_P	0.00 (57.40, 58.22)	0.00 (57.47, 58.14)	0.00 (57.54, 58.07)
		HZ_O	0.98 (58.31, 59.32)	2.01 (59.28, 60.33)	4.39 (61.42, 62.95)
		Proposed	-0.40 (56.83, 57.95)	-1.45 (55.75, 57.05)	-3.14 (53.53, 55.92)
		Succuess	64.8	69.6	69.7

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