Simulation Result 1: C~Exp(0.2)

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Table 1: Summary of the estimated SAUC(2) in Biomarker1 when the true censored time 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	74.97 (73.45, 76.48)	74.78 (73.43, 75.97)	74.68 (73.69, 75.66)
		HZ_O	76.30 (74.32, 78.03)	76.51 (74.57, 78.51)	77.03 (75.15, 79.14)
		Prop	75.61 (73.01, 77.96)	74.93 (72.29, 77.54)	74.16 (71.10, 77.02)
		CR	64.19	60.48	56.21
	30	HZ_P	74.79 (73.58, 75.95)	74.59 (73.54, 75.58)	74.52 (73.76, 75.32)
		HZ_O	75.89 (74.27, 77.41)	76.22 (74.54, 77.85)	77.01 (75.42, 78.57)
		Prop	75.17 (73.51, 77.07)	74.64 (72.59, 76.81)	74.31 (72.02, 76.51)
		CR	73.32	69.48	65.89
	50	HZ_P	74.68 (73.78, 75.58)	74.60 (73.73, 75.38)	74.52 (73.85, 75.12)
		HZ_O	75.76 (74.67, 76.93)	76.27 (75.06, 77.32)	76.79 (75.60, 78.07)
		Prop	75.09 (73.56, 76.57)	74.64 (73.06, 76.21)	74.10 (72.27, 76.01)
		CR	81.3	77.1	72.77
	100	HZ_P	74.54 (73.87, 75.17)	74.53 (73.96, 75.05)	74.42 (73.93, 74.82)
		HZ_O	75.53 (74.75, 76.31)	76.13 (75.32, 76.94)	76.80 (75.93, 77.54)
		Prop	74.84 (73.79, 76.08)	74.64 (73.50, 76.19)	74.16 (72.88, 75.45)
		CR	90.5	85.7	83.6
50-300	20	HZ_P	75.87 (74.66, 77.07)	75.73 (74.79, 76.82)	75.73 (74.99, 76.53)
		HZ_O	76.73 (75.22, 78.36)	77.29 (75.65, 78.87)	77.90 (76.18, 79.45)
		Prop	75.45 (72.75, 77.47)	75.24 (72.37, 77.46)	73.91 (35.05, 76.41)
		CR	59.05	57.93	55.61
	30	HZ_P	75.85 (74.85, 76.88)	75.68 (74.84, 76.53)	75.69 (75.03, 76.33)
		HZ_O	76.77 (75.43, 77.98)	77.02 (75.77, 78.34)	77.79 (76.19, 79.14)
		Prop	75.89 (74.14, 77.43)	75.58 (73.74, 77.40)	74.68 (71.10, 76.78)
		CR	71.8	65.06	61.18
	50	HZ_P	75.76 (74.96, 76.51)	75.61 (75.04, 76.22)	75.59 (75.08, 76.07)
		HZ_O	76.51 (75.48, 77.45)	76.75 (75.81, 77.69)	77.40 (76.36, 78.48)
		Prop	75.82 (74.65, 77.09)	75.63 (74.47, 76.90)	75.19 (73.71, 76.45)
		CR	77.1	70.1	64
	100	HZ_P	74.54 (73.87, 75.17)	74.53 (73.96, 75.05)	74.42 (73.93, 74.82)
		HZ_O	75.53 (74.75, 76.31)	76.13 (75.32, 76.94)	76.80 (75.93, 77.54)
		Prop	74.84 (73.79, 76.08)	74.64 (73.50, 76.19)	74.16 (72.88, 75.45)
		CR	90.5	85.7	83.6

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denotes the proposed sensitivity analysis method; HZ_P denotes the HZ model using the population (published and unpublished) studies; HZ_O denotes the HZ model using the observed (published) studies.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 2: Summary of the estimated SAUC(2) in Biomarker2 when the true censored time 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	57.63 (56.66, 58.69)	57.75 (56.92, 58.65)	57.68 (57.09, 58.42)
		HZ_O	59.42 (58.40, 60.64)	60.69 (59.44, 61.90)	61.96 (60.72, 63.21)
		Prop	59.03 (57.81, 60.32)	59.80 (58.00, 61.35)	60.79 (57.71, 62.38)
		CR	85.31	85.34	84.46
	30	HZ_P	57.80 (56.95, 58.56)	57.77 (57.03, 58.42)	57.78 (57.24, 58.27)
		HZ_O	59.64 (58.67, 60.63)	60.64 (59.74, 61.60)	61.89 (60.92, 62.90)
		Prop	59.21 (57.99, 60.25)	59.90 (58.13, 61.22)	60.76 (57.48, 62.24)
		CR	90.46	87.86	88.93
	50	HZ_P	57.74 (57.09, 58.33)	57.73 (57.17, 58.24)	57.73 (57.32, 58.15)
		HZ_O	59.59 (58.88, 60.38)	60.67 (59.98, 61.41)	62.01 (61.22, 62.73)
		Prop	59.20 (58.26, 60.06)	59.87 (57.76, 61.02)	61.10 (57.42, 62.21)
		CR	95.2	93.98	92.17
	100	HZ_P	57.71 (57.31, 58.19)	57.72 (57.36, 58.10)	57.74 (57.44, 58.02)
		HZ_O	59.63 (59.13, 60.14)	60.68 (60.14, 61.21)	62.00 (61.44, 62.53)
		Prop	59.47 (58.77, 60.04)	59.77 (57.40, 60.80)	61.33 (57.36, 62.15)
		CR	97.7	92.57	94.68
50-300	20	HZ_P	57.91 (57.09, 58.64)	57.90 (57.31, 58.54)	57.93 (57.50, 58.38)
		HZ_O	59.27 (58.31, 60.07)	60.07 (59.24, 60.89)	61.06 (60.10, 61.97)
		Prop	58.55 (57.51, 59.59)	59.20 (57.65, 60.29)	60.12 (57.97, 61.51)
		CR	69.43	76.38	78.03
	30	HZ_P	57.95 (57.24, 58.59)	57.87 (57.37, 58.37)	57.92 (57.52, 58.33)
		HZ_O	59.34 (58.58, 60.05)	60.08 (59.44, 60.82)	61.07 (60.30, 61.81)
		Prop	58.47 (57.63, 59.30)	59.18 (57.69, 60.28)	60.41 (57.78, 61.47)
		CR	74.13	77.44	83.91
	50	HZ_P	57.95 (57.47, 58.40)	57.95 (57.50, 58.35)	57.93 (57.60, 58.23)
		HZ_O	59.35 (58.82, 59.91)	60.11 (59.55, 60.68)	61.10 (60.50, 61.64)
		Prop	58.31 (57.62, 59.05)	58.77 (57.54, 59.99)	60.41 (57.75, 61.32)
		CR	77.27	81.08	88.59
	100	HZ_P	57.71 (57.31, 58.19)	57.72 (57.36, 58.10)	57.74 (57.44, 58.02)
		HZ_O	59.63 (59.13, 60.14)	60.68 (60.14, 61.21)	62.00 (61.44, 62.53)
		Prop	59.47 (58.77, 60.04)	59.77 (57.40, 60.80)	61.33 (57.36, 62.15)
		CR	97.7	92.57	94.68

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(2) in Biomarker1 when the true censored time 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	75.07 (73.54, 76.47)	74.95 (73.75, 76.05)	75.01 (74.04, 75.88)
		HZ_O	76.30 (74.15, 78.10)	76.81 (74.77, 78.67)	77.66 (75.62, 79.53)
		Prop	75.91 (73.29, 78.22)	74.89 (72.17, 77.25)	73.65 (71.08, 76.54)
		CR	44.34	37.7	35.3
	30	HZ_P	75.05 (73.89, 76.20)	74.92 (73.98, 75.91)	74.88 (74.06, 75.66)
		HZ_O	76.24 (74.85, 77.58)	76.76 (75.36, 78.17)	77.27 (75.81, 78.85)
		Prop	75.80 (74.04, 77.93)	75.29 (73.05, 77.68)	73.98 (71.48, 76.50)
		CR	50.6	43.5	39.3
	50	HZ_P	74.94 (73.92, 75.78)	74.81 (74.04, 75.59)	74.80 (74.21, 75.36)
		HZ_O	75.95 (74.84, 77.03)	76.31 (75.05, 77.39)	76.98 (75.87, 78.08)
		Prop	75.63 (74.16, 77.11)	74.61 (72.94, 76.29)	73.82 (72.14, 75.81)
		CR	58.5	50.8	48.1
	100	HZ_P	74.81 (74.14, 75.41)	74.77 (74.27, 75.28)	74.76 (74.30, 75.19)
		HZ_O	75.81 (74.98, 76.59)	76.32 (75.54, 77.10)	77.03 (76.18, 77.76)
		Prop	75.38 (74.31, 76.49)	74.82 (73.67, 76.20)	74.02 (72.73, 75.27)
		CR	72	61.4	58.1
50-300	20	HZ_P	76.22 (75.28, 77.32)	76.13 (75.17, 77.04)	75.97 (75.20, 76.64)
		HZ_O	77.13 (75.76, 78.71)	77.74 (76.27, 79.15)	78.24 (76.67, 79.81)
		Prop	75.74 (73.75, 78.07)	75.46 (71.23, 77.56)	73.97 (36.01, 76.37)
		CR	29.73	28.7	32.33
	30	HZ_P	76.08 (75.08, 76.99)	75.98 (75.14, 76.71)	75.82 (75.30, 76.36)
		HZ_O	76.99 (75.62, 78.19)	77.50 (76.27, 78.79)	78.15 (76.64, 79.48)
		Prop	76.06 (74.47, 77.57)	75.48 (73.63, 77.33)	75.18 (73.03, 76.92)
		CR	33.6	31.3	31.7
	50	HZ_P	75.97 (75.23, 76.61)	75.93 (75.36, 76.50)	75.82 (75.34, 76.26)
		HZ_O	76.72 (75.82, 77.63)	77.31 (76.24, 78.24)	77.80 (76.50, 79.06)
		Prop	76.16 (75.09, 77.16)	76.16 (74.56, 77.05)	75.30 (73.69, 76.60)
		CR	39	36.3	37.8
	100	HZ_P	74.81 (74.14, 75.41)	74.77 (74.27, 75.28)	74.76 (74.30, 75.19)
		HZ_O	75.81 (74.98, 76.59)	76.32 (75.54, 77.10)	77.03 (76.18, 77.76)
		Prop	75.38 (74.31, 76.49)	74.82 (73.67, 76.20)	74.02 (72.73, 75.27)
		CR	72	61.4	58.1

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 4: Summary of the estimated SAUC(2) in Biomarker2 when the true censorcensored time 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	57.77 (56.84, 58.68)	57.80 (56.95, 58.64)	57.79 (57.16, 58.39)
		HZ_O	59.81 (58.64, 60.87)	61.09 (59.91, 62.16)	62.47 (61.29, 63.67)
		Prop	59.28 (57.75, 60.66)	60.42 (58.29, 61.82)	61.76 (58.35, 63.26)
		CR	67.17	69.18	72.58
	30	HZ_P	57.72 (56.99, 58.42)	57.79 (57.14, 58.40)	57.82 (57.29, 58.32)
		HZ_O	59.79 (58.98, 60.71)	61.08 (60.16, 61.92)	62.52 (61.65, 63.44)
		Prop	59.23 (57.82, 60.36)	60.38 (57.96, 61.62)	61.98 (57.94, 63.12)
		CR	70.9	70.91	79.68
	50	HZ_P	57.90 (57.27, 58.43)	57.84 (57.34, 58.29)	57.79 (57.37, 58.16)
		HZ_O	59.97 (59.30, 60.62)	61.10 (60.49, 61.76)	62.43 (61.72, 63.12)
		Prop	59.32 (58.01, 60.29)	60.32 (57.68, 61.41)	62.12 (59.19, 62.99)
		CR	75.78	79.22	82.72
	100	HZ_P	57.82 (57.37, 58.21)	57.80 (57.47, 58.17)	57.81 (57.54, 58.08)
		HZ_O	59.85 (59.38, 60.32)	61.12 (60.64, 61.59)	62.45 (61.98, 62.94)
		Prop	59.25 (57.81, 60.11)	60.52 (57.56, 61.35)	62.31 (60.99, 62.88)
		CR	75.85	80.62	91.06
50-300	20	HZ_P	58.01 (57.28, 58.74)	57.90 (57.33, 58.50)	58.00 (57.50, 58.45)
		HZ_O	59.52 (58.69, 60.39)	60.33 (59.50, 61.11)	61.39 (60.52, 62.25)
		Prop	58.94 (57.62, 60.18)	59.44 (57.87, 60.72)	61.07 (58.97, 62.20)
		CR	49.54	51.78	60.81
	30	HZ_P	57.97 (57.37, 58.56)	57.96 (57.43, 58.41)	57.91 (57.58, 58.30)
		HZ_O	59.50 (58.84, 60.14)	60.41 (59.67, 61.00)	61.33 (60.65, 61.98)
		Prop	58.63 (57.57, 59.72)	59.13 (57.54, 60.63)	61.01 (58.15, 61.82)
		CR	51.22	55.91	72.5
	50	HZ_P	57.94 (57.50, 58.43)	57.93 (57.51, 58.30)	57.94 (57.66, 58.22)
		HZ_O	59.47 (58.97, 59.99)	60.35 (59.83, 60.86)	61.36 (60.79, 61.83)
		Prop	58.31 (57.55, 59.30)	58.47 (57.37, 60.18)	60.87 (57.34, 61.72)
		CR	49.03	55.02	74.42
	100	HZ_P	57.82 (57.37, 58.21)	57.80 (57.47, 58.17)	57.81 (57.54, 58.08)
		HZ_O	59.85 (59.38, 60.32)	61.12 (60.64, 61.59)	62.45 (61.98, 62.94)
		Prop	59.25 (57.81, 60.11)	60.52 (57.56, 61.35)	62.31 (60.99, 62.88)
		CR	75.85	80.62	91.06

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.