Supplemental Materials I: Model Inputs

Table 1.1. Input for the research setting (5-year) and the clinical delivery setting (1-year).

Parameters	Research (range), $ (5 years)	Clinical delivery (range), $ (1 year)
Labor		
Annual Salary (per person)		
Faculty leader/PI	151,895 (107,701 - 244,440)a	203,700 (162,960 - 244,440)
Co-investigator	181,544 (123,618 - 244,440)a	-
Site project manager	72,619 (58,000 - 90,000)a	72,619 (58,000 - 90,000)
Clinical research assistant	40,000 (32,000 - 48,000)	40,000 (32,000 - 48,000)
Research coordinator	83,218 (66,574 - 99,861)	-
Data manager	66,000 (52,800 -79,200)	106,888 (85,510 - 128,266)
Clinical pharmacist or physician	100,000 (80,000 - 120,000)	100,000 (80,000 - 120,000)
Biostatistician (PhD level)	202,000 (161,600 - 242,400)	-
Data analyst (Master level)	106,888 (85,510 - 128,265)	-
FTEs utilized (over entire time period)		
Faculty leader/PI	2.0 (1.6 - 2.4)	0.2 (0.2 - 0.2)
Co-investigator	0.6 (0.5 - 0.7)	-
Site project manager	5.3 (4.2 - 6.3)	1.1 (0.8 - 1.3)
Clinical research assistant	1.3 (1.0 - 1.5)	1.5 (1.0 - 1.5)
Research coordinator	1.3 (1.0 - 1.6)	-
Data manager	0.3 (0.2 - 0.3)	0.1 (0.0 - 0.1)
Clinical pharmacist or physician	1.0 (0.8 - 1.2)	0.2 (0.2 - 0.2)
Biostatistician (PhD level)	0.3 (0.2 - 0.4)	-
Data analyst (Master level)	0.4 (0.3 - 0.5)	-
Equipment		
Fixed costs		
MI-BP App Development	153,000 (70,000 - 209,000)	-
Configuration year	-	102,000 (28,000 - 146,000)
Non-configuration year	-	17,000 (14,000 - 21,000)
Amortized average	-	39,962 (17,804 - 54,724)
System configuration interval	-	4 (2 - 8)
Blood pressure monitor - clinical use	1,628 (1,586 - 1,953)	1,627 (1,586 - 1,953)
Tablets	1,046 (837 - 1,255)	-
Tablets cover	156 (125 - 187)	-

Parameters	Research (range), $ (5 years)	Clinical delivery (range), $ (1 year)
Survey - Patient Activation Measure	750 (600 - 900)	-
Survey - SF-12 measure	1,365 (1,092 - 1,638)	-
Investigator travel	7,500 (6,000 - 9,000)	-
Technology infrastructure support services	10,050 (8,040 - 12,060)	-
Recruitment services	46,000 (36,800 - 55,200)	-
Variable costs		
Cost per unit		
Blood pressure monitor - standard	50 (40 - 70)	50 (40 - 70)
Blood pressure monitor - large	10 (8 - 31)	10 (8 - 31)
Pedometers	51 (41 - 70)	51 (41 - 70)
Pedometer batteries	13 (10 - 15)	13 (10 - 15)
Number of unit per patient		
Blood pressure monitor - standard	1.2 (0.9 - 1.3)	1.2 (0.9 - 1.3)
Blood pressure cuff - large	0.1 (0.0 - 0.1)b	0.1 (0.0 - 0.1)
Pedometers	0.8 (0.7 - 1.0)c	1.7 (1.3 - 2.0)
Pedometers' batteries	0.8 (0.7 - 1.0)	1.7 (1.3 - 2.0)
Follow-up		
Patient recruitment	24,000 (19,200 - 28,800)	-
Week 0		
ClinCard (activation and load)	1,127 (902 - 1,353)	-
ClinCard (postage for mailing)	656 (525 - 788)	-
Blood sample measuring	8,350 (6,680 - 10,020)	-
Sodium intake - urine collection transportation	1,344 (1,075 - 1,613)	-
Sodium intake - urine laboratory tests	7,632 (6,106 - 9,158)	-
Sodium intake - sodium block screener	167 (134 - 200)	-
Incentive - follow-up visit	4,175 (3,340 - 5,010)	-
Incentive - urine collection	4,175 (3,340 - 5,010)	-
Week 2 and 8		
Incentive - follow-up visit	7,650 (6,120 - 9,180)	-
Week 13, 26, 39 and 52		
Medication adherence assay - blood sample	24,860 (19,888 - 29,832)	-
Sodium intake - sodium block screener	452 (362- 542)	210 (168 - 252)
Sodium intake - urine collection transportation	1,691 (1,352 - 2,029)	-
Sodium intake - urine laboratory tests	6,867 (5,494 - 8,240)	6,867 (5,494 - 8,240)
Sodium intake - urine sodium albumin	1,131 (905 - 1,357)	-

Parameters	Research (range), $ (5 years)	Clinical delivery (range), $ (1 year)
iBio clinical research services center	14,347 (11,478 - 17,216)	-
Incentive - follow-up visit	11,300 (9,040 - 13,560)	-
Incentive - urine collection	5,250 (4,200 - 6,300)	-
Participants		
Number of patients	167 (100 - 1,000)	167 (100 - 1,000)
Patient retention (Patient engagement)	52% (25% - 75%)	52% (25% - 75%)

aThese are effort-weighted salaries given there are multiple principal investigators/co-investigators/project managers on the project.
bThese are averages per patient. Not all patients required a large sized blood pressure cuff.
cBecause of attrition, not all patients made it long enough in the trial to receive the pedometer.

Table 1.2. Number of Participants During Trial

Time	MI-BP Group (nt)	Control Group (nc)	Total (N)
Screening / Consent (Week -2)			702
Baseline (Week 0)			167
Randomization and Titration (Week 2)	83	79	162
Medication Titration (Week 8)	74	70	144
Follow-up 1 (Week 13)	72	67	139
Follow-up 2 (Week 26)	65	58	123
Follow-up 3 (Week 39)	53	50	103
Follow-up 4 (Week 52)	44	43	87

Table 1.3. MI-BP App Configuration Schedule

Date	Configuration Year	Services
Year 1 (03/01/17 - 02/28/18)	Yes	Customer support
		Mobile application configuration
		Maintenance (Data collection, platform hosting, and storage)
Year 2 (03/01/18 - 02/28/19)	No	Customer support
		Maintenance (Data collection, platform hosting, and storage)
		System upgrades
Year 3 (03/01/19 - 02/29/20)	No	Customer support
		Maintenance (Data collection, platform hosting, and storage)
		System upgrades
Year 4 (03/01/20 - 02/28/21)	No	Customer support
		Maintenance (Data collection, platform hosting, and storage)
		System upgrades

Table 1.5. Cost Estimates of MI-BP App Development Services

Services	4-year Cost			1-year Cost		
	Base	Lower	Upper	Base	Lower	Upper
Mobile application development (One time cost)	$90,000	$16,000	$130,000	$24,212	$4,304	$34,974
Customer support ($2K/year, four years in total)	$8,000	$8,000	$8,000	$2,000	$2,000	$2,000
Maintenance ($10K/year, four years in total)	$40,000	$40,000	$56,000	$10,000	$10,000	$14,000
System upgrades ($5K/year, except the first year)	$15,000	$6,000	$15,000	$37,500	$1,500	$37,500

Supplemental Materials II: Results and Figures

Table 2.1.1. One-way sensitivity analysis for the research setting with general categories.

Parameter	Lower Bound	Upper Bound	Difference
Labor	$1,082,390.91	$2,239,215.94	$1,156,825.03
Equipment	$1,434,113.56	$1,619,145.30	$185,031.74
Follow-up	$1,512,156.97	$1,562,226.77	$50,069.80

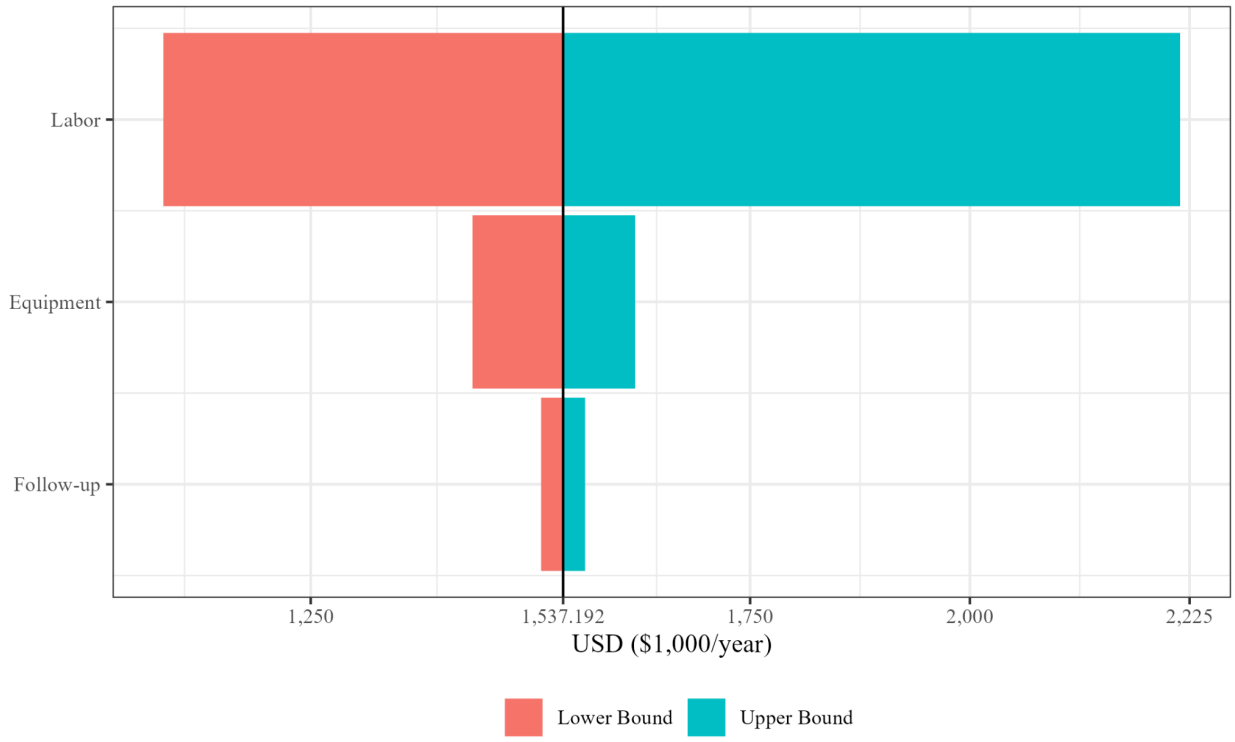

Figure 2.1.1. Tornado diagram for the research setting with general categories.

Table 2.1.1. One-way sensitivity analysis for the research setting.

Parameter	Lower Bound	Upper Bound	Difference
Number of Patients	$ 1,489,042.74	$ 2,132,946.43	$ 643,903.69
Salary: Faculty leader/PI	$ 1,448,804.47	$ 1,722,282.87	$ 273,478.40
Salary: Site project manager	$ 1,460,441.87	$ 1,628,441.87	$ 168,000.00
FTE: Site project manager	$ 1,460,941.87	$ 1,613,441.87	$ 152,500.00
MI-BP App	$ 1,454,191.87	$ 1,593,191.87	$ 139,000.00
FTE: Faculty leader/PI	$ 1,476,434.07	$ 1,597,949.67	$ 121,515.60
Salary: Co-investigator	$ 1,502,436.49	$ 1,574,929.45	$ 72,492.96
FTE: Co-investigator	$ 1,515,406.59	$ 1,558,977.15	$ 43,570.57
Salary: Research coordinator	$ 1,515,555.31	$ 1,558,828.43	$ 43,273.12
FTE: Research coordinator	$ 1,515,555.31	$ 1,558,828.43	$ 43,273.12

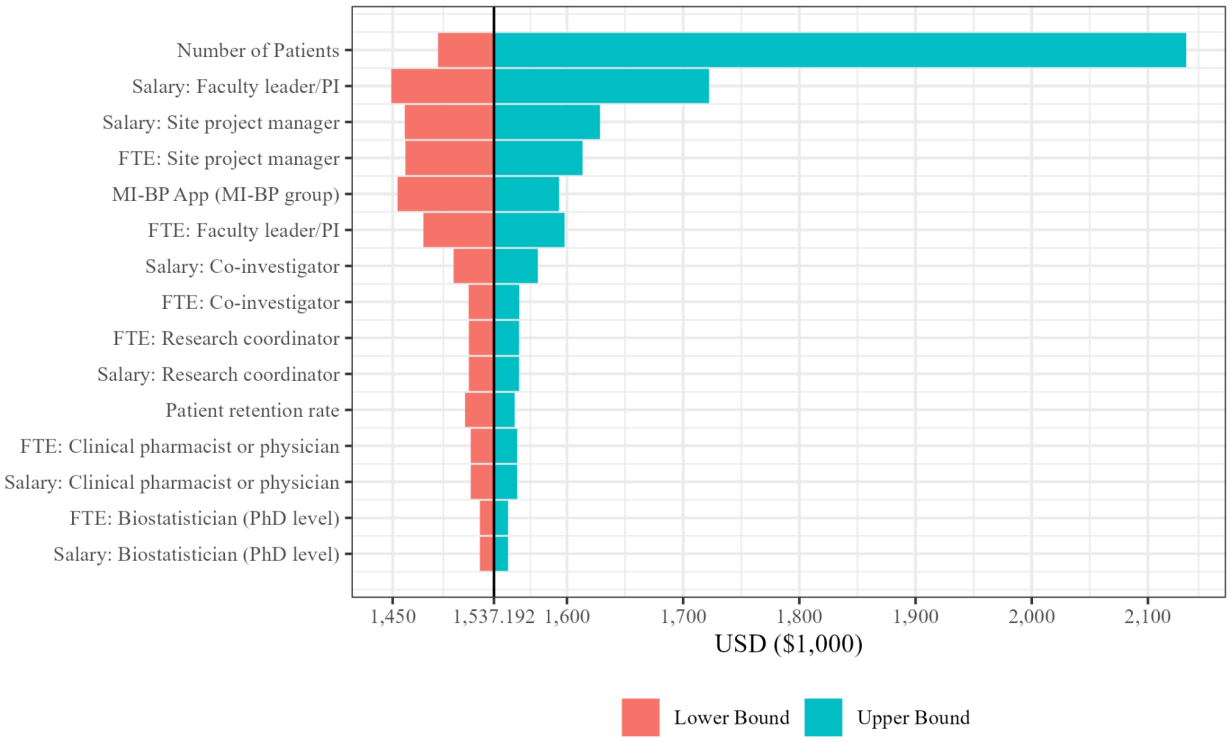

Figure S2.1.2. Tornado diagram for the research setting.

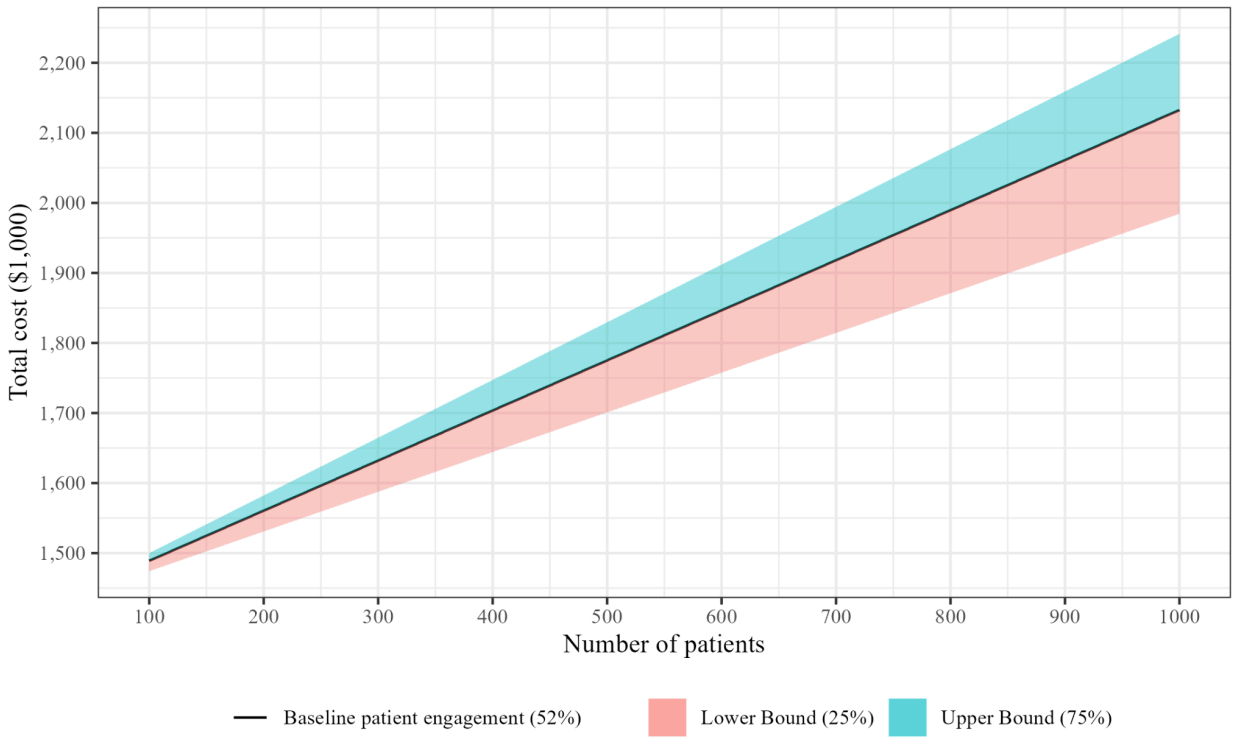

Figure S2.1.3. Relationship between number of patients and the total cost in the research setting, with varying levels of patient retention.

Table S2.2.1. One-way sensitivity analysis on the total cost in the amortized average clinical setting with general categories.

Parameter	Lower Bound	Upper Bound	Difference
Labor	$199,084.47	$380,631.99	$181,547.52
Equipment	$246,347.50	$311,133.50	$64,786.00
Follow-up	$276,989.45	$279,820.25	$2,830.80

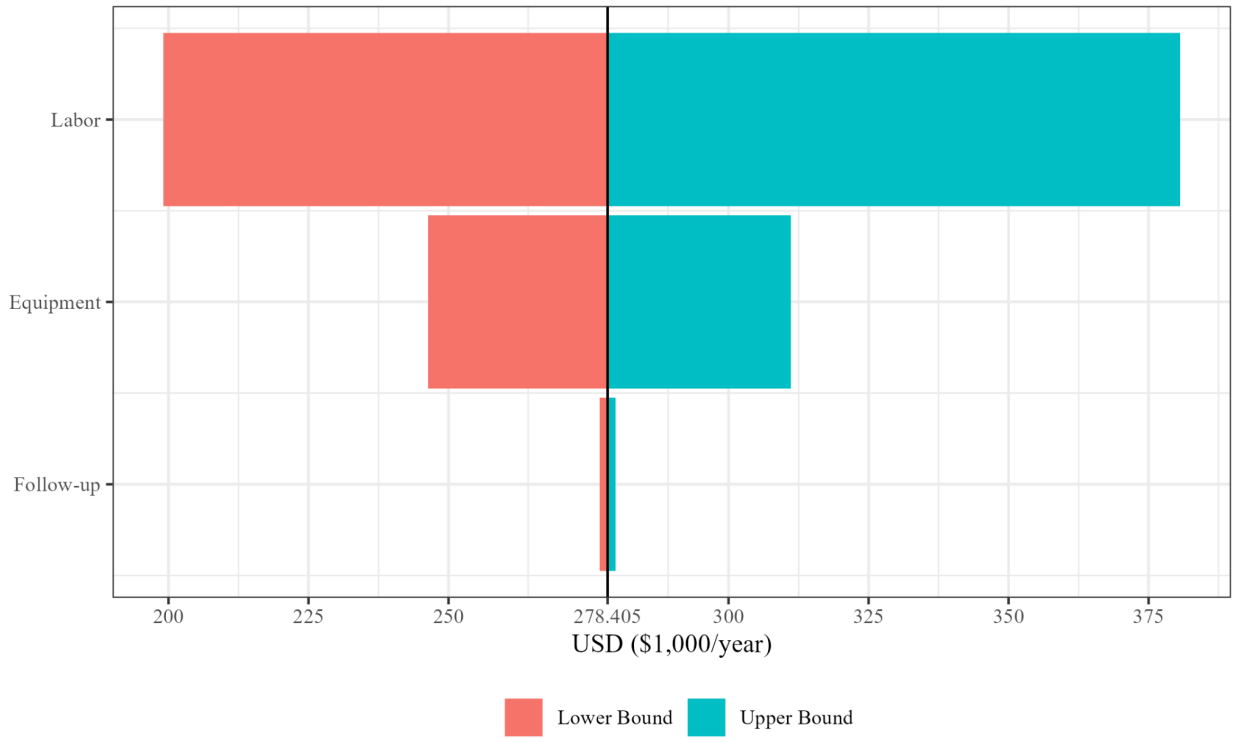

Figure S2.2.1. Tornado diagram on the total cost in the amortized average clinical setting with general categories.

Table S2.2.2. One-way sensitivity analysis on the total cost in the amortized average clinical setting.

Parameter	Lower Bound	Upper Bound	Difference
Number of Patients	$265,747.62	$435,770.13	$170,022.50
FTE: Clinical research assistant	$258,404.86	$298,404.86	$40,000.00
MI-BP App	$256,246.86	$293,165.94	$36,919.08
Salary: Project manager	$263,054.85	$296,654.85	$33,600.00
System configuration interval	$299,988.40	$267,638.50	-$32,338.90
FTE: Project manager	$263,154.86	$293,654.86	$30,500.00
Salary: Clinical research assistant	$266,404.86	$290,404.86	$24,000.00
Salary: Faculty leader/PI	$270,256.86	$286,552.86	$16,296.00
FTE: Faculty leader/PI	$270,256.86	$286,552.86	$16,296.00
Salary: Clinical pharmacist or physician	$274,404.86	$282,404.86	$8,000.00
FTE: Clinical pharmacist or physician	$274,404.86	$282,404.86	$8,000.00

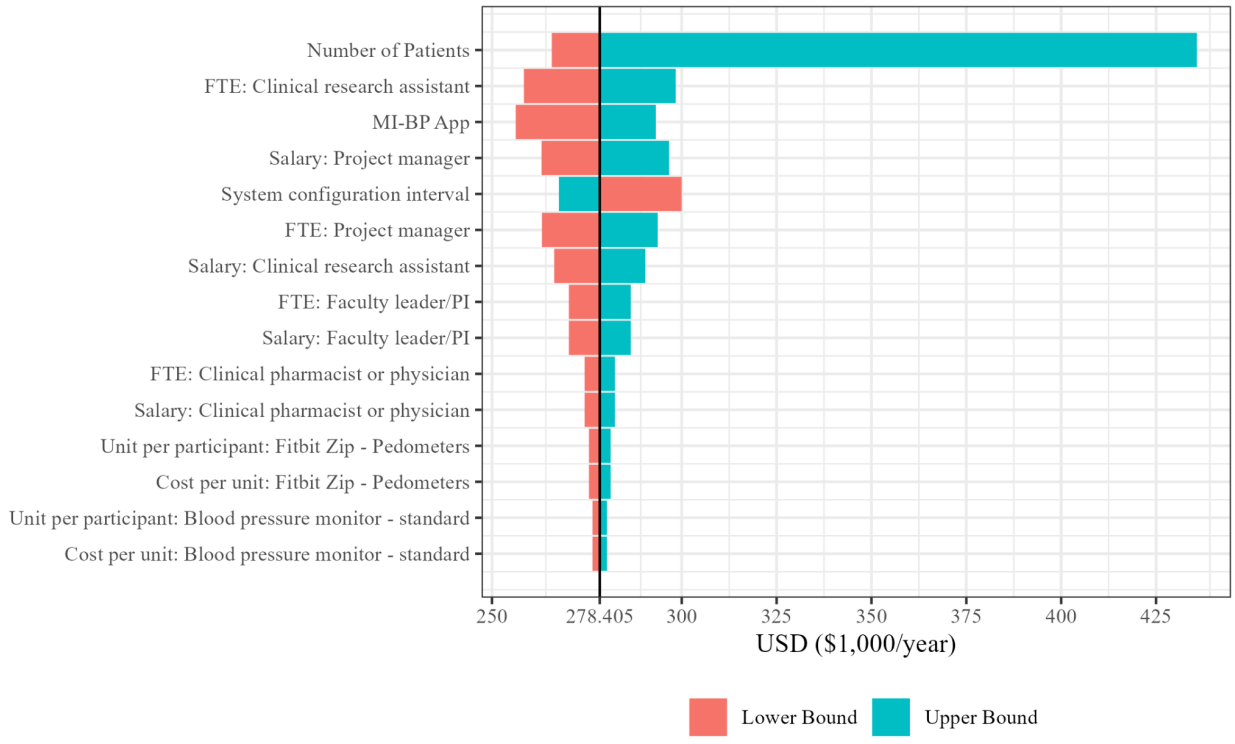

Figure S2.2.2. Tornado diagram of the total cost in the amortized average clinical setting.

Table S2.2.3. One-way sensitivity analysis on the monthly cost per patient in the amortized average clinical setting.

Parameter	Lower Bound	Upper Bound	Difference
Number of Patients	$221.46	$36.31	-$185.14
FTE: Clinical research assistant	$128.94	$148.90	$19.96
MI-BP App	$127.87	$146.29	$18.42
Salary: Project manager	$131.26	$148.03	$16.77
System configuration interval	$149.69	$133.55	-$16.14
FTE: Project manager	$131.31	$146.53	$15.22
Salary: Clinical research assistant	$132.94	$144.91	$11.98
Salary: Faculty leader/PI	$134.86	$142.99	$8.13
FTE: Faculty leader/PI	$134.86	$142.99	$8.13
Salary: Clinical pharmacist or physician	$136.93	$140.92	$3.99
FTE: Clinical pharmacist or physician	$136.93	$140.92	$3.99

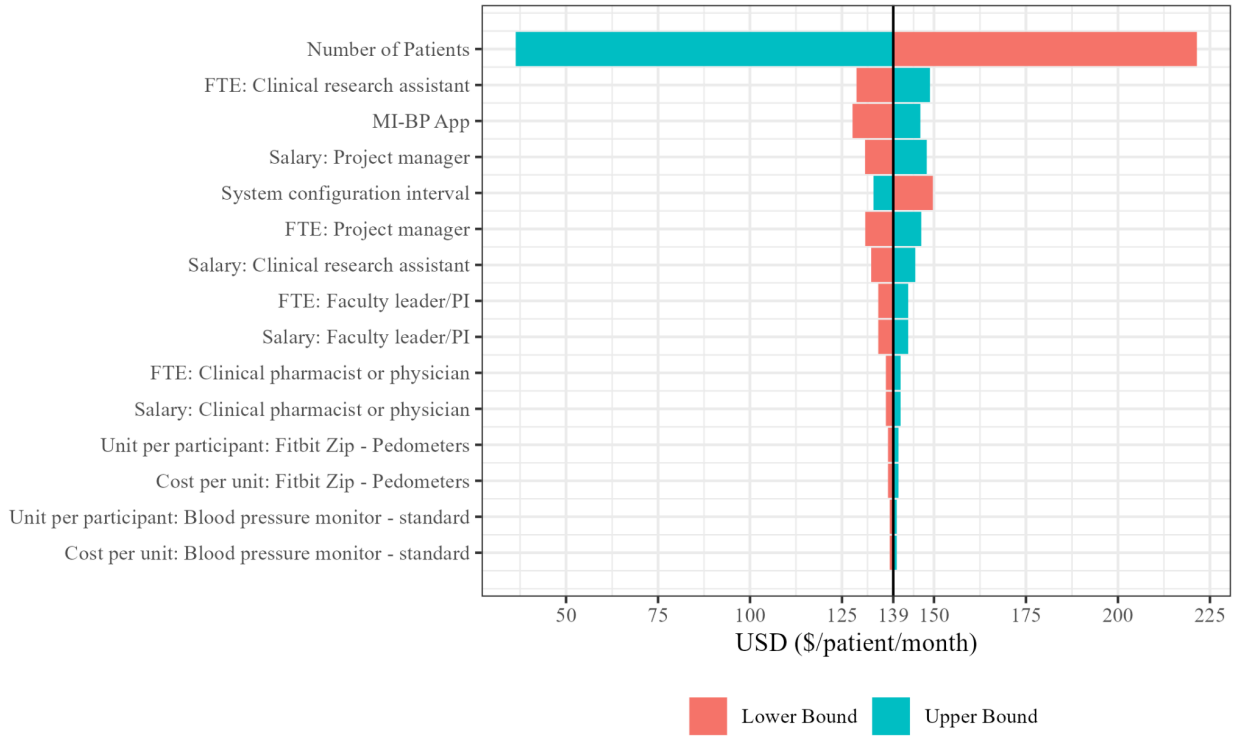

Figure S2.2.3. Tornado diagram of the monthly cost per patient in the amortized average clinical setting.

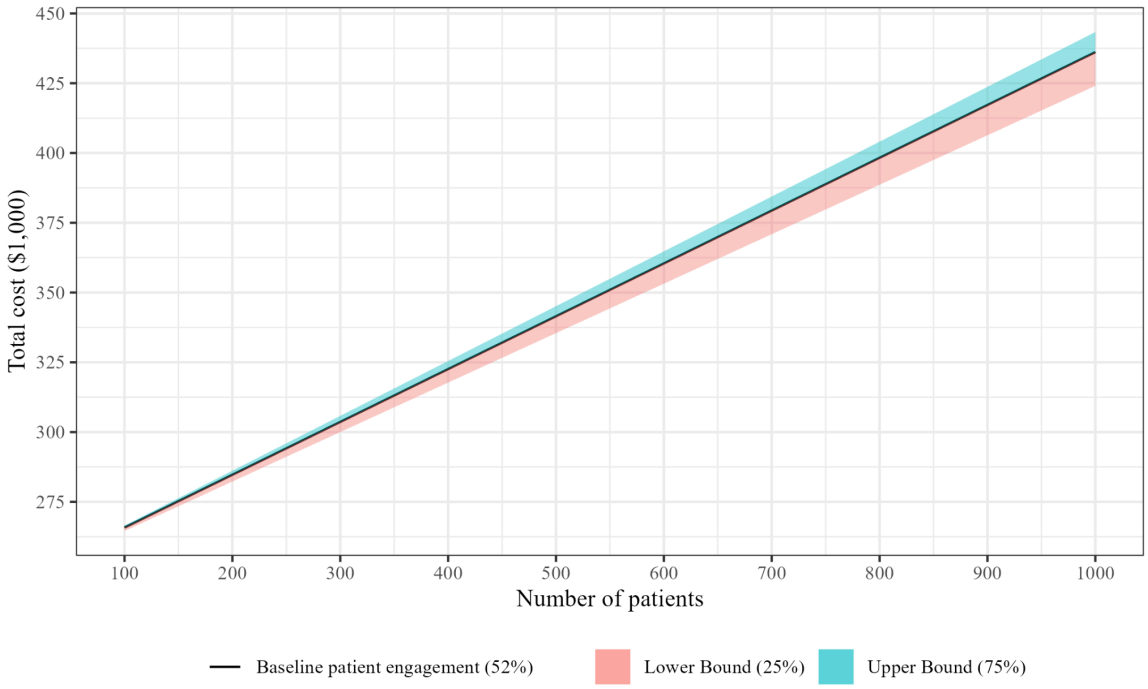

Figure S2.2.4. Impact of patient number and engagement on the total cost in amortized average clinical setting

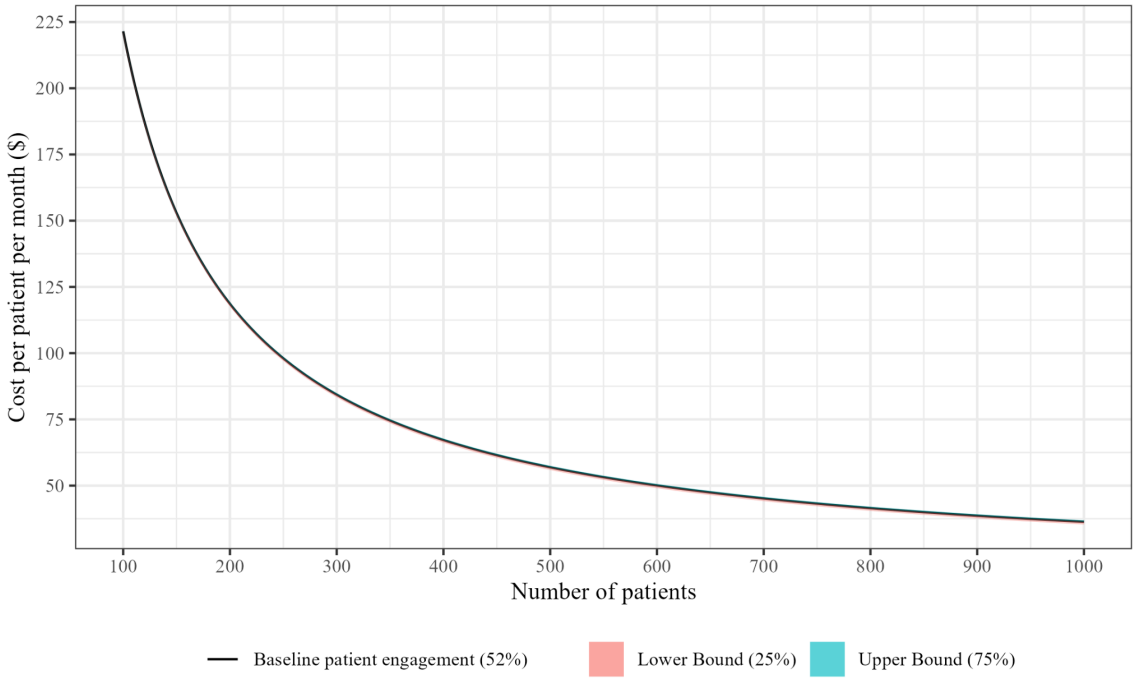

Figure S2.2.5. Impact of patient number and engagement on monthly cost per patient in amortized average clinical setting

Table 2.1. The impact of patient retention on the total costs across all settings.

	Fixed cost ($)	Variable cost ($)		
Patient retention	**All**	**52%**	**25%**	**75%**
Research setting	1,417,498	715	567	824
Clinical setting (Amortized average)	246,856			
Clinical setting (Configuration)	308,894	189	177	196
Clinical setting (Non-configuration)	233,894			

Table 2.2. The impact of patient retention on the monthly cost per patient in clinical settings

	Monthly fixed cost ($)	Monthly proportional costs ($)		
Patient retention	**All**	**52%**	**25%**	**75%**
Clinical setting (Average)	20,571.35			
Clinical setting (Configuration)	25,741.15	15.77	14.77	16.37
Clinical setting (Non-configuration)	18,657.82			

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