

Technical Appendix: Health Start Evaluation for American Indian Mothers

The following appendix presents population-level summary statistics (where available), results from propensity score matching models, and post-match comparisons for the treatment and comparison populations: American Indian mothers for the years 2006-2016. Following What Works Clearinghouse guidelines (WWC, 2020)¹ matching models were calibrated so that the standardized (effect size) differences between the intervention (Health Start) and comparison groups in the variables used for matching fell below 0.25. Where differences remained between 0.05-0.25, the intervention effect was adjusted via logistic regressions. These models included all variables used in the matching models plus the treatment (Health Start) indicator. Both the post-match unadjusted and regression-adjusted intervention effects are reported in Appendix Table 1 as odds ratios.

We did not attempt to impute missing outcome data and estimation models were limited to the populations for whom these measures were available. As a result, evaluation populations varied slightly between sets of outcomes. Accordingly, we include the matching results for each evaluation population.

¹ U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, What Works Clearinghouse.

Appendix Table 1: Unadjusted and Regression-Adjusted Outcomes for American Indian Health Start Participants

	Unadjusted Odds Ratio	Adjusted Odds Ratio†
Any prenatal care	2.05* (1.05, 4.02)	2.22* (1.07, 4.60)
Kotelchuck Index: >= Adequate	1.05 (0.87, 1.28)	1.05 (0.86, 1.29)
Kotelchuck Index: < Adequate	1.14 (0.91, 1.41)	1.15 (0.92, 1.45)
Kotelchuck Index: Adequate+	1.07 (0.84, 1.37)	1.04 (0.80, 1.33)
Low birth weight	0.61* (0.39, 0.95)	0.57* (0.36, 0.91)
Very low birth weight	0.54 (0.13, 2.23)	0.48 (0.11, 2.13)
Extremely low birth weight	0.90 (0.13, 6.07)	0.61 (0.07, 5.37)
Preterm birth	1.03 (0.72, 1.46)	0.99 (0.69, 1.42)
All Shots On Time	0.94 (0.75, 1.17)	0.92 (0.73, 1.15)
All Shots By 5	1.24* (1.02, 1.52)	1.28* (1.04, 1.57)

† Regression (logit) adjusted, models include all variables used in matching models and post-matching weights.

*** p<.001; ** p<.01; * p<.05

Appendix Table 2: Missing Outcome Information

	AZ	Health Start
N	58,440	852
Insufficient/missing prenatal care information	0.62%	0.70%
Missing birthweight information	0.14%	0.00%
No match to ASIIS database	N/A	1.06%

Appendix Table 3: Summary Statistics & Propensity Score Matching Result for Birth Outcomes Population for American Indian Mothers

	AZ	Matching Model Results		Health	Matches	p-value difference	Standardized Difference
	Totals	OR	95% CI	Start			
N	58,358			852	2,259		
Low birth weight	6.0%			3.8%	6.1%	0.028	0.106
Very low birth weight	0.9%			0.4%	0.6%	0.391	0.042
Extremely low birth weight	0.4%			0.2%	0.3%	0.912	0.005
Preterm birth	8.9%			8.1%	7.9%	0.877	0.008
Age<20	16.0%	1.37**	(1.07, 1.76)	18.8%	17.1%	0.377	0.043
Age 20-24	32.0%	1.17*	(0.98, 1.40)	35.8%	36.4%	0.801	
Age 25-30 (reference)	29.9%			28.6%	29.1%	0.831	
Age>30	22.1%	0.94	(0.76, 1.16)	16.8%	17.4%	0.748	
Less than high school (reference)	27.6%			31.0%	28.5%	0.261	0.075
High school degree/GED	38.3%	0.92	(0.77, 1.09)	40.3%	42.6%	0.326	
Some college, no degree	26.9%	0.75***	(0.62, 0.92)	26.2%	26.8%	0.784	
Four-year degree or higher	6.3%	0.37***	(0.22, 0.62)	2.1%	1.5%	0.365	
Private/commercial insurance	12.3%	0.49**	(0.25, 0.95)	5.2%	5.3%	0.913	0.032
AHCCCS	85.0%	1.34	(0.75, 2.42)	93.4%	93.7%	0.844	
Other insurance (reference)	2.7%			1.4%	1.1%	0.510	
Married	21.5%	0.73	(0.42, 1.26)	14.3%	12.3%	0.226	0.059
Cohabiting	53.7%	1.02	(0.87, 1.19)	50.5%	50.8%	0.885	0.007
Married & cohabiting	19.5%	1.15	(0.64, 2.08)	12.7%	11.6%	0.505	0.032
First birth	31.7%	0.97	(0.81, 1.15)	34.5%	34.9%	0.879	0.007
Pre-existing health risk	14.6%	0.92	(0.75, 1.12)	16.4%	15.7%	0.693	0.019

*** p<.001; ** p<.01; * p<.05

Appendix Table 3: Summary Statistics & Propensity Score Matching Result for Birth Outcomes Population for American Indian Mothers (continued)

	AZ	Matching Model Results		Health	Matches	p-value difference	Standardized Difference
	Totals	OR	95% CI	Start			
Maricopa (reference)	27.2%			56.5%	58.2%	0.463	0.092
Apache	15.4%	0.20***	(0.15, 0.28)	5.3%	3.6%	0.101	
Coconino	12.2%	0.65***	(0.54, 0.79)	23.5%	23.5%	1.000	
Navajo	17.4%	0.22***	(0.16, 0.29)	7.0%	6.7%	0.774	
Other county	24.8%	0.12***	(0.09, 0.16)	6.6%	7.2%	0.632	
County missing	3.0%	0.21***	(0.11, 0.42)	1.2%	0.8%	0.465	
Bottom income decile	20.8%	0.91	(0.58, 1.42)	5.4%	4.0%	0.170	0.131
Income decile 2	15.8%	1.58**	(1.08, 2.33)	11.3%	11.3%	1.000	
Income decile 3	12.1%	1.69***	(1.17, 2.43)	13.8%	15.3%	0.410	
Income decile 4	7.4%	1.32	(0.87, 1.99)	6.2%	5.9%	0.761	
Income decile 5	6.7%	1.79***	(1.20, 2.67)	7.5%	9.2%	0.220	
Income decile 6	9.5%	1.46*	(0.99, 2.14)	9.4%	10.3%	0.516	
Income decile 7	6.1%	2.37***	(1.63, 3.46)	10.9%	8.3%	0.071	
Income decile 8	7.8%	5.07***	(3.59, 7.15)	28.2%	28.4%	0.914	
Top income quintile (reference)	6.0%			4.9%	4.8%	0.910	
Income decile (zip code) missing	7.7%	1.52	(0.85, 2.71)	2.3%	2.6%	0.755	
2006 (reference)	10.3%			0.2%	0.2%	1.000	0.114
2007	10.6%	0.99	(0.14, 7.01)	0.2%	0.1%	0.564	
2008	10.3%	6.22**	(1.39, 27.84)	1.4%	2.1%	0.269	
2009	10.0%	14.60***	(3.47, 61.36)	3.3%	4.2%	0.308	
2010	9.3%	32.45***	(7.91, 133.08)	6.8%	7.6%	0.513	
2011	9.3%	78.07***	(19.29, 315.98)	15.3%	15.7%	0.789	
2012	8.9%	75.95***	(18.75, 307.64)	14.9%	14.7%	0.892	
2013	8.7%	96.64***	(23.88, 391.04)	16.7%	15.6%	0.554	
2014	7.8%	110.30***	(27.27, 446.12)	17.6%	17.5%	0.949	
2015	7.3%	98.90***	(24.40, 400.83)	14.7%	15.3%	0.734	
2016	7.5%	56.31***	(13.79, 229.86)	8.9%	6.9%	0.127	

*** p<.001; ** p<.01; * p<.05

Appendix Table 4: Summary Statistics & Propensity Score Matching Result for Prenatal Care Outcomes Population for American Indian Mothers

	AZ	Matching Model Results		Health	Matches	p-value difference	Standardized Difference
	Totals	OR	95% CI	Start			
N (Unweighted)	58,076			846	2,245		
Any prenatal care	97.2%			98.5%	96.9%	0.032	0.104
Kotelchuck Index: >= Adequate	54.7%			56.9%	55.6%	0.592	0.026
Kotelchuck Index: < Adequate	27.0%			27.0%	24.5%	0.248	0.056
Kotelchuck Index: Adequate+	18.0%			18.9%	17.9%	0.587	0.026
Age<20	16.0%	1.36*	(1.06, 1.74)	18.7%	16.9%	0.341	0.064
Age 20-24	32.0%	1.16	(0.97, 1.39)	35.7%	37.9%	0.339	
Age 25-30 (reference)	29.8%			28.7%	27.4%	0.552	
Age>30	22.2%	0.94	(0.76, 1.16)	16.9%	17.7%	0.653	
Less than high school (reference)	27.6%			31.0%	27.7%	0.135	0.090
High school degree/GED	38.3%	0.92	(0.77, 1.09)	40.2%	42.4%	0.348	
Some college, no degree	26.9%	0.76**	(0.62, 0.93)	26.4%	27.9%	0.477	
Four-year degree or higher	6.3%	0.38***	(0.23, 0.62)	2.1%	1.5%	0.365	
Private/commercial insurance	12.3%	0.52	(0.26, 1.04)	5.2%	5.0%	0.825	0.036
AHCCCS	85.0%	1.42	(0.77, 2.63)	93.5%	94.1%	0.615	
Other insurance (reference)	2.6%			1.3%	0.9%	0.489	
Married	21.6%	0.73	(0.43, 1.27)	14.4%	12.3%	0.199	0.063
Cohabiting	53.8%	1.02	(0.87, 1.19)	50.6%	49.6%	0.698	0.019
Married & cohabiting	19.6%	1.15	(0.64, 2.07)	12.8%	11.8%	0.554	0.029
First birth	31.7%	0.97	(0.82, 1.15)	34.5%	33.7%	0.720	0.017
Pre-existing health risk	14.6%	0.92	(0.76, 1.12)	16.5%	13.8%	0.119	0.076

*** p<.001; ** p<.01; * p<.05

Appendix Table 4: Summary Statistics & Propensity Score Matching Result for Prenatal Care Outcomes Population for American Indian Mothers (continued)

	AZ	Matching Model Results		Health	Matches	p-value difference	Standardized Difference
	Totals	OR	95% CI	Start			
Maricopa (reference)	27.2%			56.5%	58.4%	0.432	0.082
Apache	15.4%	0.20***	(0.15, 0.28)	5.3%	3.9%	0.164	
Coconino	12.3%	0.65***	(0.54, 0.78)	23.4%	23.0%	0.863	
Navajo	17.4%	0.22***	(0.16, 0.29)	7.0%	6.1%	0.492	
Other county	24.8%	0.12***	(0.09, 0.16)	6.6%	7.2%	0.632	
County missing	3.0%	0.21***	(0.11, 0.42)	1.2%	1.3%	0.826	
Bottom income decile	20.8%	0.91	(0.58, 1.43)	5.4%	3.7%	0.080	0.124
Income decile 2	15.8%	1.57*	(1.06, 2.30)	11.2%	12.6%	0.369	
Income decile 3	12.1%	1.70**	(1.18, 2.44)	13.9%	14.8%	0.628	
Income decile 4	7.4%	1.29	(0.85, 1.96)	6.1%	5.9%	0.838	
Income decile 5	6.7%	1.79**	(1.20, 2.67)	7.6%	8.5%	0.475	
Income decile 6	9.4%	1.44	(0.98, 2.12)	9.3%	9.8%	0.741	
Income decile 7	6.1%	2.30***	(1.58, 3.36)	10.6%	8.6%	0.161	
Income decile 8	7.8%	5.06***	(3.59, 7.14)	28.4%	28.1%	0.914	
Top income quintile (reference)	6.0%			5.0%	5.2%	0.825	
Income decile (zip code) missing	7.7%	1.52	(0.85, 2.71)	2.4%	2.7%	0.643	
2006 (reference)	10.3%			0.2%	0.2%	1.000	0.068
2007	10.7%	0.99	(0.14, 7.01)	0.2%	0.2%	1.000	
2008	10.3%	6.22*	(1.39, 27.84)	1.4%	1.7%	0.693	
2009	10.0%	14.57***	(3.46, 61.23)	3.3%	3.9%	0.515	
2010	9.3%	32.48***	(7.92, 133.18)	6.9%	8.2%	0.310	
2011	9.3%	78.16***	(19.31, 316.34)	15.4%	15.6%	0.893	
2012	8.9%	75.27***	(18.58, 304.88)	14.9%	14.1%	0.629	
2013	8.8%	95.89***	(23.70, 388.02)	16.7%	16.1%	0.743	
2014	7.7%	109.99***	(27.19, 444.90)	17.5%	16.9%	0.748	
2015	7.2%	98.93***	(24.41, 400.98)	14.7%	14.4%	0.890	
2016	7.5%	56.00***	(13.72, 228.69)	8.9%	8.7%	0.932	

*** p<.001; ** p<.01; * p<.05

Appendix Table 5: Summary Statistics & Propensity Score Matching Result for Immunization Outcomes Population for American Indian Mothers†

	AZ	Matching Model Results		Health	Matches	p-value difference	Standardized Difference
	Totals	OR	95% CI	Start			
N	58,440			852	2,152		
Age<20	16.0%	1.37**	(1.07, 1.76)	18.8%	17.0%	0.343	0.061
Age 20-24	32.0%	1.17*	(0.97, 1.40)	35.8%	35.2%	0.800	
Age 25-30 (reference)	29.8%			28.6%	29.2%	0.790	
Age>30	22.1%	0.94	(0.75, 1.16)	16.8%	18.5%	0.341	
Less than high school (reference)	28.4%			31.5%	29.0%	0.268	0.095
High school degree/GED	38.3%	0.92	(0.78, 1.09)	40.3%	43.8%	0.141	
Some college, no degree	26.9%	0.76***	(0.62, 0.92)	26.2%	24.3%	0.372	
Four-year degree or higher	6.3%	0.38***	(0.23, 0.62)	2.1%	2.9%	0.280	
Private/commercial insurance	12.3%	0.49**	(0.26, 0.96)	5.2%	5.0%	0.912	0.069
AHCCCS	85.0%	1.35	(0.75, 2.42)	93.4%	94.2%	0.481	
Other insurance (reference)	2.7%			1.4%	0.7%	0.155	
Married	21.5%	0.73	(0.42, 1.27)	14.3%	14.2%	0.945	0.003
Cohabiting	53.7%	1.02	(0.88, 1.19)	50.5%	51.3%	0.735	0.016
Married & cohabiting	19.5%	1.15	(0.64, 2.07)	12.7%	13.0%	0.828	0.011
First birth	31.7%	0.97	(0.81, 1.15)	34.5%	32.7%	0.442	0.037
Pre-existing health risk	14.6%	0.92	(0.75, 1.12)	16.4%	13.8%	0.137	0.072

†Immunization outcomes not available for full population

*** p<.001; ** p<.01; * p<.05

Appendix Table 5: Summary Statistics & Propensity Score Matching Result for Immunization Outcomes Population for American Indian Mothers (continued)

	AZ Totals	Matching Model Results		Health Start	Matches	p-value difference	Standardized Difference
		OR	95% CI				
Maricopa	27.2%			56.5%	59.3%	0.239	0.070
Apache	15.4%	0.20***	(0.15, 0.28)	5.3%	4.2%	0.306	
Navajo	17.4%	0.22***	(0.16, 0.29)	7.0%	6.6%	0.701	
Coconino	12.2%	0.65***	(0.54, 0.79)	23.5%	22.3%	0.564	
Other county	24.8%	0.12***	(0.09, 0.16)	6.6%	6.3%	0.844	
County missing	3.0%	0.21***	(0.11, 0.42)	1.2%	1.3%	0.826	
Bottom income decile (reference)	20.8%			5.4%	4.2%	0.258	0.122
Income decile 2	15.8%	1.75***	(1.22, 2.51)	11.3%	11.3%	1.000	
Income decile 3	12.1%	1.86***	(1.30, 2.67)	13.8%	13.8%	1.000	
Income decile 4	7.4%	1.45*	(0.96, 2.21)	6.2%	7.0%	0.496	
Income decile 5	6.7%	1.98***	(1.32, 2.97)	7.5%	7.6%	0.927	
Income decile 6	9.5%	1.61**	(1.08, 2.38)	9.4%	8.6%	0.553	
Income decile 7	6.1%	2.62***	(1.78, 3.85)	10.9%	9.2%	0.227	
Income decile 8	7.8%	5.59***	(3.95, 7.93)	28.2%	28.9%	0.748	
Income decile 9	4.7%	1.20	(0.75, 1.92)	4.3%	5.8%	0.184	
Top income decile	1.4%	0.69	(0.27, 1.77)	0.6%	1.1%	0.283	
Zip code missing	7.7%	1.67*	(0.95, 2.93)	2.3%	2.6%	0.755	
2006 (reference)	10.3%			0.2%	0.1%	0.564	0.123
2007	10.6%	0.99	(0.14, 7.01)	0.2%	0.2%	1.000	
2008	10.3%	6.23**	(1.39, 27.86)	1.4%	2.0%	0.349	
2009	10.0%	14.64***	(3.48, 61.54)	3.3%	3.2%	0.891	
2010	9.3%	32.55***	(7.94, 133.46)	6.8%	8.3%	0.234	
2011	9.3%	78.26***	(19.34, 316.77)	15.3%	17.3%	0.265	
2012	8.9%	75.98***	(18.76, 307.74)	14.9%	15.5%	0.736	
2013	8.7%	96.80***	(23.92, 391.70)	16.7%	15.8%	0.646	
2014	7.8%	110.38***	(27.29, 446.41)	17.6%	17.6%	1.000	
2015	7.3%	99.16***	(24.47, 401.86)	14.7%	12.6%	0.204	
2016	7.5%	56.48***	(13.84, 230.59)	8.9%	7.4%	0.250	

*** p<.001; ** p<.01; * p<.05