Technical Appendix: Health Start Evaluation for Hispanic and Latina 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: Hispanic/Latina 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.

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[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 Hispanic and Latina Mothers

	Unadjusted Odds Ratio	Adjusted Odds Ratio†
Any prenatal care	1.16	1.17
	(0.94, 1.44)	(0.94, 1.47)
Kotelchuck Index: >= Adequate	1.06	1.07
	(0.98, 1.16)	(0.98, 1.17)
Kotelchuck Index: < Adequate	0.99	1.00
	(0.90, 1.09)	(0.90, 1.10)
Kotelchuck Index: Adequate+	1.12*	1.12*
	(1.01, 1.24)	(1.01, 1.25)
Low birth weight	1.08	1.06
	(0.89, 1.29)	(0.88, 1.27)
Very low birth weight	0.64	0.61*
	(0.40, 1.04)	(0.38, 1.00)
Extremely low birth weight	0.38*	0.36*
	(0.17, 0.85)	(0.16, 0.82)
Preterm birth	0.93	0.91
	(0.79, 1.09)	(0.77, 1.07)
All Shots On Time	1.24*	1.25***
	(1.12, 1.36)	(1.13, 1.38)
All Shots By 5	1.28*	1.29***
	(1.17, 1.40)	(1.18, 1.42)

† 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, Hispanic/Latina Mothers

	AZ	Health Start
N	404,621	4,263
Insufficient/missing prenatal care information	0.48%	0.52%
Missing birthweight information	0.11%	0.09%
No match to ASIIS database	N/A	0.84%

Appendix Table 3: Summary Statistics & Propensity Score Matching Result for Birth Outcomes Population, Hispanic/Latina Mothers

	AZ Totals	Matching Model Results OR	Matching Model Results 95% CI	Health Start	Matches	p-value difference	Standardized Difference
N (Unweighted)	404,188			4,259	32,502		
Low birth weight	5.5%			5.8%	5.5%	0.439	0.017
Very low birth weight	0.9%			0.6%	1.0%	0.072	0.039
Extremely low birth weight	0.4%			0.2%	0.5%	0.015	0.053
Preterm birth	8.1%			7.2%	7.7%	0.376	0.019
Age<20	14.2%	1.23***	(1.10, 1.38)	18.5%	17.8%	0.431	0.020
Age 20-24	29.5%	1.13***	(1.04, 1.23)	33.3%	33.1%	0.890	
Age 25-30 (reference)	31.4%			27.3%	27.6%	0.752	
Age>30	25.0%	0.99	(0.90, 1.08)	21.0%	21.5%	0.578	
Mother born in US	52.1%			51.8%	52.6%	0.474	0.024
Mother born in Mexico	44.3%	1.66***	(1.55, 1.78)	46.9%	46.3%	0.602	
Mother born outside US	3.6%	0.88	(0.67, 1.15)	1.3%	1.1%	0.372	
Less than high school (reference)	36.6%			38.8%	39.9%	0.304	0.027
High school degree/GED	33.0%	0.83***	(0.77, 0.89)	35.1%	34.5%	0.570	
Some college, no degree	19.6%	0.79***	(0.72, 0.87)	19.5%	18.9%	0.441	
Four-year degree or higher	10.1%	0.67***	(0.57, 0.77)	6.2%	6.2%	0.893	
Private/commercial insurance	23.7%	0.91	(0.75, 1.09)	10.1%	9.7%	0.491	0.016
AHCCCS	70.3%	2.19***	(1.86, 2.58)	84.9%	85.4%	0.483	
Other insurance (reference)	6.0%			5.0%	4.9%	0.842	
Married	43.0%	1.16	(0.96, 1.40)	39.4%	39.7%	0.740	0.007
Cohabiting	71.0%	1.05	(0.97, 1.14)	63.6%	63.8%	0.822	0.005
Married & cohabiting	41.1%	0.90	(0.74, 1.11)	36.2%	36.6%	0.719	0.008
First birth	33.7%	1.39***	(1.29, 1.50)	40.7%	39.8%	0.414	0.018
Pre-existing health risk	8.0%	1.09	(0.98, 1.21)	10.7%	10.1%	0.357	0.020

Appendix Table 3: Summary Statistics & Propensity Score Matching Result for Birth Outcomes Population, Hispanic/Latina Mothers (continued)

	AZ Totals	Matching Model Results OR	95% CI	Health Start	Matches	p-value difference	Standardized Difference
Cochise	1.7%	3.18***	(2.80, 3.61)	11.9%	10.8%	0.109	0.041
Maricopa	63.9%	0.16***	(0.15, 0.18)	24.7%	25.2%	0.565	
Pima	15.2%	0.26***	(0.23, 0.29)	8.8%	8.4%	0.536	
Santa Cruz	1.5%	2.95***	(2.56, 3.39)	9.8%	9.9%	0.884	
Yuma	5.8%	1.43***	(1.29, 1.58)	23.7%	24.6%	0.349	
Other county (reference)	8.7%			18.7%	18.7%	0.978	
County missing	3.1%	0.44***	(0.28, 0.70)	2.4%	2.4%	1.000	
Bottom income decile (reference)	3.1%			2.2%	2.2%	0.941	0.045
Income decile 2	10.4%	1.34***	(1.07, 1.67)	21.3%	20.6%	0.440	
Income decile 3	15.8%	1.52***	(1.22, 1.90)	18.3%	18.6%	0.675	
Income decile 4	8.8%	1.55***	(1.23, 1.95)	10.6%	11.1%	0.464	
Income decile 5	9.8%	1.49***	(1.19, 1.86)	15.4%	15.9%	0.474	
Income decile 6	12.5%	0.96	(0.76, 1.22)	8.1%	7.9%	0.842	
Income decile 7	11.4%	1.15	(0.92, 1.45)	11.6%	10.9%	0.337	
Income decile 8	9.6%	1.50***	(1.18, 1.90)	7.6%	7.7%	0.807	
Income decile 9	7.5%	0.53***	(0.38, 0.74)	1.5%	1.6%	0.538	
Top income decile	3.7%	0.82	(0.56, 1.21)	0.9%	0.7%	0.217	
Median income (zip code) missing	7.5%	0.47***	(0.31, 0.71)	2.7%	2.7%	1.000	
2006-07 (reference)	22.2%			0.8%	0.7%	0.799	0.026
2008	10.4%	3.27***	(2.09, 5.11)	1.1%	1.0%	0.675	
2009	9.4%	8.90***	(6.02, 13.16)	2.8%	2.7%	0.739	
2010	8.4%	29.66***	(20.62, 42.66)	8.0%	7.6%	0.519	
2011	8.0%	51.27***	(35.86, 73.30)	13.5%	13.5%	0.949	
2012	8.1%	54.72***	(38.29, 78.20)	14.9%	14.9%	0.951	
2013	8.1%	57.82***	(40.46, 82.64)	15.1%	15.1%	0.976	
2014	8.5%	56.42***	(39.49, 80.62)	15.2%	15.9%	0.420	
2015	8.5%	56.24***	(39.34, 80.40)	14.9%	14.7%	0.807	
2016	8.5%	52.89***	(36.96, 75.67)	13.8%	14.0%	0.778	
County, median income missing	2.9%	2.19**	(1.18, 4.09)	1.9%	2.1%	0.489	0.015

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

Appendix Table 4: Summary Statistics & Propensity Score Matching Result for Prenatal Care Outcomes Population, Hispanic/Latina Mothers

	AZ Totals	Matching Model Results		Health Start	Matches	p-value difference	Standardized Difference
		OR	95% CI				
N (Unweighted)	402,672			4,241	32,116		
Any prenatal care	97.0%			96.1%	95.5%	0.163	0.030
Kotelchuck Index: >= Adequate	65.3%			60.6%	59.1%	0.164	0.030
Kotelchuck Index: < Adequate	20.0%			26.9%	27.0%	0.902	0.003
Kotelchuck Index: Adequate+	24.8%			22.2%	20.3%	0.035	0.046
Age<20	14.2%	1.24***	(1.11, 1.39)	18.5%	17.8%	0.367	0.021
Age 20-24	29.5%	1.14**	(1.04, 1.24)	33.4%	34.0%	0.566	
Age 25-30 (reference)	31.4%			27.2%	27.4%	0.807	
Age>30	25.0%	0.99	(0.90, 1.08)	20.9%	20.9%	0.936	
Mother born in US (reference)	52.1%			51.8%	52.1%	0.744	0.018
Mother born in Mexico	44.3%	1.66***	(1.55, 1.78)	46.9%	46.7%	0.879	
Mother born outside US	3.6%	0.88	(0.67, 1.16)	1.3%	1.1%	0.430	
Less than high school (reference)	36.6%			38.9%	40.1%	0.236	0.030
High school degree/GED	33.0%	0.82***	(0.76, 0.89)	35.1%	34.5%	0.553	
Some college, no degree	19.6%	0.79***	(0.72, 0.87)	19.5%	19.2%	0.742	
Four-year degree or higher	10.1%	0.67***	(0.57, 0.77)	6.2%	5.7%	0.382	
Private/commercial insurance	23.7%	0.89	(0.74, 1.07)	10.1%	10.1%	0.943	0.011
AHCCCS	70.3%	2.15***	(1.83, 2.53)	84.9%	85.2%	0.715	
Other insurance (reference)	6.0%			5.0%	4.7%	0.614	
Married	43.0%	1.15	(0.96, 1.39)	39.4%	39.0%	0.705	0.008
Cohabiting	71.0%	1.05	(0.97, 1.14)	63.6%	64.0%	0.735	0.007
Married & cohabiting	41.1%	0.92	(0.75, 1.12)	36.3%	36.5%	0.804	0.005
First birth	33.7%	1.39***	(1.29, 1.51)	40.8%	39.8%	0.376	0.019
Pre-existing health risk	8.0%	1.09	(0.98, 1.20)	10.7%	9.7%	0.123	0.034

Appendix Table 4: Summary Statistics & Propensity Score Matching Result for Prenatal Care Outcomes Population, Hispanic/Latina Mothers (continued)

	AZ Totals	Matching Model Results		Health Start	Matches	p-value difference	Standardized Difference
		OR	95% CI				
Cochise	1.7%	3.18***	(2.80, 3.61)	11.9%	11.7%	0.736	0.025
Maricopa	63.9%	0.16***	(0.15, 0.18)	24.6%	25.3%	0.452	
Pima	15.2%	0.26***	(0.22, 0.29)	8.8%	8.5%	0.671	
Santa Cruz	1.5%	2.97***	(2.58, 3.42)	9.8%	9.3%	0.460	
Yuma	5.8%	1.42***	(1.28, 1.58)	23.8%	23.8%	0.939	
Other county (reference)	8.7%			18.7%	19.0%	0.657	
County missing	3.1%	0.45***	(0.29, 0.71)	2.4%	2.4%	0.887	
Bottom income decile (reference)	3.1%			2.2%	2.1%	0.653	0.050
Income decile 2	10.4%	1.34**	(1.07, 1.67)	21.3%	21.2%	0.916	
Income decile 3	15.8%	1.52***	(1.22, 1.89)	18.3%	18.4%	0.955	
Income decile 4	8.8%	1.55***	(1.23, 1.96)	10.6%	11.7%	0.113	
Income decile 5	9.8%	1.48***	(1.18, 1.85)	15.3%	15.4%	0.904	
Income decile 6	12.5%	0.96	(0.76, 1.21)	8.0%	7.9%	0.904	
Income decile 7	11.4%	1.15	(0.92, 1.45)	11.6%	11.1%	0.451	
Income decile 8	9.6%	1.50***	(1.18, 1.90)	7.6%	7.5%	0.870	
Income decile 9	7.5%	0.51***	(0.37, 0.71)	1.4%	1.4%	0.854	
Top income decile	3.7%	0.83	(0.56, 1.21)	0.9%	0.6%	0.132	
Median income (zip code) missing	7.5%	0.47***	(0.31, 0.71)	2.7%	2.6%	0.839	
2006-07 (reference)	22.3%			0.8%	0.7%	0.799	0.035
2008	10.5%	3.27***	(2.09, 5.11)	1.1%	0.9%	0.278	
2009	9.4%	8.98***	(6.07, 13.28)	2.8%	2.8%	0.947	
2010	8.4%	29.69***	(20.65, 42.71)	8.0%	7.7%	0.601	
2011	8.0%	51.44***	(35.98, 73.54)	13.6%	13.2%	0.566	
2012	8.1%	54.66***	(38.24, 78.12)	14.9%	15.4%	0.544	
2013	8.1%	57.90***	(40.51, 82.75)	15.2%	15.2%	0.928	
2014	8.4%	57.20***	(40.03, 81.73)	15.2%	15.8%	0.436	
2015	8.4%	56.40***	(39.45, 80.64)	14.8%	14.8%	0.951	
2016	8.4%	52.72***	(36.84, 75.44)	13.6%	13.4%	0.824	
County, median income missing	2.9%	2.12*	(1.15, 3.93)	1.9%	2.1%	0.640	0.010

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

Appendix Table 5: Summary Statistics & Propensity Score Matching Result for Immunization Outcomes Population, Hispanic/Latina Mothers†

	AZ Totals	Matching Model Results OR	95% CI	Health Start	Matches	p-value difference	Standardized Difference
N (Unweighted)	404,621			4,263	32,719		
Age<20	14.1%	1.23***	(1.10, 1.38)	18.4%	18.5%	0.978	0.017
Age 20-24	29.5%	1.13***	(1.04, 1.23)	33.3%	32.6%	0.504	
Age 25-30	31.4%			27.3%	27.4%	0.903	
Age>30	25.0%	0.99	(0.90, 1.08)	21.0%	21.5%	0.543	
Mother born in US (reference)	52.1%			51.8%	52.0%	0.862	0.005
Mother born in Mexico	44.3%	1.66***	(1.55, 1.78)	46.9%	46.7%	0.845	
Mother born outside US	3.6%	0.89	(0.68, 1.17)	1.3%	1.4%	0.925	
Hispanic & born outside US	3.6%	1.00	(1.00, 1.00)	1.3%	1.4%	0.925	0.002
Less than high school (reference)	37.1%			39.1%	40.3%	0.257	0.032
High school degree/GED	33.0%	0.82***	(0.76, 0.89)	35.1%	35.1%	1.000	
Some college, no degree	19.6%	0.79***	(0.72, 0.87)	19.5%	18.6%	0.270	
Four-year degree or higher	10.1%	0.67***	(0.58, 0.77)	6.2%	5.8%	0.523	
Private/commercial insurance	23.7%	0.91	(0.75, 1.09)	10.1%	9.8%	0.638	0.022
AHCCCS	70.3%	2.20***	(1.87, 2.58)	84.9%	85.6%	0.360	
Other insurance (reference)	6.0%			5.0%	4.6%	0.389	
Married	43.0%	1.16	(0.97, 1.40)	39.4%	38.7%	0.491	0.015
Cohabiting	71.0%	1.05	(0.97, 1.14)	63.6%	64.2%	0.573	0.012
Married & cohabiting	41.1%	0.91	(0.74, 1.11)	36.3%	36.2%	0.982	0.000
First birth	33.7%	1.39***	(1.29, 1.50)	40.6%	39.8%	0.453	0.016
Pre-existing health risk	8.0%	1.09	(0.98, 1.20)	10.7%	10.0%	0.271	0.024

†Immunization outcomes not available for full population

Appendix Table 5: Summary Statistics & Propensity Score Matching Result for Immunization Outcomes Population, Hispanic/Latina Mothers (continued)

	AZ Totals	Matching Model Results		Health Start	Matches	p-value difference	Standardized Difference
		OR	95% CI				
Cochise	1.7%	3.18***	(2.81, 3.61)	11.9%	11.1%	0.263	0.032
Maricopa	63.9%	0.16***	(0.15, 0.18)	24.7%	25.3%	0.532	
Pima	15.2%	0.26***	(0.23, 0.29)	8.7%	8.4%	0.616	
Santa Cruz	1.5%	2.95***	(2.57, 3.40)	9.8%	10.1%	0.563	
Yuma	5.8%	1.43***	(1.29, 1.58)	23.7%	23.5%	0.779	
Other county	8.7%			18.7%	19.0%	0.699	
County missing (reference)	3.2%	0.45***	(0.29, 0.70)	2.4%	2.5%	0.888	
Bottom income decile (reference)	3.1%			2.2%	2.0%	0.497	0.041
Income decile 2	10.4%	1.34***	(1.08, 1.68)	21.3%	20.8%	0.595	
Income decile 3	15.8%	1.53***	(1.23, 1.90)	18.3%	18.5%	0.823	
Income decile 4	8.8%	1.56***	(1.24, 1.96)	10.6%	11.2%	0.366	
Income decile 5	9.8%	1.49***	(1.19, 1.87)	15.3%	15.1%	0.786	
Income decile 6	12.5%	0.97	(0.77, 1.23)	8.1%	8.3%	0.722	
Income decile 7	11.4%	1.16	(0.92, 1.45)	11.6%	12.1%	0.441	
Income decile 8	9.6%	1.50***	(1.19, 1.90)	7.6%	7.3%	0.680	
Income decile 9	7.5%	0.53***	(0.39, 0.74)	1.5%	1.3%	0.644	
Top income decile	3.7%	0.82	(0.56, 1.21)	0.9%	0.7%	0.330	
Median income (zip code) missing	7.5%	0.47***	(0.31, 0.71)	2.7%	2.6%	0.736	
2006-07 (reference)	22.2%			0.8%	0.8%	0.713	0.036
2008	10.4%	3.27***	(2.09, 5.11)	1.1%	1.1%	0.918	
2009	9.4%	8.97***	(6.07, 13.27)	2.8%	2.5%	0.459	
2010	8.4%	29.66***	(20.62, 42.67)	8.0%	7.5%	0.418	
2011	8.0%	51.28***	(35.87, 73.31)	13.5%	14.1%	0.433	
2012	8.1%	54.74***	(38.30, 78.23)	14.8%	14.6%	0.714	
2013	8.1%	57.89***	(40.51, 82.74)	15.1%	14.6%	0.523	
2014	8.5%	56.43***	(39.49, 80.63)	15.2%	15.8%	0.473	
2015	8.5%	56.25***	(39.35, 80.42)	14.8%	15.0%	0.855	
2016	8.5%	52.96***	(37.02, 75.78)	13.8%	13.9%	0.826	
County, median income missing	2.9%	2.17**	(1.17, 4.02)	1.9%	2.1%	0.538	0.013

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