

## Nurse Family Partnership

### Public Health & Prevention: Home- or Family-based

Benefit-cost estimates updated December 2019. Literature review updated March 2018.

Current estimates replace old estimates. Numbers will change over time as a result of model inputs and monetization methods.

The WSIPP benefit-cost analysis examines, on an apples-to-apples basis, the monetary value of programs or policies to determine whether the benefits from the program exceed its costs. WSIPP's research approach to identifying evidence-based programs and policies has three main steps. First, we determine "what works" (and what does not work) to improve outcomes using a statistical technique called meta-analysis. Second, we calculate whether the benefits of a program exceed its costs. Third, we estimate the risk of investing in a program by testing the sensitivity of our results. For more detail on our methods, see our [Technical Documentation](#).

**Program Description:** The Nurse Family Partnership program provides intensive visitation by nurses during a woman's pregnancy and the first two years after birth. The program is designed to serve low-income, at-risk pregnant women expecting their first child. The goal is to promote the child's development and provide support and instructive parenting skills to parents. Among programs included in the meta-analysis, participants received 25–35 home visits on average, spread over approximately two years.

### Benefit-Cost Summary Statistics Per Participant

#### Benefits to:

Taxpayers	\$4,228	Benefit to cost ratio	\$1.37
Participants	\$10,578	Benefits minus costs	\$4,556
Others	\$877	Chance the program will produce	
Indirect	\$1,310	benefits greater than the costs	64 %
<b>Total benefits</b>	<b>\$16,993</b>		
<b>Net program cost</b>	<b>(\$12,437)</b>		
<b>Benefits minus cost</b>	<b>\$4,556</b>		

The estimates shown are present value, life cycle benefits and costs. All dollars are expressed in the base year chosen for this analysis (2018). The chance the benefits exceed the costs are derived from a Monte Carlo risk analysis. The details on this, as well as the economic discount rates and other relevant parameters are described in our [Technical Documentation](#).

## Meta-Analysis of Program Effects

Outcomes measured	Treatment age	Primary or secondary participant	No. of effect sizes	Treatment N	Adjusted effect sizes and standard errors used in the benefit-cost analysis						Unadjusted effect size (random effects model)	
					First time ES is estimated			Second time ES is estimated			ES	p-value
					ES	SE	Age	ES	SE	Age		
Employment	19	Primary	3	426	0.019	0.062	27	0.000	0.000	28	0.078	0.405
Food assistance	19	Primary	3	450	-0.031	0.060	30	-0.031	0.060	30	-0.130	0.264
Public assistance	19	Primary	3	456	-0.036	0.060	30	-0.036	0.060	30	-0.153	0.176
K-12 grade repetition	1	Secondary	3	367	0.051	0.094	11	0.051	0.094	11	0.127	0.317
K-12 special education	1	Secondary	3	367	0.031	0.111	11	0.031	0.111	11	0.046	0.820
Low birthweight birth***	1	Secondary	3	9617	0.021	0.022	1	0.000	0.000	2	0.022	0.325
Crime	19	Primary	2	229	-0.106	0.080	31	-0.106	0.080	41	-0.463	0.092
Child abuse and neglect	1	Secondary	2	206	-0.353	0.141	6	-0.353	0.141	17	-0.620	0.010
Crime	1	Secondary	2	232	-0.032	0.080	18	-0.032	0.080	28	-0.119	0.320
Infant mortality	1	Secondary	2	8815	-0.130	0.118	1	0.000	0.000	2	-0.143	0.170
Very low birthweight birth**	1	Secondary	2	9162	-0.040	0.045	1	0.000	0.000	2	-0.040	0.373
Anxiety disorder	19	Primary	1	192	-0.013	0.116	37	-0.007	0.142	39	-0.037	0.833
Major depressive disorder	19	Primary	1	192	0.025	0.116	37	0.013	0.142	39	0.069	0.711
Alcohol use before end of middle school	1	Secondary	1	191	-0.114	0.087	13	-0.114	0.087	13	-0.317	0.001
Out-of-home placement	1	Secondary	1	191	0.147	0.116	13	0.147	0.116	17	0.408	0.001
Low birthweight birth***	19	Primary	3	9617	0.021	0.022	19	0.000	0.000	20	0.022	0.325
Preterm birth***	19	Primary	3	9162	0.021	0.027	19	0.000	0.000	20	0.001	0.990
Preterm birth***	1	Secondary	3	9617	0.021	0.027	1	0.000	0.000	2	0.001	0.990
Test scores	1	Secondary	3	370	0.026	0.066	14	0.023	0.073	17	0.060	0.492
Alcohol use^	19	Primary	2	9162	0.088	0.214	23	0.088	0.214	33	0.264	0.186
High school graduation^^	19	Primary	2	401	0.035	0.086	23	0.035	0.086	23	0.096	0.271
Very low birthweight birth**	19	Primary	2	9162	-0.040	0.045	19	0.000	0.000	20	-0.040	0.373
Externalizing behavior symptoms	1	Secondary	2	319	0.010	0.094	15	0.005	0.049	18	-0.065	0.676
High school graduation	1	Secondary	2	226	0.023	0.107	18	0.023	0.107	18	0.051	0.682
Internalizing symptoms	1	Secondary	2	332	-0.048	0.092	15	-0.048	0.092	17	-0.174	0.127
Very low birthweight birth	19	Primary	1	9162	0.000	0.081	19	0.000	0.000	20	0.000	0.990
Attention-deficit/hyperactivity disorder symptoms	1	Secondary	1	166	-0.094	0.142	10	0.000	0.141	11	-0.260	0.068
Cannabis use^	19	Primary	2	401	-0.061	0.108	23	n/a	n/a	n/a	-0.168	0.134
Smoking during late pregnancy^	19	Primary	1	237	-0.099	0.114	19	n/a	n/a	n/a	-0.099	0.386
Substance use disorder^	19	Primary	1	183	0.013	0.119	37	n/a	n/a	n/a	0.035	0.831
Substance use^	19	Primary	2	266	-0.049	0.094	31	n/a	n/a	n/a	-0.237	0.215
NICU admission	1	Secondary	1	564	-0.016	0.056	1	0.000	0.000	2	-0.016	0.781
Alcohol use before end of high school^^	1	Secondary	1	38	-0.162	0.206	16	n/a	n/a	n/a	-0.450	0.031
Cannabis use before end of middle school	1	Secondary	1	191	-0.114	0.087	13	-0.114	0.087	13	-0.317	0.001

Emergency department visits	1	Secondary	1	216	-0.010	0.105	3	n/a	n/a	n/a	-0.027	0.796
Hospitalization <sup>^^</sup>	1	Secondary	2	5232	0.038	0.021	4	n/a	n/a	n/a	-0.018	0.832
Illicit drug use before end of high school <sup>^^</sup>	1	Secondary	1	38	-0.087	0.206	16	n/a	n/a	n/a	-0.242	0.242
Preschool test scores <sup>^</sup>	1	Secondary	2	394	0.043	0.065	5	n/a	n/a	n/a	0.120	0.086
Small for gestational age (SGA) <sup>^^</sup>	1	Secondary	1	455	0.000	0.081	1	0.000	0.000	2	0.000	1.000
Substance use disorder <sup>^</sup>	1	Secondary	1	194	0.045	0.115	19	n/a	n/a	n/a	0.126	0.274
Substance use <sup>^</sup>	1	Secondary	1	194	0.013	0.115	19	n/a	n/a	n/a	0.035	0.752
Smoking before end of high school <sup>^^</sup>	1	Secondary	1	38	-0.122	0.206	16	n/a	n/a	n/a	-0.339	0.102
Smoking before end of middle school	1	Secondary	1	191	-0.075	0.087	13	-0.075	0.087	13	-0.208	0.018
Very preterm birth <sup>^</sup>	1	Secondary	1	8598	-0.135	0.079	1	n/a	n/a	n/a	-0.135	0.087

<sup>^</sup>WSIPP's benefit-cost model does not monetize this outcome.

<sup>^^</sup>WSIPP does not include this outcome when conducting benefit-cost analysis for this program.

<sup>\*\*\*</sup>We report this outcome twice: once for mothers (designated as the primary participant) and once for infants (designated as the secondary participant). We do this because the outcome is associated with costs and benefits for both mothers and infants, and the amount of the cost or benefit is different for mothers than it is for infants.

Meta-analysis is a statistical method to combine the results from separate studies on a program, policy, or topic in order to estimate its effect on an outcome. WSIPP systematically evaluates all credible evaluations we can locate on each topic. The outcomes measured are the types of program impacts that were measured in the research literature (for example, crime or educational attainment). Treatment N represents the total number of individuals or units in the treatment group across the included studies.

An effect size (ES) is a standard metric that summarizes the degree to which a program or policy affects a measured outcome. If the effect size is positive, the outcome increases. If the effect size is negative, the outcome decreases.

Adjusted effect sizes are used to calculate the benefits from our benefit cost model. WSIPP may adjust effect sizes based on methodological characteristics of the study. For example, we may adjust effect sizes when a study has a weak research design or when the program developer is involved in the research. The magnitude of these adjustments varies depending on the topic area.

WSIPP may also adjust the second ES measurement. Research shows the magnitude of some effect sizes decrease over time. For those effect sizes, we estimate outcome-based adjustments which we apply between the first time ES is estimated and the second time ES is estimated. We also report the unadjusted effect size to show the effect sizes before any adjustments have been made. More details about these adjustments can be found in our [Technical Documentation](#).

## Detailed Monetary Benefit Estimates Per Participant

Affected outcome:	Resulting benefits: <sup>1</sup>	Benefits accrue to:				
		Taxpayers	Participants	Others <sup>2</sup>	Indirect <sup>3</sup>	Total
Crime	Criminal justice system	\$194	\$0	\$321	\$97	\$612
Employment	Labor market earnings	\$450	\$1,056	\$0	\$0	\$1,506
Major depressive disorder	Health care associated with major depression	(\$52)	(\$15)	(\$54)	(\$26)	(\$147)
Public assistance	Public assistance	\$415	(\$152)	\$0	\$208	\$472
Anxiety disorder	Health care associated with anxiety disorder	\$26	\$7	\$27	\$13	\$74
Food assistance	Food assistance	\$132	(\$117)	\$0	\$66	\$81
Major depressive disorder	Mortality associated with depression	\$0	\$0	\$0	(\$4)	(\$4)
	<i>Subtotals</i>	<i>\$1,165</i>	<i>\$781</i>	<i>\$294</i>	<i>\$354</i>	<i>\$2,594</i>
From secondary participant						
Crime	Criminal justice system	\$274	\$0	\$581	\$137	\$992
Child abuse and neglect	Child abuse and neglect	\$144	\$1,612	\$0	\$72	\$1,828
Out-of-home placement	Out-of-home placement	(\$169)	\$0	\$0	(\$85)	(\$254)
K-12 grade repetition	K-12 grade repetition	(\$65)	\$0	\$0	(\$33)	(\$98)
K-12 special education	K-12 special education	(\$639)	\$0	\$0	(\$319)	(\$958)
Alcohol use before end of middle school	Property loss associated with alcohol abuse or dependence	\$0	\$1	\$2	\$0	\$2
Child abuse and neglect	Labor market earnings associated with child abuse & neglect	\$3,108	\$7,300	\$0	\$0	\$10,408
Infant mortality	Infant mortality	\$376	\$884	\$0	\$7,385	\$8,646
Low birthweight birth	Health care associated with low birthweight births	(\$66)	\$0	\$0	(\$33)	(\$99)
Very low birthweight birth	Health care associated with very low birthweight births	\$99	\$0	\$0	\$50	\$149
	<i>Subtotals</i>	<i>\$3,063</i>	<i>\$9,797</i>	<i>\$582</i>	<i>\$7,175</i>	<i>\$20,617</i>
Program cost	Adjustment for deadweight cost of program	\$0	\$0	\$0	(\$6,219)	(\$6,219)
<b>Totals</b>		<b>\$4,228</b>	<b>\$10,578</b>	<b>\$877</b>	<b>\$1,310</b>	<b>\$16,993</b>

<sup>1</sup>In addition to the outcomes measured in the meta-analysis table, WSIPP measures benefits and costs estimated from other outcomes associated with those reported in the evaluation literature. For example, empirical research demonstrates that high school graduation leads to reduced crime. These associated measures provide a more complete picture of the detailed costs and benefits of the program.

<sup>2</sup>"Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance.

<sup>3</sup>"Indirect benefits" includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation.

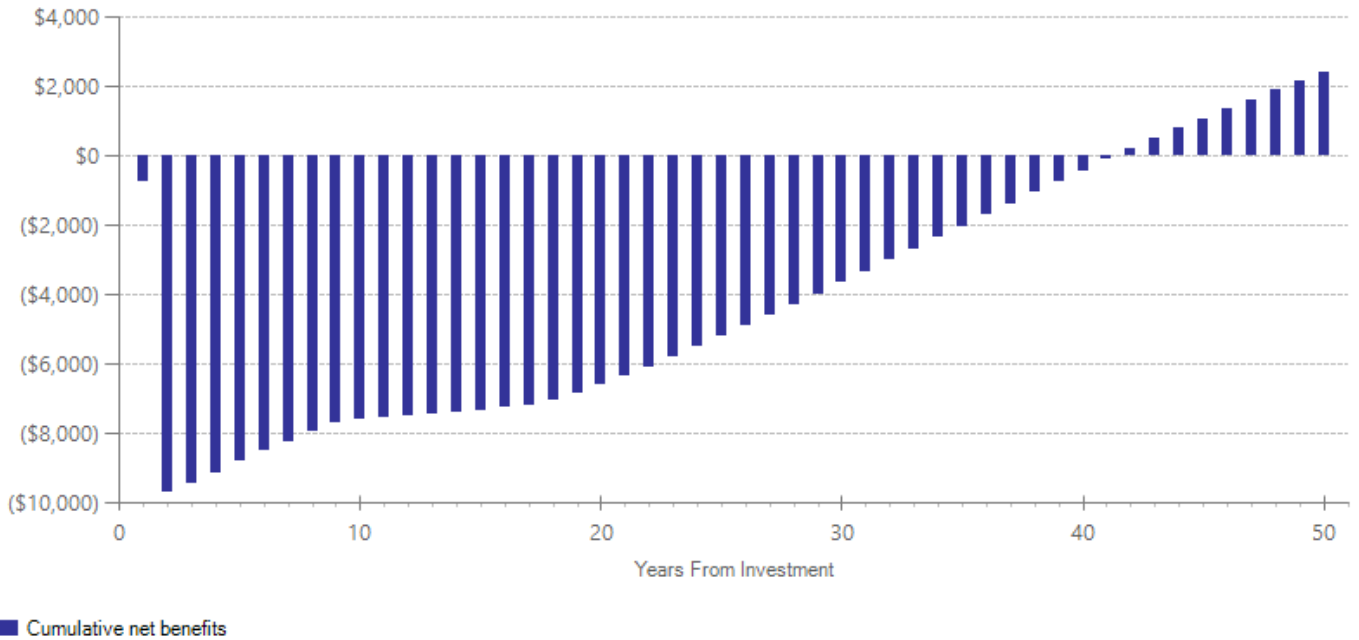
## Detailed Annual Cost Estimates Per Participant

	Annual cost	Year dollars	Summary	
Program costs	\$5,944	2015	Present value of net program costs (in 2018 dollars)	(\$12,437)
Comparison costs	\$0	2015	Cost range (+ or -)	10 %

Treatment cost estimates for this program reflect costs beyond treatment as usual. The annual per-participant cost estimate is based on average total cost per family in Washington State, provided by Siobhan Mahorter at the Nurse Family Partnership National Service Office, January 2017.

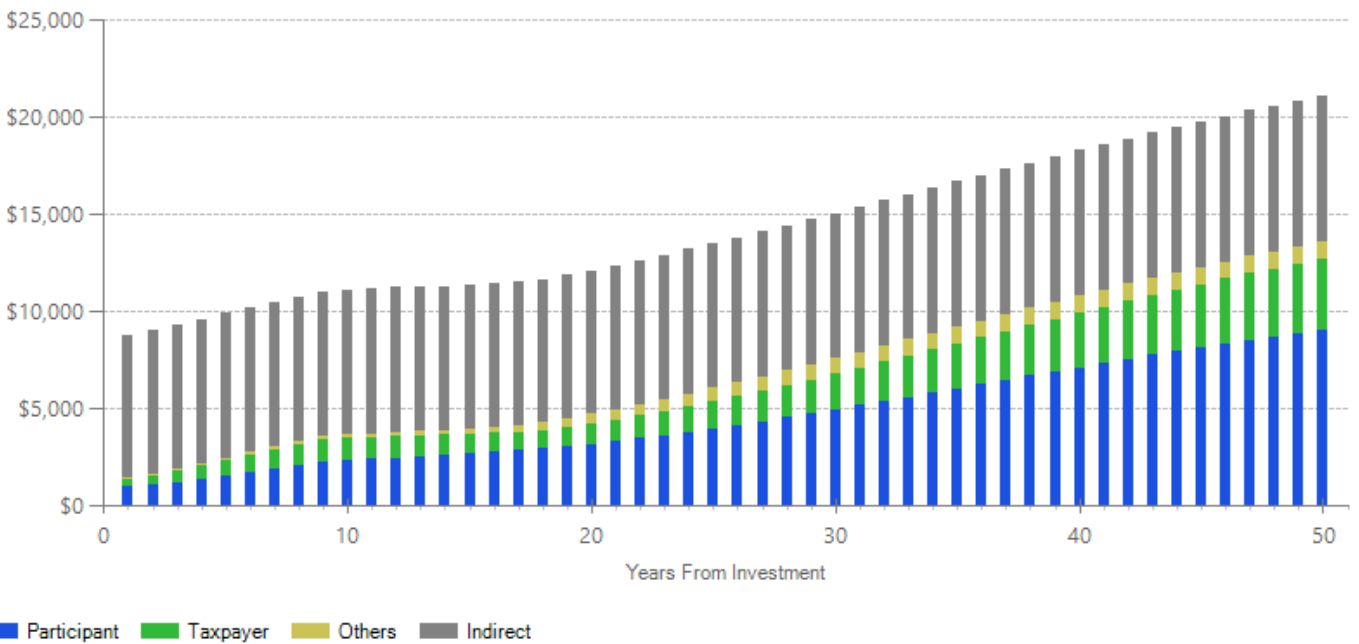
The figures shown are estimates of the costs to implement programs in Washington. The comparison group costs reflect either no treatment or treatment as usual, depending on how effect sizes were calculated in the meta-analysis. The cost range reported above reflects potential variation or uncertainty in the cost estimate; more detail can be found in our [Technical Documentation](#).

## Benefits Minus Costs Over Time (Cumulative Discounted Dollars)

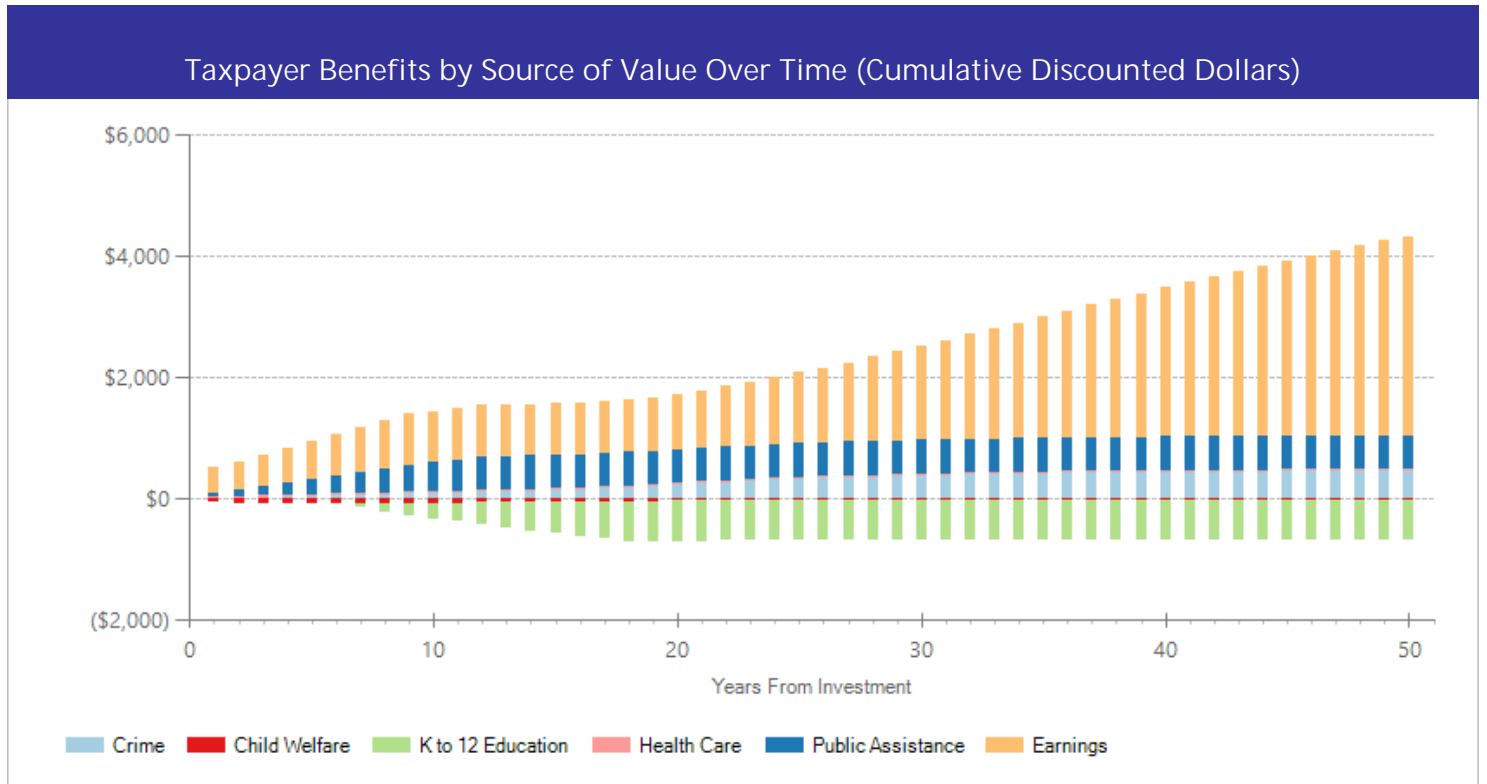


The graph above illustrates the estimated cumulative net benefits per-participant for the first fifty years beyond the initial investment in the program. We present these cash flows in discounted dollars. If the dollars are negative (bars below \$0 line), the cumulative benefits do not outweigh the cost of the program up to that point in time. The program breaks even when the dollars reach \$0. At this point, the total benefits to participants, taxpayers, and others, are equal to the cost of the program. If the dollars are above \$0, the benefits of the program exceed the initial investment.

## Benefits by Perspective Over Time (Cumulative Discounted Dollars)



The graph above illustrates the breakdown of the estimated cumulative benefits (not including program costs) per-participant for the first fifty years beyond the initial investment in the program. These cash flows provide a breakdown of the classification of dollars over time into four perspectives: taxpayer, participant, others, and indirect. "Taxpayers" includes expected savings to government and expected increases in tax revenue. "Participants" includes expected increases in earnings and expenditures for items such as health care and college tuition. "Others" includes benefits to people other than taxpayers and participants. Depending on the program, it could include reductions in crime victimization, the economic benefits from a more educated workforce, and the benefits from employer-paid health insurance. "Indirect benefits" includes estimates of the changes in the value of a statistical life and changes in the deadweight costs of taxation. If a section of the bar is below the \$0 line, the program is creating a negative benefit, meaning a loss of value from that perspective.



The graph above focuses on the subset of estimated cumulative benefits that accrue to taxpayers. The cash flows are divided into the source of the value.

## Citations Used in the Meta-Analysis

- Carabin, H., Cowan, L.D., Beebe, L.A., Skaggs, V.J., Thompson, D., & Agbangla, C. (2005). Does participation in a nurse visitation programme reduce the frequency of adverse perinatal outcomes in first-time mothers? *Paediatric and Perinatal Epidemiology*, 19(3), 194-205.
- Holmes & Rutledge (2016). *Evaluation of the Nurse Family Partnership in North Carolina*. UNC Gillings School of Global Public Health.
- Kitzman, H., Olds, D.L., Henderson Jr, C.R., Hanks, C., Cole, R., Tatelbaum, R., . . . Engelhardt, K. (1997). Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing: A randomized controlled trial. *JAMA*, 278(8), 644-652.
- Kitzman, H.J., Olds, D.L., Cole, R.E., Hanks, C.A., Anson, E.A., Arcoletto, K.J., . . . Holmberg, J.R. (2010). Enduring effects of prenatal and infancy home visiting by nurses on children: Follow-up of a randomized trial among children at age 12 years. *Archives of Pediatrics & Adolescent Medicine*, 164(5), 412-418.
- Matone, M., O'Reilly, A.L., Luan, X., Localio, A.R., & Rubin, D.M. (2012). Emergency department visits and hospitalizations for injuries among infants and children following statewide implementation of a home visitation model. *Maternal and Child Health Journal*, 16(9), 1754-61.
- Mejdoubi, J., van, . H. S. C. C. M., van, L. F. J. M., Crone, M., Crijnen, A., HiraSing, R. A., & Special Sections: Focus on Infant Feeding and Postnatal Health and Well-being. (2014). Effects of nurse home visitation on cigarette smoking, pregnancy outcomes and breastfeeding: A randomized controlled trial. *Midwifery*, 30(6), 688-695.
- Mejdoubi, J., van, . H. S. C. C. M., van, L. F. J. M., Heymans, M. W., Crijnen, A., HiraSing, R. A., & Carlo, W. A. (2015). The Effect of VoorZorg, the Dutch Nurse-Family Partnership, on Child Maltreatment and Development: A Randomized Controlled Trial. *Plos One*, 10(4).
- Olds, D., Henderson, C.R., Cole, R., Eckenrode, J., Kitman, H., Luckey, D. (1998). Long-term effects of nurse home visitation on children's criminal and antisocial behavior: 15-year follow-up of a randomized controlled trial. *JAMA*, 280(14), 1238-1244.
- Olds, D.L., Eckenrode, J., Henderson, C.R., Jr., Kitman, H., Powers, J., Cole, R., . . . Luckey, D. (1997). Long-term effects of home visitation on maternal life course and child abuse and neglect: Fifteen-year follow-up of a randomized trial. *JAMA*, 278(8), 637-643.
- Olds, D.L., Holmberg, J.R., Donelan-McCall, N., Luckey, D.W., Knudtson, M.D., & Robinson, J. (2014). Effects of home visits by paraprofessionals and by nurses on children: follow-up of a randomized trial at ages 6 and 9 years. *JAMA Pediatrics*, 168(2), 114-21.
- Olds, D.L., Kitman, H., Cole, R., Robinson, J., Sidora, K., Luckey, D.W., . . . Holmberg, J. (2004). Effects of nurse home- visiting on maternal life course and child development: Age 6 follow-up results of a randomized trial. *Pediatrics*, 114(6), 1550-1559.
- Olds, D.L., Kitman, H., Hanks, C., Cole, R., Anson, E., Sidora-Arcoletto, K., . . . Bondy, J. (2007). Effects of nurse home visiting on maternal and child functioning: Age-9 follow-up of a randomized trial. *Pediatrics*, 120(4), 832-845.

- Olds, D.L., Kitzman, H., Knudtson, M., Cole, R., Miller, T., Fishbein, D., . . . Collins, E. (2016). *Age-18 follow-up of home visiting intervention* (Grant #R01DA021624).
- Olds, D.L., Kitzman, H., Knudtson, M.D., Anson, E., Smith, J.A., & Cole, R. (2014). Effect of home visiting by nurses on maternal and child mortality: results of a 2-decade follow-up of a randomized clinical trial. *JAMA Pediatrics*, *168*(9), 800-806.
- Olds, D.L., Kitzman, H.J., Cole, R.E., Hanks, C.A., Arcoleo, K.J., Anson, E.A., . . . Stevenson, A. (2010). Enduring effects of prenatal and infancy home visiting by nurses on maternal life course and government spending: Follow-up of a randomized trial among children at age 12 years. *Archives of Pediatrics & Adolescent Medicine*, *164*(5), 419-424.
- Olds, D.L., Robinson, J., O'Brien, R., Luckey, D.W., Pettitt, L.M., Henderson, C.R., Jr., . . . Talmi, A. (2002). Home visiting by paraprofessionals and by nurses: A randomized, controlled trial. *Pediatrics*, *110*(3), 486-496.
- Olds, D.L., Robinson, J., Pettitt, L., Luckey, D. W., Holmberg, J., Ng, R.K., . . . Henderson, C.R., Jr. (2004). Effects of home visits by paraprofessionals and by nurses: Age 4 follow-up results of a randomized trial. *Pediatrics*, *114*(6), 1560-1568.
- Rubin, D.M., O'Reilly, A.L., Luan, X., Dai, D., Localio, A.R., & Christian, C.W. (2011). Variation in pregnancy outcomes following statewide implementation of a prenatal home visitation program. *Archives of Pediatrics & Adolescent Medicine*, *165*(3), 198-204.

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