

# Increasing Appropriate Vaccinations: Community-Based Interventions Implemented in Combination

## Summary Evidence Table - Economic Review

Study	Study and Population Characteristics	Intervention & Comparison	Effect Size	Program Costs	Healthcare Costs Averted Productivity Losses Averted	Economic Summary Measure
<p><b>Author (Year):</b> Browngoehl et al. (1997)</p> <p><b>Vaccine:</b> Childhood series</p> <p><b>Study Design:</b> Retrospective cohort and convenience sample.</p> <p><b>Economic Method:</b> Cost per vaccinated</p> <p><b>Monetary conversions:</b> Index year is 1992</p>	<p><b>Location:</b> Philadelphia Managed Care Organization</p> <p><b>Study Population:</b> Children in HMO age 18-24 months (Control) and 30-35 months (Interv)</p> <p><b>Sample Size:</b> Control: 1257 Interv: 1254</p> <p><b>Intervention length:</b> 12 months</p>	<p><b>Intervention:</b> \$10 gift certificate for diapers or shoes when a child was appropriately immunized for childhood series</p> <p>Part of comprehensive intervention with home visits, transport assistance, and ongoing education.</p> <p><b>Comparison:</b> Usual care</p>	<p><b>Effectiveness:</b> Statistically significant 6.6 pct pt increase in children who received all their immunizations.</p>	<p>\$10 gift certificate as part of comprehensive intervention.</p> <p>\$48000 for member incentives. No details provided.</p>	<p><b>Healthcare cost:</b> No healthcare cost considered.</p> <p><b>Productivity effects:</b> No productivity effects estimated.</p>	<p>No summary measure</p> <p>Cost per additional person vaccinated \$131.61</p>
<p><b>Author (Year):</b> Deuson et al. (2001)</p> <p><b>Vaccine:</b></p>	<p><b>Location:</b> Philadelphia, PA</p> <p><b>Study Population:</b></p>	<p><b>Intervention:</b> 1. Computerized database used to track vaccine administered and</p>	<p>Marginal changes in vaccination status: Increment in series completion – 522;</p>	<p>Planning \$34, 470 Education \$188,540 Outreach \$22,197 Vaccination \$23,543 Total \$268,660.</p>	<p>Considered both healthcare costs and work absences averted in modeling.</p>	<p><b>Summary Measures:</b> Modeled program costs, medical costs averted, and work loss averted under scenarios determined by: infection rates; vaccine</p>

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<p>Hepatitis B</p> <p><b>Study Design:</b> Pre and post</p> <p><b>Economic Method:</b> Cost per vaccinated</p> <p>Cost-Effectiveness and Cost-Benefit</p> <p><b>Monetary conversions:</b> Index year is 1995</p>	<p>Asian children 2-13 yrs identified through area hospitals, health plans, and community organizations.</p> <p><b>Sample Size:</b> 4,384</p> <p>90% foreign born; mostly Vietnamese and Camodian; 58% used district health centers.</p> <p>Hepatitis B vaccination status determined from vaccination records</p> <p><b>Study Period:</b> Planning started in October 1994 and intervention from March 95 through Feb 1996.</p> <p><b>Intervention length:</b> 12 months.</p>	<p>to generate client reminders.</p> <p>2. 4 community fairs and 100 education sessions attended by 300 at community centers and streets</p> <p>3. 250 in-home sessions attended by 800 adults.</p> <p>5. Door to door outreach</p> <p>6. In-home vaccinations for 95 who did not respond to reminders</p> <p>4. Brochures and printed materials</p> <p>Note that the VFC program began in the area midway through the intervention. However, this evaluation is not a population-based analysis.</p> <p><b>Comparison:</b> None</p>	<p>Years of life saved by this intervention ranged from 106 (30% infection rate) to 213 (60% infection rate)</p> <p>Increased series-complete coverage by 12 pct pt.</p>	<p>Cost of \$64 per child in program; \$119 per dose; and \$537 per series completion.</p>	<p>Averted costs dependent on prevalence of infections, protection at 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> dose, probabilities of symptomatic disease, persistent hepatitis, active hepatitis, cirrhosis, and carcinoma.</p>	<p>protection; probability of symptomatic disease; discount rates; vaccines at private sector versus public sector prices.</p> <p>Modeling results:</p> <ol style="list-style-type: none"> <li>Benefit-costs range from 2.08 (30% infect. rate, 5% discount rate) to 8.88 (60% infect rate, 3% disct rate)</li> <li>Cost-effectiveness range from \$5,763 (60% infect rate and 3% discount rate) to \$27,691 (30% infect rate and 5% discount rate)</li> <li>Cost-effectiveness range from \$4,836 to \$58,135 per QALY under 60% and 100%, assuming purchase of vaccines from private sector</li> </ol> <p>Cost per series completion at \$537 (n=522). Cost/additional person seroprotected \$325</p>
<p><b>Author (Year):</b> El-Mohandes et al, (2003)</p>	<p><b>Location:</b> Washington, DC</p>	<p><b>Intervention:</b> Improve parenting skills and child health</p>	<p>At 12 months percent with complete vaccine schedule:</p>	<p>Average cost per child at \$5,458. No details provided for</p>	<p><b>Healthcare cost:</b> No healthcare costs considered</p>	<p>No economic summary measures</p>

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<p><b>Vaccine:</b> DTP/OPV/Hib</p> <p><b>Study Design:</b> Randomized controlled trial</p> <p><b>Economic Method:</b> Cost Analysis Cost per vaccinated</p> <p><b>Monetary conversions:</b> Index year is 1996</p>	<p><b>Study Population:</b> Child-mother dyads recruited from 4 hospitals, with less than 5 prenatal visits in 3<sup>rd</sup> trimester. Enrollment at postpartum. 286 enrolled from initial screening of 13,705 records</p> <p><b>Sample Size:</b> Intervention 146; Control 140</p> <p>98% Black, 90% never married; 60% poor.</p> <p><b>Study Period:</b> Recruitment April 1995 to April 1997.</p> <p><b>Intervention length:</b> 12 months</p>	<p>measured by well child visits and immunization visits.</p> <p>. Home visits by lay person, trained over 9 weeks, standardized education curriculum for parenting and infant health. Also facilitated utilization of community and health care resources. Curriculum called for 32 visits. At 5 months, home visits changed to group development play and group support at hospital facilities. Group activities led by child development specialist bi-weekly and 45 minutes in length. Also monthly support calls.</p> <p><b>Comparison:</b> Controls received standard care at hospitals plus</p>	<p>Intervention 40.7% (37/91) Control 35.1%(27/77) Subgroup of High Intensity Intervention 48.9% (23/47)</p> <p>Percent with 1 or more immunization visits: At 6 months – 63% for controls and 74% for intervention At 12 months – 71% for controls and 85% for intervention</p> <p>Authors note difference becomes statistically insignificant at 12 months.</p> <p>Similar findings are reported for well-child visits.</p>	<p>components and their costs.</p>	<p><b>Productivity effects:</b> No productivity effects considered.</p>	<p>With incremental person vaccinated at 12 months of 5.6%, the incremental cost per vaccinated person is \$5458/0.056=\$97,464</p> <p>Based on high intensity subgroup, cost per additional vaccinated person=\$5458/0.138=\$39,551</p> <p><b>Notes:</b> Cost is for entire program which includes group activities and home visits to improve parenting and child health.</p> <p>There was considerable attrition of 42% at 12 months due to migration out of area or change in provider.</p>

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		monthly calls from family resource specialist providing social and health referrals.				
<p><b>Author (Year):</b> Greengold et al., (2009)</p> <p><b>Vaccine:</b> HBV/HAV</p> <p><b>Study Design:</b> RCT with Modeling</p> <p><b>Economic Method:</b> Cost-Effectiveness</p> <p><b>Monetary conversions:</b> Index year is 2006</p>	<p><b>Location:</b> Los Angeles</p> <p><b>Study Population:</b> Homeless persons. Age 18-65 with mean 42; HBV Negative; Afr.Amer-69%; White-14.7%; Hisp-13.9%.</p> <p><b>Sample Size:</b> Interv 865.</p> <p><b>Intervention length:</b> Not reported.</p>	<p><b>Intervention:</b> Nurse Case Management, Tracking, Incentives, Enhanced Education (NIT)</p> <p>Tracking &amp; Incentives (TI)</p> <p>Incentives Only (I)</p> <p><b>Comparison:</b> Usual care.</p>	<p><b>Effectiveness:</b></p> <p><u>Proportions receiving HBV doses</u> 2<sup>nd</sup> dose: NIT-0.93;IT-0.89; I-0.81;Usual-0.33</p> <p>3<sup>rd</sup> dose: NIT-0.67;IT-0.61; I-0.54;Usual-0.20</p> <p><b>QALYs Gained</b> NIT-21.3;IT-20.7;I-19.5; Usual-10.9</p>	<p><u>Cost per person per group</u> NIT-\$431.90 IT-\$425.00 I-\$315 Usual-\$241.90</p> <p>Cost include travel to clinic visits, nursing time, subject tracking, incentives, serostatus testing, and HAV/HBV vaccinations. First screen incentive \$2. First through third vaccination incentives were \$10, \$15, \$25. 2-week followup incentive \$10.</p>	<p><b>Modeled effects on healthcare cost</b> Events were HAV, HBV infections, Illness, Treatment, Hospitalization, Cirrhosis, Liver Cancer, Death, Recovery, Liver Transplant.</p> <p><b>Productivity effects:</b> Not estimated</p>	<p><b>Cost per QALY Gained</b> NIT-31.81;IT-46.63;I-53.40;Usual-198.03</p> <p>Monte Carlo simulation of decision tree with Markov Models. Base case infections from literature for high risk populations.</p> <p><b>Program Plus Health Care Cost</b> NIT-849.20;IT-964.20;I-1039.10; Usual-2153.30</p> <p>Compared to usual care, sensitivity analysis showed NIT, IT, I were CE in 50%, 47%, 41% simulations.</p> <p><b>Notes:</b> CEA not done for HAV since it is known to be cost-ineffective delivered alone.</p>
<p><b>Author (Year):</b> Hoekstra et al., (1999)</p>	<p><b>Location:</b> Chicago, IL</p> <p><b>Study Population:</b> Infants enrolled at 6 months and</p>	<p><b>Intervention:</b> Intervention adds client reminder-recall to an existing monthly voucher pickup program (MVP).</p>	<p>Percent up to date for recommended vaccine series for: <u>MVP plus reminder-recall</u> group increase from 75% to 80%</p>	<p>Program cost for the reminder-recall intervention was \$57,000 which can be considered an increment over the cost of tasks</p>	<p><b>Healthcare cost:</b> Not estimated</p> <p><b>Productivity effects:</b> Not estimated</p>	<p>Summary measure not estimated.</p> <p>Cost per additional vaccinated person is not calculated since the adding</p>

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<p><b>Vaccine:</b> Childhood series</p> <p><b>Study Design:</b> Randomized Controlled Trial</p> <p><b>Economic Method:</b> Cost-analysis</p> <p><b>Monetary conversions:</b> Index year is 1996</p>	<p>follow-up at 12 months age. n=565 inner city infants at a single WIC site, low SES, 95% Hispanic</p> <p><b>Sample Size:</b> MVP 241 MVP plus Client Reminder 324</p> <p><b>Intervention length:</b> 6 months</p>	<p>Study clerk evaluates vaccination status and provides referrals and MVP disincentive, where necessary, for n=241. Additionally, those in intervention group are reached through monthly phone and mail reminder-recalls by 1 study clerk, for n=324</p> <p><b>Comparison:</b> Monthly Voucher Pickup (MVP)</p>	<p><u>MVP group</u> increase from 77% to 79%</p>	<p>associated with assessment, MVP and referral.</p> <p>The average cost per child in reminder-recall = \$57,000/324 \$176</p> <p>No details provided for components of program costs.</p>		<p>client reminder to MVP is not effective.</p> <p><b>Notes:</b> There is no control group which precludes calculation of effect ascribable to either study arms.</p>
<p><b>Author (Year):</b> Kansagra et al. (2011)</p> <p><b>Vaccine:</b> Influenza</p> <p><b>Study Design:</b> Post Only</p>	<p><b>Location:</b> New York, NY</p> <p><b>Study Population:</b> 1232 Elementary Schools in NYC with 570K students. Targeting 4 years and older</p> <p>58 Community points of delivery.</p>	<p>2 campaigns providing 2009 H1N1 vaccines</p> <p><b>Elementary School-based</b> During school hours Schools with &lt;400 enrollment by on-site school nurse(</p>	<p><b>Elementary Schools</b> 202089 vaccinations delivered (1<sup>st</sup> dose to 21.5% of enrolled students) <b>Community</b> 49986 vaccinations delivered</p>	<p>Program cost from Department of Health (DOH) perspective. Cost of in-kind contributions included. Vaccine plus supplies-\$9.30 per dose Majority of staff were City employees valued at time and</p>	<p><b>Healthcare cost:</b> Not estimated.</p> <p><b>Productivity cost:</b> Not estimated</p>	<p>No summary measure</p> <p><b>Capacity Analysis</b> School vaccinations per nurse at capacity estimated using observed 90<sup>th</sup> percentile: School Nurse-8 per day Plus Contract Nurse-12 per day Team Nurse-63 per day Community delivery capacity estimated from</p>

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<p><b>Economic Method:</b> Average cost</p> <p><b>Monetary conversions:</b> Index year is 2009</p>	<p>Targeted age 4 to 24 and pregnant in first weekend, later relaxed to all 4 or older in last weekend.</p> <p><b>Sample Size:</b> Elementary Schools 570K Community Not reported</p> <p><b>Study Period:</b> Community interv Nov-Dec 2009 School interv Oct 2009-March 2010.</p> <p><b>Intervention length:</b> 6 months</p>	<p>Schools with 400-600 enrollment with additional contract nurse for 8 days Schools with &gt;600 enrollment by team of nurses &amp; support assigned 1-2 days</p> <p><b>Community-based</b> 58 community points of dispensing over 5 weekends. Each point with ~125 nurse, volunteers, city staff.</p>	<p>Data from NYC IIS registry and onsite records. 1134 schools had data in IIS. Missing data imputed from schools with data.</p>	<p>wage plus 37.7% fringe. School staff by location type: Principal-5 hours Vacc by School Nurse-10 hours Nurse+Contract Nurse-25 hours Vacc Team-20 hours DOH per capita overhead \$32618 multiplied by staff assigned.</p> <p><b>School Total Cost \$17.9m (\$88 per dose)</b> \$13m in-kind Personnel-59% (of which 38% was for vaccinators) Supplies &amp; Eqp-16% Overheads-16%</p> <p><b>Community Total Cost \$7.5m (\$150 per dose)</b> \$3.4m in-kind Personnel-64% Overheads-16%</p>		<p>point with most queues (3000 per day).</p> <p>Note no other cost except vaccine cost is added through capacity analysis.</p> <p>If Schools operated at Capacity cost per dose would be \$53 (\$41 to \$70 sensitivity analysis) If community points operated at capacity cost per dose would be \$50 (\$39 to \$67 sensitivity analysis)</p> <p><b>Conclusion:</b> Observed cost per dose lower for school-based vs community. At capacity, community cost would be slightly lower. School-based averted costs of provider visit not considered.</p> <p><b>Notes:</b> Interv occurred during H1N1 emergency. NYC wages high.</p>

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<p><b>Author (Year):</b> Rask et al. (2001)</p> <p><b>Vaccine:</b> Childhood Series</p> <p><b>Study Design:</b> RCT</p> <p><b>Economic Method:</b> Cost analysis</p> <p><b>Monetary conversions:</b> Index year is 1997</p>	<p><b>Location:</b> Atlanta, GA</p> <p><b>Setting:</b> County public health clinic</p> <p><b>Study population:</b> 3050 children &lt;12 months from immunization registry randomized to 4 study arms</p> <p><b>Sample Size:</b> Autodialer (A) 750 Outreach (O) 750 Combined (C) 750 Control 800</p> <p><b>Study Period:</b> Children selected Sep 1, 1996-March 31 1998</p> <p><b>Intervention length:</b> 22 months</p>	<p><b>Interventions:</b></p> <p><b>Autodialer (A):</b> Reminder by phone 7 days prior to vaccine due. Reminder by phone once past-due. If child is still not immunized, phone calls made on 4 successive days</p> <p>Letter sent to those with no phone.</p> <p><b>Outreach (O):</b> Outreach worker phoned family who missed vaccination. Called to remind family prior to appt. If unvaccinated after 1 month, a home visit attempted each month until contact.</p> <p><b>Combined (C):</b> Automated reminders followed by outreach protocol implemented.</p> <p><b>Comparison:</b> Usual care</p>	<p>Aggregate for 3 intervention arms increased rates by 5 pct pt. No significant difference among intervention arms.</p>	<p><b>Annual Program Cost</b></p> <p><b>Personnel</b> A \$10,732; O \$12,976; C \$20,877</p> <p><b>Facilities</b> A \$283;O \$2164;C \$2446</p> <p><b>Supp&amp;eq</b> A \$1074;O \$352;C \$1252</p> <p><b>Travel</b> A \$0;O \$376;C \$251</p> <p><b>Total per child per month</b> <b>A-12,089 (\$1.34)</b> <b>O-16,868 (\$1.87)</b> <b>C-24,826 (\$2.76)</b></p> <p><b>Capital equipment</b> One computer for outreach and combined arms, One autodialer for autodialer and combined.</p> <p><b>Supplies</b> Postage, autodialer software, copying expenses</p> <p><b>Personnel</b> Tech support for registry- autodialer interface, Autodialer programming cost. Outreach worker</p> <p><b>Travel for</b> Outreach staff</p>	<p><b>Healthcare cost:</b> Not estimated.</p> <p><b>Productivity effects:</b> Not estimated</p>	<p>No summary measures.</p> <p><b>Notes:</b> An IIS-based intervention using an autodialer for reminder/recall was considerably less expensive than recall by outreach workers with no significant difference in impact on vaccination rates.</p>

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<p><b>Author (Year):</b> Sander et al., (2010)</p> <p><b>Vaccine:</b> Influenza</p> <p><b>Economic Method:</b> Cost-Effectiveness</p> <p><b>Monetary conversions:</b> Index year is 2006 and in Canadian dollars</p>	<p><b>Location:</b> Ontario, Canada</p> <p><b>Study Population:</b> All &gt;6 months age in Ontario</p> <p><b>Sample Size:</b> Target all &gt;6 months age in Ontario population of 12.16 million</p> <p><b>Intervention length:</b> 10 years data</p>	<p><b>Intervention:</b> Ontario implemented policy of free universal influenza vaccines for &gt;6 months in 2000</p> <p><b>Comparison:</b> Policy of targeted vaccinations in other provinces</p>	<p>Rates increased from 18% in 1996 to 42% in 2005, compared to increase from 13% to 28% in control. Difference 9 pct pt</p> <p>Based on multivariate regression, health events reduced 40-60% in Ontario vs control.</p>	<p><u>Universal program</u> \$40 million per year <u>Targeted program</u> \$20 million</p> <p>Cost of vaccine, provider reimbursement, communications strategies, and direct operating expenditures (50% was vaccine)</p> <p>Vaccine cost was \$3.96 per dose and \$7.55 distributed.</p>	<p><b>Healthcare cost:</b> Influenza related hospitalization, ED, outpatient, from 1997 to 2004. Expected events estimated by applying relative change in mean events to pre rates. Hospital-75% v 56% Outpatient-79% v 48% ED-69% v 31%</p> <p><b>Productivity effects:</b> Productivity effects included in QALY</p>	<p><b>Cost per QALY saved</b> \$10,797</p> <p>Based on events averted due to intervention: 34541 influenza cases;111 deaths 786 hospitalizations;7745 ED;30306 outpatient Led to \$7.8 million in savings</p> <p>Total QALY gained 1134 (About 50% of QALY gained from averted deaths.) Net Incremental Cost - \$12.2 m</p> <p>Multivariate regression model with age, sex, province, influenza surveillance data, and temporal trends.</p> <p><b>Notes:</b> CE below \$50K under conservative assumptions about deaths averted. Probabilistic sensitivity analysis demonstrated cost-effective at threshold of \$50,000 per QALY exceed 90% of time.</p>



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<p><b>Author (Year):</b> Seal et al. (2003)</p> <p><b>Vaccine:</b> Hepatitis B</p> <p><b>Study Design:</b> RCT</p> <p><b>Economic Method:</b> Program cost Cost per vaccinated person</p> <p><b>Monetary conversions:</b> Index year is 1999</p>	<p><b>Location:</b> San Francisco, CA</p> <p><b>Study Population:</b> Homeless men Injection Drug Users</p> <p><b>Sample Size:</b> Outreach 48 Incentive 48</p> <p><b>Intervention length:</b> 6 months</p>	<p><b>Intervention:</b> Weekly Outreach Contact (O) Outreach plus incentives (I) Offered \$20 a month for 6 months if they got 3 doses of HepB</p> <p><b>Comparison:</b> Usual care</p>	<p><u>Receipt of 2<sup>nd</sup> dose</u> Incentive 96% Outreach 63%</p> <p><u>Receipt of 3<sup>rd</sup> dose</u> Incentive 69% Outreach 23%</p> <p>Incentive more effective than outreach</p>	<p>Cost per person: Incentive:\$220 Outreach:\$590</p>	<p><b>Healthcare cost:</b> Not estimated.</p> <p><b>Productivity effects:</b> Not estimated.</p>	<p>No summary measures</p> <p><u>Cost per additional person vaccinated:</u> Incentive \$320 Outreach \$2575</p>
<p><b>Author (Year):</b> Szilagyi et al. (2002)</p> <p><b>Vaccine:</b> Childhood series</p> <p><b>Study Design:</b> Interrupted time series</p> <p><b>Economic Method:</b></p>	<p><b>Location:</b> Monroe County (Rochester), NY</p> <p><b>Study Population:</b> Children 0-2 years in a. inner city b. suburbs, and c. rest of city.</p> <p><b>Sample Size:</b> About 6,400 children tracked from 10 practices.</p>	<p><b>Intervention:</b> Staged intervention with home visits being the last component. Conducted by lay persons as outreach workers from community.</p> <ol style="list-style-type: none"> <li>All children tracked</li> <li>¾ receive reminder by</li> </ol>	<p>Vaccination rates at 12 months age compared to baseline: Inner City – 67% to 87% Rest of city – 79% to 89% Suburbs – 88% to 92%</p> <p>Vaccination rates at 24 months age compared to baseline:</p>	<p>Total program cost of \$240,000 per year: 70% - outreach worker salaries 30% - supervisory staff, computer and administrative support, local travel, and phone.</p> <p>Cost per child per year \$38. (based on 6400 covered children)</p>	<p><b>Healthcare cost:</b> Not estimated</p> <p><b>Productivity effects:</b> Not estimated</p>	<p>No summary measures.</p> <p>Cost per additional vaccinated child = 317,158/(960/5) = \$1652 (based on 15% increased vaccinated persons over 5 years among 6,400 children)</p> <p>Notes: This is evaluation of implemented program.</p>

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<p>Program cost</p> <p><b>Monetary conversions:</b> Index year is 1996</p>	<p><b>Study Period:</b> Intervention began in 1995 and expanded in 1999.</p> <p>Intervention length: 3 years data 1993 (pre intervention), 1996 (intra intervention), and 1999 (post intervention).</p>	<p>phone or card/letter 3. Repeat of reminders-recall 4. 5% received home visits</p> <p>Objective to decrease racial and geographic disparities in vaccination coverage.</p> <p><b>Comparison:</b> None</p>	<p>All Areas – 80% to 90% Inner City – 55% to 84% Rest of city – 64% to 81% Suburbs – 73% to 88%</p> <p>Disparity measured as difference between suburbs and inner city declined from 18% to 4% for 24-month old children and from 21% to 5% for 12-month old children.</p>	<p>Costs are not apportioned by stages of the intervention. No details provided for cost components.</p>		
<p><b>Author (Year):</b> Szilagyi et al. (2011)</p> <p><b>Vaccine:</b> MCV, Pertussis, HPV</p> <p><b>Study Design:</b> RCT</p> <p><b>Economic Method:</b> Cost per vaccinated person</p>	<p><b>Location:</b> Rochester, NY</p> <p><b>Study Population:</b> Adolescents from 8 urban practices: 2 health centers, 3 hospital based or associated pediatric clinics; 3 private practices</p> <p>Age 11-15 50-67% of practice kids on Medicaid</p>	<p><b>Intervention:</b> Tiered tracking, reminder/recall, and outreach called a Patient Navigator System (PN) Managed by 4.5 Trained FTE immunization navigators from community. Oversight by Social Worker. Placed within practices. Step 1: Tracking in database</p>	<p><b><u>Vaccination rate vs control (pct pt)</u></b> MCV 14.3; Tdap 12.1 HPV-Dose1 15.6 HPV-Dose1 15.8 HPV-Dose1 12.4 Total 12.3 (12 to 16% higher)</p> <p>Secondary outcome Improved preventive visits 9 to 17 pct pt higher</p>	<p><b>Program cost per person per year</b> \$45.74</p> <p>Navigator labor costs 80%; supervisory labor 16%; office supplies, cell phone costs, travel expenses for home visits and transports, and costs of the database 4%</p>	<p><b>Healthcare cost:</b> Not estimated</p> <p><b>Productivity effects:</b> Not estimated</p>	<p>No summary measure.</p> <p>Cost per vaccinated person \$465</p> <p>Cost per additional preventive visit \$417</p> <p><b>Notes:</b> Intervention effect greater for girls and for blacks and Hispanics versus whites. Tiered intervention worked where simple reminder/recall failed in urban poor populations.</p>

Study	Study and Population Characteristics	Intervention & Comparison	Effect Size	Program Costs	Healthcare Costs Averted Productivity Losses Averted	Economic Summary Measure
<p><b>Monetary conversions:</b> Index year is 2007</p>	<p>Black-63%; Hispanic-23%; Age-13.5 ;Medicaid-74%</p> <p><b>Sample size:</b> 7546 randomized</p> <p>Patient Navigator (PN) 3707 Control 3839</p> <p><b>Intervention length:</b> 12 months</p>	<p>Step 2: Reminder for vaccine or preventive care by 2 phone calls and then 2 letters</p> <p>Step 3: Navigators attempted to educate and remove barriers and offer transport.</p> <p>Step 4: Home Visit to educate and remove other barriers</p> <p><b>Comparison:</b> Phone/mail reminders for scheduled visits</p>				
<p><b>Author (Year):</b> Vora et al., (2009)</p> <p><b>Vaccine:</b> Childhood Series</p> <p><b>Study Design:</b> Other with concurrent comparison</p> <p><b>Economic Method:</b> Cost Analysis</p>	<p><b>Location:</b> Chicago, IL</p> <p><b>Study Population:</b> Medicaid-enrolled mothers, African American, from Friend Family Health Center (FFHC) as the primary clinic or any clinic within 7 zip codes on the south side of Chicago.</p>	<p><b>Intervention:</b> First dose of hepatitis B vaccine and vaccine education at birth On-going reminder-recall until infant completed all ACIP-prescribed vaccines or reaches 35 months of age. Appointment reminders; recontact and rescheduling for those missing</p>	<p>Birth cohort were 92% vaccinated at 24 months compared to 49% city-wide. 146 completed all vaccines Of these, 122 (84%) complete by 19 months, 12 (8%) by 24 months, and 12 (8%) by 29 months</p>	<p>Program cost: \$11.26 per person per year</p> <p>Uniforms for outreach worker;;Computers, printer, copier;;home visits by 2 outreach workers due to safety concerns; outreach enrollment; reminders; in-person contacts with caregiver; time to contact non-responders.</p>	<p><b>Healthcare cost:</b> Not estimated</p> <p><b>Productivity effects:</b> Not estimated</p>	<p>No summary measures.</p> <p>Cost per vaccinated child \$288.</p> <p><b>Notes:</b> Home visits added substantially to the cost of outreach worker effort; Data-entry costs in study were high due to use of multiple databases and multiple data-entry personnel. Targeting under-vaccinated families would save resources</p>

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<p><b>Monetary conversions:</b> Index year is 2004</p>	<p><b>Sample Size:</b> 400 neonates born at Univ of Chicago Hospitals</p> <p><b>Study period:</b> March 2004 through Oct 2005</p> <p><b>Intervention length:</b> 29 months</p>	<p>appointments. Home visits were made when no contact by phone and mail.</p>				
<p><b>Author (Year):</b> Zhou et al. (2003)</p> <p><b>Vaccine:</b> Hepatitis B</p> <p><b>Study Design:</b> Before-after with control</p> <p><b>Economic Method:</b> Cost-Effectiveness and Cost Benefit</p> <p><b>Monetary conversions:</b> Index year is 2000</p>	<p><b>Location:</b> Interventions in Houston, TX and Dallas, TX</p> <p><b>Study Population:</b> Vietnamese American children 3-18 years age. Born abroad 50%; parents less than HS 40%; below FPL 25%; unaware about HBV 50%; not aware of free HBV 77%.</p> <p><b>Sample Size:</b> Houston media campaign (MC) 8692 Dallas community mobilization (CM) 5657</p>	<p><b>Intervention: Media Campaign (MC) – Houston</b> Vietnamese media: Billboards; Radio-spots; ads and articles in 5 newspapers; small media; calendars, at churches, temples, festivals, clinics, housing complexes; telephone hotline</p> <p><b>Community Mobilization (CM) – Dallas</b> Coalition with 19 ethnic groups from health care, public health, business, press, and community orgs. Committees for advisory,</p>	<p><b># Doses Received</b> <b>Houston:</b> 1<sup>st</sup> - 865; 2<sup>nd</sup> -1075; 3<sup>rd</sup> - 1176; Total - 3116 <b>Dallas:</b> 1<sup>st</sup> -437; 2<sup>nd</sup> - 416; 3<sup>rd</sup> - 390; Total - 1243</p> <p>Assumed seroprotection with 1<sup>st</sup> dose 50%; 2<sup>nd</sup> dose at 85% and 3<sup>rd</sup> at 95%. Assumed 60% whole-life infection rate.</p>	<p><b>Total Cost (1998-2000)</b> MC-Houston \$313,904 CM-Dallas \$169,561.</p> <p>Vaccine - 43% public funds at \$9 and 57% private providers at \$22.85 Administration - Caregiver travel - \$3.50 Caregiver time - 2hours at \$8.25</p>	<p>Benefits modeled with assumptions: 60% infections asymptomatic; 15% of infected in late childhood or adolescents at high risk of chronic liver disease.</p> <p>Direct medical costs: inpatient, outpatient, lab, radiologic, drug, and liver transplantation costs for HBV infection.</p> <p>Indirect costs: loss of earnings for HBV-related illness and for premature</p>	<p><u>Cost per life year saved</u> MC-Houston \$9954; 5.26 CM-Dallas \$11759; 4.47</p> <p><u>Benefit-Cost Ratio</u> MC-Houston 5.26 CM-Dallas 4.47</p> <p><u>Based on 60% infection rate and assumed seroprotection rates from 1, 2, and 3 doses.</u> Washington DC is chosen as a matched control.</p> <p>Cost per vaccinated child MC-Houston \$363 CM-Dallas \$387</p>

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	<p><b>Study Period:</b> Intervention April 1998-March 2000. Baseline Spring 1998 and follow up between April 2000 and March 2001</p> <p><b>Intervention length:</b> 24 months</p>	<p>planning, and outreach. Outreach to doctors, churches, clinics, day care, WIC, AFDC, public housing; Vietnamese doctors encouraged to join VFC; Small media; health fairs; present at fairs, churches, temples; home visits; translation services at clinics; radio announcements.</p> <p><b>Comparison:</b> Washington, DC with no intervention</p>			<p>mortality cause by HBV infection.</p>	