Illinois Chapter, American Academy of Pediatrics

Hepatitis B Vaccine

Quality Improvement Project

Final Report

Prepared by American Academy of Pediatrics, Area of Quality, Analytics & Evaluation

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Background

Hepatitis B virus infection acquired in infancy carries the highest risk of lifelong chronic infection, and approximately one in four people with chronic hepatitis B die prematurely from liver disease. Universal infant vaccination, beginning with a birth dose and completing the three-dose series by 6 to 18 months of age, has reduced hepatitis B infections among infants and children in the United States by about 99% since the universal birth-dose recommendation was introduced in 1991. Sustaining that protection depends on primary care practices reliably identifying and vaccinating children who are due for an on-schedule dose and catching up children who have fallen behind.

The policy environment shifted just before the project began. In December 2025, the federal Advisory Committee on Immunization Practices voted to end the universal birth-dose recommendation for infants born to mothers who test negative for hepatitis B surface antigen, replacing it with individual decision-making, and the Centers for Disease Control and Prevention adopted the change. The AAP continues to recommend a hepatitis B vaccine dose for all newborns and completion of the series in infancy, and pediatricians reported that more parents were declining the birth dose after the vote. As a result, pediatric primary care practices serve both as the safety net for infants who leave the birth hospital unvaccinated and as the setting where the remaining doses of the series are delivered. Missed opportunities in this setting arise from several sources, including eligibility that is not identified during a busy visit, workflows that do not prompt administration, provider postponement, caregiver postponement or refusal, supply problems, and incomplete documentation of why a dose was not given.

The ICAAP Hepatitis B Vaccine Quality Improvement (QI) Project was designed to address these gaps by supporting Illinois pediatric practices in improving hepatitis B (HepB) vaccine administration during well-child visits for children 24 months of age and younger. The project used the Model for Improvement, with practices testing and refining changes through Plan-Do-Study-Act (PDSA) cycles and submitting monthly, chart-level data to the AAP Quality Improvement Data Aggregator (QIDA). Results were displayed as run charts to track progress over time and to anchor facilitated data review and peer-to-peer learning during project webinars.

The project's aim was to achieve measurable improvements in HepB vaccine administration for children 24 months and younger. From April through July 2026, the project pursued a 20% improvement from baseline in each of three measures: (1) an increase in on-schedule HepB doses given at eligible visits; (2) an increase in catch-up HepB doses given at eligible visits; and (3) a decrease in missed opportunities for HepB vaccination, tracked by the primary reason the dose was not given.

Key Project Activities

The project was structured as a learning collaborative that paired brief clinical education on hepatitis B and HepB vaccination with hands-on QI support. Following enrollment in March 2026, participating practices engaged in a learning series of six one-hour webinars held from March through August 2026: an onboarding session on March 12 followed by five monthly sessions. Each monthly session combined a clinical education segment with a facilitated QI segment that included data review, run-chart interpretation, and a PDSA roundtable for peer learning (Table 1). Between sessions, the project team offered QI office hours and technical assistance to help teams troubleshoot workflows and resolve data submission questions.

Table 1. Webinar series: clinical and QI topics and live attendance by session.

Session	Date	Clinical Education Topic	Quality Improvement Topic
Onboarding	March 12, 2026	Hepatitis B disease burden and AAP hepatitis B vaccine recommendations	Introduction to the Model for Improvement, PDSA cycles, and QIDA data collection
1	April 15, 2026	Having productive hepatitis B vaccine conversations with families	Model for Improvement and PDSA testing, including run chart interpretation and selecting interventions
2	May 27, 2026	Illinois support for hepatitis B vaccines and ensuring patient access	Rapid Cycle Testing and PDSA application
3	June 24, 2026	Using IIS and EHR functionalities to support vaccine coverage	Leading Change and building an effective QI team
4	July 29, 2026	Best practices for vaccine messaging	Planning for Sustainability
5	August 26, 2026	Maintaining hepatitis B vaccination efforts amid changing vaccine guidance	Sustaining practice improvements and final PDSA/data review

Practices focused on three measures aligned with the project aim: administration of on-schedule HepB doses at eligible visits, administration of catch-up HepB doses at eligible visits, and missed opportunities to vaccinate, with the primary reason recorded for each missed opportunity. Each month, practices reviewed a convenience sample of at least 20 well-child visits for children 24 months and younger (or all eligible visits if fewer than 20) and submitted chart-level data to QIDA. Practices were encouraged to select charts in a consistent, systematic way across cycles, and higher-volume practices were encouraged to submit more than 20 charts. For each visit, reviewers recorded whether the child was eligible for a HepB dose based on age, prior immunization history, and documented contraindications; whether the eligible dose was an on-schedule or catch-up dose under the AAP immunization schedule; whether the dose was given; and, if not, the primary reason. Data were collected for a baseline cycle (March 2026) and four implementation cycles (April through July 2026). QIDA automated measure calculations and generated run charts, which were reviewed during webinars to identify trends, assess the impact of tests of change, and plan subsequent PDSA cycles. Table 2 presents the measures, goals, and collaborative-level results.

Table 2. Project measures, goals, and collaborative-level results.

Measure	Definition	Numerator	Denominator	Goal	Result*
On-schedule HepB dose administration	Visits at which a child was due for an on-schedule HepB dose under the AAP schedule and the dose was administered	Eligible on-schedule visits at which the dose was given	Visits at which the child was eligible for an on-schedule dose	20% **improvement** from baseline (98.0%)	81.6% to 95.2%
Catch-up HepB dose administration	Visits at which a child was due for a catch-up HepB dose and the dose was administered	Eligible catch-up visits at which the dose was given	Visits at which the child was eligible for a catch-up dose	20% **improvement** from baseline (48.7%)	40.6% to 51.6%
Missed opportunities for HepB vaccination	Visits at which a child was eligible for a HepB dose but did not receive it, with the primary reason recorded	Eligible visits at which the dose was not given	All visits at which the child was eligible for a HepB dose	20% **reduction** from baseline (20.6%)	25.7% to 15.9%

Note: *Change from baseline (Cycle 1) to the final cycle (Cycle 5) across all participating practices. Goal values in parentheses are 20% relative changes from the baseline rate.

Maintenance of Certification Requirements

The project was approved for American Board of Pediatrics (ABP) Maintenance of Certification (MOC) Part 4 credit through the AAP MOC Portfolio Program. To earn credit, physicians were expected to be intellectually engaged in planning and executing the project, to implement the project interventions, to review their data in keeping with the measurement plan, and to collaborate actively across the collaborative. Specifically, participating physicians were asked to attend or view the onboarding webinar, to attend at least three of the five monthly webinars live (and to view recordings of any sessions missed), and to contribute to their practice's PDSA cycles and data collection.

At the practice-team level, practices were encouraged to assemble a team that could include physicians, nurses, medical assistants, and practice managers, with one physician designated as the local leader. Practice teams were asked to have at least one member attend four of the five monthly webinars live, to complete and share at least one PDSA cycle during a project webinar, and to submit practice-level data for all five monthly data cycles.

Site and Participant Characteristics

The collaborative drew participation from a broad mix of Illinois organizations, including independent pediatric group practices, federally qualified and community health centers, hospital- and health-system-affiliated practices, academic medical centers, solo and two-physician practices, and three local public health departments, among them the Chicago Department of Public Health's perinatal hepatitis B program. Participating sites spanned Chicago, its suburbs, central Illinois, and rural southern and western Illinois; among 38 primary registrants who reported a setting, 20 described their practice as urban, 13 as suburban, and 3 as rural.

Fifty-six clinicians and staff representing 31 practices and organizations registered for the collaborative. Registrants were predominantly physicians: 45 of the 56 (80%) held an MD or DO. The remaining registrants included 5 nurses and 6 other team members, including public health staff, a community health worker, a birth doula, and a

healthcare administrator. Among the 20 participants who completed the post-project survey, 18 were physicians and 2 were registered nurses, with a median of 18.5 years in practice (range, 2 to 38).

Participation and Engagement

Engagement followed the pattern typical of time-limited QI collaboratives, with broad initial registration narrowing to a committed core of practices that carried the work through data submission. Of the 56 registrants, 47 attended or viewed at least one session, representing 26 organizations. The onboarding webinar was attended live by 31 participants and viewed by recording by 12 more, and live attendance at the five monthly webinars was steady, ranging from 31 to 35 participants per session. Seventeen practice sites submitted chart-level data to QIDA, and 16 of the 17 submitted data for all five cycles. Across the five cycles, these practices contributed 3,063 chart reviews. Table 3 summarizes engagement across the collaborative.

Table 3. Engagement across the collaborative.

Engagement milestone	Count	Notes
Clinicians and staff registered	56	Representing 31 practices and organizations
Registrants attending or viewing at least one session	47	Representing 26 organizations; of 6 sessions (onboarding plus 5 monthly webinars)
Live attendance per monthly webinar	31 to 35	Across the 5 monthly webinars
Practice sites submitting chart-level QI data	17	3,063 chart reviews submitted to QIDA across Cycles 1 to 5
Practice sites submitting all five data cycles	16	Of 17 submitting sites

Quality Improvement Results

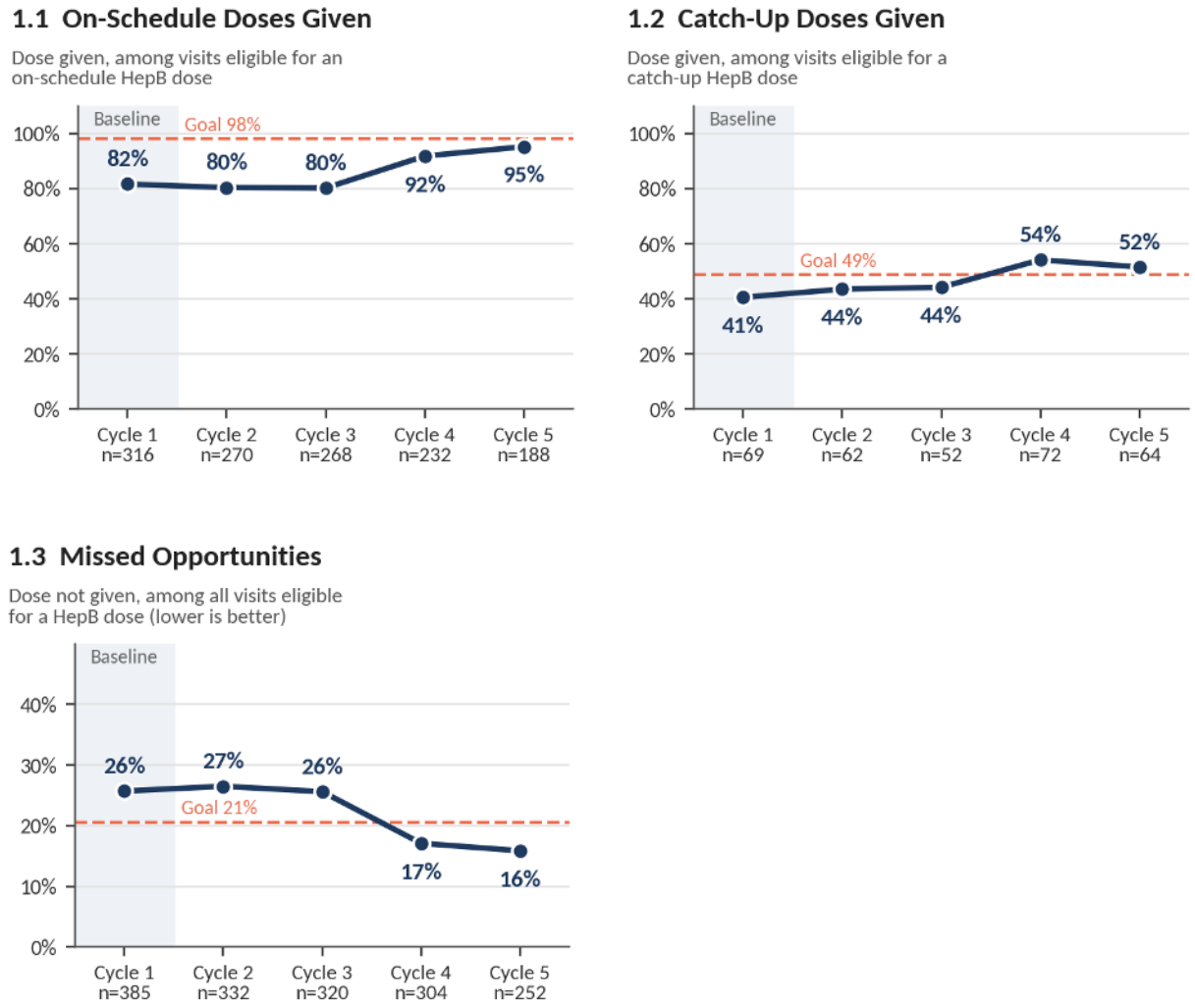
Participating practices increased HepB vaccine administration at eligible visits over the project period. Figure 1 presents run charts with performance aggregated across the collaborative for each project measure, pooling all charts submitted by participating practices. The goal for each measure is shown as a dashed reference line; because the project comprised a single baseline cycle plus four monthly cycles, a median centerline and formal run-chart rules were not applied to so few data points.

Administration of on-schedule doses showed the largest and most consistent gain (Figure 1.1). The rate was stable at roughly 80% through the first three cycles, then rose to 91.8% in Cycle 4 and 95.2% in Cycle 5, an increase of 13.6 percentage points. This represents a 16.6% relative improvement, short of the 20% relative target (98.0%). Because baseline performance was already high, the target would have required near-universal administration, and the measure approached that ceiling by the final cycle.

Administration of catch-up doses rose from 40.6% at baseline to 51.6% in Cycle 5, a 27.1% relative improvement that exceeded the project target of 48.7% (Figure 1.2). The measure peaked at 54.2% in Cycle 4. Catch-up was the smallest and most variable measure, with 52 to 72 eligible visits per cycle, and roughly half of children due for a catch-up dose still left the visit without it in the final cycle.

Missed opportunities for HepB vaccination declined from 25.7% of eligible visits at baseline to 15.9% in Cycle 5, a 38.3% relative reduction that exceeded the project target of 20.6% (Figure 1.3).The shift occurred between Cycles 3 and 4, coinciding with the data recording change described in the Data Considerations section below.

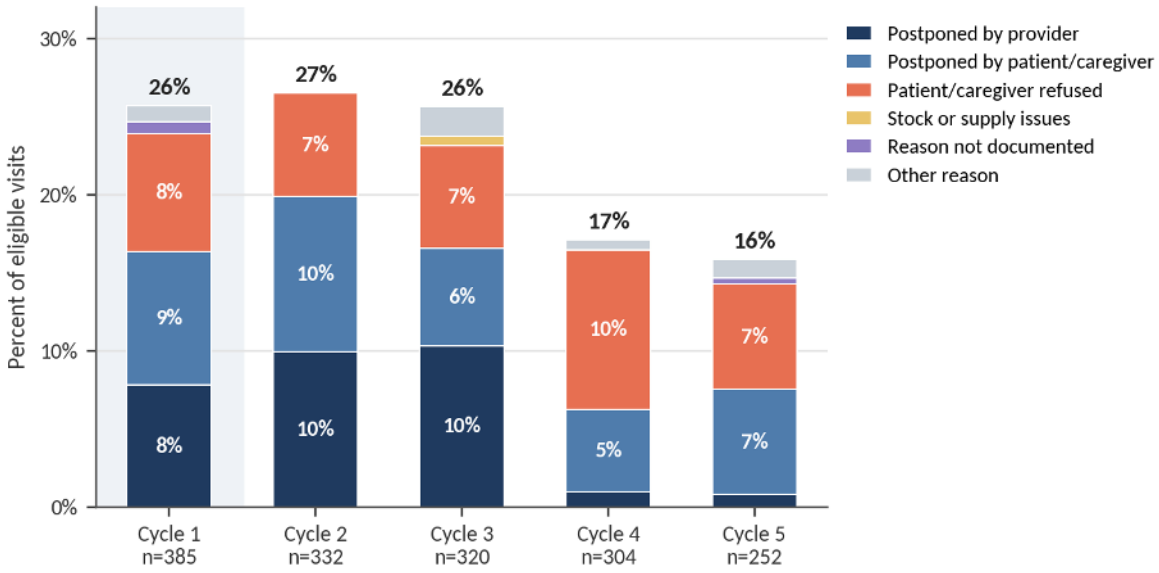
Figure 1. Collaborative-level run charts for each project measure, by data cycle.



Note: n = eligible visits in each denominator. Dashed lines show the project goal (a 20% relative change from baseline). The shaded region marks the baseline cycle.

Figure 2 breaks each cycle's missed opportunities into the primary reason the dose was not given, expressed as a share of all eligible visits so that the bar heights equal the missed-opportunity rate in Figure 1.3. Across the five cycles, 361 eligible visits ended without a dose. Caregiver-driven reasons accounted for two-thirds of these: patient or caregiver refusal (33.2%) and postponement by the patient or caregiver (33.0%). Postponement by the provider accounted for 28.0%, and other reasons (4.2%), undocumented reasons (1.1%), and stock or supply issues (0.6%) were rare. Provider postponement fell from 8% to 10% of eligible visits in Cycles 1 through 3 to about 1% or less in Cycles 4 and 5; 93 of the 101 provider postponements recorded across the project came from a single practice, and the change reflects how that practice recorded eligibility rather than a collaborative-wide shift (see below). Caregiver postponement and refusal combined held relatively steady at 13% to 17% of eligible visits across all cycles and made up 85% of missed opportunities in the final cycle. Undocumented reasons and stock or supply problems were at or near zero from baseline onward, leaving little room for improvement on those sub-measures.

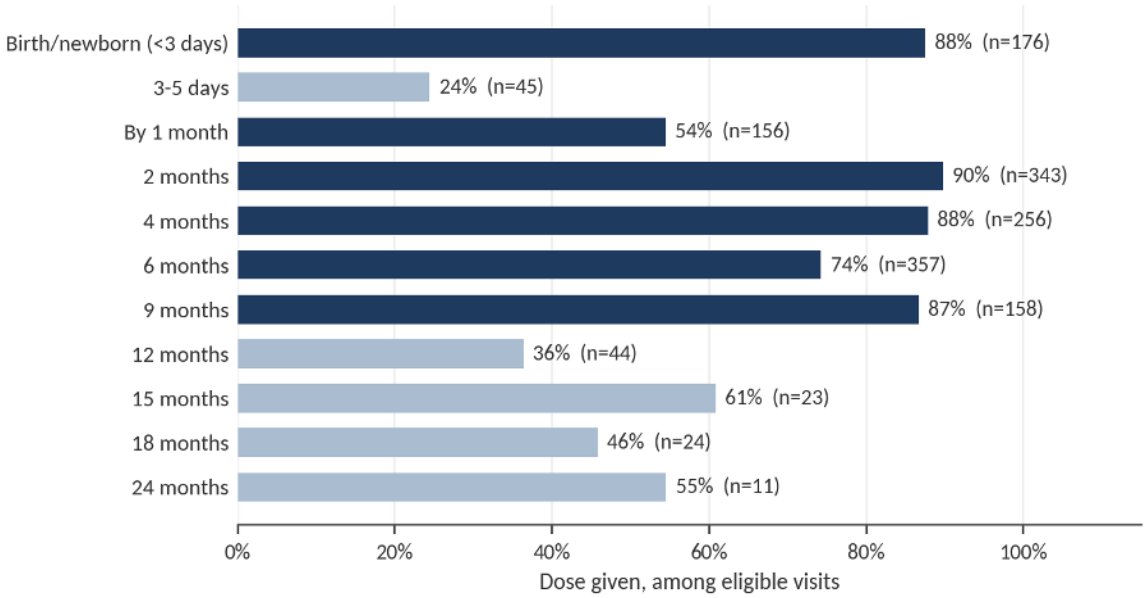
Figure 2. Primary reason an eligible HepB dose was not given, as a percentage of all eligible visits, by data cycle.



Note: Segment labels are shown for reasons representing at least 2.5% of eligible visits; totals above each bar equal the missed-opportunity rate. The shaded region marks the baseline cycle.

Pooling all five cycles, administration varied considerably by well-visit age (Figure 3). Rates were highest at the 2-month (90%), 4-month (88%), and 9-month (87%) visits and at birth-hospital newborn visits (88%), which were contributed almost entirely by one hospital newborn service. Rates were lowest at the 3-to-5-day newborn visit (24%) and the visit by 1 month (54%), the first primary care encounters for infants who did not receive a birth dose in the hospital. At the 3-to-5-day visit, 32 of the 34 missed opportunities were caregiver postponement or refusal, consistent with reports of rising birth-dose declination and suggesting that families who decline at birth often continue to decline at the first office visit. Rates at the 12- to 24-month visits, where most eligible doses were catch-up doses, were also low but rested on small numbers of eligible visits.

Figure 3. HepB dose administration at eligible visits by well-visit age, Cycles 1 to 5 pooled.



Note: Lighter bars indicate age groups with small samples size (fewer than 100 eligible visits).

Data Considerations and Sensitivity Analysis

Two data issues should be considered when interpreting the collaborative results. First, the well-visit categories of 3-5 days and by 1 month were clarified and revised after data collection began, but previously submitted QIDA cycles could not be updated. Second, one high-volume practice that accounted for 15% to 22% of eligible visits changed how it recorded eligibility in the final two cycles, resulting in shifts in administration and postponement rates that likely contributed to the observed collaborative improvement.

A sensitivity analysis excluding this practice showed that all three key measures continued to improve and remained directionally consistent with project goals, although the magnitude of improvement was smaller. Given that variation in data collection and documentation practices is common in small quality improvement initiatives, the practice was retained in the primary analyses, with the sensitivity analysis presented to provide additional context for interpreting the findings.

Post-Project Survey Results

A retrospective pre-post survey was distributed to participating clinicians at the conclusion of the project to assess satisfaction, self-reported knowledge and confidence, perceived value, barriers, and the operational impact of the project. Twenty complete responses were received, from 18 physicians and 2 registered nurses. Because the survey link was anonymous, a precise response rate cannot be calculated, but 20 respondents represent about 43% of the 47 participants who attended at least one session. The results are best interpreted as the experience of the engaged core of participants rather than as precise estimates for the full collaborative.

Satisfaction and Perceived Value

Participants reported high satisfaction with the collaborative. On the likelihood-to-recommend item, respondents produced a Net Promoter Score of 60, with 13 promoters, 6 passives, and 1 detractor (mean rating, 8.8 of 10). Participants described the project as *“very timely given the public attitude and general climate around*

immunizations" and valued hearing how other practices were handling similar struggles. The one detractor felt the program offered quality information but would need revision before they would recommend it. Nineteen of the 20 respondents agreed or strongly agreed that participation enhanced their professional satisfaction, and 19 agreed that it contributed to their professional network. Respondents rated the return on their time and effort highly (a mean of 6.0 on a 7-point scale; range, 4 to 7). Among the 18 respondents who had completed other relevant training programs, 10 rated this program's return as higher and 8 as comparable; none rated it lower.

Knowledge and Confidence

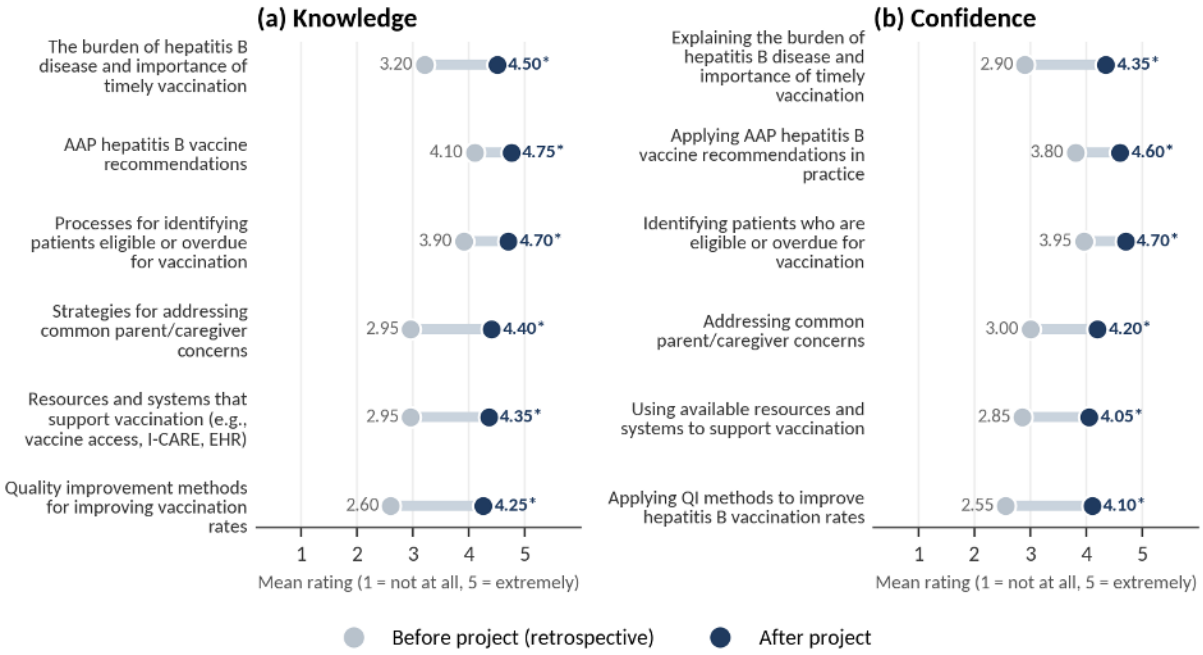
Respondents rated their knowledge and confidence on six topics each, both before the project and at its conclusion, using five-point scales. Self-reported ratings increased on every item. Overall mean knowledge rose from 3.28 to 4.49, and overall mean confidence rose from 3.18 to 4.33. Pre-post differences were tested with the Wilcoxon signed-rank test, and all 12 items showed statistically significant improvement ($p < 0.01$). The largest gains were in quality improvement methods (knowledge, 2.60 to 4.25; confidence, 2.55 to 4.10) and in strategies for addressing parent and caregiver concerns (knowledge, 2.95 to 4.40; confidence, 3.00 to 4.20), the skills most directly tied to the caregiver-driven missed opportunities seen in the QIDA data. Gains were smallest for knowledge of AAP recommendations and processes for identifying eligible patients, where ratings were already high before the project. Only one respondent reported a lower rating on any item after the project. Because ratings were collected retrospectively at a single time point, they may be influenced by recall and by participants' desire to report growth (Table 5, Figure 4).

Table 5. Self-reported knowledge and confidence, before and after the project (mean rating, 1 to 5).

Item	Before	After	p-value
Knowledge			
The burden of hepatitis B disease and importance of timely vaccination	3.20	4.50	<0.001
AAP hepatitis B vaccine recommendations	4.10	4.75	0.004
Processes for identifying patients eligible or overdue for vaccination	3.90	4.70	<0.001
Strategies for addressing common parent/caregiver concerns	2.95	4.40	<0.001
Resources and systems that support vaccination (e.g., vaccine access, I-CARE, EHR)	2.95	4.35	<0.001
Quality improvement methods for improving vaccination rates	2.60	4.25	<0.001
Confidence			
Explaining the burden of hepatitis B disease and importance of timely vaccination	2.90	4.35	<0.001
Applying AAP hepatitis B vaccine recommendations in practice	3.80	4.60	0.002
Identifying patients who are eligible or overdue for vaccination	3.95	4.70	0.004
Addressing common parent/caregiver concerns	3.00	4.20	<0.001
Using available resources and systems to support vaccination	2.85	4.05	<0.001
Applying QI methods to improve hepatitis B vaccination rates	2.55	4.10	<0.001

Note: p-values are from Wilcoxon signed-rank tests (n = 20 paired responses per item).

Figure 4. Mean self-reported knowledge and confidence before and after the project, by topic.



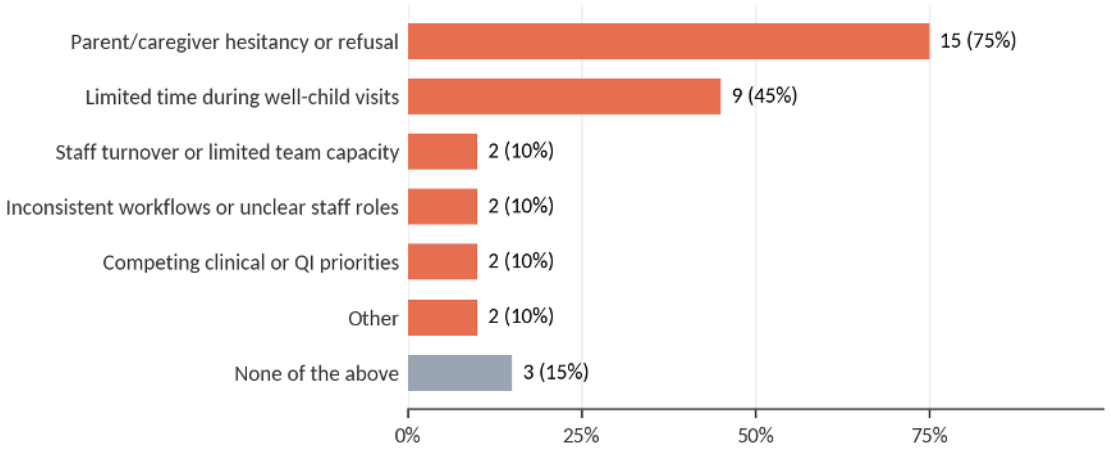
Note: Asterisks denote items with a statistically significant change ($p < 0.05$). Before-project ratings were collected retrospectively at the end of the project.

Impact, Barriers, and Sustainability

Participants reported that the project had a positive or neutral effect on their clinical and operational work: 14 of 20 rated the overall impact as improved or significantly improved, 6 rated it neutral, and none reported that it worsened. Nineteen respondents reported no unintended consequences such as increased wait times or lost revenue; the one respondent who reported an unintended consequence described a positive one, better morning huddles. Seventeen of the 20 respondents reported participating in at least one full PDSA cycle in which they implemented a change, examined the data, and made subsequent adjustments. The three who did not cited limited time, difficulty identifying areas for improvement because EHR alerts already flagged most overdue vaccines, and a lack of interest among providers who were not due for MOC credit.

When asked about barriers to applying what they learned, respondents most frequently cited parent or caregiver hesitancy or refusal, identified by 15 of the 20 respondents, followed by limited time during well-child visits (9 of 20; Figure 5). Fewer respondents cited staff turnover or limited team capacity, inconsistent workflows or unclear staff roles, or competing clinical and QI priorities (2 each). Two respondents described other barriers: needing staff assistance to generate EHR reports during a transition to a new EHR, and the political climate. Three reported no barriers. Several open-ended comments echoed the QIDA findings, noting that once a family has decided not to vaccinate, changing that decision is difficult; as one respondent put it, most patients who did not receive the vaccine *"simply refuse."*

Figure 5. Barriers experienced in applying skills learned during the project.



Note: n = 20 respondents; respondents could select more than one barrier.

Respondents described concrete changes to their practice. The most common were new approaches to conversations with vaccine-hesitant families, including leading with a positive, personal recommendation, anticipating common concerns, and scheduling follow-up visits to continue the conversation when a vaccine is declined. Several practices adopted or planned to create family handouts using AAP and other trusted materials. Others built workflows to review hospital records at every newborn visit, confirm whether the birth dose was given, and offer the vaccine the same day if it was not; used EHR flags and reminders to identify children due for a dose; and reinforced recall processes for children overdue for well visits. Asked what was most valuable, participants pointed to strengthened communication with families, reinforcement of the medical rationale for early vaccination, staff education and a more consistent message across clinicians, learning to plan and run PDSA cycles, and hearing ideas from other sites.

Looking ahead, respondents suggested that future projects involve obstetric and birth-hospital nursing teams, provide feedback on each site's PDSA cycles, allow time to brainstorm change ideas before data collection begins, extend the approach to other vaccines such as MMR, and strengthen follow-up of unvaccinated children. Respondents also asked that measure definitions be finalized before the project starts, that parameters not change mid-project, and that differences in practice size be accounted for when displaying collaborative data. When asked what future projects should stop doing, most respondents indicated nothing, while a few suggested shorter or fewer meetings.

Impact and Conclusion

The ICAAP Hepatitis B Vaccine Quality Improvement Project made measurable progress toward its aim. At the collaborative level, administration of on-schedule doses at eligible visits rose from 81.6% to 95.2%, administration of catch-up doses rose from 40.6% to 51.6%, and missed opportunities fell from 25.7% to 15.9% of eligible visits. The catch-up and missed-opportunity measures met the project's 20% relative targets, and on-schedule administration improved substantially but fell short of its target because baseline performance left little room to reach a 20% relative gain.

When the high-volume practice that modified its eligibility recording approach midway through the project is excluded, improvement in on-schedule administration remains robust, while gains in catch-up administration and reductions in missed opportunities are smaller but remain in the desired direction. However, across all practices,

the final-cycle data suggest that the primary remaining barriers were caregiver postponement and refusal, which accounted for 85% of missed opportunities. In addition, the lowest administration rates were observed at the first newborn visits following hospital discharge, indicating that these encounters may represent the greatest opportunity for future quality improvement efforts.

The QI results were accompanied by significant improvements in self-reported knowledge and confidence on all 12 survey items, high participant satisfaction (a Net Promoter Score of 60), and no reported negative impacts on clinical or operational work. Participants described durable changes, including newborn workflows to confirm and catch up the birth dose, EHR prompts, recall of overdue patients, family education materials, and more effective conversations with hesitant families, suggesting that the practices established during the project are positioned to be sustained.

Sustaining and spreading these gains will require continued attention to caregiver hesitancy in a shifting policy environment, to limited visit time, and to coordination with birth hospitals for infants who leave without a birth dose. For future collaboratives, the project also highlights the value of finalizing and distributing written measure definitions before baseline data collection and of presenting practice-level alongside pooled results so that no single practice drives the collaborative picture. Overall, the project demonstrates that a structured, time-limited QI collaborative, pairing clinical education with practical tools, peer learning, and monthly data feedback, can strengthen HepB vaccination in pediatric primary care, even as the most persistent remaining gap lies in caregiver acceptance rather than practice systems.