Hawaii's Healthy Start Program of Home Visiting for At-Risk Families: Evaluation of Family Identification, Family Engagement, and Service Delivery

Anne Duggan, ScD*; Amy Windham, MPH*; Elizabeth McFarlane, MPH‡; Loretta Fuddy, LCSW, MPH§; Charles Rohde, PhD‖; Sharon Buchbinder, PhD¶; and Calvin Sia, MD‡

Abstract. ***Objective.*** **To describe family identification, family engagement, and service delivery in a statewide home visiting program for at-risk families of newborns.**

Setting. **Six target communities of Hawaii's Healthy Start Program (HSP), which incorporates 1)** ***early identification*** **of at-risk families of newborns via population-based screening and assessment, and 2) paraprofessional** ***home visiting*** **to improve family functioning, promote child health and development, and prevent child maltreatment.**

Design. **Cross-sectional study: describes early identification process and family characteristics associated with initial enrollment. Longitudinal study: describes home visiting process and characteristics associated with continued participation.**

Subjects. **Cross-sectional study: civilian births in 6 communities (*n* = 6553). Longitudinal study: at-risk families in the intervention group of a randomized trial of the HSP (*n* = 373).**

Measures. **Process: completeness and timeliness of early identification and home visiting activities; family characteristics: sociodemographics, child abuse risk factors, infant biologic risk.**

Results. **Early identification staff determined risk status for 84% of target families. Families with higher risk scores, young mothers with limited schooling, and families with infants at biologic risk were more likely to enroll in home visiting. Half of those who enrolled were active at 1 year with an average of 22 visits. Families where the father had multiple risk factors and where the mother was substance abusing were more likely to have ≥12 visits; mothers who were unilaterally violent toward the father were less likely. Most families were linked with a medical home; linkage rates for other community resources varied widely by type of service. Half of families overall, but ≥80% of those active at 1 year, received core home visiting services. Performance varied by program site.**

Conclusions. **It is challenging to engage and retain at-risk families in home visiting. Service monitoring must be an integral part of operations.** ***Pediatrics*** **2000; 105:250–259;** ***home visiting, child abuse and neglect, health services evaluation.***

ABBREVIATIONS. AAP, American Academy of Pediatrics; HSP, Healthy Start Program; HFSC, Hawaii Family Support Center; PACT, Parents and Children Together; HIPPY, Home Instruction Program for Preschool Youngsters.

Home visiting is an old idea[1] now enjoying widespread endorsement as a strategy to promote child health and development and prevent child abuse and neglect.[2] Many home visiting models have been developed; some are being replicated in communities throughout the country.[2]

In 1998, the American Academy of Pediatrics' (AAP) Council on Child and Adolescent Health issued a formal statement on home visiting.[3] The Council noted that program models vary widely and that experimental evaluation is essential. It recommended that pediatric providers advocate for home visiting program funding, development and evaluation. Further, the Council recommended that pediatricians base their actions on the results of carefully conducted evaluative research.

Gomby, Culross, and Behrman[4] have made similar recommendations. Citing evidence of the challenge of engaging families in home visiting, they recommend that existing programs launch efforts to improve services and that research be crafted to help programs to do so. The study described here and the quality improvement program that it inspired illustrate this kind of practitioner-researcher collaboration.

One key issue is how well demonstration projects operate when expanded or 'taken to scale.' This is important for interpreting program impact. Unfortunately, even reports of demonstration projects, while describing service protocols, rarely describe actual service delivery. For example, our review of randomized trials of home visiting to prevent child abuse found that only 8 of 20 described the services actually delivered.[2,5–24]

Hawaii's Healthy Start Program (HSP) is a model of paraprofessional home visitation to improve family functioning, promote child health and development, and prevent child abuse and neglect. It includes: 1) population-based early identification of at-risk families of newborns through screening and assessment, and 2) home visiting by trained

From *Johns Hopkins University School of Medicine, ‖Johns Hopkins University School of Hygiene and Public Health, Baltimore, Maryland; ‡Hawaii Medical Association, §Hawaii State Department of Health, Honolulu, Hawaii; and ¶Towson University Department of Health Science, Towson, Maryland.

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Reprint requests to (A.D.) General Pediatrics Research Center, Johns Hopkins University School of Medicine, 1620 McElderry St, Baltimore, MD 21205-1903. E-mail: aduggan@jhu.edu

paraprofessionals in the child's first 3 years of life to improve parent and child outcomes through direct support services, parenting education, and case management to ensure access to a pediatric primary care 'medical home' and other needed community resources.

Development of the HSP model in Hawaii has been described previously.[25] The model was piloted in a single community in Hawaii in 1985–1988 and has since been expanded to cover about two-thirds of the state. National interest in the model paralleled its expansion in Hawaii. In 1991, the US Advisory Board on Child Abuse and Neglect reported that home visiting along the lines of Hawaii's model was the most promising strategy for child abuse prevention.[26] In 1993, with technical assistance from the Hawaii Family Support Center (HFSC), the National Committee to Prevent Child Abuse established Healthy Families America, a training and technical assistance program to help communities develop similar home visiting programs. By 1997, there were nearly 270 such programs in 38 states and the District of Columbia.[27]

Our study of Hawaii's HSP examines process and outcomes in a scaled-up model of paraprofessional home visitation for at-risk families. Study aims are to determine: 1) how closely program implementation mirrors program design; 2) how effective the program is in achieving its intended benefits; 3) how program impact is influenced by fidelity of program implementation; and 4) how benefits compare with program costs.

This article focuses on the first aim. It compares actual early identification and home visiting services to program standards, identifies family characteristics associated with initial and continued enrollment in home visiting, and describes Hawaii's response to our feedback of process findings. Its intent is to familiarize readers with methods for process evaluation of home visiting and with the challenges other communities are likely to encounter in adopting home visiting.

METHODS

The Healthy Start Program Model

Early Identification

The early identification component identifies at-risk families of newborns using a 2-stage screening and assessment protocol. Screening involves medical record review by trained paraprofessionals to identify indicators of risk (Table 1). Families provide informed consent for the review at hospital registration. If the medical record screen is negative, the family is considered not at-risk. If the medical record screen is positive or if the record contains too little information to make a determination, a face-to-face assessment interview is conducted using Kempe's Family Stress Checklist (Table 1). If either parent scores ≥25, the family is considered at-risk and eligible for HSP home visiting. The state's goal is to determine the risk status for at least 90% of all families of newborns in target communities within 1 week of birth.

State funding is adequate to provide home visiting to about 40% of identified at-risk families. An at-risk family is offered home visiting if intake is open in the family's community-based program. If the family is willing to have home visits, the early identification worker faxes a referral form to the home visiting program. This is to be done within 1 working day of the assessment. The form becomes a part of the home visiting record.

Home Visiting

The home visiting component aims to promote child health and development and to prevent child abuse and neglect by improving family functioning in general and parenting in particular. Home visitors are trained paraprofessionals working under professional supervision. Home visiting includes both direct service and linkage with community resources. Direct service includes providing emotional support to parents, encouraging them to seek needed professional help, teaching about child development, and role-modeling parenting skills and problem-solving techniques.

The HSP protocol requires that a home visit take place within 1 week of the family's early identification referral. Visit frequency is based on an overall assessment of family need and ranges from weekly (Level I families) to quarterly (Level IV). Families enter at Level I and progress to higher levels based on criteria such as decreased frequency of family crises, improved quality of parent-child interactions, and increased ability to use community resources. It is expected that most families will require 3 to 5 years of service and will remain on Level I through the first year.

In the initial home visits, the home visitor aims to earn the family's trust and to address urgent problems such as unstable housing. The parent and home visitor develop an individual

TABLE 1. Early Identification Screening for Referral to Healthy Start

Medical Record Screen	Family Stress Checklist Interview
1. Unmarried	1. Childhood history of being abused
2. Partner unemployed	2. Substance abuse, mental illness or criminal history
3. Inadequate income	3. Previous or current Child Protective Services involvement
4. Unstable housing	4. Low self-esteem, poor coping ability
5. No phone	5. Multiple life stressors
6. Education under 12 years	6. Potential for violent temper outbursts
7. Inadequate emergency contacts	7. Unrealistic expectations for child's development
8. History of substance abuse	8. Harsh punishment of child
9. Inadequate prenatal care	9. Perceives child as being difficult or provocative
10. History of abortions	10. Child unwanted or risk of poor bonding
11. History of psychiatric care	
12. Abortion unsuccessfully sought or attempted	
13. Adoption sought or attempted	
14. Marital or family problems	
15. History of depression	
Item scoring: True, false, unknown	Item scoring for each parent:
Positive screen:	0 = No problem
True score on either item number 1, 9, or 12	5 = Mild problem
Two or more true scores	10 = Severe problem
Seven or more unknowns	Positive assessment: A total score of 25 for either parent triggers referral to Healthy Start.

family support plan. The family support plan outlines the family's goals and strategies to work toward them in the next 6 months. The plan is signed by both the parent and the home visitor. The home visiting protocol calls for completion of the first family support plan within 45 days of the first home visit. The plan is to be reviewed at least every 6 months and revised annually.

Subsequent visits focus on enhancing child development, improving parent-child interaction, providing emotional support, and modeling effective coping skills. The protocol calls for periodic screening for developmental delay using the Infant/Child Monitoring Questionnaire[28] and observational assessment of parent-child interaction and the home environment using the Nursing Child Assessment Satellite Training Scale.[29] The program standard is to screen for developmental delay and assess parent-child interaction in ≥90% of families.

The home visitor also is expected to ensure that the family has a pediatric primary care provider or 'medical home', as well as other resources to meet family needs (eg, the Supplemental Nutrition Program for Women, Infants, and Children [WIC], food stamps, housing, education, and employment training). The program standard is that ≥90% of families will be linked with a pediatric medical home and with other needed services.

Setting

The study focused on the island of Oahu, Hawaii, home to 80% of the state's residents. A community agency conducted early identification activities through contract with the state. Screening and assessment were conducted daily at the island's 6 civilian hospitals with obstetric units.

When the study began, 3 community agencies operated 6 HSP program sites on Oahu through contracts with the state. Each agency operated 2 program sites. Each site served a geographically-defined community. The 3 agencies were Child and Family Services (CFS), a family social service organization; HFSC, a health-system's child abuse and neglect prevention component; and Parents and Children Together (PACT), a grassroots family support service organization.

Families enrolled in the study were assigned to 43 different home visitors across all 3 agencies. At baseline, the home visitors had a mean age of 40 years, a mean of 3.1 years experience as home visitors, and a mean caseload of 19.7 families. One quarter were college graduates. There were no significant differences among agencies in these attributes (all $P > .25$).

The 6 HSP communities differed in terms of demographics. According to 1990 US Census statistics, the percent of adults lacking a high school education ranged from 17% to 45% among the target communities; the percent of adults living in linguistically isolated households ranged from 6% to 38%; and the percent of Native Hawaiians ranged from 7% to 41%. However, the at-risk families within the target communities served by each agency were similar in most respects (Table 2).

Study Sample

To describe early identification services, the sample was defined as all births to civilians in the 6 study communities from November 1994 through December 1995 ($n = 6553$). Births were identified from state birth records.

To identify factors influencing initial family willingness to enroll in the HSP, the sample was defined as families who were identified as at-risk during this period ($n = 1803$), were eligible for the evaluation ($n = 1520$ of 1803), and were identified on days when HSP intake in the family's community site was open ($n = 897$ of 1520). An at-risk family was eligible for the evaluation if the mother understood English well enough to be interviewed and the family never had been enrolled in the HSP. Of the 897 families, 163 declined both the HSP and the evaluation; 730 initially agreed to take part in both; and 4 declined the evaluation but were receptive to HSP services. In our analysis of initial HSP acceptance, we compared the 734 who were receptive to home visiting to the 163 families who declined both home visiting and the evaluation.

To describe actual home visiting services and to identify factors influencing continued family participation, the sample was defined as all families who had been randomly assigned to the intervention group and interviewed at baseline ($n = 373$). As detailed elsewhere, families eligible for the randomized trial were identified by HSP staff following the usual HSP protocol. When an eligible family was identified, the staff member described the HSP and the evaluation and obtained the mother's signed, informed consent to take part. By study protocol, the HSP staff member called the evaluation office for group assignment of all HSP-eligible families. Evaluation staff entered the name of the newly enrolled family in the next open study number in the study log, which indicated the group assignment. Group assignments were predetermined using a table of random numbers. Families were randomized into 3 groups: the HSP group and main control group (followed at 1, 2, and 3 years) and

TABLE 2. Demographic Characteristics of Experimental Group Families by Agency

	Agency			*P* Value
	CFS $n = 141$	HFSC $n = 121$	PACT $n = 111$	
Age in y (mean)				
Mother	22.9	24.0	24.4	.09
Father	25.7	26.2	27.1	.34
Number of people in nuclear family (mean)	4.0	4.0	4.1	.99
Families under the poverty level (percent)	59	69	61	.19
First live birth (percent)	40	42	46	.67
Mother's primary ethnic affiliation (percent)				
Multiracial (no primary reported)	28	28	28	.45
Native Hawaiian	23	17	22	
Filipino	14	22	18	
Pacific Islander	12	10	17	
White	12	10	9	
Asian	11	12	5	
US citizen (percent)	94	86	80	<.01
Parents married or living together (percent)	48	59	59	.15
High school graduate (percent)				
Mother	71	73	62	.18
Father	74	65	77	.10
Extremely high risk (Family Stress Checklist score >45) (percent)				
Mother	21	21	24	.78
Father	39	34	30	.45
Mothers with poor general mental health (percent)	45	46	36	.24
Parental substance use (percent)				
Mother	18	18	21	.81
Father	42	38	34	.63
Domestic violence (percent)	43	48	39	.36

a testing control group (followed only at 3 years). The study was approved by the Hawaii Department of Health Research Review Committee and by the institutional review boards of The Johns Hopkins University School of Medicine and the 6 hospitals where early identification activities were conducted.

Measurement

The *early identification process* was measured using HSP management information system data on screening, assessment, and home visiting referral dates and results.

Factors influencing initial family willingness to enroll in home visiting were measured using HSP management information system data. Variables included Family Stress Checklist item and overall scores for each parent; age, race and education of each parent; maternal parity; indicators of biologic risk (birth weight, gestational age, intermediate/intensive neonatal care), and whether the assessment was conducted in-person at the hospital or by telephone after discharge.

To measure *home visiting service delivery*, information was abstracted from HSP records and gathered through structured maternal interviews at 1 year. HSP record information included dates of first attempted contact, first successful contact, first home visit; number of home visits; dates of family support plans, developmental screenings and assessment of parent-child interaction; and date and reason for program departure. Family admission to the home visiting program was defined as the date of the first home visit. Family linkage with a medical home and other community resources was measured as the number of mothers reporting use of a service as a percent of those reporting need.

Continued participation in home visiting was measured using information abstracted from HSP records. Two indicators were used: 1) whether the site considered the family to be active in the program at 1 year; and 2) whether the family had at least 12 home visits in the first year. The first measure is consistent with the program's method of measuring participation. The second indicates the program's ability to achieve a minimal level of in-person interaction with the family in the first year.

Factors influencing continued participation were measured using management information system data as described earlier and information from the baseline maternal interview. Interview measures included parental problem substance use, domestic violence, and maternal psychological well being. Problem substance use was defined as either problem alcohol use or any drug use in year before the baseline interview. Problem alcohol use was defined as having 2 or more affirmative responses to the 4 CAGE items[30] *and* drinking during the past year. Domestic violence was defined as maternal report of violence between herself and her partner in the year before the baseline interview. It was measured by the Conflict Tactics Scale.[31] We considered a parent to be 'positive' for domestic violence if 3 or more incidents of physical violence were reported. Violence perpetrated by a mother toward her partner and violence perpetrated by a partner directed to the mother were considered separately in analyses. Maternal psychological well being was measured using the Mental Health Inventory Five-Item Scale.[32] The instrument measures general mental health, focusing on anxiety and depression. It does not measure clinical anxiety or depression, but may indicate mood disturbances. Scores were dichotomized into 'good' and 'poor' psychological well being at the recommended cutpoint of 67.

Analysis

We compared measures of HSP performance to stated program standards for coverage of the target population, provision of core services, and linkage with community resources. This corresponds to the program monitoring and accountability, the second level of Kapuscik and Jacobs'[33] 5-tiered approach to evaluation.

The statistical significance of agency differences in adherence was assessed using analysis of variance and χ^2 statistics. Within agency, the statistical significance of site differences was assessed using Student's t test, χ^2, and Fisher's exact test.

Multiple logistic regression was used to distinguish families who initially accepted home visiting services from those who declined and to distinguish families who continued participation in the program from those who did not. For each analysis, the final model was derived through a systematic examination of the potential covariates described above. Variables were excluded from the final model if they did not result in a significant reduction in model deviance. For each model, we tested for all 2-way interactions. No significant interactions were detected in either model.

RESULTS

Early Identification of At-Risk Families

Medical records were screened for 89% (n = 5810) of the 6553 births during the study period. Screening rates varied by hospital. They ranged from 91% to 96% at the 3 hospitals with daily early identification staff coverage. The hospital that included screening as part of its registration process had an 87% screening rate; the 2 hospitals that used their own staff rather than early identification staff to screen charts had rates of 67% and 69%.

Of the charts screened, 2% had too little information to determine risk and 55% had information to classify the family as screen-positive. Of the 3303 screen-undetermined or screen-positive families, 12% (n = 403) were later determined not to need the second stage in-person assessment (197 families were moving out of HSP catchment areas, 170 were already known to Child Protective Services, 21 infants had died, and 15 had been adopted). Of the remaining screen-undetermined or screen-positive families, 89% were assessed, 9% were missed, and 1% refused the assessment interview. Assessment rates did not differ significantly by hospital or by family status on any screening item except marital status; 90% of unmarried mothers versus 85% of married mothers were assessed ($P < .001$). This bias resulted from the program's preferential assessment of teenage mothers; 93% of those <20 years of age versus 87% of those ≥20 were assessed ($P < .001$).

Overall, 71% of assessments were made by in-person interview in the hospital; nearly all of these were made within 1 week of the infant's birth. The other 29% of assessments were made by telephone after hospital discharge; only 22% of telephone assessments were made within 1 week of the infant's birth.

The HSP program standard is to screen and, if indicated, assess 90% of families within 1 week of the infant's birth. Early identification staff determined risk status for 84% of families overall and for 74% within the 1-week time limit.

Initial Enrollment of At-Risk Families

Of the 897 families offered the possibility of HSP enrollment during study intake, 82% agreed to take part. This is comparable with the initial HSP enrollment rate in prior years. Initial willingness to enroll in the HSP was associated with the method of assessment, infant biologic risk, overall Family Stress Checklist score, and maternal age and education (Table 3). The odds of accepting service were twice as great for mothers assessed in person rather than by telephone. For mothers of low birth weight, preterm infants, the odds of accepting service increased nearly 10-fold. Each 5-point increase in

TABLE 3. Characteristics of Families Initially Receptive to Home Visiting Services. Results* of Multivariable Logistic Regression Model

	Odds Ratio	95% Confidence Interval
Assessed in person	2.13	(1.47, 3.08)
Biologic risk		
Normal birth weight, term birth	1.00	—
Low birth weight, term birth	.86	(.31, 2.38)
Normal birth weight, preterm birth	.93	(.39, 2.21)
Low birth weight, preterm birth	9.60	(1.32, 69.91)
Combined Family Stress Checklist Score†	1.16	(1.08, 1.24)
Mother's age and education		
Adult high school graduate	1.00	—
Adult, not high school graduate	1.36	(.79, 2.34)
Teen, high school graduate	1.65	(.67, 4.05)
Teen, not high school graduate	2.45	(1.32, 4.56)

* Results are reported as odds ratios with 95% confidence intervals in parentheses.
† Kempe's Family Stress Checklist (1976) is the screening tool used to determine eligibility for Healthy Start services. Preliminary analyses indicated that mothers' and fathers' scores were similar in terms of their association with initial enrollment. Because of this, for the multivariable analysis, the scores were combined by taking the greater of the 2 scores as an indicator of the family's level of risk. The odds ratio indicates the increase in the odds of enrollment associated with each 5-point increase in the FSC score. That is, for each 5-point increase in FSC score, the odds of enrolling increased by 16%.

parental Family Stress Checklist score was associated with a 16% increase in the odds of agreeing to enroll. Teenage mothers who had not finished high school were 2.5 times more likely to accept services than adult mothers with a high school education.

Provision of Home Visiting Services

Early identification staff made 88% of family referrals to home visiting within 1 working day of assessment, nearly achieving the program goal of 90%. Home visitors first tried to contact 56% of families within 1 week of receiving the referral. They succeeded in contacting 66% of families within 1 day of the first attempt. They eventually contacted all but 3% of families.

Despite success in contacting families, it was challenging to initiate home visiting. Overall, 17% of families had their first home visit within 1 week, in contrast to the program standard of 90%. An additional 22% of families had their first visit within 8 to 14 days, 34% within 15 to 31 days, 14% more than 1 month after referral. Twelve percent of families received no visits.

It also was challenging to keep families in the program. Ninety percent of families were still considered active by the time the child was 3 months old, 70% by 6 months, 56% by 9 months and 49% by 12 months. This contrasts sharply with the expectation that families would remain in service for 3 years.

Refusal was the most common reason for attrition (118 of 189 families). Most refusals occurred early—22% within 3 months of referral and 42% within 3 to 6 months. Similarly, most refusals occurred before the home visitor had many opportunities to establish rapport. Fifty-eight percent of families who refused service had fewer than 3 visits and 21% had 3 to 6 visits.

Limited HSP service capacity contributed to 18% of early departures. Thirteen percent of families moved to parts of the state outside of the HSP target areas and 5% had work and school schedules that limited their availability during home visitors' usual work hours.

Few families were visited weekly. For all families, there were 13 home visits on average in the first year. From home visiting referral to discharge or the child's first birthday, 29% of families were visited at least every 2 weeks and 51% at least every 3 weeks. Families still active at 1 year had a mean of 22 visits, with nearly half visited at least every 2 weeks.

About half of all families received core services on time. Overall, 59% of families had an initial support plan by 45 days; of those active at 1 year, 80% did so. Home visitors began developmental screening on time for 50% of all families and 82% of those active at 1 year. They assessed parent-child interaction on time for 47% of all high-risk families and 84% of those active at 1 year.

Referral rates for needed services varied widely. At the 1-year interview, 94% of mothers reported having a specific pediatric primary care provider, exceeding the program standard of 90%. Over three-quarters of the mothers reported needing WIC, income assistance, and food stamps. The percent of mothers accessing these services (88%, 89% and 93%, respectively) approached the standard of 90%. At least 10% of mothers reported needing 3 other services in the infant's first year: public housing (31%), child support enforcement (14%), and adult education or job training (12%). Access rates for these services were far lower than the program standard (31%, 75% and 41%, respectively). Agencies varied in the percent of families active at 1 year, attributable to differences in refusal rates (Fig 1). These differences became most pronounced at 3 to 4 months. Excluding families who moved or became ineligible for the HSP, agency-specific family refusal rates at 4 months ranged from 0% to 36%. After 4 months, agency-specific family dropout rates were very similar. Within agency, the percent of families active at 1 year was similar across programs (51% and 52% at CFS sites, 57%

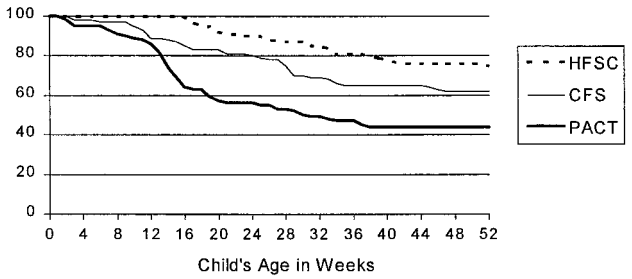

Fig 1. Percent of families considered active in home visiting by child's age in weeks and agency, excluding families who moved or returned to work or school (n = 302).

and 62% at HFSC sites, and 34% and 36% at PACT sites).

Agencies also varied in frequency of home visits and provision of core services (Table 4). Among all referred families, agencies with a higher percent of families active at 1 year made more visits and provided core services more often. However, when focusing on families with ≥12 visits, these agency differences disappeared. In fact, families served by the agency with the highest dropout rate were more likely to complete a family support plan.

Agencies varied in the consistency of site performance (not shown in table). The 2 PACT sites, for example, were similar in the number of visits they averaged and the percent of families who received core services. In contrast, the 2 HFSC sites varied greatly in number of home visits (eg, 17.6 ± 1.3 vs 32.8 ± 1.8 for all referred families; $P < .05$) and in timely provision of core services (eg, family support plan completed with 49% vs 76% of all referred families, $P < .01$; child developmental screening completed for 65% vs 87% of families active at 1 year, $P < .05$).

Continued Participation of Families

Families were more likely to receive ≥12 visits in the first year if the father had an extremely high risk assessment score and problems of substance use and domestic violence, and if the mother had problems of substance use (Table 5). They were less likely to receive ≥12 visits if the mother was at extreme risk or was unilaterally violent toward the father. Agencies did not differ in the kinds of families receiving ≥12 visits as determined by testing for interactions between agency and each covariate.

DISCUSSION

Nearly 20 years ago, the AAP sponsored a conference to reach consensus on the role of home visiting in promoting child health and development.[3] After considering the available evidence, participants concluded that official endorsement of home visiting at that time would be premature. No statement was issued.

Since then, events in several arenas have promoted interest in home visiting and have nurtured belief in its benefits for vulnerable children. First of all, some experimental studies of interventions incorporating early home visitation have reported positive and enduring impact for a broad range of outcomes. Among these are the Perry Preschool Project,[34] the Elmira nurse home visitation study by Olds et al,[35] and the Infant Health and Development Project.[36] In addition, various child education and advocacy groups have launched national campaigns to promote specific home visiting models. Among these are the Home Instruction Program for Preschool Youngsters (HIPPY),[37] Parents as Teachers,[38] and Healthy Families America.[27]

As home visiting programs proliferate nationally, policymakers increasingly find themselves called on to endorse adoption of home visiting for their own state or community. In turn, pediatricians and other professionals who work with young children are asked for guidance regarding whom to target for home visiting, what types of outcomes are reasonable to expect, and how to provide services.

Unfortunately, much of the evidence on which to estimate the benefits of scaled-up home visiting programs can be misleading. First of all, the generalizability of evidence based on 1 home visiting model in 1 area of the country at one time is limited. Second, benefits derived in carefully controlled demonstration projects are likely to overstate the impact of a model taken to scale. Third, outcomes for families who remain active in home visiting may be unrepresentative of overall program

TABLE 4. Visit Frequency and Performance of Selected Core Activities in All Referred Families and All Families with 12 or More Visits in Year 1, by Agency

	Agency			
	CFS	HFSC	PACT	*P*
All referred families	(N = 141)	(N = 121)	(N = 111)	
Number of home visits (mean ± SE)	11.2 ± 0.9	16.2 ± 1.1	12.3 ± 1.3	<.01
12 or more visits (percent)	39	56	41	<.05
Core activities performed* (percent)				
Individualized family service plan	54	68	55	<.05
Infant developmental screening	48	61	40	<.01
Assessment of mother-child interaction†	47	62	35	<.05
All families with 12 or more visits	(N = 55)	(N = 68)	(N = 45)	
Core activities performed* (percent)				
Individualized family service plan	82	74	91	.06
Infant developmental screening	87	90	91	.82
Assessment of mother-child interaction†	77	87	86	.61

* Activity performed within time period specified in service contracts; refers only to first time that activity is to be performed.
† Limited to families with an initial FSC score of 40 or greater.

TABLE 5. Characteristics of Families Receiving 12 or More Home Visits During the First Year; Results* of Multiple Logistic Regression Model

	Odds Ratio	95% Confidence Interval
Paternal problem substance use†, violence and extreme high risk‡	2.78	(1.21, 6.40)
Maternal problem substance use†	1.85	(1.05, 3.23)
Maternal Family Stress Checklist score§	.92	(.83, 1.01)
Mother violent toward father (without violence toward her)	.38	(.18, 0.79)
Infant required intensive or intermediate care at birth	1.49	(.73, 3.05)
Agency		
CFS	1.17	(.68, 2.00)
HFSC	1.85	(1.06, 3.21)
PACT (reference category)	1.00	—

* Results are reported as odds ratios with 95% confidence intervals in parentheses.
† Problem substance use defined as *problem* alcohol use or *any* drug use in year before the baseline interview. See text for more detailed description.
‡ Preliminary analysis of paternal risk behaviors indicated that, alone, substance use, partner violence and high FSC scores did not predict continued participation. However, co-occurrence of these risk factors was found to be a significant predictor. In the final multivariable model, a single variable combining these factors was used. For the combined variable, the paternal FSC score was dichotomized according to the HSP cutoff indicating "extreme high risk (FSC score >45)."
§ Kempe's Family Stress Checklist (1976) is the screening tool used to determine eligibility for Healthy Start services. Families are referred to Healthy Start if either parent scores 25 or more on the checklist. Preliminary analyses indicated that mothers' and fathers' scores were *not* similar in terms of their association with continued participation. Because of this, for the multivariable analysis, the scores were used separately.

effectiveness. Finally, many studies of widely replicated models are quasiexperimental or nonexperimental, do not use blinded measurement, or rely on program staff to measure outcomes. All of these are likely to bias findings toward overestimates of program impact. Those who endorse adoption of home visiting based on such evidence are likely to be disappointed by the actual benefits of the scaled-up models.

Our main reason for undertaking the research described here was to use careful process measurement and an experimental design to assess the effectiveness of a home visiting model once it had become a regular part of the service system. If home visiting in Hawaii and elsewhere is to achieve the potential of demonstration projects, we need to learn how programs operate once they have been taken to scale. Hawaii's experience in the Ewa community illustrates the importance of monitoring process in scaled-up models. In the 1985–1988 home visiting pilot project in Ewa, 95% of eligible families agreed to take part in the program and anecdotal evidence suggested that most remained active. In the current study, only 84% of eligible families in Ewa agreed to enroll and only two-thirds of those enrolling were still considered active in the program 1 year later.

Actual service delivery came close to some, but not all, program standards. Often departures from the model were tied to program attrition. Thus, while about 80% of active families active at 1 year received core services according to schedule, only half of *all* referred families did so. This difference points to the dilution of program process when considering all referred families rather than just those continuing in service. It also underscores the need for clear definitions of denominator in reporting service delivery.

It is important to understand which at-risk families programs reach and engage. Infant biologic risk greatly increased an at-risk family's willingness to accept home visiting. We also found that initial program acceptance was greater among teenage mothers who had not yet finished high school. Our finding that family willingness to accept home visiting increased with overall family risk was heartening.

It suggests that family's perceived need for services influences participation or, alternatively, that home visitors target needier families for more intense service.

Our study identified several aspects of the early identification process itself that influenced initial family engagement. Screening coverage was more complete when performed by program, rather than hospital, staff. In-person assessment greatly increased a family's willingness to enroll in home visiting. Since this study was conducted, hospital policies regarding early newborn discharge have been modified, increasing the percent of mothers who can be interviewed in person. This, in turn, could increase the percent of families accepting enrollment in the program.

We also found that community agencies implement the same model differently, even when following the same contracts for service provision. HSP network members believe that differences in refusal rates and visit frequency reflect differences in agency philosophy. The agency with the highest number of visits but lowest percent of families active at 1 year views the entire family, more than the index child, as its primary client. Thus, its home visitors are likely to concede to a family's change of heart about accepting home visiting by closing cases when parents are uncertain they wish to continue in the program and focusing on families that are more receptive.

The other 2 agencies expect that many at-risk families will be reluctant to engage in home visiting but believe this underscores the need for continued outreach. They regard engagement of an isolated family as more important than complying with a

family's inclination to be left alone. Thus, home visitors in these 2 agencies are encouraged to continue to try to engage reluctant families.

Although agencies differed in the proportion of families who continued in the program, they did not differ in the kinds of families who remained in service. Continued participation was greater for families where the father had multiple risks. However, families were less likely to receive at least 12 visits if the mother was at extreme high risk or was unilaterally violent toward her partner. This is concerning, for these may be the mothers at greatest risk for child abuse. It behooves programs to monitor not only their overall success in engaging families, but their success in reaching specific at-risk subgroups.

It is premature to speculate how agency differences in outreach, home visiting frequency, and performance of core services will influence outcomes. Their existence, however, demonstrates that actual program services can vary greatly even when a single model is used. While agency philosophy influenced retention rates, intraagency site variation in visit frequency and provision of core services demonstrates the importance of other organizational characteristics. These are likely to include supervision, family support worker knowledge and skill, and staff turnover. Future reports will focus on the relationship between these program characteristics and performance measures.

As the AAP Council on Child and Adolescent Health noted, service integration is key to the success of home visiting in promoting child health and development. We found that nearly all families were linked with a medical home, but that linkage with other needed community resources varied enormously. There are at least 4 possible reasons for failure to link families with needed services. First, as St Pierre and Layzer[39] have noted, a home visitor can not link families with services that are unavailable or in short supply. Second, a home visitor might be reluctant to link families to services of uncertain quality. Third, a home visitor might fail to recognize family needs, feel uncomfortable addressing identified needs, or lack the skills to do so. Fourth, despite a home visitor's best efforts, the family might decline the option of service linkage. Our ongoing analysis is assessing the influence of home visitor and family problem recognition on family linkage with community resources.

In response to our early reports of departures from the model, the Department of Health convened a statewide quality improvement planning group of HSP directors and supervisors. The group is working to learn from the experience of the most successful members of the network, including staff at all levels. It is applying what is learned to reassess program standards and to recommend practices to improve service quality. It is focusing first on 3 problem areas: the time from assessment to the first home visit, home visit frequency, and program attrition rates. One underlying issue is whether the expectation of 4 home visits per month is unrealistic, given the complexity of the families, the resistance of many families toward home-based services, and decreasing parent availability for home visits given competing demands of work and school. Future reports will focus on policy and program changes arising from the quality improvement process and the subsequent changes in family engagement, service delivery, and quality of care.

Hawaii's model is but 1 of several nationally replicated approaches to home visitation. There is intense debate about the relative merits of available models, including discussion of professional models, such as the Nurse Home Visitation Model in comparison to paraprofessional models such as Hawaii's. The Nurse Home Visiting Model has been studied extensively and found to achieve several important benefits, including reduced cigarette smoking during pregnancy, improved prenatal diets,[18] reduced child maltreatment and injuries,[17] and reduced repeat pregnancies. Moreover, the Elmira program had long-term impact on mother's reliance on public assistance and, as a result, substantial cost savings.[35]

Paraprofessional home visiting has not been evaluated as extensively, but has been endorsed widely because of the potential, but untested, advantages if offers. These include: 1) use of universal theory-based screening and "creative outreach" to identify and engage at-risk families who otherwise might not volunteer for such a program; 2) strong focus on cultural sensitivity that may lead to better success in engaging harder to reach families; 3) inclusion of families with inadequate prenatal care and previous births; 4) focus on alleviating environmental and social risks, as well as health risks; and 5) potential cost savings—paraprofessional salaries are relatively low, although increased supervisory and training costs can at least partially offset the savings in home visitor salaries.

Although our process findings for the scaled up HSP program show departures from its model, such departures are consistent with reported process in demonstrations of other national models. For example, Wagner and Clayton[40] reported an average attrition rate of 57% by 2 years for 3 Teen Parents as Teachers demonstrations and Baker et al[41] reported about a 30% attrition within the first few months of family assignment in the HIPPY program. Even under the carefully controlled conditions of the Elmira and Memphis trials of the Nurse Home Visitation Model, Olds et al[42] found that families completed only about half of the postnatal visits called for in that model.

Beyond noting that implementation is challenging across models, it is hard to compare models in terms of impact. National models such as Parents as Teachers, HIPPY, the Nurse Home Visitation Model, and Hawaii's model have different objectives and different target audiences. The Nurse Home Visitation Model, for example, is limited to women with no previous live births. Although more recent trials of it have focused on first time low-income, unmarried, or adolescent mothers, the Elmira trial allowed any woman bearing a first

child to register.[42] Hawaii's program, in contrast, is not limited to first-time mothers, but is targeted exclusively to families with multiple risk factors for child abuse and neglect beyond low income, single parenthood, and adolescent childbearing per se. Insofar as risk factors such as domestic violence moderate program impact, it is hard to draw conclusions about the relative effectiveness of models with different target populations. Moreover, comparisons of models applied to a given population should not be generalized beyond that population.

CONCLUSION

In summary, our process assessment of Hawaii's HSP program found that actual service delivery departed in many ways from the demonstration model tested 10 years ago. It is telling that our first reports of these departures were met with surprise, both within Hawaii and nationally. Certainly, experimental study of demonstration projects has shown the potential of home visiting to improve the life chances of both parents and children in vulnerable families. As states and communities implement home visiting, they also must implement ongoing evaluation to ensure that programs are reaching and engaging the families most likely to benefit, regardless of the specific choice of home visiting model.

As communities develop systems of integrated services for families with young children, home visiting might be a useful strategy to improve access to the medical home, prepare families for well child care visits, and reinforce the information and guidance of health care providers. Primary care providers are key stakeholders as systems change to integrate health, family support, and child care services. Understanding the strengths and challenges of home visitation is essential to informed advocacy in this important area of program and policy development for families with young children.

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REFERENCES

1. Boyer P. *Urban Masses and Moral Order in America, 1800–1900.* Cambridge, MA: Harvard University Press; 1978
2. Gomby D, Larson C, Lewit E, Behrman R. Home visiting: analysis and recommendations. *Future Child.* 1993;3:6–22
3. Chamberlin RW. Proceedings of an AAP conference exploring the use of home visitors to improve the delivery of preventive services to mothers with young children; June 15–17, 1980; Washington, DC
4. Gomby D, Culross P, Behrman R. Home visiting: recent program evaluations—analysis and recommendations. *Future Child.* 1999;9:4–26
5. Barnard K, Magyary D, Sumner G. Prevention of parenting alterations for women with low social support. *Psychiatry.* 1988;51:248–253
6. Barth R. An experimental evaluation of in-home child abuse prevention services. *Child Abuse Neglect.* 1991;15:363–375
7. Dawson P, van Doorninck W, Robinson J. Effects of home-based, informal social support on child health. *Dev Behav Pediatr.* 1989;10:63–67
8. Field T, Widmayer S, Greenberg M, Stoller S. Effects of parenting training on teenage mothers and their infants. *Pediatrics.* 1982;69:703–707
9. Gutelius M, Kirsch A, MacDonald S, et al. Controlled study of child health supervision: behavioral results. *Pediatrics.* 1999;60:294–304
10. Hardy J, Streett R. Family support and parenting education in the home: an effective extension of clinic-based preventive healthy care services for poor children. *J Pediatr.* 1989;115:927–931
11. Infante-Rivard C, Filion G, Baumgarten M. A public health home intervention among families of low socioeconomic status. *Children's Health Care.* 1989:102–107
12. Jester RE, Guinagh BJ. The Gordon Parent Education Infant and Toddler Program. In: *As the Twig Is Bent.* Hillsdale, NJ: Lawrence Erlbaum Associates; 1983:103–132
13. Lambie DZ, Bond JT, Weikart D. *Home Teaching With Mothers and Infants: The Ypsilanti-Carnegie Infant Education Project.* Ypsilanti, MI: High/Scope Educational Research Foundation; 1974
14. Larson C. Efficacy of prenatal and postpartum home visits on child health and development. *Pediatrics.* 1980;66:191–197
15. Madden J, O'Hara J, Levenstein P. Home again: effects of the mother-child home programs on mother and child. *Child Dev.* 1984;55:636–647
16. Marcenko M, Spence M. Home visitation for at-risk pregnant and postpartum women: a randomized trial. *Am J Orthopsychiatry.* 1994;64:
17. Olds D, Henderson C, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics.* 1986;78:65–78
18. Olds D, Henderson C, Tatelbaum R, Chamberlin R. Improving the delivery of prenatal care and outcomes of pregnancy: a randomized trial of nurse home visitation. *Pediatrics.* 1986;77:16–28
19. Powell C, Grantham-McGregor S. Home visiting of varying frequency and child development. *Pediatrics.* 1989:157–164
20. Scarr S, McCartney K. Far from home: an experimental evaluation of the mother child home program in Bermuda. *Child Dev.* 1988;59:531–543
21. Siegel E, Bauman K, Schaefer E, Saunders M, Ingram D. Hospital and home support during infancy: impact on maternal attachment, child abuse and neglect, and health care utilization. *Pediatrics.* 1980;66:183–190
22. Thompson R, Cappelman M, Conrad H, et al. Early intervention program for adolescent mothers and their infants. *Dev Behav Pediatr.* 1982;3:18–21
23. Wasik B, Ramey C, Bryant D, Sparling J. A Longitudinal study of two early intervention strategies: Project CARE. *Child Dev.* 1990;61:1682–1696
24. Osofsky J, Culp A, Ware L. Intervention challengers with adolescent mothers and their infants. *Psychiatry.* 1988;51:236–241
25. Duggan A, McFarlane E, Windham A, et al. Evaluation of Hawaii's Healthy Start Program. *Future Child.* 1999;9:66–90
26. US Advisory Board on Child Abuse and Neglect. *Creating Caring Communities: Blueprint for an Effective Federal Policy on Child Abuse and Neglect.* Washington, DC: US Advisory Board on Child Abuse and Neglect (US Government Printing Office); 1991
27. Daro D, Harding K. Healthy families America: using research to enhance practice. *Future Child.* 1999;9:152–176
28. Bricker D, Squires J, Mounts L, Potter L, Nickel R, Farrell J. *Ages and Stages Questionnaires: A Parent-Completed, Child-Monitoring System.* Baltimore, MD: Paul H. Brookes Publishing Co; 1995
29. Barnard K. *Nursing Child Assessment Satellite Training Learning Resource Manual.* Seattle, WA: University of Washington; 1978
30. Mayfield D, McLeod G, Hall P. The CAGE Questionnaire: validation of a new alcoholism instrument. *Am J Psychiatry.* 1974;131:1121–1123
31. Straus MA. *Manual for the Conflict Tactics Scales (CTS) and Test Forms for the Revised Conflict Tactics Scales (CTS2).* Durham, NH: Family Research Laboratory, University of New Hampshire; 1995
32. McHorney C, Ware J. Construction and validation of an alternate form general mental health scale for the medical outcomes study short-form 36-item health survey. *Med Care.* 1995;33:15–28
33. Kapuscik J, Jacobs F. Evaluation that works for you: a practice, useful model from the field. *Family Resource Coalition of America Report.* 1998;16:25–28
34. Schweinhart L, Barnes H, Weikart D, Senninger M, eds. *Significant Benefits: The High-Scope Perry Preschool Study Through Age 27.* Ypsilanti, MI: High/Scope Press; 1993
35. Olds D, Eckenrode J, Henderson C, et al. Long-term effects of home visitation on maternal life course and child abuse and neglect: 15-year follow-up of a randomized trial. *JAMA.* 1997;278:637–643
36. McCarton C, Brooks-Gunn J, Wallace I, et al. Results at age eight years

of early intervention of low-birth-weight premature infants. *JAMA*. 1997;277:126–132
37. Bradley R, Whiteside L. *Evaluation of HIPPY Program: A Look at Outcomes for Children at the End of Second Grade*. Little Rock, AR: University of Arkansas Center for Research on Teaching and Learning; 1995
38. Winter M, McDonald D. Parents as teachers: investing in good beginnings for children. In: Albee G, Gullotta T, eds. *Primary Prevention Works*. Thousand Oaks, CA: Sage Publications; 1997:119–145
39. St Pierre R, Layzer J. Using home visits for multiple purposes: the Comprehensive Child Development Program. *Future Child*. 1999;1: 134–151
40. Wagner M, Clayton S. The Parents as Teachers Program: results from two demonstrations. *Future Child*. 1999:1:91–115
41. Baker A, Piotrkowski C, Brooks-Gunn J. The Home Instruction Program for Preschool Youngsters (HIPPY). *Future Child*. 1999;1: 116–133
42. Olds D, Henderson C, Kitzman H, Eckenrode J, Cold R, Tatelbaum R. Prenatal and infancy home visitation by nurses: recent findings. *Future Child*. 1999;1:44–65

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