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Pediatrics 2005;116;1433-1441
DOI: 10.1542/peds.2005-0786

A Randomized, Controlled Trial of the Effectiveness of Community-Based Case Management in Insuring Uninsured Latino Children

Glenn Flores, MD*‡§; Milagros Abreu, MD‖; Christine E. Chaisson, MPH¶; Alan Meyers, MD, MPH‖; Ramesh C. Sachdeva, MD, PhD, MBA*§#; Harriet Fernandez, BA‖; Patricia Francisco, BA‖; Beatriz Diaz, BA‖; Ana Milena Diaz, BA‖; and Iris Santos-Guerrero, BA‖

ABSTRACT. *Background.* **Lack of health insurance adversely affects children's health. Eight million US children are uninsured, with Latinos being the racial/ethnic group at greatest risk for being uninsured. A randomized, controlled trial comparing the effectiveness of various public insurance strategies for insuring uninsured children has never been conducted.**

Objective. **To evaluate whether case managers are more effective than traditional methods in insuring uninsured Latino children.**

Design. **Randomized, controlled trial conducted from May 2002 to August 2004.**

Setting and Participants. **A total of 275 uninsured Latino children and their parents were recruited from urban community sites in Boston.**

Intervention. **Uninsured children were assigned randomly to an intervention group with trained case managers or a control group that received traditional Medicaid and State Children's Health Insurance Program (SCHIP) outreach and enrollment. Case managers provided information on program eligibility, helped families complete insurance applications, acted as a family liaison with Medicaid/SCHIP, and assisted in maintaining coverage.**

Main Outcome Measures. **Obtaining health insurance, coverage continuity, the time to obtain coverage, and parental satisfaction with the process of obtaining insurance for children were assessed. Subjects were contacted monthly for 1 year to monitor outcomes by a researcher blinded with respect to group assignment.**

Results. **One hundred thirty-nine subjects were assigned randomly to the intervention group and 136 to the control group. Intervention group children were significantly more likely to obtain health insurance (96% vs 57%) and had ~8 times the adjusted odds (odds ratio: 7.78; 95% confidence interval: 5.20–11.64) of obtaining insurance. Seventy-eight percent of intervention group children were insured continuously, compared with 30% of control group children. Intervention group children obtained insurance significantly faster (mean: 87.5 vs 134.8 days), and their parents were significantly more satisfied with the process of obtaining insurance.**

Conclusions. **Community-based case managers are more effective than traditional Medicaid/SCHIP outreach and enrollment in insuring uninsured Latino children. Case management may be a useful mechanism to reduce the number of uninsured children, especially among high-risk populations.** ***Pediatrics*** **2005;116:1433–1441;** ***insurance, Latino, Medicaid, medically uninsured, child health services, community health services.***

ABBREVIATIONS. CMSP, Children's Medical Security Plan; DMA, Division of Medical Assistance; DPH, Department of Public Health; SCHIP, State Children's Health Insurance Program.

There were 8.4 million children without health insurance coverage in the United States in 2003, equivalent to 11.4% of children 0 to 17 years old.[1] Latino children have the highest risk of being uninsured of any racial/ethnic group of US children, with 21% of Latino children being uninsured, compared with 7% of non-Latino white children, 14% of African American children, and 12% of Asian/Pacific Islander children.[1] Other documented risk factors among children for having no insurance include poverty[2] and noncitizen status of the parent and child.[3]

Compared with children who have health insurance, uninsured children have less access to health care, are less likely to have a regular source of primary care, and use medical and dental care less often.[4] Uninsured children are significantly more likely than insured children to be in poor or fair health,[5,6] to not have a regular physician or other medical provider,[7–9] to have made no medical visit in the past year,[6,9–10] to be immunized inadequately,[11–13] to experience adverse hospital outcomes as newborns,[14] and to have higher mortality rates associated with trauma[15] and coarctation of the aorta.[16]

To expand insurance coverage for uninsured children, Congress enacted the State Children's Health Insurance Program (SCHIP) in 1997.[17] This program targets uninsured children <19 years old with family incomes <200% of the federal poverty level who are

From the *Center for the Advancement of Underserved Children and #Quantitative Health Sciences, Department of Pediatrics, and ‡Division of Epidemiology, Health Policy Institute, Medical College of Wisconsin, Milwaukee, Wisconsin; §Children's Research Institute, Children's Hospital of Wisconsin, Milwaukee, Wisconsin; ‖Department of Pediatrics, Boston University School of Medicine, Boston, Massachusetts; and ¶Data Coordinating Center, Boston University School of Public Health, Boston, Massachusetts.
Accepted for publication May 18, 2005.
doi:10.1542/peds.2005-0786
This work was presented in part at the annual meeting of the Pediatric Academic Societies; May 15, 2005; Washington, DC; the annual research meeting of AcademyHealth; June 26, 2005; Boston, MA; the National Council of La Raza Annual Conference; July 18, 2005; Philadelphia, PA; and the Translating Research Into Practice 2005 Conference; July 19, 2005; Washington DC.
No conflict of interest declared.
Reprint requests to (G.F.) Center for the Advancement of Underserved Children, Department of Pediatrics, Medical College of Wisconsin, 8701 Watertown Plank Rd, Milwaukee, WI 53226. E-mail: gflores@mail.mcw.edu

ineligible for Medicaid and are not covered by private insurance. SCHIP is a matched block grant program that allocates more than $39 billion in federal funds over 10 years.[17] It provides for states to increase coverage of uninsured children by raising the income limits of the Medicaid program so that more children are eligible, by creating a new state insurance program separate from Medicaid, or by implementing both measures. Multiple studies have documented that previously uninsured children experience significant increases in both access to health care and more appropriate use of services after enrollment in SCHIP and Medicaid.[4,18–20]

Since the inception of SCHIP enrollment in January 1998, SCHIP has provided coverage to 3.9 million children,[21] and the proportion of uninsured US children has decreased from 15.4% to 11.4%.[1] In the past 4 years, however, the numbers and proportions of uninsured children essentially have not changed, wavering between 8.4 and 8.6 million and 11.4% to 11.9%, respectively.[1] It has been estimated that well over one half of uninsured children (~5 million) are eligible for Medicaid or SCHIP,[4] which suggests that more-effective outreach and enrollment strategies are needed. Indeed, recent research indicates that SCHIP may be failing to reach the "hardest-to-reach" subpopulations of uninsured children, such as Latinos and those who have never been insured.[22]

A randomized, controlled trial has never been performed comparing traditional SCHIP and Medicaid outreach and enrollment versus alternative strategies in terms of their effectiveness in insuring uninsured children. Recent research revealed that the parents of uninsured Latino children viewed community-based case managers as an acceptable and helpful intervention for families seeking to insure their uninsured children.[23] The aim of this study, therefore, was to conduct a randomized, controlled trial comparing community-based case management with traditional SCHIP and Medicaid outreach and enrollment with respect to their effectiveness in insuring uninsured Latino children.

METHODS

Study Participants

Enrollment occurred from May 14, 2002, to September 30, 2003. Study participants were uninsured Latino children and their parents from 2 communities in the greater Boston area confirmed in prior research[23–25] to have large proportions of both uninsured children and Latino children, ie, East Boston, where 37% of Latino children were found to be uninsured in prior studies[23–25] and 39% of the population is Latino,[26] and Jamaica Plain, where 27% of Latino children were found to be uninsured in prior studies[23–25] and 24% of the population is Latino.[26] Eligibility criteria included the following: (1) the child was 0 to 18 years old, (2) the child had no health insurance coverage and had been uninsured for ≥3 months (unless the child was an infant who had never been insured), (3) the parent identified her or his uninsured child's ethnicity as Latino, (4) the parent's primary language was English or Spanish, and (5) the parent was willing to be contacted monthly by telephone or through a home visit by research personnel (if no functioning telephone was present in the household). The focus of the intervention was Latino children because they are the racial/ethnic group of US children at greatest risk for being uninsured.[1] When >1 child in a family was uninsured, the youngest child was enrolled in the study as the "index" child (to ensure consistency), and data were collected only for that child.

Study participants were recruited primarily from the following community sites in East Boston and Jamaica Plain, which were confirmed in prior studies[23–25] to have many eligible potential participants willing to take part in research: supermarkets, bodegas, self-service laundries, beauty salons, and churches. The remaining participants were recruited through referral by other participants and in response to notices posted at consulates and schools. Community sites for recruitment were selected to obtain samples of parents consisting of both documented and undocumented families in proportions reflecting the population in each community.[25] This sampling method was chosen because traditional census block methods have the potential to undercount undocumented children and their families, given their fear of deportation when a stranger appears at the front door of a dwelling.[25] The primary caretaker (herein referred to as the parent) of each uninsured child enrolled in the study received a $50 participation honorarium at enrollment and a $5 honorarium after each monthly follow-up contact.

Written informed parental consent (in English or Spanish, depending on parental preference) was obtained for all children enrolled. To avoid selection bias against parents with low literacy levels, parents could request that the written informed consent form be read to them by research personnel, in English or Spanish, before they signed the form. The study was approved by the institutional review boards of Boston Medical Center and the Children's Hospital of Wisconsin.

Baseline Assessments

Parents of eligible children completed a brief, verbally administered screening questionnaire (in English or Spanish, according to parental preference) to confirm eligibility, determine relevant baseline characteristics, and record contact information. Data were collected on the ages of the child and parent, the self-identified Latino subgroup, the number of years the parent had lived in the United States, parental English proficiency, the highest level of parental education, the employment status of the parent and spouse (if currently living in the same household), the annual combined family income, and the citizenship status of the parent. Additional information collected included the names of the parent and child, whether there was a functioning telephone in the household, the telephone number, the preferred alternate telephone number of friends or family members (if there was no functioning telephone in the household), and the family's address.

Randomization

Subjects were allocated to the case management intervention group or the control group with a computer-generated, stratified, randomization process. Stratified randomization ensures that compared maneuvers in a randomized trial are distributed suitably among pertinent subgroups.[27] Randomization was stratified by community site, with separate allocation schedules prepared for participants from East Boston and Jamaica Plain. The randomization schedule was prepared with the RANUNI function of SAS software, version 8.2.[28] Sequentially numbered, opaque, sealed envelopes were produced for each community site, to ensure adequate allocation concealment. Potential participants were informed that, depending on the randomization, some parents would get a case manager free of charge, who would help families obtain health insurance for their children, whereas other parents would get no case manager and would just be contacted monthly. Bilingual Latina research assistants who did not participate in any aspect of preparation of randomization schedules opened the envelopes in the presence of enrolled participants, to inform them of their group assignment. Parents of uninsured children allocated to the intervention group immediately were assigned a bilingual, Latina, community-based, case manager (the research assistant who opened the randomization envelope with the parent became the case manager for children assigned to the intervention group).

Study Intervention

Case managers performed the following functions for intervention group children and their families: (1) providing information on the types of insurance programs available and the application processes; (2) providing information and assistance on program eligibility requirements; (3) completing the child's insurance application with the parent and submitting the application for the

family; (4) expediting final coverage decisions with early frequent contact with the Division of Medical Assistance (DMA) (the state agency administering Medicaid in Massachusetts) or the Department of Public Health (DPH) (the state agency responsible for the Children's Medical Security Plan [CMSP], which insures non–Medicaid-eligible children in Massachusetts, including noncitizens); (5) acting as a family advocate by being the liaison between the family and DMA or DPH; and (6) rectifying with DMA and DPH situations in which a child was inappropriately deemed ineligible for insurance or had coverage inappropriately discontinued.

All case managers received a 1-day intensive training session on major obstacles to insuring uninsured children reported by Latino parents in 6 focus groups,[23] parents' perspectives on how a case manager would be most useful in assisting with the process of insuring uninsured children,[23] completing the Medical Benefit Request (the single application used to enroll children in MassHealth [Medicaid in Massachusetts] and CMSP), following up on submitted applications, obtaining final coverage decisions, disputing applications that were rejected or deemed ineligible, and the study protocol for subject recruitment, enrollment, consent, and follow-up monitoring. These training sessions were held in collaboration with representatives from DMA and DPH. Case managers also received the following training: a 1-week session on MassHealth eligibility requirements conducted by DMA, a 4-hour session on insurance eligibility rules conducted by a DPH outreach coordinator, a 2-hour session on MassHealth managed care programs and rules, a 1-day session on CMSP conducted by a DPH representative, a 1-day seminar on insurance programs and general assistance for impoverished families conducted by Health Care for All (a nonprofit organization dedicated to improving access to health care for all people in the state of Massachusetts[29]), monthly DMA technical forums on MassHealth, and 1 week of supervised case manager training in the community.

The case managers were bilingual Latina women (of Dominican, Puerto Rican, Mexican, or Colombian ethnicity) between 22 and 36 years old. All had graduated from high school, some had obtained college degrees, and 1 had postgraduate training. None had any prior experience working as case managers insuring uninsured children. They were recruited through job listings posted in the employment offices of local Boston colleges and universities.

Control Group

Control group subjects received no intervention other than the SCHIP standard-of-care outreach and enrollment efforts administered by the MassHealth and CMSP programs. In Massachusetts, DMA has stated that they "have made every effort to implement broad-based outreach activities designed to draw attention of families, teachers, child care workers, health providers, youth and community organizations to enhanced opportunities in the Commonwealth for obtaining health insurance."[30] These efforts include the use of (1) direct mailings, press releases, newspaper inserts, health fairs, and door-to-door canvassing of target neighborhoods; (2) special attempts to reach Latino communities, such as radio advertisements on Spanish-language programs and bilingual flyers; (3) mini-grants to community organizations to provide outreach and assistance with applications; and (4) a toll-free telephone number for applying for health benefits.[30]

Outcome Measures

Using standardized telephone interview methods, a trained bilingual Latina research assistant who was blinded to participant group assignment obtained outcome data from the parents monthly for 11 months, beginning 1 month after the date of study enrollment. The research assistant also made home visits to families that lacked telephones in the household and to those that did not respond to ≥10 attempted telephone contacts. To ensure ongoing rigorous blinding, we asked parents not to reveal their group assignment at any time to the outcomes research assistant (and the blinded research assistant reported that no parents revealed their child's group assignment during the study).

The primary outcome measure was the child obtaining health insurance coverage, as determined in an interview with the parent and confirmed, when possible, through inspection of the coverage notification letter received by the family. Three secondary outcomes also were assessed. The number of days from study enrollment to obtaining coverage was determined by using the interval between the date of the participant's study enrollment and the date on which the parent reported being notified officially that the child had obtained coverage. Episodic coverage was defined as obtaining but then losing insurance coverage at any time during the 12-month follow-up period and was determined through parental report and inspection of written notification. Parental satisfaction with the process of obtaining coverage for the child was determined by asking the parent, "How satisfied were you with the process of trying to obtain health insurance coverage for your child?" Parents responded by using a 5-point Likert scale (1 = very satisfied, 2 = satisfied, 3 = uncertain, 4 = dissatisfied, and 5 = very dissatisfied). Overall parental satisfaction (regardless of whether insurance coverage was obtained) was determined during the final (11th month) follow-up contact. In addition, for the subset of children who obtained insurance, we assessed parental satisfaction during the first monthly follow-up contact after the child obtained coverage. All survey instruments were translated into Spanish and then back-translated by a separate observer, to ensure reliability and validity.

Statistical Analyses

All data analyses were performed as intention-to-treat analyses with SAS software, version 8.2.[28] Prestudy calculations with the χ^2 test of equal proportions indicated that a sample size in each study arm of 90 participants provided 90% power to detect a 20% difference in the rates of insuring uninsured children (assuming that 10% of the control group and a minimum of 30% of the intervention group would be insured at the end of the study), allowing for 2-sided $\alpha = .05$ and assuming ≥1 contact during the 12-month follow-up period. The initial combined target recruitment sample of $N = 300$ assumed that up to 40% of participants might drop out or be lost to follow-up monitoring; subsequently, recruitment was terminated at a sample size of $N = 275$ when the attrition rate was observed to be ~17%.

The baseline sociodemographic characteristics of the intervention and control groups were compared with χ^2, Fisher's exact, and t tests. All reported P values are 2-tailed, with $P < .05$ considered statistically significant. Analyses of all outcomes, including obtaining insurance, time to insurance, and satisfaction with the process of obtaining insurance, were restricted to subjects who completed ≥1 follow-up visit.

Unadjusted analyses of intergroup differences in obtaining insurance coverage (any, continuous, and sporadic) were performed with the χ^2 test. We then fitted longitudinal regression models adjusting for time and intrasubject correlations by using generalized estimating equations implemented in PROC GENMOD in the SAS software. An independent working correlation model and empirical variance estimator were used for the generalized estimating equation model.

Multivariate analyses were performed to adjust for policy changes in the MassHealth and CMSP programs that occurred during the study. In November 2002, an enrollment cap was imposed on CMSP, which resulted in a waiting list of thousands of uninsured children, and premiums were increased for both CMSP and MassHealth.[31] On February 1, 2003, the CMSP enrollment freeze was lifted, children on the waiting list began to be enrolled in the programs, and the premium increases were reduced (but not to levels before the November 2002 policy change). Study outcomes therefore were adjusted according to when the study participant was recruited, ie, before, during, or after the restrictive policy change (with construction of a 3-level variable for which the reference group was recruitment before the policy change). Because some subjects were not affected by the policy change, a second variable also was constructed, consisting of a dummy indicator for participants affected by the policy change. Both policy change variables were included in the adjusted models. On the basis of significant intergroup differences noted in bivariate analyses (for parental employment status and state insurance policy changes) and factors previously reported to be associated with being uninsured, the final adjusted model included the following covariates: the child's age, the family's poverty status (dichoto-

mized as an annual combined family income that was 0–100% of the federal poverty threshold for the family [individualized for each family according to the number of people in the family unit and the number of related children <18 years old in the household] at the time of the study versus an income that was above the federal poverty threshold), parental citizenship status, parental employment status, and participant recruitment in relation to policy changes in state insurance coverage options available for uninsured children.

Unadjusted analyses of the number of days from study enrollment to obtaining coverage were performed for the subset of subjects who obtained insurance with the *t* test and then for all subjects with the Kaplan-Meier method. An adjusted cumulative incidence curve for the time to obtaining insurance was then plotted. Parental satisfaction with the process of trying to obtain insurance was analyzed by coding the 5-point Likert scale results both as a categorical variable (using the χ^2 test) and as a continuous variable (using the *t* test).

RESULTS

Participants

A total of 275 uninsured Latino children (and their families) who met all enrollment criteria were identified at the 2 study sites; 139 were assigned randomly to receive the community-based case management intervention and 136 were allocated to the control group. Figure 1 summarizes the enrollment, randomization, follow-up, and data analysis for all study participants. At least 1 monthly follow-up contact was made for 97% (n = 135) of the intervention group and 90% (n = 122) of the control group, and follow-up contact 1 year after study enrollment occurred successfully for 72% (n = 97) of the intervention group and 62% (n = 76) of the control group. The 18 subjects who were assigned randomly but then were lost to follow-up monitoring or withdrew before any follow-up contacts were more likely than other subjects to have been allocated to the control group (75% in the control group vs 48% in the control group among subjects with ≥1 follow-up contact; $P < .04$), but there were no significant differences between these 2 groups in any other characteristic, including the children's age, number of children in the family, annual combined family income, or parental age, citizenship, and employment status.

There were no baseline differences between the 2 groups in the mean ages of the children or parents; annual combined family income; number of children in the family; parental ethnicity, citizenship, English proficiency, marital status, or education; mean number of subject follow-up contacts; or recruitment site (Table 1). Case management group families, however, were more likely to have ≥1 parent employed full-time, and there was a statistically significant but minor intergroup difference in the proportions of subjects recruited before, during, and after the policy change in state coverage of uninsured children, with a slightly greater proportion of intervention group subjects being recruited before the policy change and slightly greater proportions of control group children being recruited while the restrictive policy change was in effect and after reestablishment of most of the prior policy. There also was a slight but statistically significant difference in the number of subjects lost to follow-up before any follow-up interviews (3% of the intervention group vs 9% of the control group; P = .04).

Insurance Coverage of Children

Children who received community-based case management were substantially more likely to obtain health insurance coverage compared with children in the control group (96% vs 57%; $P < .0001$) (Table 2). Intervention group children also were significantly more likely than control group children to be insured continuously throughout the 1-year follow-up period (78% vs 30%; $P < .0001$) and significantly less likely to be insured sporadically (18% vs 27%; $P < .0001$) or uninsured continuously (4% vs 43%; $P < .0001$) during the 1-year follow-up period.

The case management group was almost 8 times more likely than the control group to obtain insurance coverage (odds ratio: 7.78; 95% confidence interval: 5.20–11.64), after multivariate adjustment for potential confounders (the child's age, family income, parental citizenship, parental employment, and the period of policy change in state coverage of uninsured children) (Table 3). The adjusted incidence curve (Fig 2) shows that the marked difference between the groups in obtaining insurance coverage emerged at ~30 days and was sustained. Multivariate analyses also revealed that older children and adolescents and participants enrolled during the state freeze on CMSP had lower adjusted odds of obtaining insurance coverage (Table 3).

Time to Obtaining Insurance Coverage

Among the children who obtained health insurance, case management group children were insured substantially more quickly than control children (Table 2), with a mean of just under 3 months to obtain coverage, compared with a mean of >4.5 months for control children (87.5 ± 68 days for the intervention group vs 134.8 ± 102 days for the control group; $P < .0001$).

Parental Satisfaction With the Process of Obtaining Insurance

Parents of children in the intervention group were substantially more likely than parents of control group children to report being very satisfied with the process of obtaining health insurance for their child (80% vs 29%; $P < .0001$) (Table 2). Conversely, control group parents were considerably more likely than intervention group parents to report being very dissatisfied (14% vs 1%; $P < .0001$) or either dissatisfied or very dissatisfied (27% vs 3%; $P < .0001$) with the process of obtaining the child's insurance. Similar intergroup differences were observed when parental satisfaction was examined with Likert scale scores (where 1 = very satisfied and 5 = very dissatisfied); the mean satisfaction score for intervention group parents was significantly better than that for control group parents (1.3 vs 2.4; $P < .0001$). These significant intergroup satisfaction differences persisted when the analysis was restricted to subjects who had obtained insurance; at the first follow-up contact with parents of children who obtained insurance,

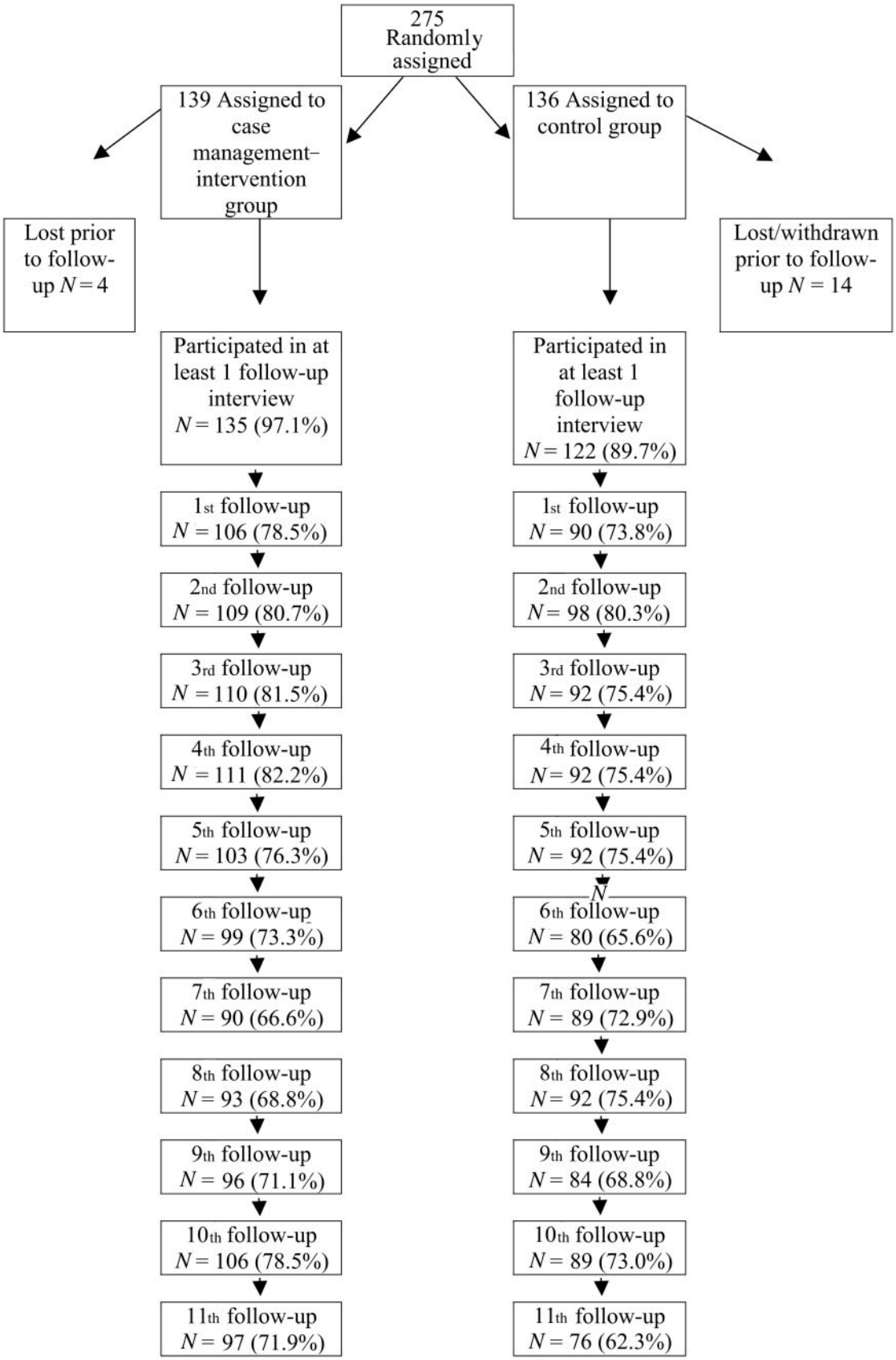

Fig 1. Enrollment, randomization, follow-up, and data analysis.

74% of intervention group parents but only 24% of control group parents reported being very satisfied with the process of obtaining coverage for their children ($P < .0001$), and the respective Likert scale satisfaction scores (mean ± SD) were 1.19 ± 0.46 vs 1.56 ± 0.72 ($P < .0001$).

TABLE 1. Baseline Characteristics of Study Participants

Characteristic	Case Management (n = 139)	Control (n = 136)	P
Child's age, y, mean ± SD	8.9 ± 5.0	8.9 ± 4.9	.96
Parent's age, y, mean ± SD	36.7 ± 9.1	36.7 ± 8.9	.98
Annual combined family income, median (range)	$13 200 ($0–72 000)	$12 945 ($0–48 000)	.41
Annual combined family income, no. (%)*			.57
0–100% of federal poverty threshold	92 (69)	86 (73)	
101–200% of federal poverty threshold	36 (27)	30 (25)	
>200% of federal poverty threshold	5 (4)	2 (2)	
Number of children in family, no. (%)			.64
1	49 (35)	42 (31)	
2	52 (37)	54 (40)	
3	25 (18)	21 (15)	
≥4	13 (9)	18 (13)	
Parent's ethnicity, no. (%)			.51
Colombian	58 (42)	47 (35)	
Dominican	27 (19)	24 (18)	
Salvadoran	29 (21)	32 (24)	
Guatemalan	7 (5)	13 (10)	
Mexican	3 (2)	6 (4)	
Other	15 (11)	14 (10)	
At least 1 parent employed full-time, no. (%)	119 (86)	99 (73)	.01
Parental citizenship, no. (%)			.96
US citizen	14 (10)	15 (11)	
Legal resident	69 (51)	67 (49)	
Undocumented	56 (40)	54 (40)	
Parent limited in English proficiency, no. (%)†	127 (91)	126 (93)	.96
Parental marital status, no. (%)			.82
Married	63 (45)	59 (43)	
Separated	19 (14)	15 (11)	
Divorced	9 (6)	9 (7)	
Single	29 (21)	39 (29)	
Common law	16 (12)	12 (9)	
Widowed/other	3 (2)	2 (1)	
Parental educational attainment, no. (%)			.75
None/grade school	43 (31)	38 (28)	
6th to 11th grade	24 (17)	20 (15)	
High school graduate	38 (28)	44 (32)	
Some college	11 (8)	15 (11)	
College degree‡	22 (16)	19 (14)	
Lost/withdrew from study before any follow up contact, no. (%)	4 (3)	12 (9)	.04
Follow-up contacts, no., mean ± SD§	8.3 ± 2.2	7.9 ± 2.3	.14
Recruitment site, no. (%)			.91
East Boston	101 (73)	98 (72)	
Jamaica Plain	38 (27)	38 (28)	
Participant recruitment in relation to policy change in state coverage of uninsured children, no. (%)			.02
Before policy change	38 (27)	20 (15)	
Restrictive change in effect	14 (10)	22 (17)	
Reestablishment of most of prior policy	87 (63)	94 (70)	

* Three parents in the intervention group and 18 in the control group chose not to answer questions on family income.
† US Census definition of self-rated English-speaking ability of less than very well (ie, well, not very well, or not at all).
‡ Associate, bachelor's, or postgraduate degree.
§ Among participants with any follow-up contacts.

DISCUSSION

Community-based case managers were found to be substantially more effective in obtaining health insurance for uninsured Latino children than traditional Medicaid and SCHIP outreach and enrollment. In addition, compared with control group children, children in the case management group obtained insurance coverage sooner, were more likely to be insured continuously during 1 year of follow-up, and had parents who were much more satisfied with the process of obtaining coverage for their children.

Several characteristics of the case management intervention might account for its greater effectiveness in comparison with traditional Medicaid and SCHIP outreach and enrollment. First, case managers received training and focused their efforts on addressing barriers to insuring uninsured children that had been identified specifically by Latino families in prior research,[23] including lack of knowledge about the application process and eligibility, language barriers, immigration issues, income cutoff values and verification, hassles, pending decisions, family mobility, misinformation from insurance representatives, and system problems. Second, case managers were active agents in the process of obtaining insurance coverage for children, assisting parents with application completion and acting as a family liaison and advocate whenever complications or setbacks occurred; traditional SCHIP and Medicaid outreach and enrollment tended to be much more passive,

TABLE 2. Study Outcomes According to Group Assignment

Outcome	Case Management (n = 139)	Control (n = 136)	P
Child obtained health insurance coverage, %	96	57	<.0001
Continuously insured	78	30	<.0001
Sporadically insured*	18	27	<.0001
Child continuously uninsured, %	4	43	<.0001
Mean time to obtain insurance, d, mean ± SD	87.5 ± 68	134.8 ± 102.4	<.009
Parental satisfaction with process of obtaining child's insurance, %†			
Very satisfied	80	29	<.0001‡
Satisfied	12	41	
Uncertain	5	4	
Dissatisfied	2	13	
Very dissatisfied	1	14	
Mean parental satisfaction score for process of obtaining child's insurance (5-point Likert scale), mean ± SD†§	1.33 ± 0.77	2.40 ± 1.40	<.0001

* Obtained but then lost health insurance coverage.
† Regardless of whether child was insured or continuously uninsured; data were collected at the final 1-year follow-up contact.
‡ By Wilcoxon 2-sample test, Kruskal-Wallis test, and Cochran-Armitage trend test.
§ Where 1 = very satisfied, 2 = satisfied, 3 = uncertain, 4 = dissatisfied, and 5 = very dissatisfied.

TABLE 3. Multiple Logistic-Regression Analysis of Factors Associated With Children Obtaining Insurance Coverage

Independent Variable	Adjusted Odds Ratio (95% Confidence Interval) for Obtaining Insurance Coverage
Group assignment	
Control	Referent
Case management	7.78 (5.20–11.64)
Child's age	
0–5 y	Referent
6–11 y	0.32 (0.19–0.56)
12–18 y	0.35 (0.019–0.63)
Annual combined family income	
At or below federal poverty threshold	Referent
Above poverty threshold	1.19 (0.70–2.02)
Parental citizenship	
Undocumented	Referent
Legal resident	1.42 (0.82–2.44)
US citizen	2.40 (0.08–7.48)
Parental employment	
Employed	Referent
Unemployed	0.78 (0.45–1.37)
Participant recruitment in relation to policy change in state coverage of uninsured children	
Before policy change	Referent
Restrictive change in effect	0.46 (0.22–0.99)
Reestablishment of most of prior policy	0.74 (0.45–1.21)

with outreach being heavily reliant on direct mailings, flyers, radio advertisements, and toll-free telephone numbers, but frequently with little or no assistance with the enrollment process. Third, the case managers were all bilingual, bicultural Latinas, which enhanced the cultural competency of the process and eliminated the often considerable language barriers[23] faced by Latino parents seeking to insure their uninsured children. Therefore, the evidence-based, customized, active, culturally competent features in a community-based setting distinguish this intervention from traditional case management approaches and may account for its effectiveness.

The success of the community-based case management intervention is noteworthy, given a study population characterized by multiple factors known to place children at especially high risk for being uninsured. All intervention group children were Latino, 69% lived in poverty, 96% lived in families with incomes ≤200% of the federal poverty threshold, only 10% of parents were US citizens, and one fifth of parents were unemployed. These findings suggest that community-based case management might prove especially useful in regions characterized by large proportions of uninsured children who are Latino, poor, immigrants, and have parents who are unemployed. Additional research is needed to determine whether community-based case managers would be equally effective in insuring uninsured children from other racial/ethnic groups and socioeconomic strata and those with parents who are primarily US citizens and employed.

The effectiveness of community-based case management suggests that it could play an important role in states with large proportions of uninsured Latino children. In Texas, for example, where 21% of children (equivalent to 1.4 million children) are uninsured[32] and an estimated 56% of uninsured children

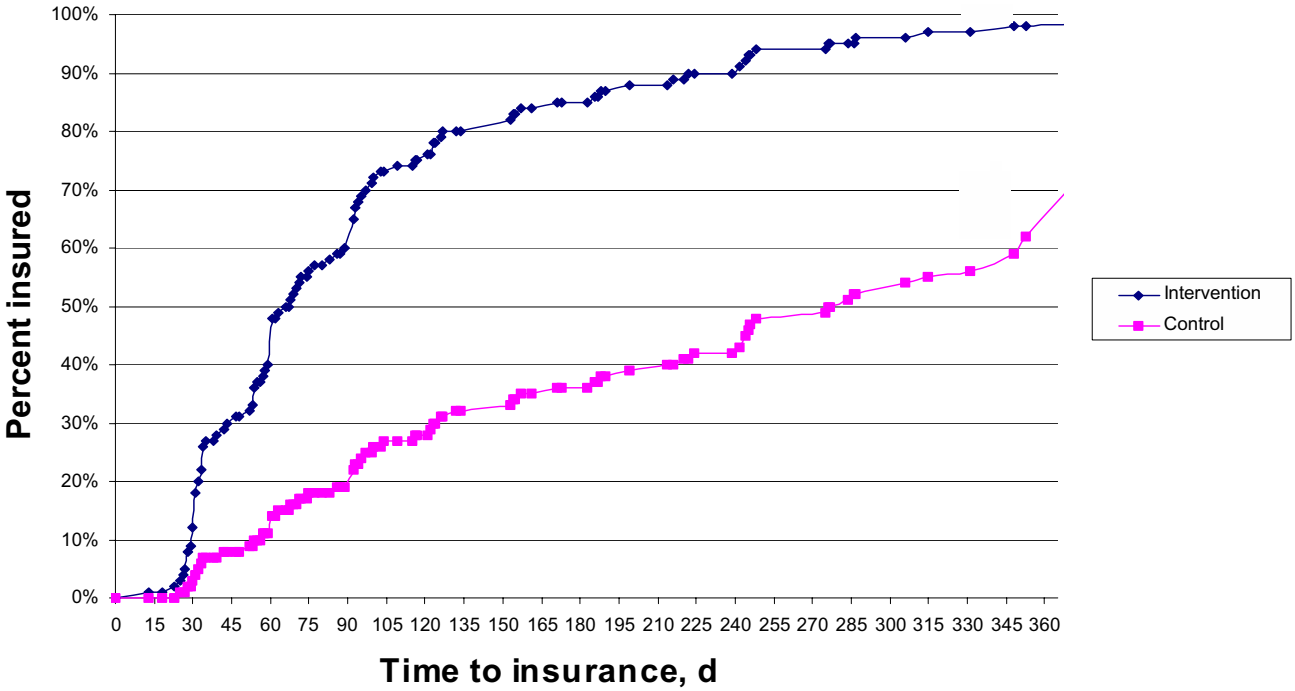

Fig 2. Time to insurance (adjusted cumulative incidence curve). Adjusted for child age, family income, parental citizenship, parental employment status, and changes in state coverage of uninsured children.

are Latino,[33] community-based case management potentially could insure >750 000 uninsured Latino children, assuming the 96% effectiveness of case management observed in this study. The study findings suggest that community-based case management has the potential to be highly effective in reducing the number of uninsured children even in states such as Texas where children from undocumented families are not eligible for insurance programs; community-based case management was found to be more effective than traditional Medicaid and SCHIP outreach and enrollment even after adjustment for parental citizenship, and more than one half of all uninsured US children are eligible for Medicaid or SCHIP.[4] As demonstrated in our study, however, in states with relatively small proportions of uninsured children, such as Massachusetts, case management might prove to be an important means of insuring the hardest-to-reach populations of uninsured children who have continued to be uninsured despite 7 years of SCHIP and Medicaid expansion, such as Latinos, poor children, and those with noncitizen parents. Our study findings may be of particular relevance for states such as Florida, which, like Massachusetts, has a SCHIP program (the Florida KidCare program[34]) that covers both citizen and qualified noncitizen children.

Certain limitations of this study should be noted. The case management intervention was studied only among Latino children; therefore, the results may not pertain to other racial/ethnic groups. The Latino subgroups represented in the study sample were typical of an urban area in the Northeast, and the findings may not be generalizable to populations with greater proportions of Mexican Americans, in other regions of the country, or in rural or suburban areas. Because the study aim was to determine the effectiveness of the case management intervention, a cost analysis was not performed, and the cost-effectiveness of the intervention could not be determined. However, we did evaluate the feasibility of conducting a cost-effectiveness analysis by collecting pilot data on 10 consecutive families enrolled in the study. Pilot data collected included the number of missed school days, the number of missed work days, out-of-pocket expenses incurred during a child's illness, the number of emergency department and clinic visits, hospitalizations, and estimates of the costs of implementing the program, including personnel salaries and time spent implementing the intervention. These pilot data suggest that a formal cost-effectiveness analysis of the intervention is feasible for this population and could be performed in future studies. Future cost-effectiveness analyses of this intervention should consider comprehensive evaluation of direct, indirect, and opportunity costs associated with implementing the case management intervention in other communities and populations.[35,36]

It can be speculated that insuring children through community-based case managers might have the potential to contribute to the revitalization of impoverished Latino communities. Case management not only could effectively reduce the number of uninsured children in a community but also might serve as a means of enhancing a community's employment opportunities. The case managers could be trained individuals from the community who serve their own community, drawn from welfare-to-work and other local and state employment programs. Part of each case manager's earnings, in turn, might be spent at local businesses, resulting in a "triple effect" of reducing the number of uninsured children, increas-

ing parental employment, and stimulating the local economy. Under this scenario, SCHIP and Medicaid programs could partner with state employment agencies to train and to hire the community case managers. As an intervention that is comprehensive, community-based, and focused on the family, community-based case management shares key features with several established family support programs considered to be effective in improving child health outcomes, such as Head Start and early intervention programs for children with special health care needs.[37]

CONCLUSIONS

This randomized, controlled trial indicates that community-based case managers are significantly more effective than traditional SCHIP/Medicaid outreach and enrollment in insuring uninsured Latino children. Community case management seems to be a useful mechanism for reducing the number of uninsured children, especially among children most at risk for being uninsured.

ACKNOWLEDGMENTS

This work was supported by grants to Dr Flores from the Robert Wood Johnson Foundation (grant 042215), the Agency for Healthcare Research and Quality (grant K02 HS11305-01), and the Centers for Medicare and Medicaid Services (grant 25-P-91458/1-01).

We are indebted to Dr Robert Kliegman, John McDonough, Sandy Tomany-Korman, and Dr Paul Wise for reviewing early drafts of the manuscript. We are grateful to the following business owners and businesses for their cooperation and assistance: Rafael Peña and J & J Market; Wash, Dry, and Fold; Hilo Market; Green Laundromat; Latino Beauty Salon; the Francisco family and In Plaza Market; and El Platanero. Special thanks are owed to all of the families who participated in this study.

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Glenn Flores, Milagros Abreu, Christine E. Chaisson, Alan Meyers, Ramesh C. Sachdeva, Harriet Fernandez, Patricia Francisco, Beatriz Diaz, Ana Milena Diaz and Iris Santos-Guerrero

Pediatrics 2005;116;1433-1441
DOI: 10.1542/peds.2005-0786