

Medical-Legal Strategies to Improve Infant Health Care: A Randomized Trial

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abstract

BACKGROUND: Changes in health care delivery create opportunities to improve systems to better meet the needs of low-income families while achieving quality benchmarks.

METHODS: Families of healthy newborns receiving primary care at a single large urban safety-net hospital participated. Intervention families were randomly assigned a family specialist who provided support until the 6-month routine health care visit. The Developmental Understanding and Legal Collaboration for Everyone (DULCE) intervention is based on the Strengthening Families approach and incorporated components of the Healthy Steps and Medical-Legal Partnership models. Medical record reviews determined use of preventive and emergency care. Surveys conducted at baseline, postintervention (6 months), and follow-up (12 months) were used to determine hardship and attainment of concrete supports.

RESULTS: Three hundred thirty families participated in the study. At baseline, 73% of families reported economic hardships. Intervention parents had an average of 14 contacts with the family specialist, and 5 hours of total contact time. Intervention infants were more likely to have completed their 6-month immunization schedule by age 7 months (77% vs 63%, $P < .005$) and by 8 months (88% vs 77%, $P < .01$). Intervention infants were more likely to have 5 or more routine preventive care visits by age 1 year (78% vs 67%, $P < .01$) and were less likely to have visited the emergency department by age 6 months (37% vs 49.7%, $P < .03$). The DULCE intervention accelerated access to concrete resources ($P = .029$).

CONCLUSIONS: Assignment to the Project DULCE intervention led to improvements in preventive health care delivery and utilization and accelerated access to concrete supports among low-income families.

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Dr Sege conceptualized and designed the study, supervised its implementation and analysis, and drafted the initial manuscript; Drs Preer, Morton, and Kaplan-Sanoff participated in the clinical implementation of the intervention, wrote sections of the initial manuscript, and participated in its editing; Drs Cabral and De Vos led the evaluation team, which also included Ms Lee and Ms Abreu; each participated in conducting statistical analyses, preparing tables, and editing the manuscript; Ms Morakinyo coordinated all aspects of the project, and ensured regulatory and human subjects compliance; she participated in reviewing and editing the manuscript; and all authors approved the final manuscript as submitted.

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WHAT'S KNOWN ON THIS SUBJECT: US parents trust the health care system and bring their infant children in for preventive care. Previous studies have demonstrated the ability of health care systems to identify, and sometimes address, the economic needs of low-income families.

WHAT THIS STUDY ADDS: Families of newborns at a safety-net primary care center have high levels of economic hardship. Compared with controls, Developmental Understanding and Legal Collaboration for Everyone families had accelerated access to concrete supports, improved rates of on-time immunization and preventive care, and decreased emergency department utilization.

As policy changes enable low-income families to gain insurance, the health care system has begun to adapt to the challenge of meeting their specific needs while also attaining quality benchmarks for preventive care.¹⁻⁴ As a result, health care systems have also begun to address the social determinants of health that play a powerful role in the health trajectories of children living in poverty.^{5,6}

Poverty affects children both directly, when material needs are not met, and indirectly, through amplifying family stress. Children's health suffers when basic needs such as food,⁷⁻¹² housing,^{13,14} and utilities^{15,16} are not met. Adverse impacts include low weight for age, developmental concerns and behavioral problems, higher risk of hospitalization, and overall poor health as rated by parents. Hardships resulting from inadequate resources to meet basic needs may coexist in >1 domain, and have cumulative impacts on child health.¹⁷⁻²⁰ The health effects of poverty on US children have led the American Academy of Pediatrics to address "child poverty and well-being" as 1 of its current strategic priorities.²¹

In addition to the direct health outcomes, economic hardship leads to increased risk for child maltreatment.^{22,23} As shown in Fig 1, the family stress model²⁴ suggests that economic hardship leads indirectly to child abuse and neglect.

Abuse and neglect themselves result in harm to child and adult health; the aggregate long-term consequences of a single year's child maltreatment in the United States have lifetime direct health care costs estimated at over \$150 billion.²⁵ Meeting basic needs for food and housing has been identified as a key strategy in preventing child abuse and neglect through the promotion of protective factors.²⁶

Poverty also adversely affects the ability of the health care system to address large disparities in the

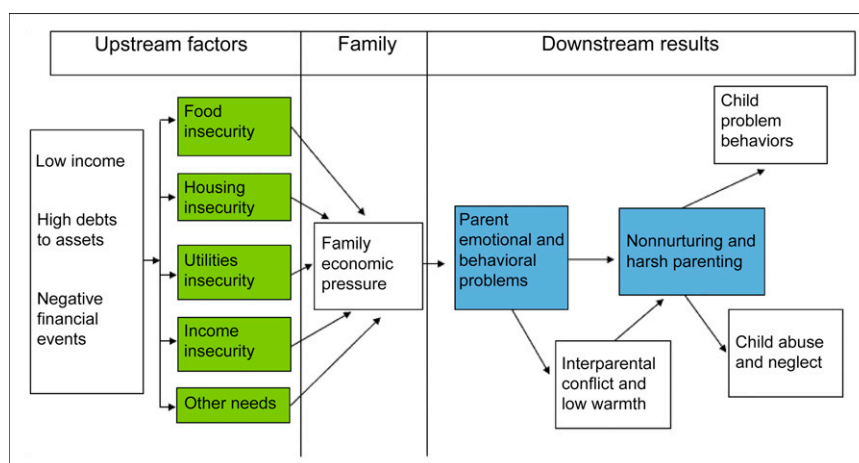


FIGURE 1 Theoretical framework. Adapted from Barnett,¹⁷ DULCE leveraged support from MLP | Boston to address upstream factors: food, housing, and utilities hardship, and to identify and support other family legal needs. This intervention was designed to reduce overall family economic pressure and the resultant downstream results.

delivery of preventive medical services, which continue to be observed,²⁷ even though virtually all US children have access to primary care.³ Some elements of the solution have already been demonstrated: care coordination in the context of the patient-centered medical homes improves health care delivery for children with and without special health care needs.²⁸ Although a positive association between visit time and delivery of preventive services has been demonstrated,²⁹ nearly 80% of routine visits involve fewer than 20 minutes of face-to-face time with a medical provider.

This report describes the outcomes of a randomized trial of a new approach to improve care of newborns and their families, Project Developmental Understanding and Legal Collaboration for Everyone (DULCE). DULCE implemented the Strengthening Families approach²⁶ in a pediatric primary care setting by developing a new program based on previous efforts: the evidence-based Healthy Steps^{30,31} and Medical-Legal Partnership (MLP)³²⁻³⁴ models.

The DULCE intervention model focused on the time from birth to age 6 months. This age group was selected for several reasons: (1)

nearly all US infants are seen in a primary care setting, and up to 5 health care visits are recommended; (2) the birth of a child inevitably changes family relationships and may accentuate existing economic hardships; and (3) the first 6 months of life is a high risk period for serious and lethal child abuse.

As a novel intervention, it was important to ensure that this new service did not diminish the ability of the setting to deliver high quality care. Children's health care quality metrics include well-child visits during the first 15 months of life, childhood immunization status, and emergency department (ED) visits.^{2,35,36} DULCE tested the hypothesis that the addition of a trained family specialist (FS) in the infants' health care setting would be able to both support families and facilitate measurable improvements in health care quality.

METHODS

Setting

This intervention occurred in the pediatric primary care clinic at a major urban teaching hospital. The practice serves over 11 000 children, the majority of whom (83%) were

covered by Medicaid, Medicaid managed care, or other state-subsidized plans. At the time of the study, this state had universal health insurance.

Parents of all eligible newborns younger than 10 weeks of age who presented for pediatric primary care at the clinic were recruited to participate in a randomized controlled trial from February 2010 to September 2012, with data collection completed by November 2013. Approval for this study was obtained from the Boston University Medical Campus Institutional Review Board. Families were excluded if the parent was younger than 18 years old, received medical care in a language other than English or Spanish, intended to change their primary care provider from the study site within the first 6 months of life, or if the infant had been hospitalized for >1 week after birth. Immediately after consent was obtained, the research assistant opened an opaque envelope and assigned families to control or intervention conditions. Subjects were randomly assigned in blocks of 10. Control group families were offered an unrelated infant safety intervention. Although data collection was masked as to group assignment, participants were aware of their group assignment.

Intervention

In addition to usual care, families randomly assigned to the intervention group were assigned to a DULCE FS. FSs had postgraduate training in child development or a related field and underwent additional training by the Healthy Steps National Director and the staff of MLP | Boston (the nation's founding MLP site). All cases were discussed in weekly case conferences that included the Healthy Steps Director, an MLP | Boston staff member, and a primary care pediatrician. The intervention itself consisted of 3 types of patient contact: (1) collaborative routine

visits with the family, the medical provider, and the FS; (2) home visits by the FS; and (3) contact with the FS by telephone, e-mail, text, or in person. Further details of the staff recruitment and training, and the content of the intervention are described elsewhere³⁷ and may be obtained online (<http://www.bmc.org/Project-DULCE.htm>).

Data Collection

Surveys were administered in our general clinical research center by trained research staff who were not involved in the intervention and were not informed of the participant's group assignment. Assessments, conducted in English or Spanish, were administered at baseline, after the 6-month well-child visit (postintervention), and after the child turned 12 months of age (follow-up). Items concerning family hardship were adapted from the Fragile Families study³⁸ with the addition of an item regarding telephone service. Initial findings indicated that some resources were available quickly, whereas others involved long waiting lists. Before data collection and analysis, the pediatric clinic's 2 primary care social workers classified types of support as being "likely," "possible," or "impossible" for families to obtain within 6 months. Receipt of concrete supports (ie, food stamps, utilities assistance, or a housing voucher) was measured by participant self-report: respondents were asked whether they had heard about, attempted to get, or received specific resources. See results for a complete list of benefits assessed.

All MLP advocate communications with the FS and all of MLP's work performed on behalf of intervention families were recorded in the MLP | Boston case management database. This database was also used to identify all MLP referrals from the practice site. FS activity was measured through analysis of an electronic activity log in which DULCE FSs recorded each participant contact.

Immunization and ED utilization data were obtained from the electronic health record. Immunization data were computed by using the age in days at the time of administration of the infant's third diphtheria-tetanus-acellular pertussis (DTaP) immunization (per the 6-month recommended vaccine schedule), including any combined immunization preparation, and age in days at the time of administration of first measles-mumps-rubella immunization (per the 12-month recommended vaccine schedule³⁹).

The total number of infants who had at least 1 ED visit recorded in the medical record and the total number of ED visits were analyzed. Visits to EDs at other hospitals were not consistently captured in the medical record and were not included in analyses.

Statistical Analysis

Descriptive statistics were generated as means and SDs for continuous variables and counts with percentages for categorical variables. Bivariate analyses comparing the study groups were conducted by using cross-tabulations with χ^2 tests for categorical variables and 2-sample *t* tests for continuous variables. Means for measures repeated over time per subject were compared between the study groups by using mixed linear models. The intention-to-treat principle was applied in all comparative analyses. All statistical analyses were conducted by using SAS version 9.3 (SAS Institute, Inc, Cary, NC).

P values < .05 were deemed throughout as statistically significant.

RESULTS

Figure 2 shows the Consolidated Standards of Reporting Trials diagram, illustrating that 1378 infant families were screened for recruitment. Infants were excluded if they spent more than 7 days in the hospital after birth (102 infants) or

had a maltreatment report filed before recruitment (50 infants). Families who had a parent who was younger than 18 years of age (19 families), who intended to leave the primary care practice within 6 months of birth (76 families), who received other home visiting services (35 families), or who did not receive pediatric medical care in either English or Spanish (149 families) were excluded. Parents who consented but did not complete baseline assessments were excluded (68 families: 31 intervention and 37 control) from all analyses. Of these, 23 (31.5%) notified us of their decision to withdraw before baseline, and 12 (9.6%) transferred their

infant's primary care to another primary care site before completing baseline assessment.

Baseline data were obtained from 330 families, including 163 control families and 167 intervention families. Table 1 describes the population demographics of participants. As shown, there were no significant differences between intervention and control families. The study population was largely African-American; 12% of families reported that they were originally from Africa or the Caribbean. Ninety-three percent of parent participants were the infant's mothers; the remaining participants

were fathers. The median age of participants was 29 years. This was the first child for half of the enrolled families. The median household income for participants was in the \$10 000 to \$30 000 range. Two-thirds of respondents reported an annual household income of \$30 000 or less, including 36% who reported annual income of \$10 000 or less. Fifty-nine percent of respondents reported being unemployed (as opposed to being on maternity or parental leave) at the time of the survey. Race, ethnicity, and insurance status of the population recruited generally reflected the population served at the practice.

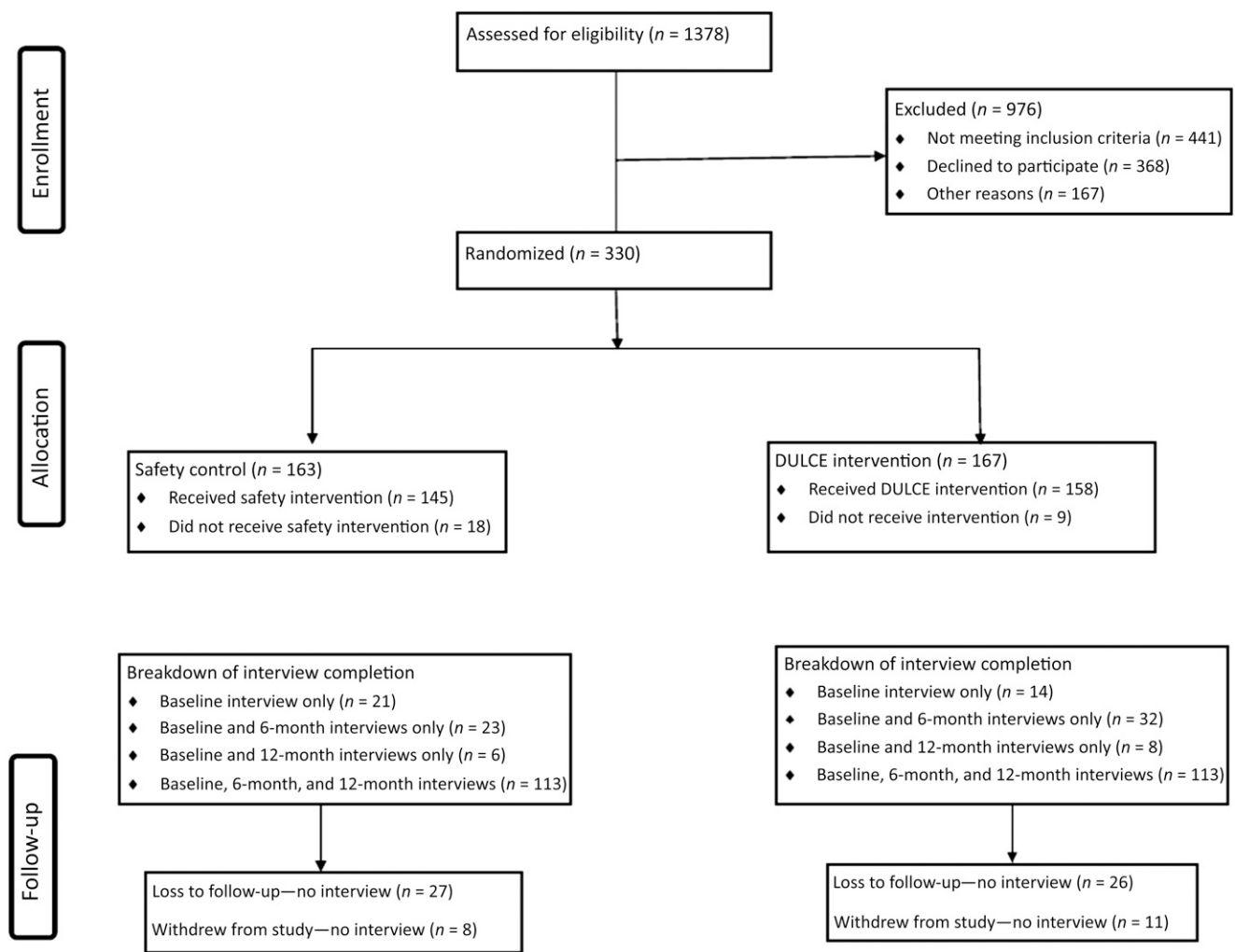


FIGURE 2 DULCE Consolidated Standards of Reporting Trials diagram showing flow of participants from initial assessment through data analysis. Please see text for detailed explanation.

TABLE 1 Participant Demographics

	Total, N = 330, %	Intervention, N = 167, %	Control, N = 163, %
Parent gender			
Woman	93.0	92.8	93.3
Parent race/ethnicity			
African American/Black	55.5	55.1	55.8
Caucasian, White, or European American	8.5	6.6	10.4
Hispanic or Latino	12.4	15.6	9.2
Other (includes multiracial, biracial, Caribbean islander, or African national)	23.6	22.8	24.5
Parent age, y			
18–24	27.0	25.2	28.8
25–29	27.9	28.1	27.6
30–34	27.9	32.3	23.3
>34	17.3	14.4	20.3
Marital status			
Never married	43.6	41.3	46.0
Married to father or mother of child in project	31.5	34.7	28.2
Not married but living with the father or mother of child in project	12.4	13.2	11.7
Other (includes divorced, separated, married but not to father/mother of child, not married but living with boyfriend, girlfriend, partner who is not the parent of the child in the project)	12.4	10.8	14.1
Education			
Less than high school graduation	9.4	9.6	9.2
Completed high school or earned GED	48.5	50.3	46.6
Completed trade/technical school; received 2-y college degree (Associate's)	23.0	24.6	21.5
Received 4-y college degree (Bachelor's); received a graduate degree	19.1	15.6	22.7
Employment status			
Unemployed	59.1	62.3	55.8
Employed	40.9	37.7	44.2
Household income			
\$0–\$10 000	36.3	40.9	31.6
\$10 000–\$30 000	30.3	28.3	32.3
\$30 000–\$50 000	17.2	17.0	17.4
>\$50 000	16.2	13.8	18.7
Reported any material hardship			
Food	60.6	63.9	57.1
Utilities	42.8	46.4	39.1
Housing	44.9	48.2	41.5
Total	74.9	77.1	72.5

Data were collected at baseline as described in the text. There were no significant differences between intervention and control groups for any of the measures shown.

Prevalence of Hardship at Baseline

At baseline, most respondents (73%) reported at least 1 type of hardship during the 12-month period before the baseline survey, which included the entire pregnancy for all participants. More than half of participants (61%) reported food insecurity. Families also reported facing significant housing concerns: 45% of respondents reported housing insecurity, with 28% reporting not having been able to pay rent or

mortgage and 6% reporting eviction. Additionally, many families struggled to pay utility bills: 42% of respondents reported missing a payment for gas, electricity, or water in the past year, and 12% reported utility shut-off due to lack of payment. Finally, almost half of respondents (44%) reported disconnection of telephone service due to failure to pay.

A majority of respondents (55%) faced hardship in more than 1

domain, including 22% who reported hardships in all 3 domains. χ^2 analysis was performed to analyze associations between family characteristics and hardships reported. Families with >1 child were more likely to experience hardship (81% vs 68%, $P = .05$). There were no significant differences between intervention and control families in any type of baseline hardship reported, or in overall hardship.

Delivery of DULCE Services

Although the study design called for visits with both the pediatrician and FS at all routine health visits and at least 1 home visit, the actual services delivered resulted from joint decision-making between the FS and the parents. As shown in Table 2, 92% of families had at least 1 collaborative health care visit, with a median of 3 visits during the 6-month intervention period. Home visits were accomplished for 52% of families, with a median of 1 home visit and a maximum of 4 visits. FSs had extensive telephone contact with participants, and also provided support in person at the clinic and in the community, and via e-mail and text messaging. Altogether, FSs had a median of 5 contact hours with each family, spread over a median of 14 separate contacts.

DULCE participation in collaborative routine health care visits did not interfere with patient flow. DULCE FSs spent a median of 1 hour with each family during the collaborative clinic visit, mirroring the 1.1 hours from check-in to check-out observed during a contemporaneous time-study conducted by the hospital administration.

Delivery of MLP Services

The FS initiated consults with MLP | Boston on behalf of 75 intervention families. Active MLP consultation involved an average of 2.3 telephone calls per family between the FS and MLP | Boston. Of these 75 consults,

TABLE 2 Number of FS Contacts per Subject by Activity Type (*N* = 143)

Activity	Mean No. per Participant	SD	Median No. per Participant	Maximum No.	% of Participants With Activity
Routine health care visit	3.2	2.1	3	11	92
Home visit	0.7	0.87	1	4	52
Summary: protocol-required contacts	3.9	2.4	4	15	99
Telephone call	11.9	11.0	9	75	97
Meeting with FS not associated with routine visit	0.7	1.3	0	9	39
Community agency visit	0.1	0.5	0	4	8
E-mail	0.9	2.8	0	25	29
Other	0.4	0.8	0	5	31
Summary: participant-initiated contacts	14.1	12.5	10	77	98
Overall summary	17.0	14.0	14	90	100

This table demonstrates the types of services provided to participants through Project DULCE. The intervention specifically required collaborative routine health care visits; each family was also offered a home visit. In addition to the protocol-required contacts, families could access the FS by telephone, e-mail, text, or personal visits at the clinic. Telephone calls may have been initiated by either FS or participant; 17% were under 2 minutes. E-mail, text, and community visits were initiated or requested by participant.

72 (96%) were resolved without direct MLP involvement in the form of legal intake and representation. Exact statistics comparing study participants to other infants are not available. However, during the DULCE study time period, MLP | Boston received 174 consults from primary care doctors, nurses, and social workers concerning patients of any age from 0 to 21, excluding the 75 DULCE calls.

Effects of the Intervention on Receipt of Pediatric Preventive Care

Routine immunizations are recommended at 2, 4, and 6 months of age.³² We examined the distribution of ages at which the third (6-month) DTaP immunizations were delivered. As shown in Table 3, intervention children were significantly more likely to have received these immunizations on time (by 7 months of age) or delayed by no more than 1 month (by 8 months of age). The difference in immunization rates was not statistically significant at the 12-month follow-up (59% vs 52%). These data were obtained from the medical records of the practice site, and may not include immunizations received elsewhere.

Bright Futures⁴⁰ recommends up to 8 routine health care maintenance (RHCM) visits during the first year of life (2 days postnewborn discharge, 2 weeks, 1 month, 2 months, 4 months,

6 months, 9 months, and 12 months); generally 6 of these occurred after study recruitment. In an exploratory analysis, we found that intervention infants were more likely than controls to have 5 or more RHCM visits in the period from initial recruitment until 1 year of life (78% vs 67%, *P* = .01). The higher number of RHCM visits may reflect improved retention of patients at the clinic, as families discontinued primary care at the study site during the first year of life. By 12 months of age, 93% of intervention families continued to receive primary care at the study site, compared with 86% of control families (*P* = .056).

ED Utilization

We observed a decrease in the proportion of infants who had at least 1 ED visit by age 6 months: 36.5% of intervention infants had at least 1

visit compared with 49.7% of control infants (*P* = .021). By 12 months of age, the trend, although still favoring the intervention group, was no longer significant (59.3% vs 65.0%, *P* = .40). Similarly, the total number of ED visits was significantly lower in the DULCE group than in the control group at 6 months (*P* = .023) but no longer significant by age 12 months (*P* = .08).

Intervention Effects on Access to Resources

Participants were asked about their receipt of specified public benefits and protections at baseline, postintervention (6 months), and follow-up (12 months). Table 4 lists these benefits, and Table 5 shows the results of a mixed linear model analyses of these data; models with group, time, and group-by-time interaction. Compared with controls, research subjects had significantly more success in obtaining utilities assistance and in obtaining resources overall. Maternal age, education, and parity did not significantly modify these outcomes. There was a significant difference between the intervention and control groups in access to 8 resources (local food pantry or food program, Supplemental Nutrition Assistance Program, Special Supplemental Nutritional Program for Women, Infants, and Children, discounted telephone service, low-income utility

TABLE 3 Immunization Adherence, 6-mo Recommended Immunizations

Age at Third DTaP	DULCE, <i>N</i> = 165, %	Control Group, <i>N</i> = 161, %	<i>P</i>
<7 mo (211d)	78	63	.002
<8 mo (241d)	89	78	.008
Ever	95	89	.06

This table reveals the proportion of participants who received their third DTaP immunization on time. In adherence with American Academy of Pediatrics and Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices standards, patients receive DTaP immunizations at the 2-mo, 4-mo, and 6-mo visits. Therefore, patients who comply with recommended preventive health care will receive immunizations before age 7 mo.

TABLE 4 Public Resources Included in Participant Survey

Food assistance
Local food pantry or other food program ^a
SNAP: Supplemental Nutrition Assistance Program (“food stamps”) ^a
WIC: Special Supplemental Nutritional Program for Women, Infants, and Children ^a
Utility assistance
Discounted cell phone or landline service ^a
Low-income utility discount ^a
Utility shut-off protection ^a
Housing assistance
Rental voucher (state subsidy programs)
Section 8 voucher (federal subsidy program)
Income assistance
Child support
EAEDC: Emergency Aid to the Elderly, Disabled, and Children ^a
TAFDC: Transitional Aid to Families With Dependent Children ^a
SSI: Supplemental Security Income
SSDI: Social Security Disability Income
Unemployment benefits

As described in the text, participants were asked whether they had heard about, tried to get, or obtained each of 14 public resources. This table lists the times included, divided by assistance type.

^a Resources were described by Boston Medical Center Department of Pediatrics clinical social work team as likely to be obtainable within 6 months of application.

discount or shut-off protection, Emergency Aid to the Elderly, Disabled, and Children, and Transitional Aid to Families With Dependent Children) that clinical social workers had previously categorized as being likely to be attainable within the 6-month study time frame ($P = .0072$), and a trend toward improvement in areas deemed possible ($P = .2$), and no difference between the groups in resources that were judged to be impossible to obtain within 6 months such as housing.

DISCUSSION

The families of infants who received primary care at our urban safety-net hospital experienced high levels of hardship. DULCE added the services of a specially trained FS to services available in the clinic for families with children from birth to 6 months of age and led to significant acceleration in attainment of concrete supports, and in measures of preventive care delivery.

Families of newborns may experience particularly high levels of hardship. Our finding that 61% of the families of newborns experienced food insecurity is higher than reported in a recent study of the entire pediatric age span conducted at an urban pediatric clinic reported (33% incidence),⁴¹ and then reported by the 5-city Children’s Health Watch (22% for 2012).⁴² Although direct comparison is complicated by methodological differences, there is little doubt that many low-income families of newborns experience high levels of hardship. This high level was observed despite demographic factors that would seem likely to mitigate hardship: most participating mothers were at least 25 years old, almost half of the households included 2 parents, and half of parents had attained at least a high school degree.

Government agencies administer public benefits programs in accordance with complex laws and regulations. MLP | Boston provided training and ongoing consultation to the FSs throughout the intervention. This study represents the added effects of a trained FS in a system that

already includes MLP services; physicians caring for control group patients also had access to MLP resources. Integration of a FS allowed MLP to reserve direct legal services for the small number of families facing complex situations. This model’s success in amplifying the impact of a relatively low dose of MLP resources carries important implications for evolution of the MLP network, which currently has over 250 sites and has been endorsed by the American Medical and Bar Associations.^{43–45}

DULCE accelerated access to concrete supports for newborns and their families; intervention families received greater support for their concrete needs during the infants’ first 6 months of life. Previous research suggests that the early provision of concrete support may protect against child neglect and abuse and reduce parental stress,⁴⁶ and promote the formation of positive attachment relationships.^{47,48} Other programs to address the concrete needs of families through improvements in primary health care have been described: WE CARE features a simplified, self-administered needs assessment coupled with practice guidance to specific resources.⁴⁹ Safe Environment for Every Kid uses a screening instrument, originally administered by physicians, to refer selected families to social work support.^{50,51} DULCE differs from these interventions in that a specially trained FS who has established

TABLE 5 Family Resources Received by Group and Time

Resource	Baseline, N = 330		6 mo, N = 281		12 mo, N = 237		P, Group by Time Interaction
	DULCE, N = 167, %	Control, N = 163, %	DULCE, N = 145, %	Control, N = 136, %	DULCE, N = 119, %	Control, N = 118, %	
Food assistance	43.0	40.6	44.8	39.5	43.5	42.2	.179
Housing assistance	9.4	11.2	11.0	10.3	13.9	12.7	.285
Income assistance	21.5	16.6	23.8	18.4	21.1	18.8	.453
Utility and telephone assistance	4.2	6.4	9.3	4.6	12.7	10.6	.006
Summary result: mean number of resources received	2.8	2.6	3.2	2.7	3.7	3.2	.029

Participants were asked whether they had heard about, tried to get, or obtained specific resources at the baseline, 6-mo, and 12-mo interviews. This table reveals the results of these surveys for each type of assistance. Probabilities were computed based on participants who had complete follow-up through 12 mo (N = 223).

a trusting relationship with families both conducts the needs assessment and provides direct assistance to families in obtaining resources.

DULCE support was delivered universally within the health care setting and is intended to implement the Strengthening Families approach.^{26,37} Although this study was not designed to directly assess costs in routine implementation, several features may reduce costs: the intervention is based in the primary care setting, reducing the costs of case identification, outreach, and travel. In general, the cost is expected to compare favorably with universal home visiting models and be a fraction of the cost of more intensive maternal–infant early childhood home visiting programs.

Project DULCE improved the delivery of preventive health care. Although the physician spends less than 20 minutes with each family during a routine health care visit, families often spend over 1 hour at the health care site. DULCE made use of this time. Families who have been actively engaged in their infant’s health care and may be more likely to prioritize their routine health care visits. Reminder systems have been shown to promote adherence^{52,53}; DULCE, by making the visits more valuable for families, may offer another avenue for improvement in delivery of preventive health care. As health care systems become accountable for the delivery of preventive services, the cost of this intervention may be partially offset by reduction in case management costs.

The single site involved in this study has on-site social work support available, extended services through availability of MLP, and a help desk staffed by HealthLeads.⁵⁴ Higher effectiveness of the intervention may be seen in clinical sites with less robust preexisting integrated support resources. Even so, the findings reported here support the conclusion that a FS trained and supported by MLP and Healthy Steps and embedded in pediatric primary care can measurably assist low-income families with infants in securing concrete supports, and improve the overall quality of primary care and preventive care delivery.

Limitations

This study was conducted at a single hospital-based primary care site, 1 with previous experience with each of the programs that formed the basis for the intervention: Healthy Steps and MLP | Boston. Quantitative measures reported here were restricted to unverified self-report of specific public benefits and review of medical records. For many outcomes, the effect size diminished by 6 months postintervention (12 months) to the point that it was not significant in this population. Future studies may examine the impact of a DULCE model in supporting other family strengths.

This project was implemented in the context of a randomized controlled trial design requiring that the initial innovation be completed with fidelity; further improvements in effectiveness may be sought by using quality improvement techniques.⁵⁵

CONCLUSIONS

Project DULCE offers a promising method of delivering services that appears to improve the quality of preventive service delivery without disrupting core clinical operations. This may prove to be a useful innovation in developing comprehensive, family-centered, community-based systems to support low-income families with young children.

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ABBREVIATIONS

DTaP: diphtheria-tetanus-acellular pertussis
DULCE: Developmental Understanding and Legal Collaboration for Everyone
ED: emergency department
FS: family specialist
MLP: Medical-Legal Partnership
RHCM: routine health care maintenance

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