The Challenge of Population Impact on School Readiness

Through Early Intervention Programs

Kenneth A. Dodge

To Be Presented at the Conference on:

Improving Low-Income Children’s School Readiness:
New Perspectives on an Enduring Challenge

Laura Parsons Pratt Conference Center at the Federation of Protestant Welfare Agencies

New York, New York

September 29-30, 2010
The Challenge

Although some early-life home-visiting programs have been found to be effective in preventing child maltreatment and improving school readiness among their participants, no home-visiting program that was developed at the individual level has yet demonstrated successful impact when implemented on a community level, that is, measured by population scores. Rarely has such a goal even been attempted, in spite of the presumed prescribed plan for the field of prevention science to move from basic science to an efficacy trial to an effectiveness trial to dissemination (Welsh, Sullivan & Olds, 2010). Scaling up is either not attempted or runs into problems for many reasons, primarily because funds are limited (that is, even a promising advertised rate of return cannot compel a community if the opportunity costs of saturating a community are too high) and scaling up presents inherent obstacles in fidelity and implementation. However, impact on population outcomes is the essential goal of public health and public policy.

The thesis of this paper is that community impact might be achieved by a different research and development strategy altogether, one that starts at the community level so that scaling up is not an issue. In this paper, I have three goals: 1) I will identify several problems in scaling up; 2) I will articulate a community-level strategy as an alternative; and 3) I will report initial implementation findings from one program using this strategy.

Problems with a Model that Requires Scaling Up

(As an aside, I will acknowledge that I have been involved in a different program that followed the model of an efficacy trial and yielded favorable impact, but I have learned that it will never be disseminated fully due to challenges in scaling up.)
The most popular maltreatment-prevention programs are long-term, intensive home visiting for high-risk, pregnant, primiparous women selected by demographic characteristics (e.g., Healthy Families, Lee et al., 2009; Nurse Family Partnership [NFP]; Olds et al., 2009). The rationale for these programs is that the highest victimization rates occur among infants under age 1, and certain groups of women are at higher risk than others. Only some of these programs have proven efficacious to prevent child maltreatment, however, and even in the gold-standard NFP program, effects are weaker in some subgroups than others, probably because one intervention protocol cannot meet the needs of diverse families. *Most importantly, no targeted home-visiting program has ever been scaled up successfully to lower the population rate of maltreatment for an entire community.*

Numerous challenges remain to be solved before home visiting can be said to have a significant effect on population rates of child maltreatment. Greenwood et al. (1998) and Welsh, Sullivan, and Olds (2010) identify several of these challenges. Even if an effective program is successful in reducing child maltreatment among its participants by as much as one half, it would likely have only a negligible impact on population rates of maltreatment, for numerous reasons including *universality, penetration, fidelity, and community capacity.*

First, home-visiting programs are rarely intended to be universal. For example, the NFP program is limited to first-time, low-income mothers who receive prenatal services before the end of the second trimester. Although this is a high-risk group, they account for less than half of all maltreatment cases in a community. A policy of targeting low-income families stigmatizes this group and would reach only a portion of problem-outcome families. Although targeting first-time mothers means that every child would eventually be covered, it would take years before the current child population ages out and the new population is saturated.
Second, penetration and retention for home-visiting programs are typically low. For the NFP, mothers must be identified and consented before the end of the second trimester of pregnancy, and too many members of this group do not receive ongoing prenatal care by this date or do not consent to a 27-month program. Furthermore, randomized controlled trials involve women who consent to participate in a research study and who remain in the original community. It is plausible that this subgroup is biased toward those who are particularly susceptible to the positive impact of intervention and that intervention with the full population would be less effective. For the NFP Program, Olds, Henderson, and Kitzman (1994) reported that 10 percent of their target group was missed due to late registration for prenatal care, an additional 10 percent was missed due to being served by private practitioners, and an additional 20 percent was interviewed but did not enroll.

Once consented, women have a high rate of dropping out of a home-visiting program before completion. Harding, Reid, Oshan, and Holton (2004) report a 50 percent dropout rate in less than 12 months for the Healthy Families program. Daro et al. (2003) report that only a third of families in home-visiting programs remain for two years.

Third, program developers acknowledge that programs typically suffer degradation in quality, fidelity, and presumed impact when a small program is scaled up. Olds, Hill, O’Brien, and Moritz (2003) reported that families have higher attrition rates when the NFP Program is disseminated, and, even when retained, they receive fewer postnatal visits. Welch et al. (2010) label this effect the “scale-up penalty” and estimate it as being 15 to 40 percent. Reasons for degradation include lower quality in hiring, less supervision, and management difficulties with shifting to community ownership. It may be easier to hire qualified interventionists, train and
supervise them, bring them to fidelity, and retain them and their high fidelity at small scale in a university context than in a public government or community context.

Finally, existing programs are predicated on the assumption that community capacity to respond to the needs of participants would be sufficient if a program were to be taken to scale. A key component of the effectiveness of home-visiting, according to Olds et al. (1986), is the ability of the nurse home-visitor to navigate the network of services in a community and bring individualized resources, such as high quality child care and professional mental health services, to the family. When a program is implemented in a randomized trial with a relatively small proportion of families in a community, the home visitor probably provides the family with a competitive edge over non-treated families in receiving these resources. It is plausible that if a program is taken to scale, the identified needs of families would exceed community capacity to provide services, resulting in lower impact on child outcomes. As noted by Guterman (1999), the debate between universal and targeted home-visiting programs has important implications “not only for the screening process per se, but also for the ... subsequent configuring of services to address families’ specific needs” (p. 864). Thus, problems in scaling up any program are inevitable if the program is conceived, developed, and initially implemented at the individual level with only a small number of families.

A New Population Approach: Durham Connects

An influential Institute of Medicine report (Mrazek & Haggerty, 1994) advocated a sequential process of using epidemiological findings to create a program, to evaluate it with a small RCT, to replicate with a larger RCT, and then to disseminate the program in a community. A different approach starts with the population impact as the goal and the community as the
context. This approach confronts challenges of universality, penetration, fidelity, and size during the design stage of program creation, admittedly slowing down initial development.

An assumption of traditional prevention science is that there is an inherent trade-off between ecological validity and experimental rigor. Developers assume that programs implemented at scale in community contexts cannot be evaluated with as much rigor as those in university contexts. I argue that this is a false premise and that RCTs are possible in communities without any loss in ecological validity.

The Durham Connects Program is a short-term community-based, universal nurse home-visiting program that aims to lower the population rate of child maltreatment. It was developed in the community through support of The Duke Endowment over a period of six years, piloted for 12 months, and is now being implemented and evaluated in an RCT by a collaboration of university scholars, public health officials, and community leaders. The Durham Connects Program is implemented jointly by the Durham County (North Carolina) Department of Health and Duke University. It is designed to be brief and relatively inexpensive per family (about $800) so that communities can afford its costs. Its goals are consistent with those of more intensive nurse home-visiting programs. For NFP, Olds, Henderson, Chamberlin, and Tatelbaum (1986) stated that in postnatal home visits, “the nurses carried out three major activities that they had begun during pregnancy: parent education regarding fetal and infant development, the involvement of family members and friends in child care and support of the mother, and the linkage of family members with other health and human services” (p. 66). The goals of Durham Connects nurse visits were to: 1) connect with the mother in order to enhance maternal education, skills, and self-efficacy; and 2) connect the mother with individually-identified
community services in health care, child care, mental health care, and financial and social support.

Durham Connects consists of 4-7 intervention contacts. It begins with a visit during the birthing hospital stay, followed by 1-3 nurse home visits between 3-8 weeks of infant age, 1-2 contacts with a community service provider, and then a follow-up contact one month later. During the visits, the nurse engages with the mother and completes a health and psychosocial assessment, during which she systematically assesses risk and family needs in 12 important empirically-derived domains of family functioning. For each domain found to be at risk, the nurse intervenes directly to support the mother or connects the mother with ongoing evidence-based interventions in the community. Although Durham Connects is implemented universally, it focuses on triaging families according to assessed risk and then connecting them with ongoing collaborating community resources that can “carry the family’s baton” after the nurse home-visitor leaves the family. Close monitoring of rates of identified family needs and of family experiences with services by two community advisory boards enables the program leaders to improve community infrastructure for services, which would not be possible with an individual-level program. Community agencies have signed a memorandum of agreement to implement services according to a Preventive System of Care (Dodge et al., 2004; Tolan & Dodge, 2005), which requires collaboration across agencies, family-centered delivery, and commitment to building a continuum of care.

The optimal evaluation of a program like Durham Connects would involve random assignment of numerous communities to intervention or control conditions. Prinz et al. (2009) is a model for this design. In the current case, we randomly assign families within Durham according to the date of birth: For the period July 1, 2009, through December 31, 2010, every
infant born on an even birth date (approximately 2,500 births) is assigned to receive intervention, and infants born on odd birth dates (approximately 2,500 births) receive other services as usual and serve as randomized controls. Population rates of outcomes including official rates of investigated and substantiated maltreatment, emergency department rates for maltreatment-related infant injuries, and pediatric record reviews of health care compliance are coded by birth date to evaluate impact. A random sample of infants (one per birth date) from the intervention (n = 275) and control (n = 275) groups at infant age 6 months, 15 months, and 24 months will be contacted for in-home interviews to assess maternal functioning, infant healthy development, and child maltreatment outcomes.

With this design, intervention impact can be evaluated monthly, and documented mid-trial improvements in intervention plan can be implemented and evaluated without loss of integrity of the RCT. As an example, on April 1, 2010, half-way through the RCT, the in-hospital visitor improved recruitment practices, leading to higher penetration rates.

The impact of Durham Connects on population outcomes is not yet known. To date, Durham Connects has shown evidence of high penetration when implemented with all births in the community, high fidelity of implementation as assessed by independent observation and coding, successful connection of families with community services, and high family-consumer satisfaction.

**Penetration**

The first nine months of implementation included 1,162 births assigned to intervention. Of these, 81% were successfully contacted and scheduled, with a trajectory of slightly increasing penetration success across months, moving from 74% in the first month to 86% in the most recent month. Penetration rates varied across groups, with successful penetration for 83% of
Africans, 88% of Latinas, and 67% of Caucasians. Poor families, as measured by having Medicaid or no insurance, had 83% penetration, in contrast with 72% for privately insured families. Thus, it seems that the program is initially more attractive to disadvantaged families.

However, disadvantaged families were slightly more likely to drop out before completion of all stages of the program, with 15% of poor families dropping out, in contrast with 13% for privately insured families. Dropout rates were 19% for African Americans, 7% for Latinas, and 14% for Caucasians.

**Identified Risk Factors**

The nurse home visitor is charged with scoring family risk in each of 12 factors that have been linked empirically to risk for maltreatment. For each factor, the nurse scores 1 if the family is functioning well with no need for intervention, 2 if the need is identified but resolved adequately by the nurse during the 1-3 home visits, 3 if the need is identified and warrants a connection to an ongoing community service, and 4 if the risk is so imminent that intervention is necessary within 24 hours. Examples for the factor maternal substance use are: 1 if substance use is denied and not suspected; 2 if past but not current use is identified, along with a current plan if it occurs again; 3 if it is ongoing; and 4 if it is so obstructive that child protective services must be called. These 12 factors sort themselves into 4 domains.

Thus far, we have found that 36% of families have been documented as having scored a 3 in at least one factor, leading the nurse to connect the family with community resources. An additional 47% of families scored at least one 2, indicating that the nurse tried to provide supportive intervention of some type for 83% of all families. Broken down by domain, 28% scored a 3 in the health care domain, 11% in the parenting/child care domain, 20% in family
violence/safety domain, and 15% in the parent mental health and support domain. Because these categories overlap, the figures sum to more than 36% in all.

At a more discrete level, the highest areas of risk for families (i.e., scoring a 2 or higher on the 4-point scale) are: maternal health (55.4%), household supports (46.2%), infant health (39.9%), maternal well being (i.e., depression, anxiety) (36.5%), child care plans (33.6%), and social support (31.9%). These figures are being used to identify community resources to address needs. We have an electronic database of over 500 community service agencies, coded by risk factor, which nurses can use in meeting with families. The figures are also used to marshal local support for additional evidence-based interventions in high-need factors. This is an example of how the program iterates between individual-level intervention and community-level change.

Fidelity of nurse behavior and reliability of scoring are being assessed by having an independent auditor accompany each of the 10 nurses on at least one home visit per month. Cohen’s kappa on scoring the 12 risk factors has a median of .53, with a range of .38 to 81. Kappas across the 10 nurses have a median of .54, with a range of .43 to .76. These figures are used in nurse supervision and retention, with an understanding of the challenges of hiring, supervision, and retention in a government department.

**Consumer Satisfaction**

Interviews by an independent caller have been conducted with a random sample of families one month after the case has been closed. Overall, families have been extraordinarily pleased the nurse services they had received. The vast majority reported the following elements of the visit as helpful (versus not helpful): the timing of the visit (94.6%); the materials provided by the nurse (diapers, thermometer, books, etc.) (100%); the discussion with the nurse about the
mother’s needs (97.2%); and the discussion with the nurse about parenting the baby (94.5%). Every respondent has indicated that she would recommend the visit to another new mother.

This is a program that has become very popular in the Durham community. Popularity is explicitly a goal of the program’s implementation and marketing. Ob/gyn physicians refer pregnant women, community hospitals claim the program as part of their usual care, and pediatricians encourage family participation. Popularity challenges the random assignment plan when odd-birth date families ask for the program. The RCT will end on December 31, 2010. If the program has positive impact as evaluated by the RCT, the next step will be expansion to every family in 2011. One challenge is that the evaluation will not be completed for at least an additional 9 months, so an interim community funding solution must be identified.

Conclusion

There are numerous limits and flaws in the design of the Durham Connects Program and evaluation. It is short-term. It relies on ongoing community resources, which may not always be evidence-based or effective in real practice. It attempts to reach every family but still misses some families. Its true penetration and impact are optimally tested in an RCT with assignment at the community level, but the current testing only approximates that level.

Nonetheless, the design and implementation differ vastly from university-based efficacy trials because of the grounding in community ownership and the goal of population impact. We maintain that this added richness is well worth the extra time it has taken and perhaps lower level of implementation quality as measured by fidelity. The best evidence on this question will come when the impact of Durham Connects is evaluated for impact when the infants reach age 6 months and beyond.
References


