**Online Resource Caption**

*Online Resource 1.* Implementation Strategies and Partnership Building Activities

# Online Resource 1: Implementation Strategies and Partnership Building Activities

**Article Title:** Developmental Monitoring and Referral for Low-Income Children Served by WIC: Program Development and Implementation Outcomes

**Journal Name:** *Maternal and Child Health Journal*

# Author Names

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**Implementation Strategies**

The Expert Recommendations for Implementing Change Project published a compilation of 73 implementation strategies to promote conceptual clarity in the field of Implementation Science (Powell, et al., 2015). This project employed the following recommended strategies.

|  |  |
| --- | --- |
| Phase I (2010–2012) | Phase II (2014–2016) |
| Access new funding  Build partnerships  Build a coalition  Use Advisory Board  Use data experts  Assess for readiness and identify barriers and facilitators  Identify early adopters  Develop program  Identify and prepare champions/inform local opinion leaders  Conduct local consensus discussions Develop training materials (program  delivery, data collection)  Make training dynamic  Centralize technical assistance  Initial implementation  Distribute educational materials  Conduct educational meetings, model and simulate change  Conduct ongoing training  Capture and share local knowledge  Facilitation/problem solving  Promote adaptability  Audit and provide feedback  Provide clinical supervision  Tailor strategies  Remind clinicians  End of project  Conduct data collection and analysis Facilitate relay of program evaluation data to providers  Develop formal implementation blueprint for next phase  Stage implementation scale up | Access new funding  Obtain formal commitments  Purposefully reexamine the implementation  Revise program materials and training  Deliver training  Recruit and train leaders to provide ongoing  technical assistance  Encourage intra-professional sharing of  information at points of staff turnover Conduct program evaluation and share results  with providers |

**Partnership Building Activities (Phase I)**

|  |  |
| --- | --- |
| WIC | 3 St. Louis City WIC agencies with 11 clinics\* 176 site visits  19 staff meetings  5 WIC district meetings  3 meetings with state WIC leaders |
| Advisory Committee | 20 people representing state and local WIC, healthcare providers, and related child-serving agencies  12 meetings (2 full group meetings each year, plus subgroup meetings during 2-year grant period) |
| Primary care providers | 3 primary care practices co-located with WIC sites; these practices made a special request for and installed environmental graphics  75 community providers given program  information at small group trainings and workshops |
| Specialty care providers | 2 child development centers; these centers made  a special request for and installed the environmental graphics  9 diagnosticians participated in informational meetings |
| Childcare providers/parent educators | 4 agencies  278 providers given program information at their trainings and workshops  602 packets/postcards sent to providers  4 association newsletter articles  1 large childcare site made a special request for and installed environmental graphics |

\* Initially there were four agencies with 16 sites in St. Louis City. One agency shut down shortly after the program began, and WIC services consolidated into three agencies with 11 sites that participated throughout the pilot.

**Reference**

Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., Proctor, E. K. & Kirchner, J. E. (2015). A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implement Sci, 10*, 21. doi:10.1186/s13012-015-0209-1

**Online Resource Caption**

*Online Resource 2***:** *Learn the Signs. Act Early*. Developmental Milestone Checklists

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***Learn the Signs. Act Early*. Developmental Milestone Checklists**

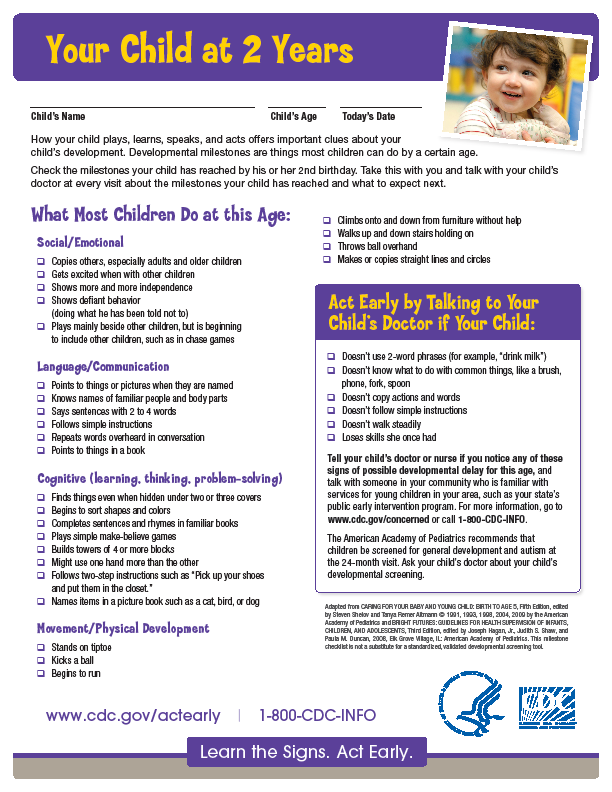
The Developmental Milestone Checklists were first introduced during the launch of the *Learn the Signs. Act Early*. (LTSAE) public health campaign in 2004 (Daniel, Prue, Taylor, Thomas, & Scales, 2009). Subject matter experts at the Centers for Disease Control and Prevention (CDC) adapted the developmental milestones presented in two key publications from the American Academy of Pediatrics (Hagan et al., 2008; Shelov & Altmann, 2009) into age-specific checklists with plain language descriptions and examples of the milestones**.**

For the WIC Developmental Milestones project, parents of children ages two months through four years were invited to complete age-appropriate LTSAE developmental milestone checklists during WIC eligibility recertification visits. Nine checklists were used in this project, ranging from age two months to four years (2, 4, 6, 9, 12 and 18 months; 2, 3 and 4 years). The checklists were available in English and Spanish. The checklist for 2-year-old children below is an example. Other milestone checklists specifically developed for use in WIC clinics are available online (<https://www.cdc.gov/ncbddd/wicguide/wic-developmental-milestone-checklists.html>).

At the top of each checklist is space to enter the child’s name, age, and the date. Each checklist contains a section entitled “What Most Children Do at this Age” under which are four categories of development-social/emotional, language/communication, cognitive, and movement/physical development. Under each category are several milestones that children typically achieve by that specific age. Each checklist also contains a separate box with potential warning signs (i.e., concerning behaviors that should prompt immediate follow-up with the child’s health care provider). The checklist also provides information about how to find local early intervention agencies that provide standardized developmental screenings. An open-ended question about developmental concerns was added at the bottom of the checklist during Phase II, and children whose parents reported possible concerns were always referred.

The checklists have now expanded into a larger suite of related materials, such as the CDC Milestone Tracker mobile app. CDC materials are currently available online in several languages other than English and Spanish, including Arabic, Brazilian Portuguese, Haitian Creole, Simplified Chinese, Somali, and Vietnamese.

(<https://www.cdc.gov/ncbddd/actearly/freematerials>)

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References

Daniel, K.L, Prue, C., Taylor, M.K., Thomas, J., & Scales, M. (2009). ‘Learn the signs. Act early’: a campaign to help every child reach his or her full potential. *Public Health, 123 Suppl 1,* e11-16. Doi: 10.1016/j.puhe.2009.06.002

Hagan, J., Shaw, J.S., & Duncan, P.M. (2008). Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents, Third Edition. Elk Grove Village, IL: American Academy of Pediatrics.

Shelov, S., & Altmann, T. (Eds.). (1991, 1993, 1998, 2004, 2005, 2009). Caring for Your Baby and Young Child, 5th edition. Bantam: American Academy of Pediatrics. Retrieved September 13, 2021, from <https://reader.aappublications.org/caring-for-your-baby-and-young-child-5th-edition/1>.

**Online Resource Caption**

*Online Resource 3***:** Supplement to Methods Section

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**Supplement to Methods Section**

The first step in the WIC Developmental Monitoring project was to develop a workable process for developmental monitoring and referral in WIC clinics, and then examine staff response to the program in the clinics where it was developed (Phase I) and replicated (Phase II). This supplement presents more detailed information about programmatic decisions and data collection procedures during this project.

1. *Learn the Signs. Act Early*. (LTSAE) checklist administration.
   1. *How often*? WIC required visits every 6 months for eligibility recertification, and these were designated for developmental monitoring. This process involved parent completion of brief, family-friendly milestone checklists, followed by WIC staff review of responses and referral for screening and further assessment if potential concerns were noted. Parents were likely to participate in recertification visits to maintain their qualification for WIC food vouchers, as well as to access other nutritional supports. Linking developmental monitoring to these visits maximized the likelihood that parents would be invited to complete a milestone checklist at least twice a year, yet also helped staff manage time required for monitoring by focusing their efforts on these two visits. This approach was preferred by staff as the process was being developed*.* If a parent expressed a developmental concern during another visit or if staff observed possible concerns, WIC staff had the option to complete a checklist during that visit.
   2. *By whom*? During Phase I, both the nutrition and clerical staff were involved in program planning and implementation to determine optimal ways to integrate the checklists into WIC clinic flow. The emerging consensus was that nutrition staff should take the lead on program administration rather than share this task with clerical staff, during Phase II, for the following reasons:

* Only nutrition staff made referrals for outside services, so it was logical that they should review the checklist and make the determination about referral for screening and further assessment.
* Nutritionists always see the clients as a part of eligibility recertification visits twice a year, so they supported the idea of linking developmental monitoring with recertification. They felt this process would standardize developmental monitoring and referral in WIC clinics, clearly establish responsibility for monitoring so every child had the opportunity to participate, and increase time efficiency.
* Some clinics chose to have clerical staff give the parents the checklist during recertification visits, but the nutritionists always reviewed it with the parent and made referrals for possible developmental concerns.
  1. *How much time is required*? Project staff worked with WIC staff and administrators to shape a program that was acceptable, feasible, and as time efficient as possible, as described below.
* The developmental monitoring process typically required two to five minutes or less, and checklists were readily accepted as developmental monitoring tools (see Table 3).
* The checklist protocol included structural supports that promoted time efficiency, such as the organizational Materials Toolkit and the Talking Points Guide for protocol administration and frequently asked questions. The environmental graphics also may have supported time efficiency because staff reported they made it easier to initiate a discussion about milestones with parents.
* Staff only administered checklists during eligibility recertification visits twice a year, as noted above, reducing the time required each month. Parents of children older than 24 months may have only completed one LTSAE checklist during the year, since only one checklist was available for children ages 2, 3 and 4 years old. If a child in this age range had achieved all milestones during the first recertification visit, no other checklist was given that year. Checklists were no longer administered to children who were referred unless the parent requested continued monitoring.
* Staff were allowed to use the referral as a parent goal for Growth and Development as long as it was also linked to nutrition goals, reducing time spent with parents on a separate goal.
* Flexibility was built into the program, so that if staff time was limited on a particular day, they could opt to provide the checklist at a later visit. Each clinic was also encouraged to integrate the milestones program into their own clinic flow to optimize time efficiency.
* We did not ask staff to take time to track data that would have been helpful, including number of children with completed checklists, number referred, number of children already diagnosed with developmental conditions and number excluded because of language/literacy concerns or other barriers. We acknowledge this as a limitation, but asking for the collection of this data would have presented significant challenges in this formative project. University project staff did not collect this data due to the lack of adequate resources to do so and the need to avoid excessive intrusion into WIC clinic flow during this formative project.

1. Referral guidelines

The checklists are not screening tools with empirically validated “cutoffs.” Yet WIC staff needed a guideline to determine when to refer children’s parents to the PCP or other community professionals for screening and further assessment. See below for details about this process.

* While missing even one milestone is an opportunity for parents to discuss their child’s development with their child’s health care provider, WIC staff sought slightly more restrictive guidelines to more practically and feasibly support their ability to make a referral for developmental screening and follow up. With input from CDC partners, project staff selected a Phase I referral guideline of >3 missing checks in the list of milestones most children achieve, or at least one check in the box indicating “red flags” for developmental concerns.
* Prior to launching Phase II, project staff sought direct feedback about this guideline from WIC nutritionists who reviewed the checklists and made referrals during Phase I. They reported some parents were unsure of how to respond to a few of the checklist items for a variety of reasons (e.g., inattention/distractibility, item wording, low literacy). In these instances, WIC nutritionists reported the likelihood that some children were referred not because of developmental concerns but rather because of parental challenges when completing the checklist. Referral for a potential developmental concern added time to the program, compared to time needed just for checklist administration and review. To address these issues, the guideline for referral was increased to >5 missing checks or at least one “red flag” item checked in Phase II. This change aimed to ensure referral for children with potential developmental concerns yet also reduced the time demand on WIC staff. Additionally, in Phase II, project staff added an open-ended question at the bottom of the checklist that asked if the parent had any concerns about the child’s development. If parents reported concerns in response to this question, WIC staff referred the child for screening and further assessment regardless of their responses to the checklist items.
* Recent research has established normative data for individual developmental milestones using a large dataset of 45,465 screens and compared these norms to CDC guidelines for achievement of key milestones included on *Learn the Signs. Act Early.* checklists (Sheldrick et al, 2019). The study showed that a very high percentage of children (>90%) achieved many of these milestones by the age specified on the CDC checklists, and an even higher percentage had achieved the milestones in the box indicating the parent should seek immediate follow-up. These findings suggest that the guidelines used by WIC staff in this project supported the referral of children with potential developmental concerns, but additional research is needed to determine optimal referral guidelines for developmental monitoring and referral in WIC clinics.

1. Data collection
   1. *Staff characteristics.* The total number and type of WIC staff at the clinics are reported in Table 1. The number and type of staff who completed the surveys at the end of Phase I and Phase II are noted in footnote (a) on Table 3. All Phase I staff (clerical and nutritionists) were invited to participate in the survey because all were involved in this program development phase of the project (26/35 respondents; 74% response rate). In Phase II, based on feedback from WIC staff, the protocol was refined so that WIC nutritionists provided oversight for checklist administration, reviewed parents’ responses, and initiated a referral for screening and further assessment if they noted possible developmental concerns. Only nutritionists participated in the Phase II WIC staff survey at the end of Phase II because they were primarily responsible for program administration (n = 20/21 staff; 95% response rate). The electronic survey used in both phases was intentionally designed so that participation was voluntary and anonymous to reduce the influence of social desirability on WIC staff responses. For this reason, we do not have any information on the 8 staff (26%) who did not complete the survey in Phase I or the 1 staff member (5%) who did not complete the survey in Phase II. We could not compare survey respondents and non-respondents.
   2. *Caseload data*. Missouri WIC administrative datasets provided average monthly caseload for participating WIC clinics during FY10 and FY13 (Table 1). Each month, the caseload consists of *the average number of individuals who receive WIC benefits*. This is not the same as the average number of individuals who visited the clinic each month. Caseload data should be interpreted with caution because these figures overestimate the actual number of children whose parents were invited to complete LTSAE checklists during each phase of the project for the following reasons.
      * Participants may be issued anywhere from one to three months of benefits during a single visit and these are added to the count for each month of benefits. Thus, some participants included in the number of those receiving benefits were seen only during the month or two months prior. According to a WIC clinic administrator who partnered with this project, the actual number of people seen in the clinic may be 1/2 to 1/3 of the monthly caseload, but this varies as clinics have different policies for how many months of benefits to issue based on category and risk factors. This makes it difficult to tease out the actual number of participants seen using WIC administrative data.
      * Only a subset of children under five seen in any given month participate in developmental monitoring, which is linked to visits for eligibility recertification every six months.

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Hagan, J., Shaw, J.S., & Duncan, P.M. (2008). Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents, Third Edition. Elk Grove Village, IL: American Academy of Pediatrics.

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