Better together: Developmental screening *and* monitoring best identify children who need early intervention

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ABSTRACT

Background: Widely recommended developmental surveillance methods include developmental monitoring (DM) and development screening (DS). Much research has been done on DS, but very little research has compared the effectiveness of DM and DS together.
Objectives: To investigate the relationship between DM and DS in Part C early intervention (EI) service receipt.
Methods: Authors used data from the 2007/2008 and 2011/2012 National Survey of Children's Health (NSCH). Authors report the prevalence of children aged 10 months to 3 years who received (a) DM only, (b) DS only, (c) both DM and DS, and (c) no DM or DS across survey years. Authors compare the odds of EI receipt across these groups.
Results: During both periods, estimated EI receipt prevalence was higher for children receiving both DM and DS (8.38% in 2007/2008; 6.47% in 2011/2012) compared to children receiving no DM or DS (1.31% in 2007/2008; 1.92% in 2011/2012), DM alone (2.74% in 2007/2008; 2.70% in 2011/2012), or DS alone (3.59% in 2007/2008; 3.09% in 2011/2012) (for both time frames, $p < .05$). From 2007/2008 to 2011/2012, the proportion of children receiving DS only and both DM and DS increased, while children receiving DM only and no DM or DS decreased.
Conclusions: Children receiving DM and DS together were more likely to receive EI compared to children receiving DM alone, DS alone, or neither DM nor DS. These findings support the AAP recommendations indicating that DM and DS are complementary strategies for improving early identification and linkage to EI for young children.

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Early intervention (EI) programs effectively improve developmental skills and help children at risk of developmental disabilities or delays thrive socially as well as academically.[1,2] Unfortunately, only a small proportion of children who could benefit from EI are identified early enough to receive it.[3–5] To facilitate early identification, several federal organizations and non-profit agencies have developed policy guidelines and quality care indicators for

pediatricians and other child health care providers (CHCP).[6–9] The American Academy of Pediatrics (AAP) recommends that CHCPs engage in early identification efforts via periodic developmental monitoring (DM) and developmental screening (DS).[6] DM is a flexible and ongoing process whereby healthcare professionals ask about children's developmental progress and make informed clinical judgments based on their education and experience. DS is a more formal early identification method in which professionals use validated developmental screeners to help identify the presence of developmental concerns. There is mounting evidence that indicates DM alone is insufficient to identify many children at risk for developmental delays and disabilities.[6,10–12] Thus, in recent years there has been an expansion of policy and research activities focusing on expanding the number of CHCPs conducting

DS.[6–8,13–26] Ideally DM and DS should be used in tandem to maximize sensitivity to potential developmental delays.

Children with developmental delays are a heterogeneous group. Not all developmental screeners identify children with the same delays or diagnoses, and different screeners measure different aspects of development[27–29] and vary widely in how they were normed and which particular developmental conditions they target.[30–34] Thus, DS should occur in the context of DM whereby "knowledgeable healthcare providers identify children who may have healthcare problems" (AAP, 2006, p. 407).[6] Part of what knowledgeable a CHCP may bring to DM includes information on which screeners are most appropriate for particular developmental concerns, particularly as related to their patients' unique backgrounds.[27–29,35,36]

While there is abundant research on the sensitivity and specificity of developmental screeners, very little exists on the effectiveness of DM and/or DS at identifying children who ultimately receive EI.[15,37] Research indicates that increased DM or DS predicts increased EI referrals,[17,20,21,24,26,37] assessments,[37] and eligibility.[17,21,24,37] One study showed that DM in tandem with DS resulted in more EI referrals (13.9%) compared to DM alone (5.84%).[20] However, while increased referral rates are certainly promising, increased positive screens do not always lead to accurate identification.[35,36] Thus, more research is needed on the relative utility of DM in tandem with DS and, separately, on whether use of DS and DM together improves CHCPs' ability to identify children who ultimately receive EI services.

Purpose of the study

The purposes of this analysis are two-fold: (a) determine the rates of DM and DS singly and in tandem in 2007/2008 and 2011/2012 to identify trends; and (b) compare the difference in odds of EI receipt between groups of children receiving DM or DS alone and DM/DS in tandem. EI in this study refers to children receiving Individuals with Disabilities Education Act Part C services, a federally funded EI program for infants and toddlers, via the receipt of an Individualized Family Service Plan (IFSP).[38]

Methods

Study data and key variables

Data for this study on children between 10 months and 3 years of age came from the National Survey of Children's Health (2007/2008; 2011/2012). Ten months was selected as the lower age threshold because the AAP recommends DS begin at 9 months and DS is not likely a widespread practice under this age.[6] The NSCH (2007/2008) data were collected between April 2007 and July 2008 and for NSCH (2011/2012) between February 2011 and June 2012.[39,40] The Maternal and Child Health Bureau of the Health Resources and Services Administration funded both NSCH surveys; the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention administered both surveys to parents and other caregivers using the State and Local Area Integrated Telephone Survey.[40] For both datasets, estimates are adjusted for non-response bias and weighted to represent the ages 0–17 non-institutionalized U.S. population. The NSCH (2007) was conducted over landlines and the NSCH (2011/2012) was conducted over both landlines and cell phones; this difference was accounted for in their stratifications. The NSCH (2007) collected data from 91,642 caretakers with a 51.2% response rate and NSCH (2011/2012) from 95,677 caretakers with a 54.1% and 41.2% response rate respectively for landline and cell phone samples. National population estimates were developed according to NCHS criteria. Further details are

described in publications available from the NCHS.[39,40]

The key predictor variables for our analyses were whether, in the last year, a parent reported that the child's CHCP provided (a) DS without DM, (b) DM without DS, (c) both DM and DS, or (d) no DM or DS. Authors measured DS from a single survey item: "Did a doctor or other health care provider have you fill out a questionnaire about specific concerns or observations you may have about [S.C.]'s development, communication, or social behaviors?" DM was measured with the item: "During the past 12 months, did [child's] doctor or other health care providers ask if you have concerns about [his/her] learning, development, or behavior?" The key outcome variable was whether the child received an IFSP in the last year measured by: "Does [child] have any developmental problems for which [he/she] has a written intervention plan called an Individualized Family Service Plan or IFSP?"

Authors included two sets of independent variables related to the receipt of EI. The first was a binary item identifying children with special health care needs (CSHCN); this item was developed from other items indicating that the child has a known medical, behavioral or health condition limiting his or her abilities or the child requires health and related services of a type or amount beyond that generally required by children of the same age. The second set of independent variables included individual, household/socio-demographic, medical care, and Part C variables associated with EI receipt. Details for these variables—age, race/ethnicity, gender, English as the primary household language, metropolitan area, federal poverty level, Part C eligibility criteria, parent education, and insurance type—are found in Tables 1 and 2. Medical care variables included whether children had family centered care or not. Part C variables included whether states had broad, moderate, or narrow eligibility criteria based on cut-off scores on developmental assessments states require to determine EI eligibility.[5] Broad states have relatively less stringent cut-off scores for disability and delay assessments allowing more children to be EI eligible (e.g., cut off $\leq$ 90%ile), narrow have more stringent cut-off scores disallowing more children (e.g., cut off $\leq$ 75%ile), and moderate states are in the middle.

Analytic methods

Authors estimated national IFSP receipt percentages and stratified them by the key variables considered in this study (Tables 1 and 2). To detect proportional differences across years and between groups, authors conducted Rao Scott χ^2 tests. Furthermore, authors determined the relationship between DM and DS on EI receipt by binary logistic regression, with IFSP receipt as the outcome variable; CSHCN and individual, household/socio-demographic, and Part C variables displaying significant differences on χ^2 tests were included as independent variables in final models. For analyses, authors used the *survey* package available in the R domain and accounted for design effects via NCHS recommended procedures.[39–42] All analyses used datasets with imputed SES data, and were weighted and stratified per published recommendations. Statistical significance is set at $p < .05$.

Results

In 2007/2008, according to parent report, about 36% of children received DM alone, 9% received DS alone, 15% received both, and 39% received neither (Fig. 1). In 2011/2012, about 29% of children received DM alone, 12% received DS alone, 26% received both, and 33% received neither (Fig. 1). χ^2 tests indicated that all developmental surveillance changes across time were statistically significant ($p < .05$).