Impact of Healthy Steps on Developmental Referral Rates
Susan Hughes, MS; Lydia Herrera-Mata, MD; Justin Dunn

BACKGROUND AND OBJECTIVES: Diagnosis and treatment of pediatric mental, physical, and behavioral issues are essential for optimal growth and development. Our family medicine residency program implemented a change in our pediatric curriculum by incorporating aspects of Healthy Steps into well-child visits 1 day a week. This study was done to determine the impact on developmental referral rates after incorporating Healthy Steps.

METHODS: We did a retrospective medical records review at a rural California family medicine residency clinic on children through 5 years of age receiving well-child care. We collected developmental referrals as documented in the chart and in a referral log for 1 year before the curriculum change and 3 years after implementation. This retrospective case-control study included a pre-intervention group (Pre) and two post-intervention groups, usual care control (UC) and Healthy Steps intervention (HS). The three groups were compared using Fisher’s exact tests.

RESULTS: Developmental referrals assessed by chart review were 0% (0/154) in Pre, 0.6% (1/159) in UC, and 5.4% (4/74) in HS groups. When assessed by referral logs, developmental referral rates were 1.2% (10/864) in Pre, 1.1% (14/1,251) in UC, and 9.9% (14/141) in HS groups. For both sources, the HS group had significantly higher referral rates than the other groups. There was no statistical difference in referrals between the Pre and UC groups.

CONCLUSIONS: After incorporating aspects of Healthy Steps into our curriculum, developmental referrals rose significantly in the intervention group compared to pre-intervention. Referral rates did not change in the non-intervention control group.

(Fam Med 2014;46(10):788-91.)

Diagnosis and treatment of pediatric mental, physical, and behavioral issues are essential for optimal growth and development. An estimated 9.5%–16% of children 5 years and younger have social-emotional, developmental, or behavioral disorders. Among low-income families, developmental issues are more common, particularly behavioral ones, which can negatively impact their development.

Inadequate screening precludes early recognition of problems. According to the American Academy of Pediatrics, in 2006, detection rates of childhood developmental disabilities ranged from 2.4%–5.8%, whereas prevalence rates were 12%–16%. Though many published studies demonstrate positive changes in child development with early intervention for identified needs, nearly 55% of family physicians and pediatricians reported they did not use a standardized tool to screen for developmental delays during routine well-child visits of 2-year-olds.

The Healthy Steps for Young Children Initiative started in 1994. It has three main goals to support: physical and emotional development of each young child, caregivers’ confidence in child-rearing knowledge and skills, and primary care providers’ clinical effectiveness to meet the needs of young children and their families. The program offers comprehensive services to extend usual pediatric care from birth to age 3, including formal developmental screening beginning at 6 months. Integrating Healthy Steps into routine pediatric practice has been shown to have positive and lasting effects on children and their families.

To better prepare our residents in the diagnosis and management of behavioral/developmental issues in children and promote family-centered care, we revised our...
pediatric curriculum to incorporate parts of the Healthy Steps Program into our family medicine residency program. This study investigates the impact on developmental referral rates after this implementation.

**Methods**

At one rural California family medicine residency ambulatory clinic, we trained personnel and became a Healthy Steps site. Specific rotations within the pediatric curriculum were revised to incorporate weekly Healthy Steps clinics. The dedicated well-child clinic included enhanced well-child visits for children through 5 years old, formal developmental screening using Ages and Stages Questionnaire—Social Emotional (ASQ-SE), Reach Out and Read, parent handouts, and coordinated and tracked referrals. Residents conducted well-child care visits under the supervision of faculty trained in Healthy Steps. Children who screened positive on the ASQ-SE were appropriately referred to a psychologist, speech therapist, or for further developmental assessment.

We did a retrospective medical records review after the local Institutional Review Board approved our research (IRB #200769). We reviewed referrals for two time periods: 1 year before and 3 years after implementation of the curriculum. Three well-child groups were created: before the change or pre-intervention (Pre), after the change usual well-child care control (UC), and after the change with the Healthy Steps intervention (HS). Two sources were used to assess the outcome: referral log and chart. Referral logs were reviewed in their entirety. Charts were randomly selected from electronic records for Pre and HS while a systematic selection was used with paper records (ordered by medical record number) for UC. About 12% of clinic records were sampled in Pre and UC, while oversampling was used for HS to increase sample size. Demographic information including date of birth, gender, and insurance was collected. A Child Health and Disability form from the state of California was used to extract data from the chart about referrals. Similar referral information was gathered from the referral logs.

Data were analyzed using SAS (version 9.2, SAS Institute Inc, Cary, NC). To determine if developmental referral rates differed among the three groups, chi-squared or Fisher’s exact tests were used for categorical data. Non-parametric median tests were used for continuous data.

**Results**

There were 154 (12%) charts reviewed from Pre, 159 (13%) from UC, and 74 (52%) from HS (Figure 1). Demographic characteristics in Table 1 show the three groups were similar in gender distribution.

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Figure 1: Comparison of Developmental Referrals* Between Chart and Referral Log by Group

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* Developmental referrals included psychologists, speech pathologists, and agencies that do further developmental assessment.
Table 1: Demographic Characteristics of Children by Group

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pre-Intervention</th>
<th>Usual Care (Q1–Q3)*</th>
<th>Healthy Steps (Q1–Q3)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median years</td>
<td>0.8 (0.4–1.6)</td>
<td>2.4 (1.1–4.2)</td>
<td>1.3 (0.6–3.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (%)</td>
<td>49</td>
<td>52</td>
<td>55</td>
<td>.22</td>
</tr>
<tr>
<td>Insurance</td>
<td>94</td>
<td>96</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Medicaid**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Q1 is value in the 25th percentile; Q3 is value in the 75th percentile
**Proxy for low socioeconomic status

Table 2: Percentage of Developmental Referrals Made by Location and Group

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-Intervention</th>
<th>Usual Care</th>
<th>Healthy Steps</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart</td>
<td>0.0</td>
<td>0.6</td>
<td>5.4</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Log</td>
<td>0.8</td>
<td>1.1</td>
<td>9.9</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>P value</td>
<td>.27</td>
<td>.57</td>
<td>.26</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: Comprehensive Referral Log Rates for Developmental Referrals* by Type and Group

* Developmental referrals included psychologists, speech pathologists, and agencies that do further developmental assessment.
and Medicaid status. They differed significantly in age. The HS intervention was linked to significantly higher rates of developmental referrals when compared to either the Pre or UC group in both the referral log and chart (Table 2). According to the referral logs, 9.9% of children who presented for well-child care to the HS Clinic received a developmental referral. Using the chart review, 5.4% of HS well-child visits led to such a referral. For both sources, HS had significantly higher referral rates than the other groups (P<.05). There was no statistical difference in referrals between Pre and UC. Additionally, the rates of referral to each type of developmental specialty were highest for HS and differed in distribution from Pre (Figure 2).

Discussion
Family physicians understand the importance of family-centered pediatric patient care. Our goal with the Healthy Steps Clinic is to prepare developmentally minded family physicians. For practical reasons, we could not implement a full Healthy Steps Program; instead, we incorporated key feasible aspects of Healthy Steps into our pediatrics curriculum. This modified version significantly increased the rates of developmental referrals in our rural family medicine residency clinic. The HS group had an overall developmental referral rate consistent with prevalence rates of developmental delays reported in the literature. Referral differences over time were probably influenced by availability of psychologists and heightened awareness of referral resources after the intervention.

There were some limitations and lessons learned from this investigation. First, we identified that there were fewer referrals recorded in the charts than those tracked in the referral logs. Since this was similar for all three groups investigated, it should not impact our findings. Second, there were differences between average ages in the groups due to the chart selection process. Age could confound the rate of developmental referrals, with older children having a higher likelihood of being identified with developmental delay. However, the comprehensive review of the referral logs would not be affected. Third, our study involved one residency program (33 residents) at one largely Hispanic medically underserved clinic, so study results may not generalize.

In summary, our study shows that incorporating a modified Healthy Steps curriculum positively impacts the identification of early developmental delays and referral practices for those problems. The value of this curriculum revision was recognized and has been continued post-grant funding.

ACKNOWLEDGMENTS: These results were previously presented at the 2011 Society of Teachers of Family Medicine Annual Spring Conference, New Orleans, LA. The authors would like to acknowledge Mary Fraijo, LVN, and Betty Jarman, PhD for their assistance in implementing the Healthy Steps curriculum, and acknowledge Elisabeth Wilson, MD, MPH for her assistance in the preparation of the manuscript.

Funding to support the revision and implementation of our pediatric curriculum was obtained from First Five Fresno County (California State mandated program funded by cigarette taxes).

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References