The Time and Practice Challenges of Developmental-Behavioral Pediatrics: An Australian National Study

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ABSTRACT: ***Objective:*** **Developmental/behavioral diagnoses are common in pediatric practice but, until the impact on pediatricians of caring for these children is quantified, training and remuneration barriers are unlikely to be addressed. In a prospective audit of Australian office-based pediatricians, developmental-behavioral and medical consultations were examined regarding (1) consultation characteristics, (2) child and parent health, and (3) referrals and investigations ordered.** ***Methods:*** **In 2008, all 300 eligible members of the nationwide Australian Paediatric Research Network were invited to prospectively record standardized information for every consultation over 2 weeks or 100 consecutive patients, whichever came first. After coding all diagnoses, consultations were classified as developmental/behavioral, medical, or "mixed." These groups were compared using simple 3-group comparisons (Aims 1 and 2) and logistic regression (Aim 3).** ***Results:*** **One hundred ninety-nine (66%) pediatricians recorded 15,360 diagnoses for 8,335 consultations (34% developmental/behavioral, 48% medical, and 18% mixed). Compared with medical patients, developmental/behavioral patients were older, more likely to be male, and required on average ~9 minutes more time per consultation; self-reported parent health was worse; and referrals were more common (odds ratio 2.2, 95% confidence interval 1.9 to 2.5; $p < .0001$), but investigations less common (odds ratio 0.4, 95% confidence interval 0.3 to 0.4; $p < .0001$). Child health was worst in the "mixed" group.** ***Conclusion:*** **Developmental/behavioral consultations are common in pediatric office settings. They are time-consuming, often lead to referrals, and the worse health reported by their parents may pose additional challenges. Pediatric training and funding models must address these barriers if adequate and comprehensive care is to be accorded to these complex patients.**

*(J Dev Behav Pediatr 32:*368–374, 2011) **Index terms:** developmental/behavioral pediatrics, office visits, physician's practice patterns, clinical audit, epidemiological studies.

Child development has been recognized as a basic science essential for pediatric practice for almost half a century.[1] Subsequently, there has been a major shift in focus from the "classical morbidities," such as infectious diseases, to the "new morbidities,"[2] such as learning and emotional disorders. By 1995, the prevalence of the "new morbidities" in the United States was reported to be 20% and, according to the AAP Committee on Psychosocial Aspects of Child and Family Health, was continuing to increase.[3] Similar trends have occurred internationally despite differences in the structure of children's health care and the pediatrician's role.[4] A 12-month prospective study of pediatric practice in a single Australian region showed that, by the late 1990s, developmental/behavioral diagnoses made up 35% of all consultations,[5] and pediatricians spent "most of their time dealing with children with chronic illness, chronic physical and intellectual disability, and learning and behavioral disorders."[5]

In Australia, primary pediatric care is provided by family medical practitioners and maternal and child health nurses. Pediatricians are specialists who act as consultants and provide secondary care for children with a wide range of more complex health conditions (e.g., chronic asthma, attention deficit disorder, and epilepsy). Caring for children with developmental/behavioral disorders, therefore, is the realm of all pediatricians except those who have specialized in specific pediatric subspecialty areas (typically in tertiary pediatric hospitals).

However, barriers to providing expert care for children with developmental/behavioral disorders include

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educational, economic, and time management concerns.[3] Practice realities contrast with the continuing strong emphasis on biological medical training during pediatric residency.[6] A 1994 survey of Australian pediatric residents (who had already completed medical school and a year of adult medicine internship) revealed concerns about the inadequacy of developmental/behavioral training,[7] and a national survey of Australian pediatricians in 1998 recommended that, to adequately equip trainees for the realities of contemporary practice, they should spend at least 9 months of the 6-year pediatric training program learning about developmental/behavioral pediatrics, developmental disabilities, and child psychiatry.[4] This led to a mandatory 6-month training period in developmental-behavioral pediatrics as part of the 6-year pediatric residency curriculum, which has the overall aim of producing competent consultant pediatricians. These concerns are mirrored in US surveys: for example, in a 1997 survey, graduates of a Colorado pediatric residency program reported that 4 of the top 5 areas needing increased training time in residency were developmental/behavioral content areas.[8]

Structural reform has lagged behind the increasing volume, diversity, and complexity of developmental/behavioral pediatrics seen in general pediatric practice.[9] Although it is now feasible to go beyond surveys of physicians views on their practice to study physicians' practice patterns directly and prospectively,[10,11] this methodology has not yet extended to examining the time and practice challenges of providing secondary pediatric care for children with developmental/behavioral disorders. A more comprehensive understanding of these challenges could inform curricula for pediatric training and ongoing professional development by, for example, including a set of competencies in developmental/behavioral pediatric practice during residency that reflect the reality of consultant pediatric practice, and increasing opportunities for pediatricians to recertify in these competencies periodically. Current data regarding practice challenges could also form the basis for policy briefs that could be used to lobby policymakers to fund more comprehensive models of service delivery and appropriate practice structure and remuneration.

Our recent Australian national prospective audit of outpatient pediatric practice, the Children Attending Paediatricians Study (CAPS), allowed us to address this gap in knowledge by examining the characteristics of consultant secondary pediatric practice, excluding less complicated primary care activities such as routine developmental screening (because Australian pediatricians do not carry out this role). In this article, we specifically aim to describe and compare consultations for developmental/behavioral, medical, and "mixed" developmental/behavioral and medical diagnoses according to (1) pediatrician's caseload, i.e., main diagnoses, proportion of consultations, and time spent; (2) the characteristics of the children and parents; and (3) their outcomes, in terms of subsequent referrals and investigations.

METHODS

Design and Setting

This study was conducted through the Australian Paediatric Research Network (APRN).[12] Established in 2007 and modeled on the successful US Pediatric Research in the Office Setting network,[13] the APRN is a national research network for Australian pediatricians that aims to facilitate multisite research in pediatric outpatient settings. In 2008, the APRN conducted the Children Attending Paediatricians Study (CAPS), the first prospective national audit to date of pediatric practice in secondary care settings, including private consulting rooms, community health centers, and hospital outpatient clinics.

Participants

APRN members were recruited from the 1006 nonsubspecialist pediatricians registered with the Royal Australasian College of Physicians in 2007.[14] By October 15, 2008, 300 pediatricians had joined the APRN, with all Australian states and territories proportionally represented.[14] All members who self-nominated as general, community, or developmental pediatricians were invited to participate in the CAPS; we excluded medical pediatric subspecialists and APRN members who did not have an outpatient practice.

Procedure

In October to November 2008, APRN pediatricians prospectively recorded de-identified information for each consecutive patient seen in their outpatient settings in a booklet that was mailed to eligible APRN members. We asked pediatricians to fill out a patient information form (see Figure, Supplemental Digital Content 1, at http://links.lww.com/JDBP/A19) for either 100 patients or for all patients seen over a 2-week period, whichever was completed first.

We modeled the form on the Morbidity and Treatment Survey of the Bettering the Evaluation and Care of Health program, a continuous national study of general practice activity in Australia.[10] For the purposes of this article, data extracted from the individual data forms included start and end times of each consultation, diagnoses (up to four), Medicare item numbers billed, investigations and referrals made, and parents' perception of both their own and their child's health on a 5-point Likert scale where 1 = "poor" and 5 = "excellent." (Medicare is the Australian government universal public health care system, funded by a compulsory taxpayer levy.)[14,15] We asked pediatricians to record diagnoses using a coding sheet with the top 60 most common diagnoses based on the 1999 Australian regional audit[5] or, where necessary, by writing the diagnoses in full.

Pediatricians asked parents' verbal permission to record family information before asking parents to report

on their own and their child's health. Institutional ethics approval was obtained from the Royal Children's Hospital, Melbourne, Human Research Ethics Committee (CA28088), without the need for full informed consent.

Analyses

Once all booklets were returned, 1 APRN steering committee member recoded the written diagnoses into the original 60 codes and 55 additional codes, i.e., 115 codes in total, and an "Other" code (see Appendix, Supplemental Digital Content 2, at http://links.lww.com/JDBP/A20). Two study authors, one a developmental/behavioral pediatrician (G.R.) and the other a general pediatrician (D.E.), independently classified each diagnosis as either developmental/behavioral or medical (see Appendix). There was 94% agreement on initial categorization, with differences in coding resolved through discussion. The consultation was classified as developmental/behavioral if all of the recorded diagnoses were developmental/behavioral; as medical if all of the recorded diagnoses were medical; or as mixed if there was at least 1 developmental/behavioral and at least 1 medical diagnosis.

We assigned each child a census-derived Australian Socio-Economic Indexes For Areas (SEIFA)Index of Relative Disadvantage score based on the postal code of their home address (Australian mean = 1000, SD = 100, higher scores indicate better socioeconomic status).[16] Patients aged older than 25 years (n = 10) were excluded as outliers. For the parametric analyses only, we truncated continuous scores to lessen skewing as follows: consultation lengths >90 minutes (n = 90) were recoded as 90 minutes, extra time postconsultation >60 minutes (n = 38) recoded as 60 minutes, and SEIFA 594 (70 patients living in a single suburb with this outlying SEIFA code) recoded as 650 (the next lowest SEIFA value).

We used percentages to describe proportions, means and SDs for continuous data and median with interquartile range (IQR) for normally distributed and skewed data, respectively. When comparing consultation (Aim 1) and child and parent (Aim 2) characteristics between developmental/behavioral, medical, and mixed consultations, we used *t* tests to compare developmental/behavioral and medical consultations by new and review classification; Pearson's χ^2 for 3-group proportions; and Analysis of Variance and Kruskal-Wallis tests for normally distributed and skewed 3-group comparisons, respectively. For Aim 3, we calculated odds ratios for referrals and investigations for each of the developmental/behavioral and mixed categories versus the medical category by fitting marginal logistic regression models using generalized estimating equations.[17] This assumes an exchangeable correlation with information sandwich (robust) estimates of standard error, which allows for the correlation between characteristics of patients from the same cluster (pediatrician), controlling for the child's disadvantage index tertile (low/medium/high SEIFA). All analyses were conducted using STATA 11.0.

RESULTS

Two-thirds of all eligible Australian Paediatric Research Network (APRN) members (n = 199/300) recorded patient information during the 2-week audit. Detailed sample characteristics are described elsewhere.[18] In brief, responders and nonresponders were similar with regard to gender, age, practice location (metropolitan/regional/rural), and state/territory distribution, but responders were more likely to work full-time hours.[18] The most recent Royal Australasian College of Physicians data available (response fraction 22%) describe a professional group that is similar in gender distribution to Children Attending Paediatricians Study (CAPS) respondents but is more likely to work full time.[19]

Participating pediatricians recorded information on 8,335 consultations, with a total of 15,360 diagnoses (average 1.8 diagnoses per consultation). Only 1.2% of diagnoses were unclassifiable due to missing data, and these consultations were excluded from subsequent analyses (n = 100 children).

Caseload (Aim 1)

Table 1 shows the top 5 developmental/behavioral and medical diagnoses. The most common developmental/behavioral diagnoses were attention deficit hyperactivity disorder/attention deficit disorder (which accounted for 10% of all diagnoses) and learning problems (4.1%), while the most common medical diagnoses were for postneonatal baby checks (5.0%) and asthma (3.6%). Of the recorded consultations, one-third (2783, 34%) had solely developmental/behavioral diagnoses, almost half (3975, 48%) had solely medical diagnoses, and 18% (1477) had mixed diagnoses. Table 2 shows the proportion of time spent by pediatricians over the audit period on the 3 diagnostic groupings listed above.

Pediatricians required ~6 minutes more time during and 3 minutes more time after consultations for patients in the developmental/behavioral category than for patients in the medical category (Table 3). This difference remained even if new and continuing consultations were analyzed separately (new consultation mean [SD] time 48.2 [20.5] min vs 32.8 [15.9] min, $p < .0001$; review

Table 1. The 5 Most Common Developmental/Behavioral and Medical Diagnoses, as Proportions of the 15,170 Total Diagnoses Recorded

Developmental/Behavioral (n = 7032)		Medical (n = 8138)	
Diagnosis	**%**	**Diagnosis**	**%**
ADHD/ADD	10.0	Baby check[a]	5.0
Learning difficulty/disability	4.1	Asthma	3.6
Autism spectrum disorder	3.9	Allergy	3.1
Developmental delay	3.3	Eczema	2.6
Behavior	3.2	Constipation	2.2

ADHD, attention-deficit hyperactivity disorder; ADD, attention deficit disorder.
[a]These baby checks are commonly performed by Australian pediatricians for at-risk babies such as those discharged from the nursery.

Table 2. Percentage of Pediatrician Time Spent by Consultation Type Over the Study Period

Type of Diagnosis	New	Review	Total
Total	47	53	100
Developmental/behavioral	*15*	*22*	*37*
Medical	*22*	*20*	*42*
Mixed	*10*	*11*	*22*
Any medical	32	31	63
Any developmental/behavioral	25	33	57

The breakdown of the total consultations into developmental/behavioral, medical, and mixed categories is indicated in italics.

consultation mean time 28.4 [13.9] min vs 23.8 [12.5] min, $p < .0001$) for developmental/behavioral compared with medical diagnoses, respectively. The mixed group was more similar to the developmental/behavioral group with respect to time required.

Patient and Parent Characteristics (Aim 2)

Compared with children presenting with medical diagnoses, more children with developmental/behavioral diagnoses were boys and they were considerably older (median age 9.0 years vs 1.9 years; Table 3). The mixed group's proportion of boys and mean age lay in-between the other 2 groups. We did not consider the small differences in disadvantage index scores across the groups as clinically significant.

Table 3 also shows that the mean health of parents of children with developmental/behavioral or mixed diagnoses was worse than that of parents of children with only medical diagnoses. Thus, 21% and 17% of parents with a child in the mixed and developmental/behavioral categories, respectively, versus 8% in the medical category, had health that was only "poor or fair," compared with "good, very good, or excellent" ($\chi^2(2) = 182.1; p < .001$). Child health was reported to be similar for the developmental/behavioral (mean 3.5 of 5) and medical (mean 3.6) categories, but those with mixed developmental/behavioral and medical diagnoses had substantially worse health (mean 3.1). Thus 27% of children in the mixed category, versus 13% and 14% in the developmental/behavioral and medical categories, had health that was "poor or fair" ($\chi^2(2) = 144.1; p < .001$).

Referrals and Investigations (Aim 3)

Table 4 compares the referral patterns and investigations ordered for children in the developmental/behavioral and mixed categories with the patients in the medical category. Compared with children in the medical group, children with developmental/behavioral diagnoses were more likely to be referred to allied health providers (e.g., psychologists and speech therapists); referral to a subspecialist was the only referral that was more common in the medical group. In contrast, investigations were ordered more frequently for children with medical than developmental/behavioral diagnoses, the only exception being developmental and behavioral questionnaires. Compared with children with medical diagnoses, the patients with mixed diagnoses were more likely to be referred to both allied health practitioners and subspecialists, but similar proportions had investigations ordered.

DISCUSSION

This national, prospective study of outpatient pediatric practice patterns and time use confirms that around half of all Australian secondary care pediatric consultations are for patients with developmental/behavioral diagnoses. These diagnoses are more time-consuming and result in more complex referral pathways than purely medical consultations. Additional management challenges may arise because self-reported parent health status is worse for children with developmental/behavioral diagnoses compared with children who had medical diagnoses only.

Table 3. Three-Group Comparisons of Consultation Characteristics by Type of Diagnosis (Developmental/Behavioral, Medical, and Mixed)

		Type of Diagnosis			
Variable	Range[a]	Developmental/ Behavioral (n = 2783)	Medical (n = 3975)	Mixed (n = 1477)	*p*
Male patients, %[b]		73.8	53.9	61.5	<.0001
Patient age (yr), median (IQR)[c]	0–26.0	9.0 (5.8 to 12.8)	1.9 (0.4: 6.9)	7.1 (2.9 to 11.4)	.0001
Time (min), mean (SD)[d]					
Consultation	0–430	34.0 (18.4)	27.8 (14.8)	34.6 (16.3)	<.0001
Extra time	0–300	9.5 (10.0)	6.5 (5.8)	9.6 (9.4)	<.0001
Total time	1–480	39.6 (25.9)	30.3 (19.1)	40.4 (23.4)	<.0001
Parent-reported health, mean (SD)[d]					
Child	1–5	3.5 (1.0)	3.6 (1.0)	3.1 (1.0)	<.0001
Parent	1–5	3.3 (0.9)	3.6 (0.9)	3.2 (0.9)	<.0001
Disadvantage index, mean (SD)[d]	594–1149	998 (65)	1004 (80)	998 (68)	.009

IQR, interquartile range. [a]This column shows the full ranges, but the comparisons in the next 3 columns use the truncated ranges as described in Methods. [b]Chi-square test. [c]Kruskal-Wallis test. [d]Analysis of variance.

Table 4. Referrals and Investigations by Type of Diagnosis (Developmental/Behavioral and "Mixed" Each Compared with Medical)

Outcome	Medical (n = 3975, 48.3%) %	Developmental/Behavioral (n = 2783, 33.8%) %	Adjusted OR (95% CI)	*p*	Mixed (n = 1477, 17.9%) %	Adjusted OR (95% CI)	*p*
Referral							
Any referral	16.1	35.9	2.2 (1.9–2.5)	<.0001	40.6	2.7 (2.3–3.1)	<.0001
Psychology	0.3	16.0	13.0 (9.1–18.5)	<.0001	9.3	17.3 (10.3–29.0)	<.0001
Speech pathology	0.6	8.8	7.4 (4.7–11.5)	<.0001	6.4	8.4 (4.5–15.9)	<.0001
Audiology	1.0	2.4	2.4 (1.7–3.4)	<.0001	3.7	3.4 (2.0–5.6)	<.0001
Subspecialist	9.2	4.8	0.6 (0.5–0.7)	<.0001	14.8	1.4 (1.2–1.7)	<.0001
Multidisciplinary team	1.3	7.0	3.1 (2.3–4.2)	<.0001	6.5	3.6 (2.5–5.4)	<.0001
Other allied health	4.1	7.1	1.4 (1.2–1.8)	.001	10.2	2.1 (1.7–2.6)	<.0001
Investigation							
Any investigation	25.8	7.8	0.4 (0.3–0.4)	<.0001	27.7	0.9 (0.8–1.1)	.4
Blood	14.7	4.5	0.4 (0.3–0.5)	<.0001	16.8	1.1 (0.9–1.3)	.3
Urine	3.9	1.8	0.6 (0.5–0.8)	.002	3.9	1.1 (0.8–1.5)	.8
Stool	1.5	0.2	0.2 (0.1–0.4)	<.0001	2.0	1.4 (0.9–2.1)	.1
X-ray	4.1	1.1	0.3 (0.2–0.4)	<.0001	4.3	0.8 (0.6–1.1)	.2
CT/MRI	1.1	0.7	0.9 (0.5–1.5)	.6	1.6	1.5 (1.0–2.4)	.07
Ultrasound	5.3	0.7	0.2 (0.2–0.3)	<.0001	4.7	0.6 (0.5–0.9)	.008
Questionnaire	0.2	1.8	3.5 (1.8–6.9)	<.0001	1.0	2.4 (1.1–5.5)	.03
Other	2.5	1.4	3.5 (1.8–6.9)	<.0001	4.5	1.2 (0.8–1.7)	.3

OR, odds ratio; CI, confidence interval; CT, computed tomography; MRI, magnetic resonance imaging. Medical diagnosis classification is the reference group for logistic regression.

This study's strengths include its nationwide coverage, prospective data collection, and large sample size and thus precision of estimates. We were able to establish the consultation burden of secondary care developmental-behavioral pediatrics, excluding primary care (e.g., developmental screening), which is not provided by Australian pediatricians. In addition, secondary care, large US data collections, such as the US National Ambulatory Medical Care Survey[10] and the US Medical Expenditure Panel Survey, include routine and preventive primary care for common problems. It has recently been recommended that this should move away from specialists and back to the primary care setting (general or family practitioners).[20] Thus, our data have relevance beyond Australia. For instance, they could assist US health services planners to better understand the workforce implications of concentrating children's complex care needs into the secondary care setting.[21]

This study is also unique in that, unlike studies such as National Ambulatory Medical Care Survey, it catalogs time spent both in and subsequent to the consultation, so that we could compare developmental/behavioral and medical consultations on these parameters. As highlighted by a recent US adult practice audit,[22] factoring such time into practice and remuneration structure can improve the delivery of care by acknowledging the reality that medical care involves not just face-to-face contact with patients but also telephone and e-mail communication with other members of the care team, reviewing correspondence, filling in forms, and checking and acting on the results of investigations. At least anecdotally, the time required both in and beyond developmental/behavioral consultations is proving a barrier for Australian pediatricians, with some restricting the number of children they will see because the available remuneration does not recognize these additional costs. Our results highlight the reality of this extra time spent per patient, clearly demonstrating the differences between patients who have developmental/behavioral diagnoses and those who do not. A shift in medical culture and policy that acknowledges this reality would allow pediatricians to be better equipped to provide comprehensive care for children with developmental/behavioral diagnoses.

Limitations to this study include data availability from only the subset of Australian pediatricians who are interested in research, such that these results may not generalize to all pediatricians. The pediatricians did not report on their previous training in developmental/behavioral pediatrics or perceived training needs, so we could not explore practice patterns according to expertise or training. Unfortunately, the characteristics of general pediatricians are not readily available for comparison with our study participants; for example, the low response fraction (22%) of the most recent Australian pediatric workforce survey (2008)[19] precludes an accu-

rate comparison of our Australian Paediatric Research Network (APRN) members with Australian pediatricians in general. We were able to collect only limited sociodemographic information about the presenting children, but what we did collect (age, sex, and disadvantage index) were the most important predictors of care in Dovey's analysis of US children's health care utilization.[20] Finally, we cannot be sure that the audit includes all patients seen by the participating pediatricians over the 2-week recording period, or of any selection bias that incomplete within-pediatrician enumeration might have introduced.

Our results are congruent with, but go further than, previous Australian[7,9] and North American[23] surveys. The 2003 US National Survey of Children's Health revealed high rates of developmental/behavioral diagnoses in US children. These children had poorer quality of life, mood, and levels of community involvement, compared with peers, and their parents had higher levels of social and parenting stress.[23] In a regional Australian cohort, a similarly high prevalence of developmental/behavioral diagnoses was reported in general pediatric practice.[24] Pediatricians were shown to spend, on average, 1.5 hours a week on patient related nonconsulting activities.[24]

Developmental/behavioral difficulties appeared to be as important to children's health as medical conditions,[25] with the worst health experienced by those with a combination of both. Children with medical diagnoses may be assumed to be "sicker" than those with developmental or behavioral problems, but this is clearly not how they are perceived by their parents; in addition, having a combination of medical and developmental/behavioral diagnoses seems to have cumulative negative associations with parent-reported child health. Further, parents rated their own health worse when their children had developmental/behavioral, as opposed to medical, diagnoses. Raising children with developmental/behavioral diagnoses often presents major daily challenges and is associated with significant family stress.[26] Consistent with the transactional nature of child development, increasing family stress is strongly associated with worse child health and developmental outcomes, placing a double burden of care on these families.[27,28] The cross-sectional nature of this study does not allow conclusions to be drawn regarding causality when comparing parent health with their children's medical or developmental/behavioral outcomes. Health care providers need to be aware of this association, however, and provide appropriate support and referral where indicated. The significantly higher rates of referrals to allied health providers, especially psychologists, for children with developmental/behavioral diagnoses suggest that Australian pediatricians have a good understanding of the need for an interdisciplinary approach to these complex problems.

CONCLUSION

In summary, the large burden that developmental/behavioral diagnoses place on child and parent health also has major pediatric practice ramifications. These consultations are more time consuming and lead to more complex referral pathways than consultations for children with purely medical diagnoses. These results could inform not only pediatric training curricula but also funding models that acknowledge the complexity of caring for these children to overcome the educational, economic, and time management barriers that may impede provision of this expert, and necessary, care. In the future, systematic repeated prospective national audits of secondary health care delivery to children and adolescents could provide valuable information to measure and to continue guiding training and practice reform.

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A commentary related to this article entitled "Strengthening the Capacity and Effectiveness of Developmental and Behavioral Services: Implications from Australia" by Paul H. Dworkin, MD can be found in this issue on page 402.