Characteristics of Medicine-Pediatrics Practices: Results From the National Ambulatory Medical Care Survey

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Abstract

Background
Combined medicine-pediatrics (med-peds) training has existed for 40 years, yet little is known about national med-peds practices. A more comprehensive understanding of med-peds practices is important to inform medical students and guide evolving curricula and accreditation standards.

Method
The authors used data from the National Ambulatory Medical Care Survey from 2000 to 2006 to characterize the age distribution and types of visits seen by med-peds, internal medicine, pediatric, and family physicians.

Results
Forty-three percent of visits to med-peds physicians were from children ≤18 years of age. Compared with family physicians, med-peds physicians saw a higher proportion of infants and toddlers ≤2 years of age (21.0% versus 3.7%; $P = .002$) and children ≤18 years of age (42.9% versus 15.5%; $P = .002$), but they treated fewer adults age 65 or older (13.8% versus 21.3%; $P = .013$). Compared with internists, med-peds physicians saw a greater percentage of visits from adults 19 to 64 years of age (75.8% versus 61.2%) and fewer visits from patients age 65 or older (24.2% versus 38.8%; $P = .006$). Med-peds physicians, like family physicians and pediatricians, most commonly treated patients for acute problems and reported high levels of continuity of care for patients—pediatric (93.6%) and adult (94.6%).

Conclusions
Med-peds physicians care for a considerable proportion of pediatric patients while maintaining high levels of continuity of care for adult and pediatric patients. Within their practices, med-peds physicians treat a larger percentage of pediatric patients than do family physicians, but they see a smaller percentage of elderly patients.

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In 1967, the American Board of Internal Medicine and the American Board of Pediatrics formally established requirements for combined internal medicine-pediatrics (med-peds) residency training, which stipulate a total of four years of integrated experiences in both internal medicine (IM) and pediatrics, culminating in board eligibility in both specialties.

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During the past 40 years, med-peds training has grown to include more than 80 programs training approximately 350 new med-peds physicians per year.[1] Currently, med-peds residents make up approximately 7% of internists entering training and 13% of pediatricians entering training.[1]

Students who pursue med-peds training most commonly cite their desire to care both for children and adults.[2] After completion of residency, most med-peds physicians (81.6%) become board certified in both IM and pediatrics.[3] In practice, the majority of med-peds providers seem to provide at least some care both to adults and children,[3–7] but the actual age distributions of their patients is not well described. A 1997 study of two practices in Ohio including four med-peds physicians estimated that med-peds practices serve an average of 67% adult and 33% pediatric patients.[7] Although these prior studies demonstrated that med-peds physicians see more adults than children, no national studies, to our knowledge, have directly evaluated the age distribution of med-peds physicians' patients.

A more comprehensive understanding of med-peds practices is important to inform medical students considering med-peds training and to guide residency training curricula and evolving accreditation standards. We therefore undertook a study to characterize patient visits to med-peds, IM, pediatric, and family physicians using data from the National Ambulatory Medical Care Survey (NAMCS) from 2000 to 2006. Our primary goal was to describe the age distribution of patients visiting med-peds physicians and to compare the distribution with that of other primary care providers. On the basis of prior literature, we hypothesized that med-peds providers saw slightly more adult patients than pediatrics patients and that med-peds physicians were more likely to have a higher proportion of pediatric visits than family physicians. A secondary goal of this study was to characterize the types of visits (e.g., acute versus chronic care) to med-peds physicians and other primary care physicians.

Method

NAMCS survey design

NAMCS is a national cross-sectional survey of patient visits to nonfederal, office-based physicians in the United States conducted by the Division of Health Care Statistics, National Center for Health Statistics (NCHS), and the Centers for Disease Control and Prevention. The survey uses a multistage probability design to select a stratified, systematic sample of office-based visits and then assigns visit weights to these encounters to extrapolate estimates of national use of ambulatory medical services.[8] NAMCS uses a three-stage sampling design based on geographic area, physician practices within the geographic region, and patient visits within the practice.[8] This first stage consists of selecting geographic areas (counties, groups of counties, towns, or townships), known as probability sampling units (PSUs), from a total of approximately 1,900 PSUs covering the 50 states and the District of Columbia. The PSUs are stratified by socioeconomic, geographic, and demographic variables, and 112 PSUs are subsequently selected based on a probability proportional to their size.[8] The second stage of sampling consists of a probability sampling of physicians within the selected PSUs. Physicians are stratified on the basis of their specialty group.[8] In the third stage of sampling, physicians are randomly assigned to a one-week reporting period, and a systematic, random sample of visits is recorded during that week. Physicians and the physicians' office staff record the data regarding the patient visits during the assigned reporting period, as instructed by field staff from the U.S. Census Bureau.[8] Additionally, field staff make checks for completeness of the data.

NAMCS provides visit weights to extrapolate to national estimates of use of ambulatory medical services.[8] Each physician–patient encounter is assigned an inflation factor, or visit weight. Estimations of visit weights are based on four factors: (1) the probability of the visit being selected in the three-stage sampling design, (2) an adjustment for physician nonresponse, (3) an adjustment for physician specialty groups, and (4) a weight-smoothing function to limit the impact of outliers.[8]

To combine multiple years of data, we used the multistage design variables within the NAMCS to create new cluster and strata variables that allow for estimating variance while accounting for the complex sampling design, as publicly described by the NCHS.[9]

The NCHS considers estimates reliable if the relative standard error (SE) is less than 30% of the point estimate.[8] In addition, the NCHS considers estimates derived from fewer than 30 total visits unreliable regardless of the relative SE.[8] All values reported in this manuscript were based on 30 or more visits unless otherwise noted.

A comprehensive explanation of the methods used for data collection, sampling, and weighting within the NAMCS is available online at (http://www.cdc.gov/nchs/about/major/ahcd/ahcd1.htm). We performed all statistical tests using SAS version 9.1 and SAS callable SUDAAN functions to appropriately weight visits and account for the complex sampling design.

Data analysis

We included visits to med-peds, IM, pediatric, and family physicians from 2000 to 2006. Med-peds data were not readily available before 2000, and 2006 was the most recent year for which survey data existed.

To estimate the age distribution of patients within each type of practice, we tabulated the ages of patients at the time of their office visits to primary care providers. To ensure coding accuracy, we compared patient ages recorded as 0 years old against age in days. We dichotomized visits by age into infants/toddlers less than or equal to two years of age versus those greater than two years of age, and into visits from patients less than or equal to 18 years of age versus those greater than 18 years of age. We compared age categories between med-peds and family physicians with χ^2 test statistics and used logistic regression models to adjust for season, region of country, metropolitan status (i.e., located within—versus outside—a federally designated metropolitan statistical area), and reason for visit. To compare the distribution of pediatric visits between med-peds physicians and pediatricians, we stratified visits by patient age (0–2 years of age and 3–18 years of age) and compared frequencies with χ^2 test statistics. Similarly, we compared the distribution of adult visits (19–64 years of age and ≥65 years of age) with those of med-peds and IM physicians.

NAMCS directly recorded the major reason for the patient visit as "Acute problem," "Chronic problem, routine," "Chronic problem, flare-up," "Pre/postsurgery," and "Preventative care." Within our analysis, we combined the two chronic problem categories because both represent similar types of visits for management of chronic diseases. We did not include pre/post surgical visits because of the limited number of these to primary care providers in this study (less than 1.5% of visits for all specialties). We compared the types of visits to internists, pediatricians, and family physicians with the types of visits to med-peds physicians with χ^2 test statistics.

To evaluate continuity of care, we determined the proportion of patient visits to the physician designated as the primary care physician. The survey instrument specifically asks, "Are you the patient's primary care physician?" If the primary care provider was unknown or missing (<2% unknown/missing), we coded the visit as not with the patient's primary physician. We compared the proportion of visits to patients' primary care doctors across specialties using χ^2 test statistics. Lastly, we tabulated practice characteristics and expected sources of payment for each specialty.

The NCHS institutional review board approved the protocols used by NAMCS.[10] All tests are two tailed, with $P < .05$ used to determine statistical significance.

Results

From 2000 to 2006, a total of 9,439 physicians participated in NAMCS, with participation rates ranging from 58.9% in 2006 to 70.4% in 2002. There were 502 visits to med-peds providers recorded during this study period (Table 1). There were no visits recorded within NAMCS to med-peds providers in 2003. Table 1 reports unweighted data from a systematic random sample of visits to describe when and where the data were collected.

Age distribution of visits

Forty-three percent of visits to med-peds physicians were from children ≤18 years of age (Figure 1). Compared with family physicians, a greater proportion of all visits to med-peds providers were from infants and toddlers ≤2 years of age (21.0% versus 3.7%; $P = .002$) and from children ≤18 years of age (42.9% versus 15.5%; $P = .002$) (Figure 1, Table 2a). In

Table 1

Visits to Primary Care Physicians Recorded in the National Ambulatory Medical Care Survey From 2000 to 2006*

Sampling characteristic	Specialty			
	Med-peds	Internal medicine	Pediatrics	Family medicine
Year—No. of visits occurring in				
2006	51	2,819	2,817	6,163
2005	16	1,737	2,521	4,073
2004	99	1,567	1,886	3,664
2003	0	1,639	1,818	4,312
2002	174	1,998	2,952	5,196
2001	101	1,818	2,072	2,528
2000	61	2,303	2,244	3,124
Total	*502*	*13,881*	*16,310*	*29,060*
Sampling region—% of total visits in the				
Northeast	16.9	26.2	29.0	16.1
Midwest	40.0	22.7	15.6	30.2
South	29.5	30.2	29.4	32.0
West	13.6	20.9	26.0	21.7
% From a metropolitan statistical area	91.4	84.0	91.1	78.3
Sampling season: % of total visits occurring in the				
Winter	27.3	23.5	25.5	26.4
Spring	27.9	29.2	26.6	25.5
Fall	25.7	23.5	23.8	23.0
Summer	19.1	23.8	24.1	25.1

* Data in this table are not weighted, and they reflect a stratified systematic sample of visits to office-based physicians.

logistic regression models comparing pediatric visits between med-peds and family physicians, adjusted for season, region of country, reason for visit, and metropolitan status, visits to med-peds providers, compared with visits to family physicians, were more likely to be from infants and toddlers ≤2 years of age (OR 8.7; 95% CI 5.5–13.6). Similarly, visits to med-peds providers, compared with visits to family physicians, were more likely from pediatric patients ≤18 years of age (OR 4.5; 95% CI 3.0–6.7).

Pediatric visits to med-peds physicians included a similar percentage of infants and toddlers as visits to pediatricians (Table 2b). Compared with family physicians and internists, med-peds providers saw fewer patients ≥65 years of age (Table 2a, b).

Types of visits

The distribution of types of pediatric visits to med-peds physicians was similar to those of pediatricians and family physicians (Table 3). Med-peds providers saw a slightly higher percentage of pediatric visits for childhood chronic disease management than did pediatric or family physicians, but this estimate is based on exactly 30 visits; therefore, it is at the threshold of what is considered a reliable national estimate and should be interpreted with caution.

Continuity of care

Overall, med-peds physicians reported a high level of continuity of care with patients. For pediatric office visits (patients ≤18 years/old), a similar proportion of med-peds physicians (93.6%) and pediatricians (90.9%) were identified as primary care physicians ($P = .36$). For adult office visits (patients >18 years/old), med-peds providers seemed slightly more likely than internists to be patients' primary care doctors (94.6% versus 85.5%; $P = .06$), although this finding was not statistically significant. Similarly, family physicians were identified as primary care physicians for 86.2% of all visits.

Practice characteristics

Med-peds physicians practiced in similar types of office settings as did internists and pediatricians, most commonly in private group practices (Table 4). The expected sources of reimbursement to providers reflected the age distribution of patients seen and are listed in Table 4. Med-peds providers saw fewer visits reimbursed through private insurance than did pediatricians and a greater proportion of visits reimbursed through Medicaid or the State Children's Health Insurance Program (SCHIP) than did family physicians or internists.

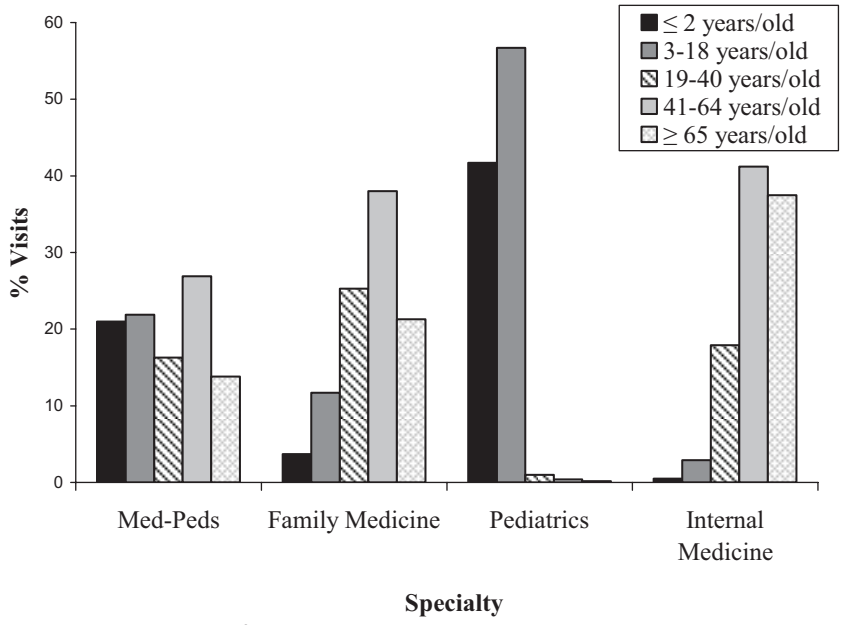

Figure 1 Age distribution of patient visits to primary care providers recorded in the National Ambulatory Medical Care Survey between 2000 and 2006.

Table 2a

Age Distribution of All Patients to Med-Peds and Family Physicians Recorded in the National Ambulatory Medical Care Survey from 2000 to 2006

Patient age	Specialty and % (standard error) of patients		P*
	Med-peds	Family medicine	
≤2	21.0 (2.6)	3.7 (0.3)	0.002
3–18	22.0 (2.1)	11.7 (0.4)	0.006
19–64	43.2 (3.4)	63.3 (0.7)	0.005
≥65	13.8 (2.4)	21.3 (0.7)	0.013

* χ^2 comparing to med-peds physicians.

Discussion

Our findings provide the first description of office visits to med-peds providers based on nationally representative data. Previous studies have indicated that the vast majority of med-peds generalists provide at least some care to pediatric patients but that they are more likely to spend the majority of their time focused on the care of adults.[3–6] Only one prior study, however, described the actual patient mix (33% pediatric patients) based on two Midwestern practices.[7] We confirmed that med-peds physicians see more adult than pediatric visits; however, we found that visits to med-peds physicians included a larger percentage of pediatric patients (43%) than previously reported.

Several factors may explain the considerable percentage of pediatrics patients seen by med-peds providers. Med-peds training programs enjoyed significant growth through the 1990s, more than doubling the number of training positions from 1987 to 1997.[1] This expansion greatly increased the training experiences for med-peds residents, particularly through the creation of combined med-peds clinics. In a recent survey of med-peds residents, nearly all graduating residents (93%) planned to care for children and adults after completing their residencies.[11] This combination of increased practice opportunities and a sustained interest in caring both for adults and children may partially account for the increased pediatric numbers observed in this study. In addition, regional differences in practice patterns may exist and might account for some of the differences in the proportions of pediatric patients seen between this and the previous study.

Our data further characterize the actual age distribution of patients seen by med-peds providers. Compared with family physicians, med-peds physicians treated a significantly higher percentage of pediatric patients but saw fewer adult and elderly patients. This finding is consistent with previously observed trends in decreasing pediatric office visits to family physicians.[12] Similarly, med-peds physicians saw a younger age distribution of adult patients than internists. A recent survey demonstrated that med-peds physicians felt most prepared to care for patients 19 to 64 years of age.[4] This comfort with younger adults, and the likelihood of continuity with adolescent patients as they age into adulthood, may account for the younger distribution of adults seen by med-peds physicians as compared with internists in this study.

With the recent accreditation of med-peds programs in 2006, this study has implications for outpatient continuity training of med-peds residents. This study supports the concept of requiring residents to complete a minimum number of outpatient adult and pediatric visits. Such an approach would ensure adequate pediatric and adult outpatient continuity training while recognizing that typical med-peds physicians do not see exactly 50% pediatric and 50% adult patients in their ambulatory practices.

These findings also provide important information for prospective residency applicants regarding future ambulatory practice patterns in med-peds. Students most commonly decide to pursue med-peds training because of their desire to care both for children and adults.[2] Our findings confirm med-peds training as a viable career path for those students interested in caring both for pediatric and adult patients.

Patient continuity with med-peds providers, as measured by visits to the patients' designated primary care providers, was comparable with that of other primary care providers. This considerable degree of continuity exists both for adult and pediatric visits and provides reassurance that continuity is preserved in the treatment of adult as well as pediatric patients. The variety of caring for adults and children, with the assurance of longitudinal patient–doctor relationships, should make med-peds an appealing option for medical students considering careers in primary care.

The major reasons for ambulatory visits to med-peds providers were similar in scope to those of other primary care providers studied. Within our data, there is a suggestion that med-peds providers see a slightly larger percentage of visits for pediatric chronic disease management; however, this finding may not be a reliable national estimate because of the limited sample size. Nevertheless, given the considerable percentage of pediatric visits and the high level of continuity, med-peds providers are well positioned to care for children with special health care needs, including chronic disease, as they transition through adolescence into adulthood. A recent survey of graduating

Table 2b

Age Distribution of Pediatric Patients and of Adult Patients Recorded in the National Ambulatory Medical Care Survey from 2000 to 2006

Patient age	Specialty and % (standard error) of patients		P*
Patients ≤18 years old	Med-peds	Pediatrics	
≤2	48.9 (3.1)	42.4 (0.8)	0.09
3–18	51.1 (3.1)	57.6 (0.8)	
Patients >18 years old	Med-peds	Internal medicine	
19–64	75.8 (3.6)	61.2 (1.0)	0.006
≥65	24.2 (3.6)	38.8 (1.0)	

* χ^2 comparing to med-peds physicians.

Table 3

Types of Ambulatory Visits Recorded in the National Ambulatory Medical Care Survey from 2000 to 2006*

Visit types	Specialty and % (standard error) of visits		
Pediatric visits†	Med-peds	Pediatrics	Family medicine
Acute problem	56.1 (3.4)	55.5 (0.9)	61.9 (1.3)
Chronic problem‡	14.9 (2.2)	10.7 (0.6)	11.6 (0.8)
Preventative§	29.0 (3.1)	33.8 (0.9)	26.5 (1.3)
Adult visits†	Med-peds	Internal medicine	Family medicine
Acute problem	49.7 (4.9)	37.5 (1.0)‖	46.9 (0.7)
Chronic problem‡	37.1 (4.9)	47.7 (1.2)	38.5 (0.8)
Preventative§	13.2 (3.4)	14.8 (1.0)	14.6 (0.6)

* The type of ambulatory visits was missing for <5% of visits for all specialties; these visits were excluded from the tabulation.
† Pediatric visits include patients ≤18 years old, and adult visits include patients >18 years old.
‡ Chronic problems visits include visits for routine management of chronic problems and visits for flare-ups of chronic problems.
§ Preventive visits include nonillness care, routine general medical exams, and well-child exams.
‖ $P < 0.05$ based on χ^2 test statistic comparing to med-peds physicians.

med-peds residents found that the majority are confident in their ability to care for children and young adults with special health care needs.[11] This role for med-peds providers in transitional care should be further explored in future research.

According to the measures in NAMCS, office characteristics were generally similar for med-peds, IM, pediatrics, and family practice. The expected source of reimbursement to med-peds providers reflected the composition of visits from pediatric and adult patients. Med-peds providers saw fewer visits reimbursed through private insurance and more visits reimbursed by Medicare than did pediatricians. Similarly, med-peds providers saw more visits reimbursed through Medicaid or SCHIP than did IM providers. The greater proportion of visits reimbursed by Medicaid/SCHIP among med-peds physicians compared with family practice likely reflects the greater percentage of pediatric visits.

Table 4

Types of Office Practices and Expected Source of Payment Recorded in the National Ambulatory Medical Care Survey Between 2000 and 2006

	Percent of specialty with characteristic (standard error)			
Characteristic	**Med-peds**	**Internal medicine**	**Pediatrics**	**Family medicine**
Type of office				
Private practice	93.0 (4.2)	90.9 (1.6)	90.2 (1.6)	87.0 (1.2)
Urgent care center	4.1 (2.9)	5.0 (1.3)	5.7 (1.3)	8.6 (1.1)
HMO*/prepaid	2.9 (2.9)†	2.1 (0.7)	1.6 (0.5)	1.5 (0.4)
Other‡	0†	2.0 (0.7)	2.5 (0.7)	2.9 (0.6)
Group practice	71.5 (11.7)	56.1 (2.7)	76.7 (2.2)	67.6 (2.0)
Source of payment§				
Private insurance	51.9 (4.0)	51.0 (1.4)	68.2 (1.6)‖	59.6 (1.1)
Medicare	9.3 (2.1)	32.2 (1.1)‖	1.2 (0.3)‖	17.8 (0.7)‖
Medicaid/SCHIP	23.4 (6.8)	6.4 (0.6)‖	23.3 (1.6)	9.7 (0.6)‖
Self-Pay/NC¶	5.1 (1.2)†	4.4 (0.5)	2.5 (0.3)	6.3 (0.4)
Other**	10.3 (4.9)	6.0 (0.6)	4.8 (0.5)	6.6 (0.6)

* HMO, health maintenance organization.
† Includes fewer than 30 visits and, therefore, is considered an unreliable national estimate. No statistical comparisons performed.
‡ *Other* includes federally qualified health centers, mental health centers, nonfederal government clinics, family planning clinics, and other clinics.
§ The source of payment for visits was missing for less than 10% of visits for all specialties; visits with missing data were classified as *other* source of payment in the table.
‖ $P < 0.05$ based on χ^2 test statistic comparing to med-peds physicians.
¶ NC, no charge; includes payments from worker's compensation and no-charge visits.
** Includes other forms of payment not listed, unknown sources of payment, and missing data.

This study has several limitations. First, there are a relatively limited number of visits to med-peds physicians compared with visits to internists, pediatricians, and family physicians. The results should, therefore, be interpreted in the context of the comparatively small sample size of visits to med-peds physicians. Despite the relatively limited numbers, the SEs of the national estimates for our primary outcomes are well within accepted ranges for reliable national estimates (the NCHS considers estimates reliable if the relative SE is less than 30% of the point estimate[8]). Second, NAMCS data are based on office visits to physicians, not individual physicians' patient panels. Therefore, we are unable to draw any direct conclusions about the composition of individual physicians' patient panels. Furthermore, data on individual physician characteristics are not publicly available. Consequently, we are unable to adjust for physician demographics and, therefore, are unable to determine whether older or more experienced med-peds and family physicians care for older patients. Third, we estimated continuity of care using the proportion of patient visits to the physician designated as the primary care physician. Although this is an indirect measure of patient continuity, we believe that it provides a reasonable estimate of physician continuity with their patients. Lastly, NAMCS is limited to nonfederal, office-based physicians in the United States and does not include visits to hospital-based offices, family planning centers, or school-based clinics.

Conclusions

Med-peds physicians care for a considerable proportion of pediatric patients in their practices while maintaining high levels of continuity of care both for adult and pediatric patients. Compared with family physicians, med-peds providers see a significantly higher percentage of pediatric patients. At the same time, med-peds physicians see fewer elderly patients than do family physicians or internists.

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Teaching and Learning Moments

Talking the Talk

Certainly none of us entered medicine because we enjoy difficult conversations, conversations that bring up painful and feared topics such as life and death or the wisdom of pursuing certain treatments. Even more certainly, we can recall the dread that rises in anticipation of these conversations, however necessary, with a patient and his family. In my work with children, I am left to wonder if, at times and perhaps inadvertently, we avoid these conversations.

I travel outside the United States to do international work with residents and provide them with an opportunity to practice medicine in a resource-poor environment. During these trips, I generally find myself teaching on the medical aspects of the experience—scabies, parasites, nutrition, hygiene. Then, during my last trip, one of the residents brought to my attention a little girl who was neurologically devastated after suffering a febrile illness. Her parents had been waiting two years for her recovery and they were asking when she would return to her normal self. It sounded like meningitis, the resident concluded, and she wanted to know if we should place a gastrostomy tube and evaluate for a tracheostomy—since that is what we would do at home. Wow. I did not know how to respond. Is this what we are teaching our trainees? To do *something*. *Anything*. Without questioning why? Or for whom? What about resource allocation? What about doing what is best for that child, her parents, and her community?

I asked the resident if she thought major interventions in this child's life would be good for this family. She responded by saying that is what we normally do with near-drowning patients, motor-vehicle accident cases, and so many of our micropremies. I asked her if doing that for our patients back in the United States was always a good idea. Her answer was thoughtful: "But if we don't do anything, what are we doing for this family?" Tough question. I responded, "We are going to give them closure," and together we explained to those parents that their child was never going to return to normal.

Several months later, back at home, the father of a comatose teen hit by a car two years before stopped me in the halls to chat. "I know not everyone thinks T.J. is still in there, but I know he is. I mean, the neurosurgeon wouldn't do the surgery if he didn't think there was hope, would he?" Again, I did not know how to respond. I did not want to strip this father of his hope, and I simply did not have it in my heart to break his.

Asking parents to make decisions for their sick children is complicated, painful, and messy, but we cannot take the easy way out—always continuing to offer more, to do something. We must acknowledge our weaknesses. We must be honest about the power of nature and the limits of medicine, a determined force but far from magical. We must be fair and give families the choice to do what is most comfortable for their child. We have to be unafraid of uncomfortable situations and draw for patients and families a realistic picture of the future, and we absolutely must include our trainees in these conversations. As role models, we are obligated to step up to this task. If we ask students and residents to be a part of the process, they can see that some decisions cannot be fit into a protocol. They may not realize just then that their ethics are being challenged—or even that they are learning medicine—but, eventually, they may come to find that saving or repairing a life is all a matter of perspective.

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