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# Pediatric Gastroenterology Workforce Survey, 2003–2004

## A Report of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition

**ABSTRACT**

**Background:** The North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) performed a workforce survey to determine the number, distribution, and work-related activities of pediatric gastroenterologists in the United States of America (USA) and Canada, and compared these findings with the first workforce survey completed in 1996.

**Methods:** The survey queried pediatric gastroenterologists in the USA and Canada between November, 2003 and June 2004. To permit the optimal comparison to the 1996 survey data, the original survey was used as a template for development of the current instrument and, when possible, the questions were left unchanged. Additional questions were added to address important contemporary issues not present in the initial survey. Limited income information was also collected. The survey was posted on the NASPGHAN website, and the NASPGHAN membership was notified of the survey by electronic mail via its electronic mail distribution list. This was followed by a three-part postal mail survey to all non-respondents. After the Internet and postal mail requests, all non-respondent physicians were telephoned a minimum of three times. If unsuccessful in contacting the physicians directly, office personnel were queried to facilitate survey completion regarding the provision of pediatric gastroenterology, nutrition or hepatology services in either clinical care or research.

**Results:** The response rate based on the potential contact list for Part I of the survey was 69%. The final phone call or electronic mail contact of an office staff member with questions regarding gender and delivery of pediatric gastroenterology services yielded a total contact rate of 88%. There were 699 pediatric gastroenterologists identified in North America, as compared with 672 in 1996. If known non-respondents are included, there could be as many as 794 pediatric gastroenterologists. Time spent in clinical activities increased from 60% to 66% in the USA and from 43% to 53% in Canada. The use of nurse practitioners and physician assistants has increased considerably over the past 7 years. Fifty-three percent of respondents feel there are too few pediatric gastroenterologists. Fifty percent of section and practice heads report that they are currently recruiting partners. Limited income information is presented.

**Conclusions:** There is currently a self-perceived shortage of pediatric gastroenterologists as compared with 7 years ago, despite a constant proportion of pediatric gastroenterologists per million children. In the USA, nurse practitioners and physician assistants are being increasingly used to fill this need, and physicians in both Canada and the USA have increased the time they spend in clinical care. ***JPGN 40:395–000, 2005.***
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## INTRODUCTION

In 1996, NASPGHAN conducted a workforce survey, the results of which were published in 1998 (1). The survey included information on demographics, allocation of time spent in professional activities, the perceived adequacy of the number of pediatric gastroenterologists and career and retirement plans. In addition, a workforce analysis was performed. Projections regarding the future supply of, and demand for, pediatric gastroenterologists were made based on the number of fellows entering the workforce, the estimated number of pediatric gastroenterologists retiring annually and the prevailing opinions of the time regarding the effects of managed care on the future need for subspecialty care.

In 1996, 24% of the United States of America (USA) pediatric gastroenterology workforce was female, 76% were board certified, 90% were USA citizens and 97% worked full time. The findings were similar in Canada. In the USA, 55% worked in an academic position, whereas 82% of Canadian gastroenterologists were in academic settings. Sixty percent of the workweek was spent in clinical activity related to pediatric gastroenterology in the USA, as compared with 43% in Canada. Sixteen percent of pediatric gastroenterologists in the USA and 27% in Canada worked with nurse practitioners and physician assistants.

In 1996, 12% of respondents in the USA felt there were too few pediatric gastroenterologists, 58% felt there was the right number and 30% felt that there were too many. In Canada in 1996, those percentages were 57%, 40% and 3%, respectively. Based on that survey, and the subsequent workforce analysis, it was recommended that pediatric gastroenterology training programs be decreased by 50% to 75%.

Beginning in November, 2003, NASPGHAN conducted a follow-up workforce survey, the results of which are presented here. This survey was undertaken to determine changes in the practice of pediatric gastroenterology

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over the previous 7 years, the current status of our workforce and the accuracy of the projections of the 1996 survey.

## METHODS

The NASPGHAN Clinical Practice Committee compiled a master list of all practicing pediatric gastroenterologists in North America from a combination of the NASPGHAN membership list, American Board of Pediatrics (ABP) data, American Medical Association (AMA) data (both ABP and AMA data sets contain an unspecified number of false ''tracking'' names used by the organizations to assure the data sets are not used beyond the contracted period) and regional reporters. The regional reporters were 53 NASPGHAN members from the USA and Canada who agreed to review, modify and correct the physician lists from their regions. A pediatric gastroenterologist was defined as a physician currently providing pediatric gastroenterology clinical care, nutrition clinical care or both and/or a physician active in research, teaching or administration related to pediatric gastroenterology and nutrition.

The 1996 survey was used as a template for the development of the current instrument and, when feasible, the questions were left unchanged. Additional questions were submitted by members of the NASPGHAN Clinical Practice Committee, International Committee, Women's Committee and the NASPGHAN Executive Council for inclusion in the current survey. After careful review and prioritization of the proposed questions by the Workforce Survey Chair, additional questions that addressed relevant, contemporary issues were added. The resulting questionnaire was reviewed by the NASPGHAN Clinical Practice Committee for clarity and content, and a revised final survey was created. A duplicate, Internet-based version was then constructed and tested by members of NASPGHAN committees including the Internet Committee. Modifications to the Internet survey were incorporated based on feedback from the beta testing.

The survey consisted of two parts. The first part requested information on demographics, workforce activities and identifying information such as the name and address of the respondent. The second part was anonymous and requested information about income. Recipients were asked to complete the questionnaire if they were pediatric gastroenterologists, as defined. Recipients who were not pediatric gastroenterologists, or who were retired or in training, were asked to return the questionnaire without providing additional information. The questionnaire required 15 to 30 minutes to complete.

The survey was posted on the NASPGHAN website, and members of the NASPGHAN electronic mail distribution list were notified of the survey in November 2003. Electronic mail prompts were sent over the next 4 months encouraging completion of the survey. Beginning in March 2004, a three-part direct mail survey consisting of the survey instrument, a postcard follow-up and a second full mailing was used to contact non-respondents. The remaining non-respondents were telephoned a minimum of three times and a toll-free number was provided to office personnel when the physician was not immediately available. If contact was made, the physician was urged to complete the survey. Finally, the office staff of non-respondents were contacted and queried regarding the provision of pediatric gastroenterology, nutrition or hepatology services in either clinical care or research. Physician gender was also asked. Several names on the master list did not have phone numbers but did have electronic mail addresses. All non-respondents who could not be reached by telephone were contacted by electronic mail for information regarding the provision of pediatric gastroenterology services and gender.

The survey specifically requested information about age, gender, employment status (full or part time), board certification, citizenship and the number of hours worked per week. Respondents were requested to estimate the average number of half-days per week spent in clinical pediatric gastroenterology, clinical work other than pediatric gastroenterology, research, teaching, administration and other activities. Definitions and guidelines for estimating the time spent in various activities were provided.

Outpatient time was defined as the number of half-days per week dedicated to scheduled outpatient visits. Procedure time was defined as the number of half-days per week dedicated to scheduled procedures. Hospital work rounds were defined in two ways. For those performing hospital work rounds every week, 5 hours of hospital rounds per week was equivalent to one half-day per week; for those performing hospital work rounds on a rotating basis, every 10 weeks of assigned hospital rounds was also equivalent to one half-day per week for the year. Night and weekend on-call duties were not included in these estimates of professional effort but rather were addressed separately later in the survey.

Research time was defined as any time spent working on a research project, including submission of grant applications, performance of the research study, data analysis and manuscript preparation; time spent in the routine clinical care of patients was not included. Teaching time was defined as classroom, lecture, conference and other didactic teaching. Teaching at the bedside or in the clinic that was performed during the provision of patient care was not included; neither was teaching associated with research. Five hours of teaching per week was considered to be equivalent to one half-day per week.

Administrative time was defined as time spent in specific administrative assignments such as section head, chairman or vice-chairman of a department, training program director or journal editorship. Administrative time did not include time spent on telephone calls, insurance forms, medical records or other tasks directly associated with patient care, research or teaching. Respondents were requested to estimate time allocated to ''other activities'' such as preparation of manuscripts and committee work but not activities related to patient care, research, teaching and administration, as defined above.

The average total hours worked per week included all time spent at the workplace, together with time spent working at home on research, teaching, administrative and other academic activities or other activities related to patient care at night and on weekends.

Respondents provided additional information concerning the source of salary support for research, involvement in a liver or small bowel transplantation program, performance of endoscopy, use of nurse practitioners and physician assistants, on-call schedules and time allotment for clinic patients.

All respondents were asked to indicate which of the following statements best expressed their impression of the number of pediatric gastroenterologists in the referral area they served: ''There are too few pediatric gastroenterologists relative to the need,'' ''There are too many pediatric gastroenterologists

relative to the need'' or ''There is approximately the right number of pediatric gastroenterologists.'' In addition, practice/section heads were asked about the number of open positions in their program for which they were currently recruiting.

In the present study, additional information was obtained on total annual compensation (defined as total income reported on tax forms) and its sources. Benefit packages such as retirement and malpractice insurance (which may total an additional 19% to 21% of salary) were not specifically examined. To preserve confidentiality, income information was completed on a separate form. Some basic demographic information was completed, but identifying variables were not included. All currency was converted to USA dollars by multiplying 0.8 times Canadian currency.

Population estimates were based on the 2000 census data from the USA (2) and the 2001 census data from Canada (3).

Data from the USA and Canada were analyzed, and compared to that obtained in 1996 when possible. USA data is also reported by region as follows: Northeast (ME, NH, VT, MA, RI, CT, NY, NJ, PA, MD, DE, DC), Midwest (ND, SD, NE, KS, MN, WI, IA, MO, MI, IL, IN, OH), South (OK, TX, AR, MS, LA, KY, WV, VA, NC, TN, SC, GA, AL, FL), and West (AK, HI, WA, OR, CA, ID, NV, UT, MT, WY, CO, NM, AZ). As there were only four respondents from Mexico, no analysis of that data is reported.

### Statistical Methods

Descriptive statistics are presented. Strength of relationships was measured with Chi-Square testing and individual cells were evaluated with standardized residuals (Observed − Expected values / square root (Expected values)). Expected values for individual cells are estimated by row and column totals and represent the numbers one would expect by chance if there were no association between the row and column. When the Chi-Square is significant, the standardized residual provides information on where the association between the row and column values has the greatest impact. Standardized residuals greater than 2 are considered statistically significant at $P < 0.05$. Continuous data were statistically compared with nonparametric tests and analysis of variance with Tukey adjusted multiple comparisons. Statistical significance was at $P < 0.05$. Statistical analyses were performed with SPSS software (SPSS, Chicago, IL).

Due to space constraints of the *Journal*, supplemental tables and figures can be found on both the publisher's and the NASPGHAN websites.

## RESULTS

Eight hundred twenty nine names were obtained from the NASPGHAN membership list. An additional 177 names were obtained from the American Board of Pediatrics, American Medical Association and regional reporters. Seventy-two physicians not on the initial master list responded to the web survey. Sixty names from the master list did not have valid contact information, and four respondents practiced outside of North America. This left a potential contact list of 1014 individuals, with 946 in the USA, 60 in Canada and eight in Mexico.

### Part I

Four hundred thirty-one people responded to the web survey. Two hundred sixty-four of those not responding to the web survey returned a mail survey. Twelve completed the survey over the phone. The response rate based on the potential contact list for Part I was 69% (703 of a possible 1014) compared with 85% in 1996. The final phone call or electronic mail contact of an office staff member with questions regarding gender and delivery of pediatric gastroenterology services yielded an additional 190 responses for a total contact rate of 88% (893 of a possible 1014), compared with 99% in 1996.

Of the 893 physicians who were contacted, 194 (22%) were either in training or not providing pediatric gastroenterology services. Thus, 699 eligible pediatric gastroenterologists were identified as practicing in North America, compared to 672 in 1996. Of these 699 pediatric gastroenterologists, 650 reside in the USA, 46 in Canada, and three in Mexico. Of the 1014 names on the potential contact list, 121 could not be contacted. Assuming that the percentage of those not contacted who are either in training or not providing pediatric gastroenterology services is equal to that of the respondents (22%), the total number of practicing pediatric gastroenterologists could be as high as 794. However, this is likely an overestimation, in part given the presence of an unknown number of ''tracking names'' included in the ABP and AMA lists.

Completed surveys were received from 526 (75%) of the eligible 699 pediatric gastroenterologists, and form the basis of this report. The data on gender include results from all 893 contacted pediatric gastroenterologists.

### Part II

Two hundred and forty-two individuals responded to the web survey, and 204 responded to the mailed survey for a total of 446 (43.8%). Of these 446, 405 were from the USA, 27 were from Canada and four were from Mexico. Ten respondents did not identify the country in which they practice.

Demographic information is shown in Table 1. In the USA, 27% of the workforce is female. In 1996, that number was 24% ($P = 0.11$). There are significantly more women in the Northeast Region and significantly fewer women in the South than statistically predicted based on the standardized residuals ($P < 0.001$). In Canada, the proportion of female pediatric gastroenterologists is twice as high (46%) as in 1996 (23%, $P = 0.03$). The proportion of female pediatric gastroenterologists in Canada was also significantly higher than in the USA ($P = 0.02$). African-American physicians were underrepresented in all regions of the USA when compared with the general population. There were no significant differences in the racial distribution or age distribution across the four regions of the USA ($P = 0.45$ and $P = 0.79$,

**TABLE 1.** *Basic demographics by country*

| | USA Region | | | | Country | | 1996 | |
|---|---|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada | USA | Canada |
| Number of identified pediatric gastroenterologists* | 200 | 146 | 183 | 119 | 650 | 46 | 624 | 48 |
| Gender | | | | | | | | |
| Male | 63% | 73% | 81% | 76% | 73% | 54% | 76% | 77% |
| Female | 37% | 27% | 19% | 24% | 27% | 46% | 24% | 23% |
| Racial Category | | | | | | | | |
| Asian | 11% | 13% | 12% | 13% | 12% | 5% | | |
| Black | 2% | 4% | 3% | 2% | 3% | 0% | | |
| White | 85% | 80% | 79% | 85% | 82% | 89% | | |
| "Other" | 1% | 4% | 5% | 0% | 3% | 5% | | |
| Hispanic | | | | | | | | |
| Hispanic or Latino | 7% | 10% | 12% | 11% | 9% | 3% | | |
| Not Hispanic | 93% | 90% | 88% | 89% | 91% | 97% | | |
| Age (years) | | | | | | | | |
| <=40 | 17% | 18% | 18% | 18% | 18% | 41% | | |
| 41–55 | 64% | 65% | 65% | 57% | 63% | 41% | | |
| 56+ | 19% | 17% | 17% | 25% | 19% | 19% | | |
| American Board of Pediatrics certification | | | | | | | | |
| Board Eligible | 10% | 5% | 8% | 12% | 9% | 53% | | |
| Board Certified | 90% | 86% | 90% | 84% | 88% | 13% | | |
| Neither | 0% | 9% | 2% | 3% | 3% | 34% | | |
| Royal College of Physicians of Canada certification | | | | | | | | |
| Board Eligible | 2% | 1% | 5% | 1% | 2% | 58% | | |
| Board Certified | 1% | 6% | 6% | 1% | 3% | 26% | | |
| Neither | 96% | 94% | 90% | 98% | 94% | 16% | | |
| Either American Board or Royal College certification | | | | | | | | |
| Board Certified | 90% | 87% | 90% | 84% | 88% | 37% | 76%** | 86%** |
| Member of NASPGHAN | | | | | | | | |
| Yes | 96% | 95% | 93% | 94% | 95% | 100% | | |
| No | 4% | 5% | 7% | 6% | 5% | 0% | | |
| Country where Medical Degree obtained | | | | | | | | |
| USA | 83% | 80% | 80% | 88% | 82% | 6% | | |
| Canada | 2% | 0% | 2% | 0% | 1% | 91% | | |
| Mexico | 1% | 2% | 1% | 1% | 1% | 0% | | |
| Other | 15% | 18% | 17% | 11% | 15% | 3% | | |
| Citizenship | | | | | | | | |
| USA | 95% | 92% | 95% | 96% | 95% | 9% | 90%** | |
| Canada | 0% | 0% | 2% | 0% | 1% | 91% | | 91% |
| Other | 5% | 8% | 2% | 4% | 5% | 0% | | |

* Region not identified for two USA respondents.
** $P < 0.01$.

respectively). There were no Canadian respondents who identified themselves as "Black or African American." In the USA, the percent of pediatric gastroenterologists who are USA citizens increased from 90% to 95% ($P < 0.01$). Ninety-five percent of US physicians and all Canadian physicians who completed the survey identified themselves as members of NASPGHAN.

T2 The nature of employment is summarized in Table 2. The distribution of employment varied regionally within the USA ($P < 0.001$). In the Northeast the number in private practice is lower than the expected value ($z = -4.3$), while the number of hospital affiliated physicians ($z = 3.4$) and pharmaceutical physicians ($z = 2.3$) is greater. In the Midwest, there are fewer private practice physicians ($z = -2.7$) and more hospital affiliated physicians ($z = 2.9$). The South has more private practice ($z = 5.1$) and fewer university affiliated physicians ($z = -2.4$). In the West, there are more private practice physicians ($z = 2.2$), more HMO physicians ($z = 5.0$) and fewer hospital-affiliated physicians ($z = -2.3$). The USA tended to have more private practice physicians ($z = 2.5$) and fewer university physicians ($z = -3.7$, overall Chi-Square $P = 0.03$) than Canada. As seen in Table 2, these patterns are very similar to those of the 1996 survey. The number of US pediatric gastroenterologists working full time (≥40 hours per week) decreased from 97% to 92% ($P < 0.01$),

**TABLE 2.** *Summary of employment*

| | USA Region | | | | Country | | | 1996 | |
|---|---|---|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada | Total | USA | Canada |
| Employment status | | | | | | | | | |
| University/Academic | 59% | 68% | 47% | 50% | 56% | 87% | 58% | 55% | 82% |
| Private practice | 11% | 14% | 39% | 32% | 23% | 5% | 22% | 21% | 9% |
| Hospital or Clinic | 25% | 15% | 13% | 9% | 16% | 8% | 16% | 11% | 9% |
| HMO | 0% | 1% | 0% | 8% | 2% | 0% | 2% | 3% | 0% |
| Pharmaceutical or formula company | 3% | 1% | 0% | 1% | 1% | 0% | 1% | | |
| Other | 1% | 1% | 0% | 1% | 1% | 0% | 1% | 8% | 0% |
| Government | 1% | 0% | 1% | 0% | 1% | 0% | 1% | 2% | 1% |
| Academic appointment | | | | | | | | | |
| Yes | 92% | 88% | 71% | 79% | 83% | 97% | 84% | | |
| No | 8% | 12% | 29% | 21% | 17% | 3% | 16% | | |
| Academic rank | | | | | | | | | |
| Instructor | 7% | 6% | 3% | 7% | 6% | 8% | 6% | | |
| Assistant Professor | 41% | 37% | 39% | 30% | 38% | 47% | 39% | | |
| Associate Professor | 27% | 33% | 26% | 30% | 29% | 14% | 27% | | |
| Full Professor | 24% | 24% | 32% | 33% | 27% | 31% | 28% | | |
| Academic track | | | | | | | | | |
| Adjunct | 6% | 5% | 8% | 10% | 7% | 12% | 7% | | |
| Clinical | 65% | 61% | 56% | 61% | 61% | 55% | 61% | | |
| Tenure | 29% | 34% | 36% | 29% | 32% | 33% | 32% | | |
| Practice type | | | | | | | | | |
| General Multispecialty Group | 3% | 2% | 1% | 6% | 3% | 0% | 2% | | |
| Pediatric Multispecialty Group | 27% | 31% | 33% | 26% | 29% | 14% | 28% | | |
| Pediatric Gl Group | 66% | 57% | 47% | 54% | 57% | 78% | 58% | | |
| Solo Practice | 5% | 10% | 20% | 15% | 12% | 8% | 11% | | |
| Years practiced since fellowship | | | | | | | | | |
| 0–5 years | 17% | 18% | 16% | 19% | 17% | 32% | 19% | | |
| 6–10 years | 20% | 22% | 22% | 13% | 20% | 16% | 19% | | |
| 11–15 years | 22% | 19% | 25% | 18% | 21% | 16% | 21% | | |
| 16–20 years | 17% | 16% | 14% | 16% | 16% | 13% | 16% | | |
| >20 years | 24% | 25% | 23% | 34% | 26% | 24% | 26% | | |
| Work hours | | | | | | | | | |
| Full time (>= 40 hours/wk) | 91% | 95% | 93% | 92% | 92% | 84% | 92% | 97%** | 95% |
| Part time | 9% | 5% | 7% | 8% | 8% | 16% | 8% | | |

** $P < 0.01$

whereas the proportion of full-time Canadian pediatric gastroenterologists decreased from 95% to 84% ($P = 0.08$). The smaller number of Canadian respondents (n = 38) may explain the lack of statistical significance. In the USA, 95% of males work full-time as compared with 85% of females ($P < 0.001$). In Canada, the difference between males (95%) and females (71%) working full-time was also significant ($P = 0.04$).

The mean time spent in various categories of professional activity is shown in Table 3. Pediatric gastroenterologists in the USA, on average, spend most of their work week (66%) in clinical activities of their subspecialty (i.e., outpatient clinic, hospital rounds and procedures), as compared with 60% in 1996 ($P = 0.04$). Of the sample who reported activities other than clinical care, 12% of professional time is spent in research (not significantly different than the 14% in 1996), 5% in teaching (not significantly different than the 6% in 1996), 7% in administration (not significantly different than the 8% in 1996), 3% in clinical work unrelated to their subspecialty (significantly less than the 7% of time spent in 1996, $P < 0.01$) and 9% in other activities (significantly more than the 4% in 1996, $P < 0.01$). In the USA, physicians in the South spend more time than those from other regions providing outpatient care, more time on new patient visits and less time in research. In the Northeast, less time is devoted to procedures. In Canada, 53% of professional time is spent in clinical pediatric gastroenterology compared with 43% in 1996. This difference is not statistically significant; however the sample size may be insufficient to detect a difference. Nineteen percent of time is spent in research, similar to the 20% in 1996, and 10% in administration, compared with 16% in 1996. The time spent in clinical activity in the USA (66%) is significantly greater than the percent of clinical time in Canada (53%, $P = 0.001$), whereas the amount of professional time dedicated to research in Canada (19%) is significantly greater than that in the USA (12%, $P < 0.001$). Table S1 describes the allocation of time in half days among various professional activities.

More physicians reported performing at least 50 endoscopies per year compared with 1996 in both the

**TABLE 3.** *Mean proportion of time spent in various activities*

| | USA Region 2004 | | | | 2004 | | | 1996 | |
|---|---|---|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada | Total | USA | Canada |
| Proportion Effort | | | | | | | | | |
| Outpatient Gl Clinic | 0.37 | 0.34 | 0.43 | 0.37 | 0.38 | 0.26 | 0.37 | 0.32* | 0.21 |
| Procedure | 0.11 | 0.14 | 0.15 | 0.13 | 0.13 | 0.09 | 0.13 | 0.14 | 0.09 |
| Inpt Rounds | 0.14 | 0.15 | 0.16 | 0.14 | 0.15 | 0.18 | 0.15 | 0.14 | 0.13 |
| Outpt non-Gl | 0.02 | 0.01 | 0.03 | 0.04 | 0.03 | 0.01 | 0.02 | 0.07** | 0.08 |
| Research | 0.14 | 0.17 | 0.06 | 0.12 | 0.12 | 0.19 | 0.13 | 0.14 | 0.20 |
| Teaching | 0.06 | 0.05 | 0.04 | 0.06 | 0.05 | 0.07 | 0.05 | 0.06 | 0.06 |
| Administrative | 0.08 | 0.07 | 0.06 | 0.08 | 0.07 | 0.10 | 0.07 | 0.08 | 0.16 |
| Miscellaneous | 0.10 | 0.09 | 0.09 | 0.07 | 0.09 | 0.10 | 0.09 | 0.04** | 0.08 |
| Time for new patient visit (minutes) | 38 | 38 | 34 | 43 | 38 | 42 | 38 | | |
| Time for follow-up visit (minutes) | 20 | 20 | 18 | 21 | 20 | 21 | 20 | | |
| Hours worked per week | 59 | 60 | 59 | 60 | 59 | 57 | 59 | 62 | 61 |
| Call weekday nights/year | 81 | 85 | 109 | 105 | 95 | 62 | 92 | | |
| Call weekend days/year | 27 | 32 | 43 | 43 | 36 | 18 | 34 | | |

* Comparing USA 1996 to USA 2004, $P < 0.05$; ** Comparing USA 1996 to USA 2004, $P < 0.01$.
Sample size for Canada was too small to detect any differences.

USA (84%, $P < 0.01$) and Canada (77%, $P < 0.05$) TS2 (Table S2). Similar numbers of physicians provided endoscopic and endoscopic retrograde cholangiopancreatography services across regions of the USA. The Midwest physicians are more involved with transplant programs ($z = 3.2$) whereas physicians in the Northeast are less involved ($z = -2.8$). Active participation in transplant programs was reported by 32% of USA and 43% of Canadian respondents. Approximately 10% of respondents practice hepatology predominantly (>50% of total time), and approximately 6% practice nutrition predominantly.

The percent of the total time spent in research in the USA is about the same in 2004 (14%) as in 1996 (12%). More than twice the proportion of USA pediatric gastroenterologists (24%) is funded by grants than their Canadian counterparts (11%). In the USA, 50% of those with research funding receive support from the Federal government, as compared with 25% in Canada. Federal funding is the largest source of salary support for pedi- TS3 atric gastroenterologists engaged in research (Table S3).

There are substantially more practices using nurse practitioners and physician assistants (55%) in the USA than there were in 1996 (16%, $P < 0.001$). The number of Canadian practices using nurse practitioners and physician assistants decreased from 27% to 17% over the TS4 same time, a statistically insignificant change (Table S4).

There is a significant shift in the perceived adequacy of the number of pediatric gastroenterologists from 1996 T4 (Table 4). In the USA, 53% of respondents feel there were too few pediatric gastroenterologists, compared with 12% in 1996. In Canada, 76% of respondents felt there were too few pediatric gastroenterologists compared with 57% in 1996; however this difference did not reach statistical significance. Approximately 55% of the responding section and practice heads report recruiting at least one (average, 1.7) pediatric gastroenterologist. These findings are interesting in the context of a constant proportion of pediatric gastroenterologists per million children as compared to 1996 (Table S5). TS5

Tables 5, S6 and S7 show income information for T5 pediatric gastroenterologists based on gender, location, and practice type. Note that these data reflect total income (including income derived from consulting, lecturing, bonuses, incentives, etc.) rather than salary. Academic physicians at the ranks of Assistant Professor ($P < 0.001$) and Associate Professor ($P < 0.001$) reported less income than private practice physicians. Full professors reported similar incomes ($P = 0.08$) to those in private practice. Women in private practice ($P < 0.001$) and female Full Professors ($P = 0.02$) report earning significantly less than men in the same categories. No differences based on gender were reported at the level of Assistant Professors ($P = 0.63$), and differences at the Associate Professor level did not reach statistical significance ($P = 0.06$), seen in Figure S1. Figure S2 AU3 illustrates the gender difference ($P < 0.001$) based on years since Fellowship training. Annual income as a function of years in practice follows a significant linear increase from 0 through 16 years and then levels off ($P < 0.001$) for male physicians. The linear increase was not seen for female pediatric gastroenterologists.

There was no significant difference between regions within the USA ($P = 0.66$), and the interaction between gender and region was not significant ($P = 0.82$). There was no statistically significant difference between Canada and the USA.

## DISCUSSION

The pediatric gastroenterology workforce survey conducted in 1996 identified 672 individuals who

**TABLE S1.** *Distribution of time spent in various activities in half days*

| | USA Region | | | | Country | |
|---|---|---|---|---|---|---|
| Number of Half Days | Northeast | Midwest | South | West | USA | Canada |
| Outpatient Gl Clinic | | | | | | |
| 75th% | 6 | 5 | 6 | 6 | 6 | 3 |
| Median | 4 | 4 | 5 | 4 | 4 | 2 |
| 25th% | 3 | 2 | 3 | 2 | 3 | 2 |
| Procedure | | | | | | |
| 75th% | 2 | 2 | 2 | 2 | 2 | 1 |
| Median | 1 | 1 | 2 | 1 | 1 | 1 |
| 25th% | 1 | 1 | 1 | 1 | 1 | 1 |
| Inpatient rounds | | | | | | |
| 75th% | 2 | 2 | 3 | 2 | 2 | 3 |
| Median | 1 | 2 | 2 | 1 | 1 | 2 |
| 25th% | 1 | 1 | 1 | 1 | 1 | 1 |
| Outpatient non-Gl | | | | | | |
| 75th% | 0 | 0 | 0 | 0 | 0 | 0 |
| Median | 0 | 0 | 0 | 0 | 0 | 0 |
| 25th% | 0 | 0 | 0 | 0 | 0 | 0 |
| Research | | | | | | |
| 75th% | 2 | 2 | 1 | 2 | 2 | 4 |
| Median | 1 | 1 | 0 | 0 | 1 | 2 |
| 25th% | 0 | 0 | 0 | 0 | 0 | 1 |
| Teaching | | | | | | |
| 75th% | 1 | 1 | 1 | 1 | 1 | 1 |
| Median | 1 | 1 | 0 | 1 | 1 | 1 |
| 25th% | 0 | 0 | 0 | 0 | 0 | 0 |
| Administrative activities | | | | | | |
| 75th% | 1 | 1 | 1 | 1 | 1 | 2 |
| Median | 0 | 1 | 0 | 1 | 0 | 1 |
| 25th% | 0 | 0 | 0 | 0 | 0 | 0 |
| Miscellaneous | | | | | | |
| 75th% | 1 | 1 | 1 | 1 | 1 | 1 |
| Median | 0 | 0 | 0 | 0 | 0 | 1 |
| 25th% | 0 | 0 | 0 | 0 | 0 | 0 |
| Time for new patient visit (minutes) | | | | | | |
| 75th% | 45 | 45 | 40 | 60 | 45 | 45 |
| Median | 40 | 40 | 30 | 40 | 35 | 45 |
| 25th% | 30 | 30 | 30 | 30 | 30 | 30 |
| Time for follow-up visit (minutes) | | | | | | |
| 75th% | 30 | 20 | 20 | 30 | 25 | 25 |
| Median | 20 | 20 | 15 | 20 | 20 | 20 |
| 25th% | 15 | 15 | 15 | 15 | 15 | 15 |
| Hours worked per week | | | | | | |
| 75th% | 70 | 70 | 65 | 70 | 68 | 70 |
| Median | 60 | 60 | 60 | 60 | 60 | 60 |
| 25th% | 50 | 55 | 50 | 50 | 50 | 50 |
| Call weekday nights worked per year | | | | | | |
| 75th% | 120 | 120 | 146 | 137 | 130 | 85 |
| Median | 58 | 60 | 86 | 79 | 65 | 60 |
| 25th% | 20 | 38 | 40 | 45 | 35 | 24 |
| Call Weekend days worked per year | | | | | | |
| 75th% | 34 | 36 | 52 | 51 | 47 | 26 |
| Median | 24 | 24 | 34 | 26 | 26 | 14 |
| 25th% | 10 | 15 | 22 | 19 | 16 | 10 |

considered themselves pediatric gastroenterologists. Over the past 7 years, that number has grown to between 699 and 794. Employment settings and practice types have changed very little. However, the amount of time spent in clinical activity has increased from 60% to 66% in the USA and from 43% to 53% in Canada, perhaps reflecting an increasing demand to see patients and generate clinical revenue. Although the use of nurse practitioners and physician assistants has not significantly changed in Canada, their use by US pediatric gastroenterologists has increased from 16% in 1996 to 55% of practices currently. This increase may represent another means by which practices are trying to evaluate patients in a timely manner and expand patient care services.

The perceived adequacy of the numbers of pediatric gastroenterologists has dramatically changed since the

**TABLE S2.** *Specific types of services*

| | USA Region | | | | Country | | 1996 | |
|---|---|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada | USA | Canada |
| Perform more than 50 endoscopies/yr | | | | | | | | |
| Yes | 81% | 86% | 90% | 78% | 84% | 77% | 78%** | 57%* |
| No | 19% | 14% | 10% | 22% | 16% | 23% | 22% | 43% |
| Perform ERCP without supervision | | | | | | | | |
| Yes | 2% | 4% | 5% | 10% | 5% | 6% | | |
| No | 98% | 96% | 95% | 90% | 95% | 94% | | |
| Involved with transplants | | | | | | | | |
| Yes | 23% | 45% | 27% | 38% | 32% | 43% | | |
| No | 77% | 55% | 73% | 62% | 68% | 57% | | |
| If yes, type of program | | | | | | | | |
| Liver | 87% | 84% | 88% | 75% | 83% | 50% | | |
| Small Bowel | 0% | 8% | 3% | 3% | 4% | 21% | | |
| Both | 13% | 8% | 9% | 22% | 13% | 29% | | |
| Half days involved with transplants for those in transplant centers | | | | | | | | |
| Mean | 1.12 | 1.22 | 1.18 | 1.47 | 1.25 | 1.54 | | |
| Median | 0.5 | 0.5 | 1 | 1 | 1 | 1.5 | | |
| $25^{th}$% | 0.1 | 0.2 | 0.5 | 0.5 | 0.2 | 1 | | |
| $75^{th}$% | 1 | 1.7 | 1 | 1 | 1 | 2 | | |
| Practice >50% pediatric hepatology | | | | | | | | |
| Yes | 4% | 12% | 4% | 13% | 8% | 11% | | |
| No | 96% | 88% | 96% | 88% | 92% | 89% | | |
| Practice >50% pediatric nutrition | | | | | | | | |
| Yes | 7% | 8% | 3% | 7% | 6% | 6% | | |
| No | 93% | 92% | 97% | 93% | 94% | 94% | | |
| If yes, then also trained in pediatric Gl | | | | | | | | |
| Yes | 100% | 88% | 100% | 83% | 93% | 50% | | |
| No | 0% | 13% | 0% | 17% | 7% | 50% | | |

** $P < 0.01$; * $P < 0.05$.

**TABLE S3.** *Grant funding*

| | USA Region | | | | Country | |
|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada |
| Percent of physicians who receive a portion of salary from grants | 22% | 30% | 16% | 30% | 24% | 11% |
| Of those who have grants, source of grant funds | | | | | | |
| Federal | 56% | 40% | 21% | 73% | 48% | 25% |
| State | 3% | 0% | 0% | 4% | 3% | 0% |
| Local | 3% | 3% | 5% | 4% | 4% | 0% |
| Institutional | 9% | 10% | 11% | 8% | 10% | 25% |
| Other or unstated* | 59% | 60% | 84% | 42% | 61% | 50% |
| Percentage of salary from grants for recipients of grant funding | 50% | 54% | 21% | 49% | 45% | 47% |
| Of those with grant funding, percent of salary paid by source | | | | | | |
| Federal | 25% | 20% | 6% | 34% | 22% | 25% |
| State | 2% | 0% | 0% | 0% | 1% | 0% |
| Local | 1% | 0% | 0% | 0% | 1% | 0% |
| Institutional | 1% | 3% | 3% | 1% | 2% | 8% |
| Other or unstated | 21% | 30% | 17% | 14% | 20% | 14% |

* Note: Columns do not add to 100% because individuals can receive funds from various sources.

**TABLE S4.** *Practice heads report of the use of nurse practitioners and physician assistants*

| | USA Region | | | | Country | | 1996* | |
|---|---|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada | USA | Canada |
| Practice Heads responding | 51 | 31 | 64 | 42 | 189 | 12 | | |
| Practices that include PA/nurse practitioners | 60% | 65% | 44% | 62% | 55% | 17% | 16%** | 27% |
| Number of PA/nurse practitioner per practice | 1.7 | 2.4 | 2.7 | 1.7 | 2.1 | 3.0 | | |
| Mean half days per each PA/nurse practitioner | 4.9 | 4.5 | 5.8 | 6.3 | 5.4 | 6.0 | | |

* In 1996 the number of nurse practitioners was asked of all Gl physicians. In 2004, it was only asked of department heads.
** $P < 0.01$.

1996 survey. At that time, 88% of USA respondents felt that the number of pediatric gastroenterologists was ''about right'' or ''too many,'' whereas 57% of Canadian respondents felt that there were ''too few.'' Currently 53% of USA and 76% of Canadian respondents feel there is a shortage. This subjective analysis is consistent with information on current recruitments obtained from the 190 respondents, 178 from the USA and 12 from Canada, who identified themselves as practice or section heads. Of those practice/section heads, 55% from the USA and 50% from Canada report that they are actively recruiting partners, with an average of 1.7 open positions per USA group and 1.5 open positions per Canadian group recruiting. If these numbers are accurate, at least 174 additional pediatric gastroenterologists are needed to fill positions that are currently open.

Despite the perceived shortage, the total number of pediatric gastroenterologists has at least modestly increased since the 1996 survey, and the ratio of pediatric gastroenterologists per million children has remained relatively constant (2,3). Seven years ago, there were 9.1 pediatric gastroenterologists per 1 million children in the

**TABLE 4.** *Estimated workforce needs and recruitment*

| | USA Region | | | | Country | | 1996 | |
|---|---|---|---|---|---|---|---|---|
| | Northeast | Midwest | South | West | USA | Canada | USA | Canada |
| Number of Pediatric Gls in area | | | | | | | | |
| Too few | 59% | 50% | 49% | 54% | 53% | 76% | 12%** | 57% |
| Approximately the right number | 34% | 45% | 43% | 38% | 40% | 24% | 58% | 40% |
| Too many | 8% | 6% | 8% | 8% | 7% | 0% | 30%** | 3% |
| Age plan to retire | | | | | | | | |
| <=55 | 5% | 5% | 8% | 3% | 5% | 11% | | |
| 56–60 | 14% | 16% | 15% | 10% | 14% | 27% | | |
| 61–65 | 49% | 45% | 52% | 56% | 50% | 46% | | |
| 66–70 | 22% | 26% | 19% | 27% | 23% | 14% | | |
| 70+ | 10% | 8% | 5% | 4% | 7% | 3% | | |
| Anticipate career change in next 5 yrs | | | | | | | | |
| Yes | 17% | 13% | 13% | 14% | 14% | 18% | | |
| No | 83% | 87% | 87% | 86% | 86% | 82% | | |
| If yes, plan to change career to | | | | | | | | |
| Private Practice | 30% | 6% | 21% | 25% | 21% | 0% | | |
| HMO | 0% | 0% | 0% | 0% | 0% | 0% | | |
| University/Academic | 30% | 12% | 29% | 25% | 24% | 50% | | |
| Hospital or Clinic | 15% | 29% | 14% | 17% | 19% | 0% | | |
| Government | 0% | 6% | 0% | 0% | 2% | 0% | | |
| Pharmaceutical or Formula Company | 10% | 6% | 7% | 0% | 6% | 0% | | |
| Retire | 5% | 35% | 21% | 33% | 22% | 50% | | |
| Other | 10% | 6% | 7% | 0% | 6% | 0% | | |
| Percent of practices currently recruiting Gl physicians | 63% | 61% | 49% | 46% | 55% | 50% | | |
| Of those recruiting, number of physicians being recruited | 2.0 | 1.8 | 1.6 | 1.4 | 1.7 | 1.5 | | |

** $P < 0.01$

**TABLE S5.** *Rate of pediatric gastroenterologists per one million children*

| | | Pediatric GI | | Pediatric GI per Million Children | | |
|---|---|---|---|---|---|---|
| | Population 0–17[2,3] | Actual Respondents | Maximum | Actual Respondents | Maximum | 1996 |
| Northeast | 16,677,581 | 200 | 227 | 12.0 | 13.6 | 12.7 |
| Midwest | 16,486,817 | 146 | 165 | 8.9 | 10.0 | 8.1 |
| South | 25,154,102 | 183 | 208 | 7.3 | 8.3 | 9.1 |
| West | 22,190,254 | 119 | 135 | 5.4 | 6.1 | 6.9 |
| USA Total | 80,508,754 | 650 | 738 | 8.1 | 9.2 | 9.1 |
| Canada | 6,966,145 | 46 | 52 | 6.6 | 8.2 | 6.8 |

Maximum is computed by assigning the non-respondents as pediatric gastroenterologists at the same rate as the respondents.

USA, and 6.8 per million children in Canada. Currently there are 8.1–9.2 pediatric gastroenterologists per million children in the USA, and 6.6–8.2 in Canada. Although the incidence of some pediatric gastrointestinal illnesses has increased and there has been an increase in the complexity of care, it is unlikely that these factors alone explain the increased demand for and perceived shortage of pediatric gastroenterology services in the face of a relatively constant proportion of pediatric gastroenterologists. Perhaps the increased demand for services represents changes in referral habits of primary care physicians. It is likely that patients with common pediatric complaints such as constipation with encopresis, gastroesophageal reflux and chronic abdominal pain are being increasingly referred for sub-specialty care.

In the 1996 workforce survey analysis, the supply of pediatric gastroenterologists was projected to increase to 950 physicians by 2006 if the number of training programs was not decreased and to increase to 715 if no further fellows were trained. At the same time, the projected demand for pediatric gastroenterologists was 675, based in part on an anticipated decline in referrals resulting from managed care (1). Based on these findings, the NASPGHAN leadership recommended that training programs be decreased by 50% to 75%. The number of physicians taking the ABP certifying examination in pediatric gastroenterology for the first time serves as a useful surrogate number for the fellows completing training each year. The number of physicians taking the pediatric gastroenterology board for the first time decreased from approximately 48 per year in 1996 to 28 per year in 2003. However, the number of fellows in training has increased over the past several years, with approximately 50 pediatric gastroenterology fellows completing

**TABLE 5.** *Total annual income and proportion of income from addition sources*

| | Annual Income (including "additional income") | | | Portion from "additional income" | | |
|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total |
| Practice Location | | | | | | |
| Northeast | 218 (79) | 169 (50) | 203 (75) | 12 (17) | 16 (39) | 14 (26) |
| Midwest | 194 (53) | 163 (35) | 188 (51) | 7 (19) | 1 (2) | 6 (18) |
| South | 211 (83) | 140 (53) | 195 (83) | 21 (32) | 4 (14) | 17 (30) |
| West | 196 (90) | 173 (19) | 193 (84) | 29 (59) | 5 (8) | 25 (55) |
| Canada | 167 (22) | 134 (66) | 153 (47) | 7 (14) | 2 (3) | 5 (11) |
| Employment | | | | | | |
| Academic-Asst Prof | 136 (24) | 143 (56) | 139 (44) | 8 (23) | 14 (40) | 11 (32) |
| Academic-Assoc Prof | 175 (45) | 148 (29) | 168 (43) | 11 (17) | 4 (8) | 10 (15) |
| Academic-Full Prof | 205 (60) | 171 (34) | 200 (58) | 15 (20) | 4 (7) | 13 (19) |
| Hospital or Clinic | 216 (39) | 185 (26) | 212 (39) | 14 (19) | 4 (5) | 13 (18) |
| Private practice | 241 (102) | 166 (56) | 226 (99) | 27 (56) | 4 (15) | 22 (51) |
| Practice | | | | | | |
| Solo practice | 250 (137) | 155 (58) | 228 (129) | 11 (26) | 9 (21) | 10 (25) |
| Pediatric GI group | 199 (66) | 162 (44) | 188 (63) | 18 (43) | 7 (24) | 15 (39) |
| Pediatric multispecialty group | 195 (51) | 132 (67) | 188 (56) | 17 (23) | 14 (38) | 17 (25) |
| General multispecialty group | 213 (67) | 150 – | 208 (67) | 27 (41) | 3 (4) | 23 (39) |
| Years since fellowship | | | | | | |
| 0–5 years | 167 (67) | 134 (64) | 155 (67) | 28 (64) | 3 (5) | 19 (53) |
| 6–10 years | 181 (55) | 165 (48) | 175 (53) | 21 (52) | 18 (44) | 20 (49) |
| 11–15 years | 213 (72) | 155 (39) | 198 (70) | 10 (20) | 1 (3) | 8 (18) |
| 16–20 years | 222 (87) | 162 (38) | 211 (64) | 18 (29) | 7 (9) | 16 (26) |
| >20 years | 209 (81) | 163 (54) | 203 (80) | 16 (25) | 4 (7) | 14 (24) |
| Total | 204 (77) | 157 (48) | 193 (74) | 17 (36) | 7 (25) | 15 (34) |

Values are Mean (SD).

AU1

**TABLE S6.** *Further distributional characteristics of annual income*

| | Total Annual Income (excluding benefits) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | | | | | Female | | | | | Total | | | | |
| | n | 25th | Median | 75th | Mean | n | 25th | Median | 75th | Mean | n | 25th | Median | 75th | Mean |
| Practice Location | | | | | | | | | | | | | | | |
| Northeast | 56 | 166 | 200 | 250 | 218 | 21 | 123 | 180 | 200 | 169 | 77 | 151 | 195 | 238 | 203 |
| Midwest | 51 | 150 | 190 | 220 | 194 | 12 | 130 | 162 | 190 | 163 | 63 | 150 | 183 | 215 | 188 |
| South | 69 | 163 | 200 | 230 | 211 | 19 | 110 | 133 | 160 | 140 | 88 | 150 | 180 | 220 | 195 |
| West | 51 | 150 | 175 | 225 | 196 | 10 | 153 | 180 | 185 | 173 | 61 | 150 | 180 | 220 | 193 |
| Canada | 10 | 154 | 160 | 187 | 167 | 6 | 120 | 150 | 176 | 134 | 16 | 136 | 160 | 180 | 153 |
| Employment | | | | | | | | | | | | | | | |
| Academic-Asst Prof | 21 | 115 | 140 | 151 | 136 | 21 | 110 | 128 | 172 | 143 | 42 | 113 | 135 | 161 | 139 |
| Academic-Assoc Prof | 38 | 148 | 170 | 190 | 175 | 14 | 127 | 138 | 171 | 148 | 52 | 140 | 160 | 190 | 168 |
| Academic-Full Prof | 64 | 165 | 193 | 220 | 205 | 11 | 150 | 175 | 190 | 171 | 75 | 162 | 188 | 215 | 200 |
| Hospital or Clinic | 31 | 190 | 220 | 240 | 216 | 4 | 165 | 180 | 205 | 185 | 35 | 180 | 210 | 237 | 212 |
| Private practice | 73 | 175 | 225 | 279 | 241 | 18 | 150 | 180 | 200 | 166 | 91 | 165 | 207 | 250 | 226 |
| Practice | | | | | | | | | | | | | | | |
| Solo practice | 34 | 160 | 210 | 300 | 250 | 9 | 138 | 178 | 190 | 155 | 43 | 155 | 200 | 287 | 228 |
| Pediatric Gl group | 116 | 155 | 184 | 225 | 199 | 46 | 128 | 158 | 190 | 162 | 162 | 150 | 180 | 220 | 188 |
| Pediatric multispecialty group | 65 | 158 | 180 | 220 | 195 | 9 | 100 | 120 | 190 | 132 | 74 | 153 | 180 | 220 | 188 |
| General multispecialty group | 15 | 159 | 223 | 270 | 213 | 2 | 150 | 150 | 150 | 150 | 17 | 150 | 220 | 250 | 208 |
| Years since Fellowship | | | | | | | | | | | | | | | |
| 0–5 years | 20 | 110 | 150 | 200 | 167 | 10 | 110 | 123 | 176 | 134 | 30 | 110 | 138 | 200 | 155 |
| 6–10 years | 41 | 145 | 170 | 205 | 181 | 18 | 125 | 158 | 200 | 165 | 59 | 135 | 168 | 200 | 175 |
| 11–15 years | 44 | 160 | 202 | 250 | 213 | 17 | 132 | 155 | 190 | 155 | 61 | 153 | 190 | 230 | 198 |
| 16–20 years | 45 | 175 | 208 | 258 | 222 | 9 | 130 | 152 | 170 | 162 | 54 | 165 | 200 | 240 | 211 |
| >20 years | 86 | 165 | 190 | 225 | 209 | 13 | 150 | 180 | 190 | 163 | 99 | 165 | 186 | 220 | 203 |
| Total | 236 | 155 | 190 | 230 | 204 | 67 | 125 | 155 | 190 | 157 | 303 | 150 | 180 | 220 | 193 |

training in 2004 and 77 first-year fellows beginning training in 2004.

Although this survey attempted to obtain meaningful income information that would be useful to all pediatric gastroenterologists, the decision to do so was not without debate. Concerns were expressed regarding response rates and sampling bias to questions regarding income, the accuracy of the reported data, the definition of income and even what questions to ask. It was decided that a comprehensive financial survey was beyond the scope of this effort. However, the committee felt that some attempt to evaluate compensation should be pursued. To protect confidentiality and to maximize response rates, the income information questions were asked as a second, de-identified portion of the survey. As a consequence, it was not possible to control for variables only asked in the main body of the survey. Approximately 45% of pediatric gastroenterologists completed section 2 of the survey, which should be considered when interpreting the data. The respondents reported income information for academic practices that was generally greater than the data derived from the Association of American Medical

AU2

**TABLE S7.** *Income by location*

| Income in 1000's | Northeast | Midwest | South | West | Canada |
|---|---|---|---|---|---|
| Employment | | | | | |
| Academic-Asst Prof | 158 ± 52 | 140 ± 22 | 118 ± 25 | 131 ± 27 | 165 ± 74 |
| Academic-Assoc Prof | 178 ± 39 | 176 ± 59 | 159 ± 32 | 146 ± 19 | 214 ± 40 |
| Academic-Full Prof | 227 ± 86 | 197 ± 28 | 188 ± 50 | 192 ± 46 | 219 ± 24 |
| Hospital or Clinic | 198 ± 66 | 197 ± 36 | 212 ± 59 | 202 ± 86 | 98 ± 105 |
| Private practice | 245 ± 100 | 222 ± 62 | 227 ± 109 | 211 ± 110 | 220 |
| Years in practice | | | | | |
| 0–5 years | 132 ± 44 | 186 ± 111 | 162 ± 52 | 179 ± 53 | 130 ± 79 |
| 6–10 years | 168 ± 42 | 179 ± 42 | 177 ± 58 | 180 ± 69 | 245 |
| 11–15 years | 218 ± 55 | 207 ± 63 | 199 ± 93 | 177 ± 46 | 200 ± 12 |
| 16–20 years | 226 ± 66 | 186 ± 44 | 214 ± 55 | 219 ± 140 | 234 ± 12 |
| >20 years | 227 ± 95 | 190 ± 30 | 215 ± 102 | 195 ± 82 | 225 ± 35 |

Values are mean ± SD.

Colleges (AAMC) salary report. Data regarding salaries of pediatric gastroenterologists in private practice are not available for comparison.

There are several possible explanations for the observed differences. First, the AAMC data represent salary figures from 1–2 years before this survey, with the most current AAMC salary information coming from the 2002–2003 academic year. Next, the current survey reports total income (i.e., as reported on tax return statements) rather than salary. Although this survey tried to account for additional income beyond salary, this may have been misinterpreted by some respondents. Differences between the AAMC data and the survey could also reflect the inclusion of income information from individuals with academic appointments who work in non-academic positions. Every effort was made to avoid this confounder in the analysis. Finally, it is possible that willingness to respond to this survey was influenced by income (e.g., those with higher incomes were more willing to share that information) or that self-reported income was exaggerated in some instances.

Physicians in private practice reported higher incomes than did assistant and associate professors in academic institutions. However, this survey did not address the benefit packages, such as retirement and malpractice insurance, provided to academic physicians, which can total an additional 20% of salary. To what degree these benefit packages equalize differences in income between physicians in private practice and those in academic settings cannot be reliably determined based on these data.

Significant income differences were found between men and women in some areas. Although no statistically significant differences were seen at the Assistant and Associate Professor levels, men reported significantly more income than women at the Full Professor level and in private practice and hospital- and clinic-based practices. Income differences in private practice positions may represent differences in billing and would be heavily influenced by several variables including the number of hours worked. Part 1 of the survey found that female pediatric gastroenterologists more commonly work part time than their male counterparts. However, as the income information (Part 2) was de-identified and therefore not linked to many pertinent survey variables such as hours worked and the percentage of time spent in clinical activities, it is not possible to determine whether these or other confounding variables account for any or all of the differences. Income differences at the Full Professor rank could reflect differences in responsibilities (e.g., section head, department chair) rather than true differences in income; however, there are insufficient data to confirm or refute this hypothesis. Further investigation of income and benefits should include sufficient information to adequately examine whether the gender differences seen in this sample are attributable to identifiable factors such as hours worked, billing or differences in administrative responsibilities.

In summary, there is currently a self-perceived shortage of pediatric gastroenterologists compared with the perception 7 years ago despite a constant proportion of pediatric gastroenterologist per million children. In the USA, nurse practitioners and physician assistants are being increasingly used to fill this need, and physicians in both Canada and the USA have increased the time they spend in clinical care. There has been little change in the distribution of work settings. Salaries of those working in private practice are greater than those of most academic physicians; however, benefits were not considered in this analysis.

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