

**Analysis of the NRMP-SMS Match for Infectious Disease for
2016-17 Appointment Year and Trends Over-Time**

George Washington University Health Workforce Institute

A Report to:

The Infectious Diseases Society of America

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I. Introduction

The National Residency Match Program (NRMP) Specialties Matching Service (SMS) is the key process for internal medicine and pediatric sub-specialty fellowship programs to recruit fellows and for physicians to be matched with a program. While not all entrants into a sub-specialty are selected and matched through the SMS, the data can provide a good picture of those who are entering the specialty as well as the level of interest in the specialty.

While we don't know the final number of positions that will be filled in the 2016/17 training year, according to the Accreditation Council for Graduate Medical Education (ACGME) 366 fellows entered adult Infectious Disease (ID) fellowships in 2014/15¹; and according to the NRMP there were 335 positions offered in the 2016/17 SMS match of which 218 were filled through the match². Thus, while additional physicians will be selected for ID fellowships in 2016/17, the results of the SMS still provide valuable information, particularly through the comparison with other sub-specialties and with results from earlier years.

Section II of this report provides a summary of the experience of ID in the 2016/17 NRMP match including the trends in the NRMP in the match over the past few years. Section III presents the results for adult ID in the SMS match as compared to other adult IM specialties. Section IV of the report provides data on residency and fellowship training from the ACGME annual Resource Data Book; the most authoritative source on ACGME accredited training. Although the most recent available data is for the 2014/15 training year (this data is not available until the fall after a training year ends), data from 2009/10 through 2014/15 is available and provides helpful insights on recent trends.

A report on a survey of the ID physicians completing training in 2016 on their future practice plans and their experience in the marketplace will be available in summer 2016.

¹ ACGME Data Resource Book, Academic Year 2014-15; ACGME, October 2015

² Results and Data Specialties Matching Service, 2016 Appointment Year; NRMP, February 2016

II. Findings : Adult Infectious Disease

The results of the NRMP Specialties Matching Service (SMS) for the 2016-17 appointment year for Infectious Disease (ID) showed a continuation of the recent trend of declining applications for training in the specialty. While the number of ID positions offered in the SMS and the number of residents completing internal medicine increased, and other IM sub-specialties did well, ID continued a 7 year trend of decreasing applications and increasing numbers of unfilled programs³.

1. Both the number and percent of adult Infectious Disease (ID) programs filling their fellowship positions through the SMS as well as the total number of positions filled have been decreasing over the past 8 years. **Between 2009/10 and 2016/17, the number of programs filling all of their positions dropped from 101 to 60, a decrease of 41%** (Exhibit 1). **Over that same period, the number of positions filled dropped from 267 to 218, a decrease of 18%** (Exhibit 2)
2. While there has been an increase in the number of ID positions offered in the match from 301 to 335 (11%), **the number of applicants fell sharply from 331 to 229 (31%) between 2009/10 and 2016/17** (Exhibit 3).
3. **The net result was that while there were 1.1 applicants for each position in 2009/10, there were only 0.7 applicants for each position in 2016/17** (Exhibit 4). Conversely, while 81% of applicants were accepted in 2009/10, 95% of the 2016/17 applicants were accepted.
4. The decrease in applicants experienced by ID is in contrast to the overall experience in internal medicine, where the total number of physicians completing IM residency training was actually going up during this period. **The net effect was that the share of IM completers applying for ID positions dropped from 5.1% in 2009/10 to 3.2% in 2016/17** (Exhibit 5).
5. **The experience of ID in the SMS was also at odds with most other IM sub-specialties.** While ID only filled 65% of their positions in the 2016/17 SMS, 6 of the other IM sub-specialties matched more than 90% of their positions, 5 of them matching 97% or higher (Exhibit 6).

³ The NRMP SMS does not include all of the entrants into the specialty: a few ID programs (6 in 2016) fill outside of the match; and most programs that do not fill through the match identified candidates after the match. According to the ACGME there were 366 first year fellows in 2014/15; the NRMP reported that 328 positions were offered in the match and 254 were filled that year. Thus, while 90% of the positions were offered in the SMS, only 69% were filled through the match. The remainder was filled outside of the formal match.

6. The decrease in the matched positions appears to have been largely driven by non-US citizen graduates of foreign medical schools (IMGs). **The number of non-US IMGs matching to ID dropped from 98 in 2009/10 to 52 in 2016/17, a 47% decrease** (Exhibit 7). Overall, the number of active non-US IMGs in the SMS for all IM sub-specialties decreased by only 10% during this period. It is not clear why the number of non-US IMGs applying to ID dropped so sharply.
7. While ID had the second highest matching rate for US MDs (58%) in the 2016/17 SMS compared to the other IM sub-specialties in the match, this appears to be a result of the relatively high number of matches made outside of the SMS by ID compared to most of the other IM sub-specialties. Since other IM specialties filled almost all of their positions through the SMS, the SMS figures are close to the final percent IMG. For ID a large number of positions are filled after the match and this includes many IMGs. The ACGME data on IMGs (Exhibit 22) clearly shows that the final percentage of IMGs in ID has been very close to the percent of US MDs training in the specialty.
8. Based on surveys of residents and fellows conducted each year in New York State by the New York Center for Health Workforce Studies, from 2010 to 2014 the income, job offers and relative demand for ID fellows have all been substantially below those in other IM specialties. This finding needs to be treated with caution given that the number of survey respondents each year in New York has been relatively small⁴. Nevertheless the results are consistent over time suggesting these may be real factors contributing to the decrease in applications to ID fellowships (Exhibit 8).

⁴ The New York survey only includes physicians completing training in New York; further, the demand measures only include those that have looked for a job and exclude IMGs on temporary visas. While the survey has a response rate from ID physicians above 50%, only 10 to 21 ID respondents were included in the demand index each year.

**Exhibit
1**

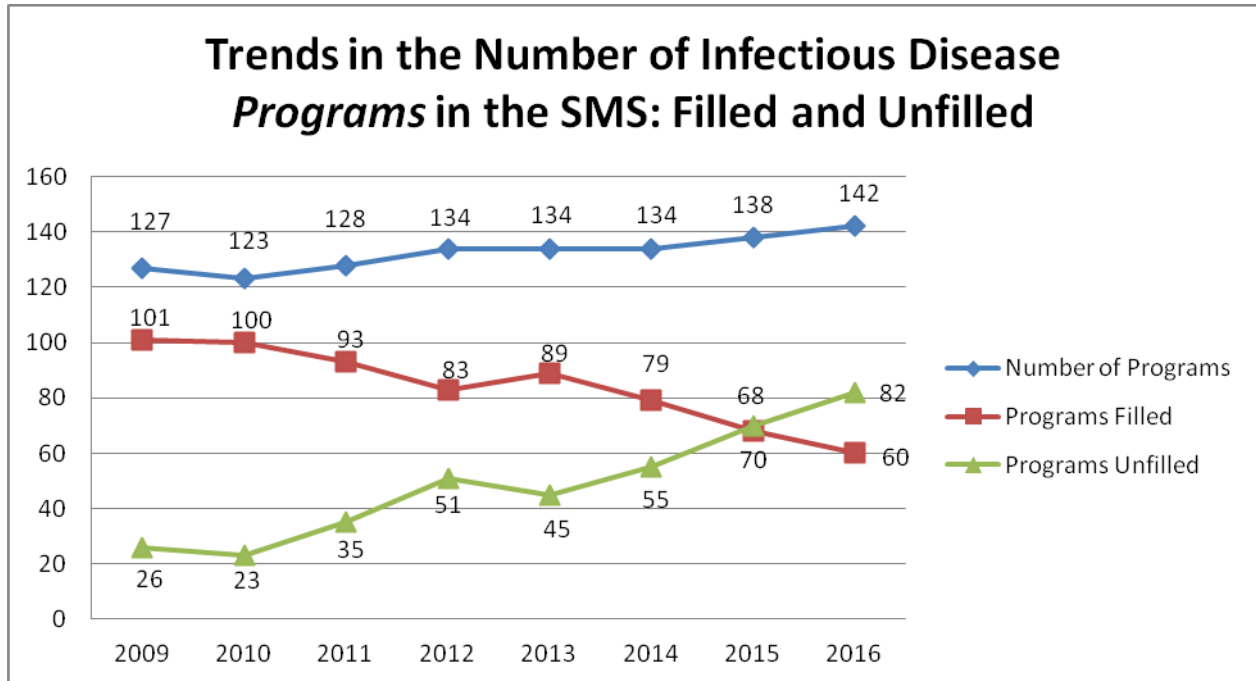
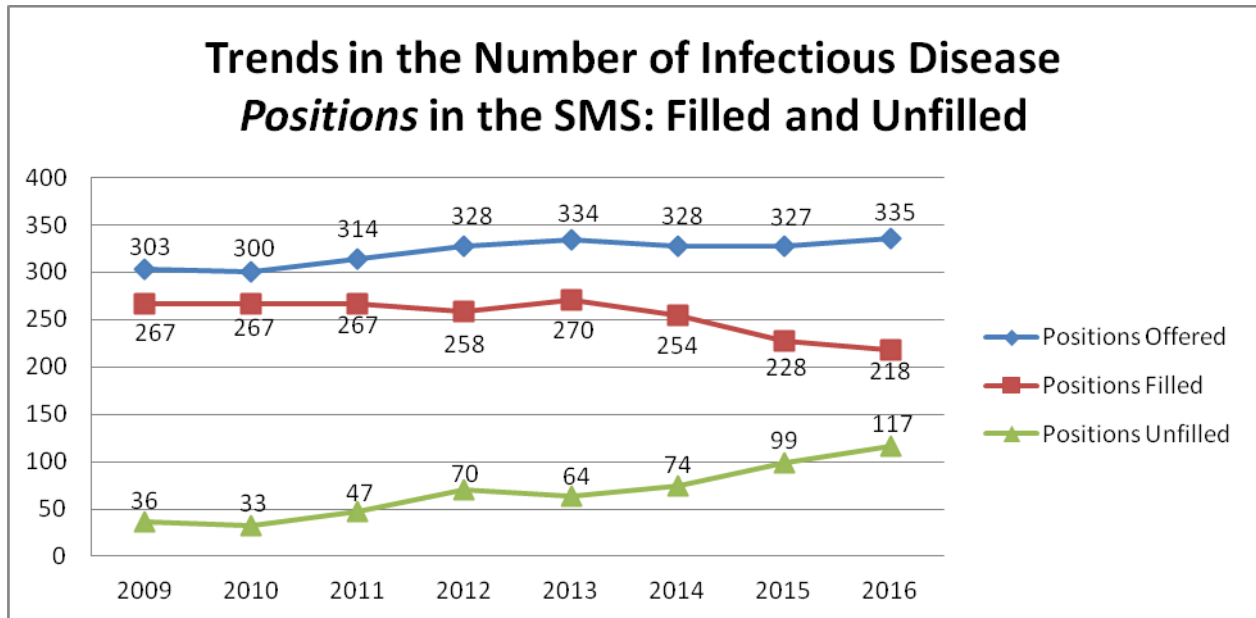


Exhibit 2



**Exhibit
3**

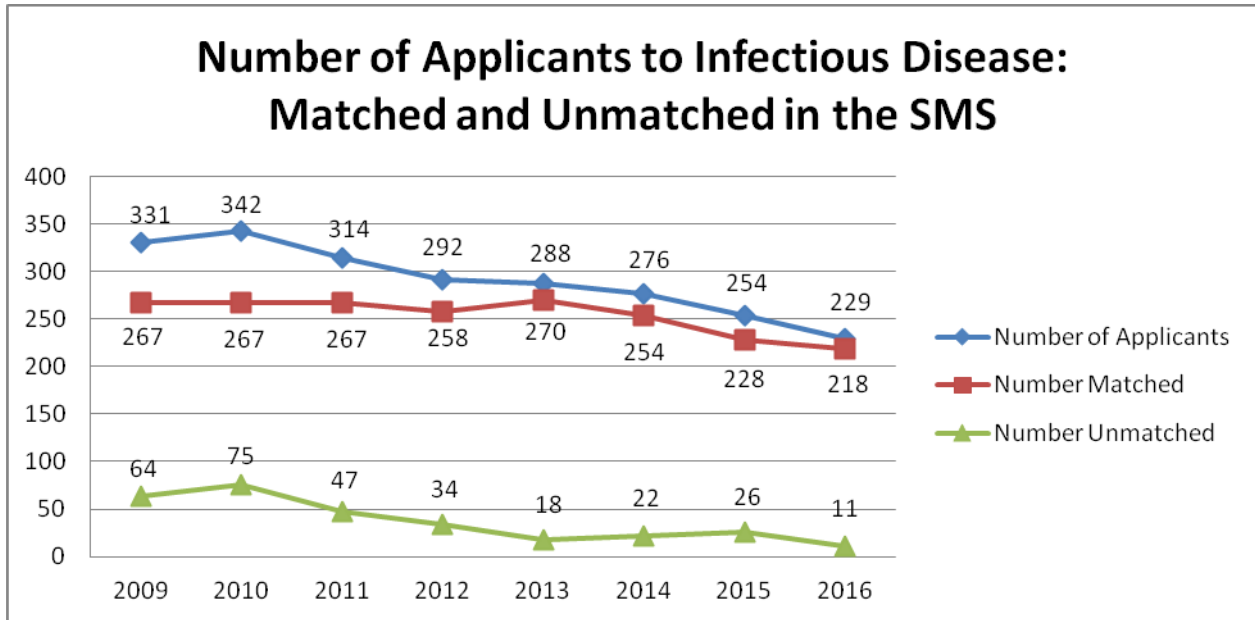


Exhibit 4

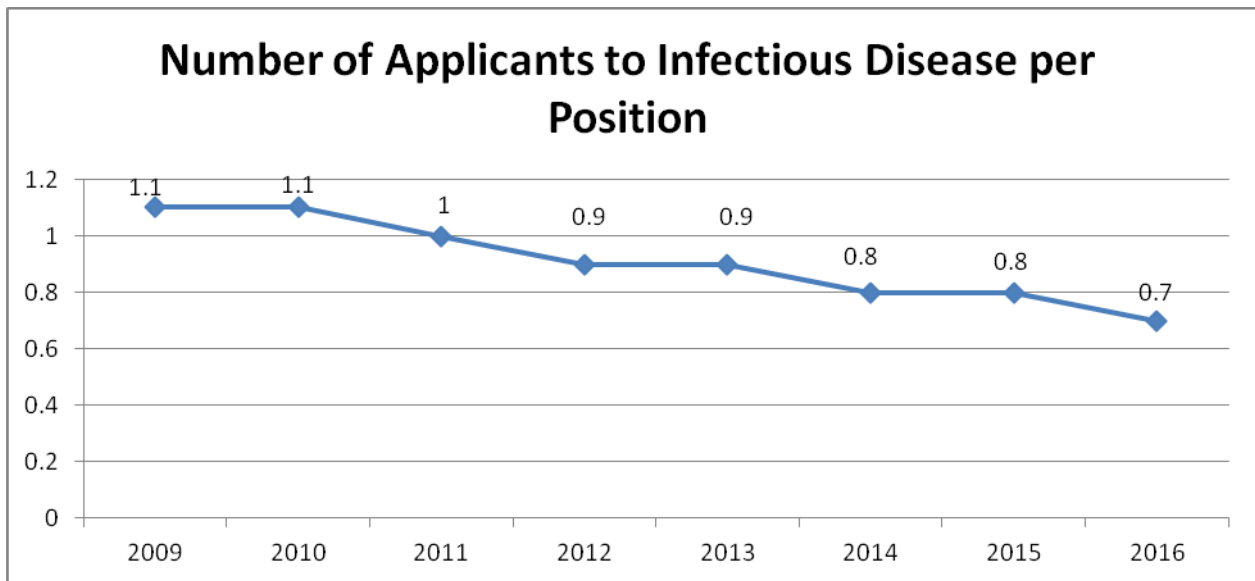


Exhibit 5

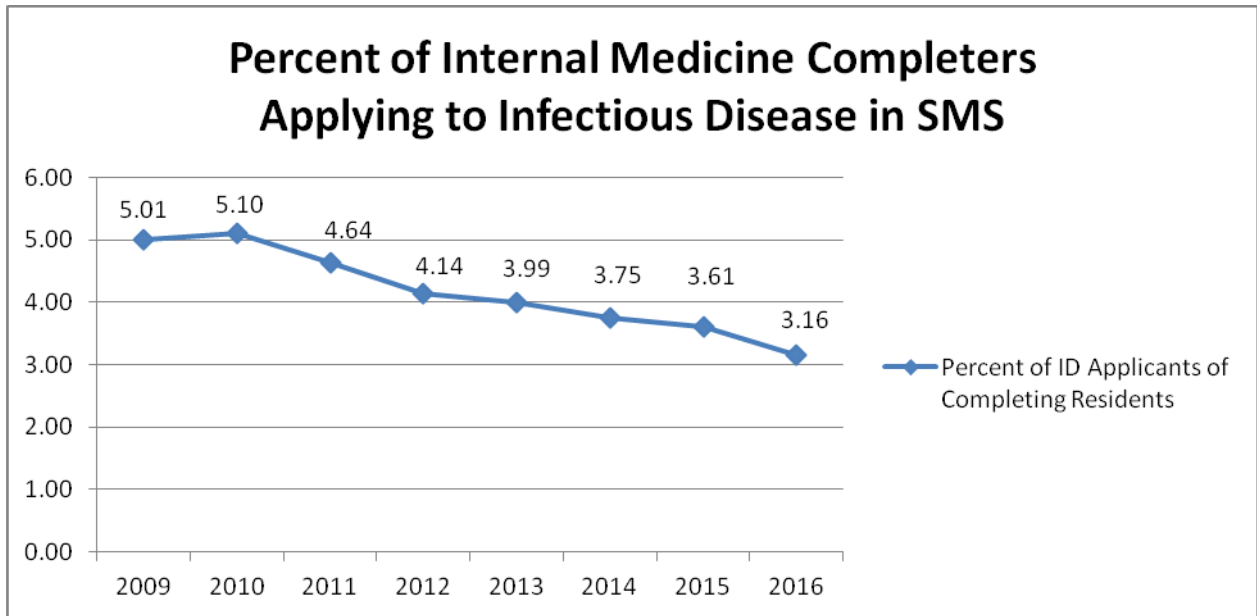


Exhibit 6

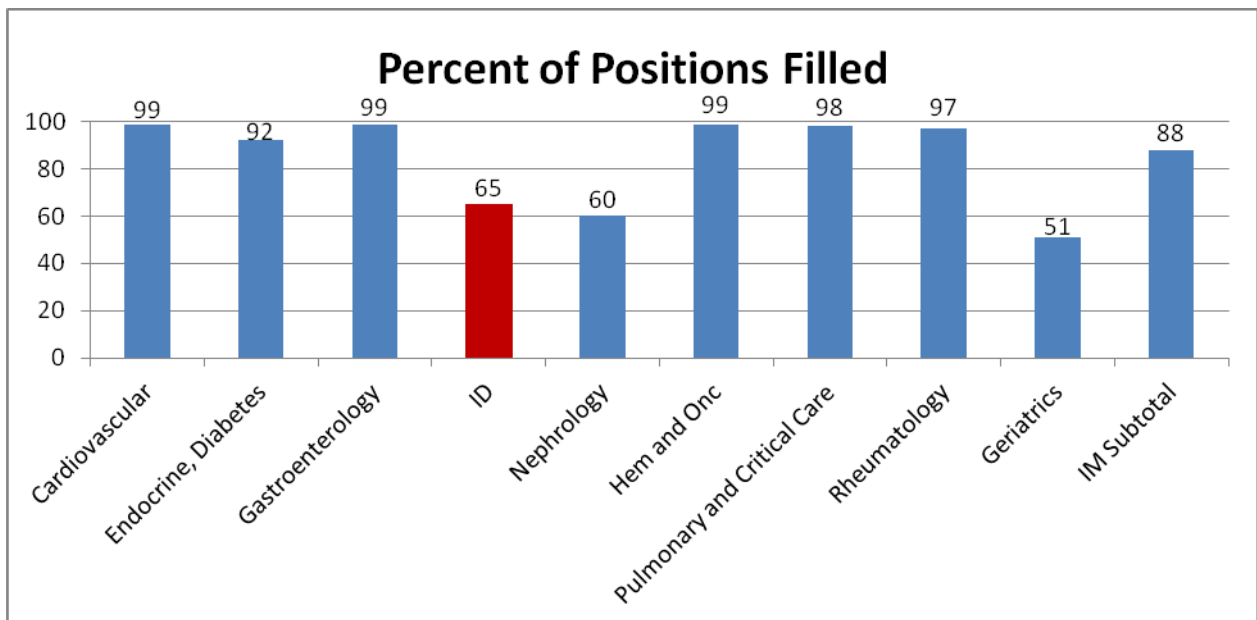


Exhibit 7

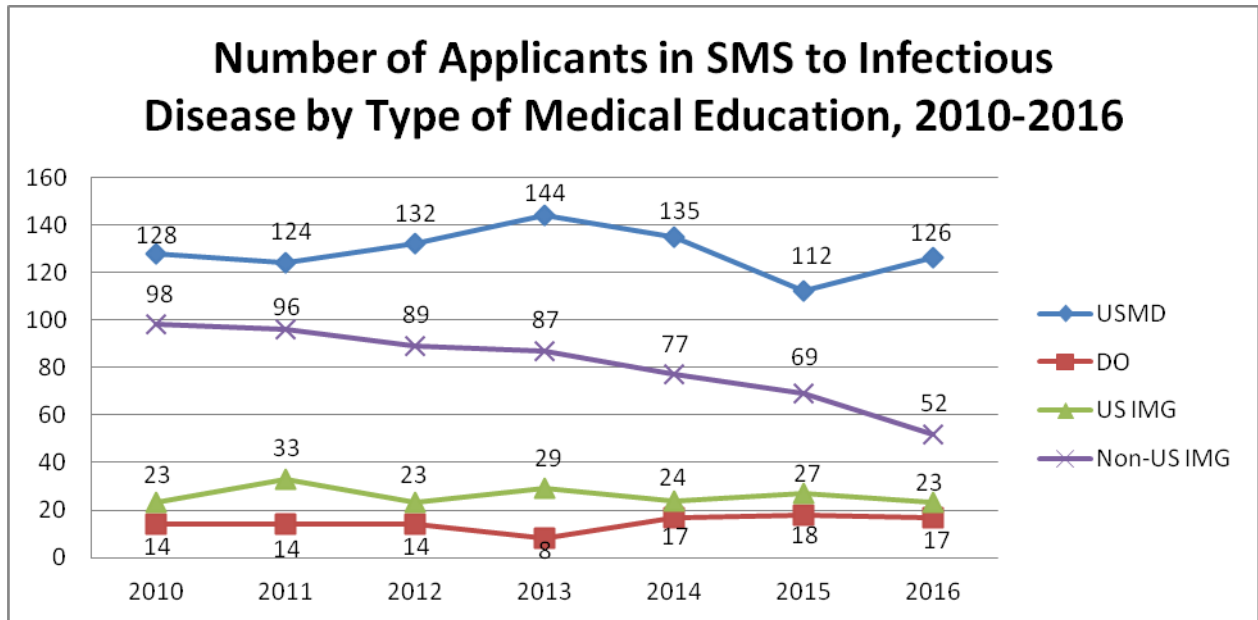


Exhibit 8

Results for ID in NYS Survey of Residents and Fellows 2010-14⁵

Specialty: Infectious Disease

Legend: ■ 2010 ■ 2011 ■ 2012 ■ 2013 ■ 2014



Number of responses: 2010: n = 15, 2011: n = 21, 2012: n = 17, 2013: n = 17, 2014: n = 10.

*Source: CHWS, Survey of Residents Completing Training in New York, 2009 - 2013.

**Source: JAMA Medical Education Issues, 2004 - 2013.

⁵ "Trends in the Demand for New Physicians"; Center for Health Workforce Studies, August 2015

III. Analysis of the NRMP-SMS Match for Adult Infectious Disease

Exhibit 9 presents a summary of the results of the SMS for AY 2016/17 for each of the IM sub-specialties⁶. Although geriatrics is not part of the SMS match, their results are included in order to capture all of the IM sub-specialties.

Infectious disease filled 65% of the positions that were offered; this was well below the percent for all IM specialties in the match (88%) and well below six of the other IM sub-specialties, all of which were above 92% filled with five having fill rates of 97% or higher. The 65% match rate for ID bettered the match rates for only nephrology and geriatrics.

ID had the second highest percent of positions filled by US medical school graduates, at 58%, and the second lowest reliance on IMGs at 34%. However, these numbers do not include fellows accepted after the match but before the beginning of the 2016-17 training year and many of the 117 positions not filled in the NRMP match are likely to be IMGs. Other specialties generally recruit fewer fellows after the match.

Exhibit 9: Results of AY 2016/17 NRMP-SMS Match for IM Subspecialties

IM Specialty	Offered Slots	Filled Slots	% Filled	USMD	%USMD*	% DO*	% US IMG*	% Non-US IMG*	Total % IMG*
Cardiovascular	844	836	99%	446	53%	5%	12%	30%	42%
Endocrine, Diabetes	270	247	92%	107	43%	7%	13%	37%	49%
Gastroenterology	466	462	99%	309	67%	6%	8%	20%	27%
ID	335	218	65%	126	58%	8%	11%	24%	34%
Nephrology	466	276	60%	81	29%	10%	25%	36%	61%
Hem and Onc**	521	513	99%	284	55%	4%	10%	31%	40%
Pulmonary and Critical Care**	515	505	98%	272	54%	8%	16%	22%	38%
Rheumatology	215	209	97%	82	39%	10%	16%	34%	51%
Geriatrics***	312	159	51%	75	47%	9%	21%	22%	43%
IM Subtotal	3944	3425	88%	1782	49%				

* Percentage of filled positions (not offered).

**"Hem and Onc" and "Pulmonary and Critical Care" include combined and separate programs.

*** Geriatrics is not in SMS.

⁶ For purposes of the analysis the results for hematology, oncology, and "hematology and oncology" are combined; similarly, results for pulmonary disease are combined with the results for "pulmonary disease and critical care."

Trends Over the Past 4 years in Comparison with Other IM Subspecialties

- There was a slight increase in ID positions offered over the past year (8 positions) but this brought the number offered to 1 more than in 2013/14 (Exhibit 10).
- With the exception of hematology/oncology, ID, at 0.3%, had the least growth of any specialty. Overall growth in positions offered in the SMS across all specialties was 5.3% (it should be noted that if nephrology had not instituted an “all – in” policy for the NRMP for AY 2016-17 they would have likely have experienced a decrease in positions in the match.)

Exhibit 10: IM Subspecialty Positions Offered in NRMP SMS AYs 2013–2016

IM Specialty	NRMP Offered Slots				Change	% Change
	AY 2013	AY 2014	AY 2015	AY 2016		
Cardiovascular	781	800	835	844	66	8.07%
Endocrine, Diabetes	251	261	271	270	19	7.57%
Gastroenterology	433	461	464	466	33	7.62%
ID	334	328	327	335	1	0.30%
Nephrology	416	403	374	466	50	12.02%
Hem and Onc combined and separate	554	561	555	521	-33	-5.96%
Pulmonary and Critical and Pulmonary alone	485	511	542	515	30	6.19%
Rheumatology	195	206	209	215	20	10.26%
IM Subtotal	3449	3531	3577	3632	183	5.31%

- Despite the relatively constant number of positions offered in ID over the past 4 years there has been a steady decrease in positions filled in the NRMP SMS. Between AY 2013/14 and AY 2016/17 the number of positions filled dropped by 52 or 19.3%. The numerical drop in the most recent match was less than in the prior 2 years (Exhibit 11).
- Only nephrology experienced a greater decrease in filled positions over the 4 year period.

Exhibit 11: IM Subspecialty Positions Filled in NRMP SMS AY 2013–2016

IM Specialty	NRMP Filled Slots				Change	% Change
	AY 2013	AY 2014	AY 2015	AY 2016		
Cardiovascular	771	797	824	836	65	8.4%
Endocrine, Diabetes	238	238	252	247	9	3.8%
Gastroenterology	418	452	457	462	44	10.5%
ID	270	254	228	218	-52	-19.3%
Nephrology	369	306	254	276	-93	-25.2%
Hem and Oncology + Hem and Onc alone	540	546	544	513	-27	-5.0%
Pulmonary and Critical (and Pul alone)	481	508	534	505	53	5.0%
Rheumatology	186	189	190	206	4	10.8%
IM Subtotal	3273	3290	3283	3266	10	-0.2%

- There was an increase in US MDs matching in ID for 2016/17 (+14, 12.5%); this compares to a decrease of 32 US MDs over the preceding 2 years (Exhibit 12).
- With the exception of hematology/oncology all of the IM sub-specialties experienced an increase in the number of US MDs being matched in 2016/17 from the prior match.
- ID and nephrology were the only 2 IM sub-specialties to experience a decrease in US MDs over the 4 year period.

Exhibit 12: IM Subspecialty Positions Filled with USMDs in NRMP SMS 2013–2016

IM Specialty	USMD Filled Slots				# Change	% Change
	AY 2013	AY 2014	AY 2015	AY 2016		
Cardiovascular	418	443	431	446	28	6.7%
Endocrine, Diabetes	92	93	99	107	15	16.3%
Gastroenterology	274	297	298	309	35	12.8%
ID	144	135	112	126	-18	-12.5%
Nephrology	94	90	79	81	-13	-13.8%
Hem and Oncology	278	284	300	284	6	2.2%
Pulmonary and Critical	223	258	258	272	49	22.0%
Rheumatology	71	66	69	82	11	15.5%
Subtotal	1594	1666	1646	1700	106	6.6%

Analysis of 7 Year Trend in Infectious Disease Matches by Type of Education

Exhibit 13 presents the actual number of physicians by type of education that matched to ID through the SMS over the past 7 years.

- The number of USMD matches has risen and fallen over the past 7 years ending up slightly down in AY 2016/17 from AY 2010/11 (2 positions).
- The number of DOs has grown slightly, consistent with the growing number of DO graduates.
- US citizen IMG number have risen and fallen over the past 7 years, and in AY 2016/17 match were the same as in AY 2010/11.
- A notable change over the past 7 years has been a steady decrease in non-US IMGs.

Exhibit 13: 7-Year Trend in Infectious Disease Matches by Education Type

	AY 2010	AY 2011	AY 2012	AY 2013	AY 2014	AY 2015	AY 2016
USMD	128	124	132	144	135	112	126
DO	14	14	14	8	17	18	17
US IMG	23	33	23	29	24	27	23
Non-US IMG	98	96	89	87	77	69	52

IV. Findings: Pediatric Infectious Disease

Pediatric Infectious Disease (PID) has only participated in the NRMP pediatric match for the past 4 years; as such there is less experience to analyze. Historical data on the number of programs and the number of fellows is available from the ACGME but data has so far only been published through the 2014/15 training year.

The number of PID training programs has been relatively stable, ranging between 60 and 62 between 2007/08 and 2014/15, and there are now 63 accredited programs according to the ACGME. The number of fellows entering PID had been relatively constant from 2007/08 to 2013/14, when it dipped from 62 to 56, only to rebound in 2014/15 to 67.

Findings

1. As can be seen in Exhibits 14 and 15, the number of PID programs and positions offered in the NRMP match has been increasing since the PID programs entered into the match in 2013/14. It appears that 53 of the 63 PID fellowship programs participated in the match for appointment year 2016/17.
2. While the programs and positions available for the match were increasing, the number of applicants and matched positions dropped sharply from 2014/15 to 2015/16: applicants went from 48 to 34 and matches went from 44 to 30. Both then rose sharply in 2016/17, to 49 applicants and 45 filled positions (Exhibit 16).
3. While the ratio of applicants to offered positions rose in 2016/17 from .05 to .07 reflecting the increase in applicants, .07 is still well below the desirable range (Exhibit 17).

4. The majority of fellows matched through the NRMP were US medical school graduates (Exhibit 18) with a significant increase in number of US MDs matched in 2016 compared to 2015. The number of IMGs matched through the NRMP has been relatively consistent over the past 4 years. Exhibit 26 presents the ACGME data showing that the actual percent US MD and IMGs from 2007/08 to 2014/15.

Exhibit 14

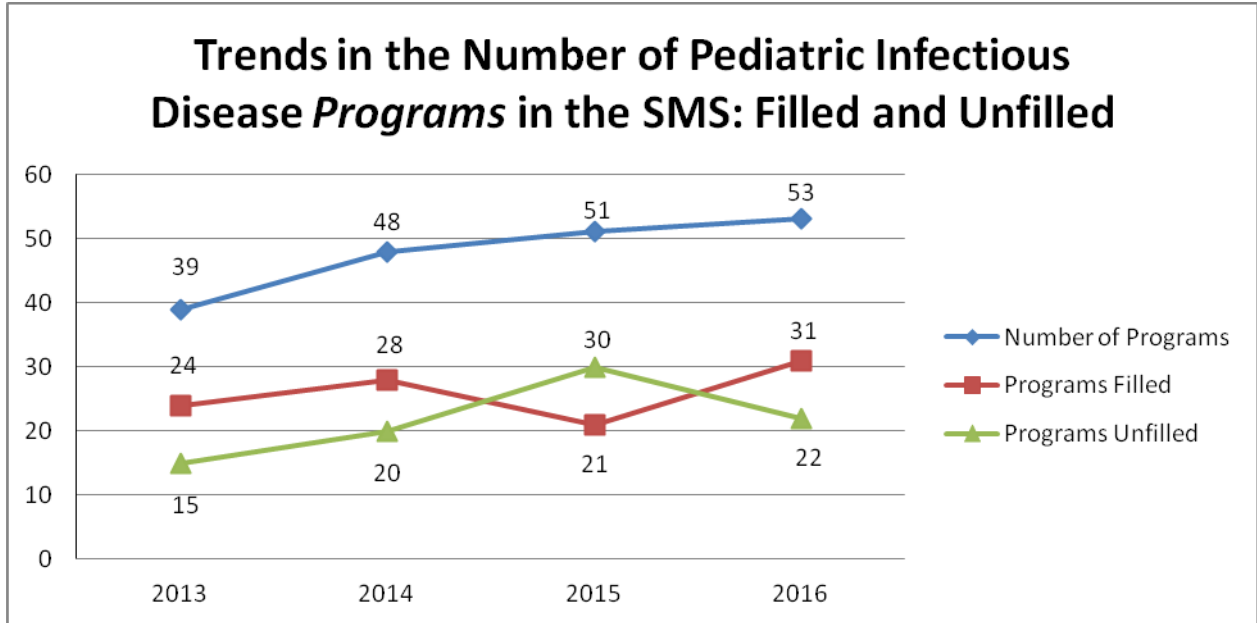


Exhibit 15

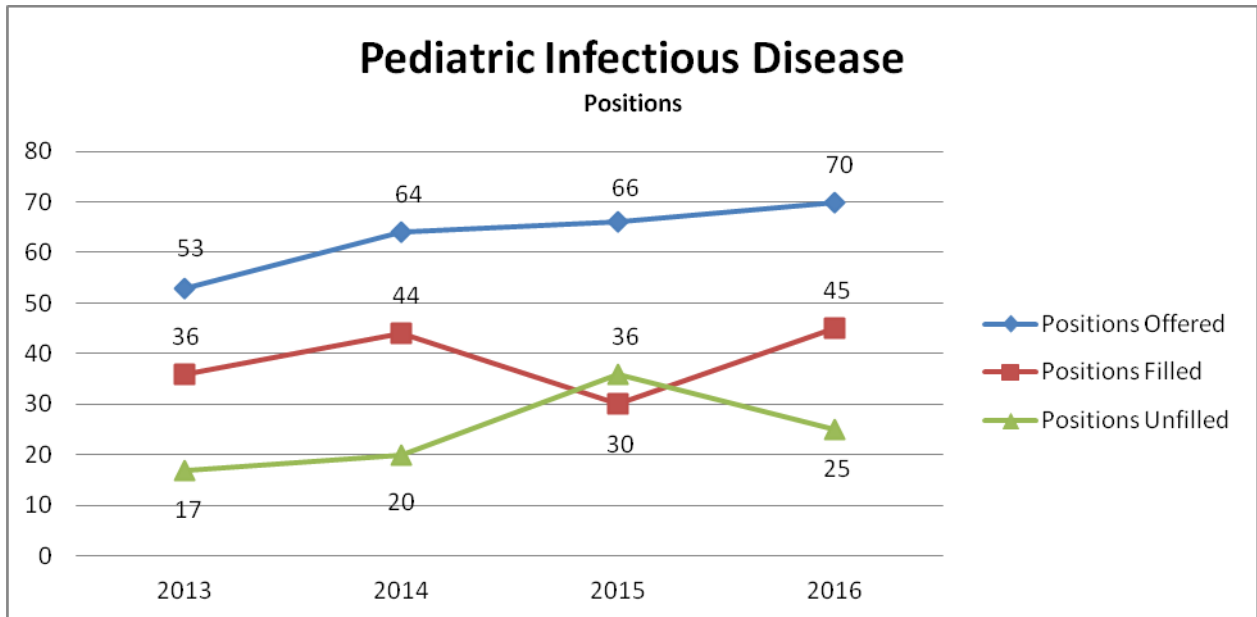


Exhibit 16

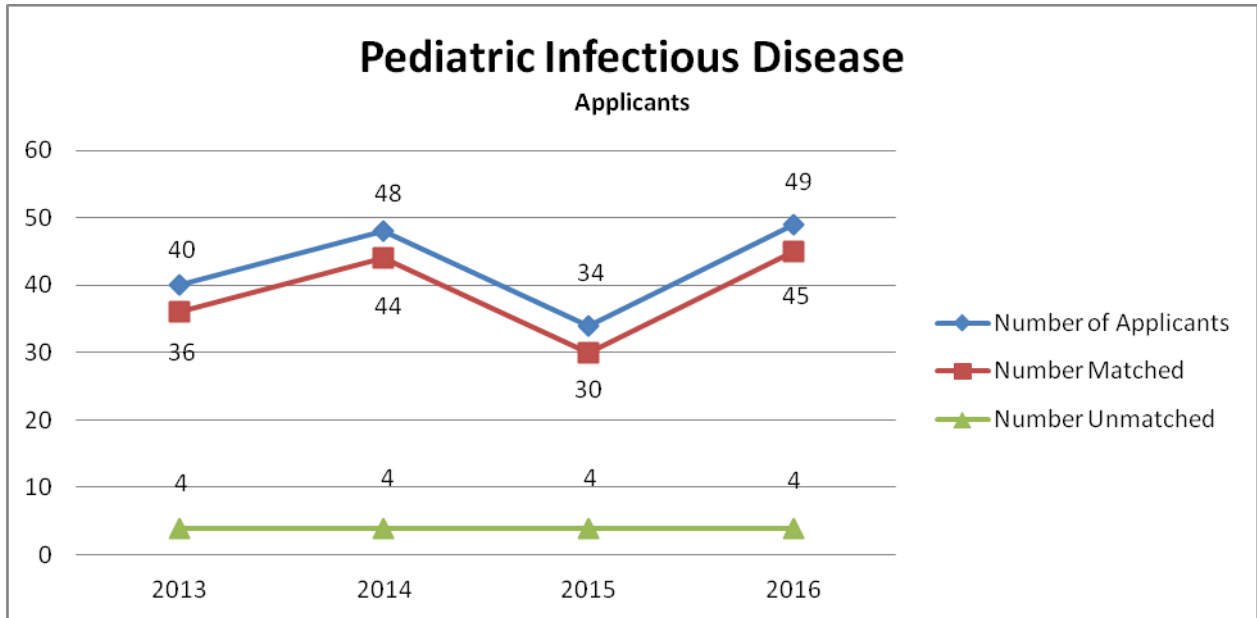


Exhibit 17

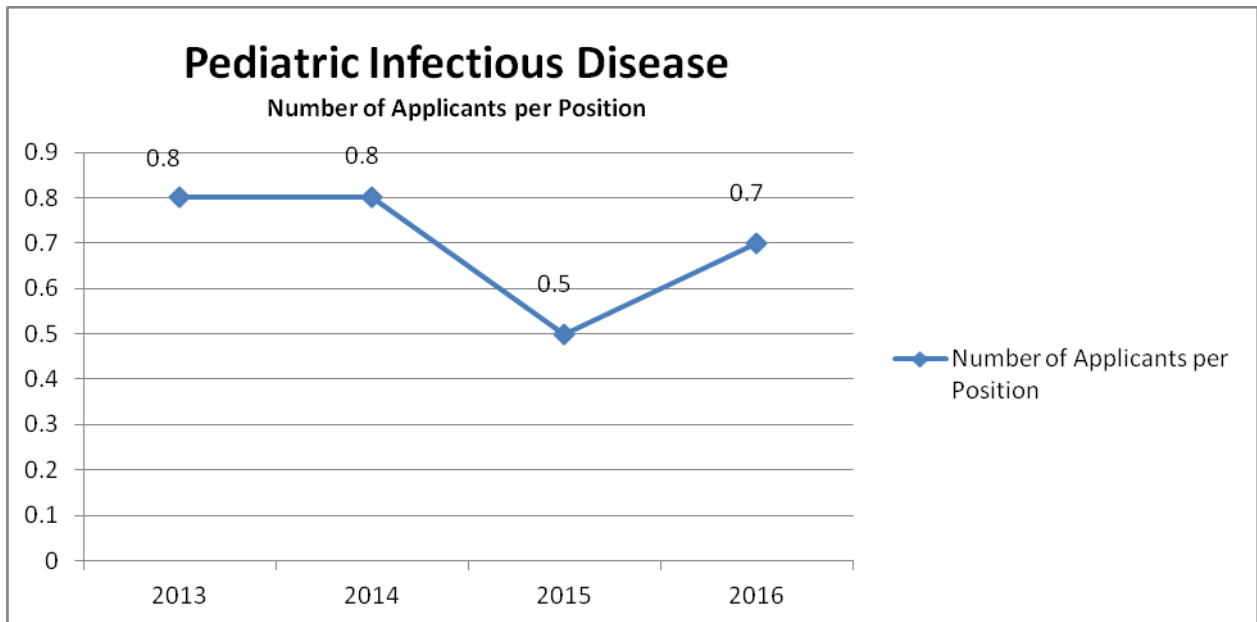
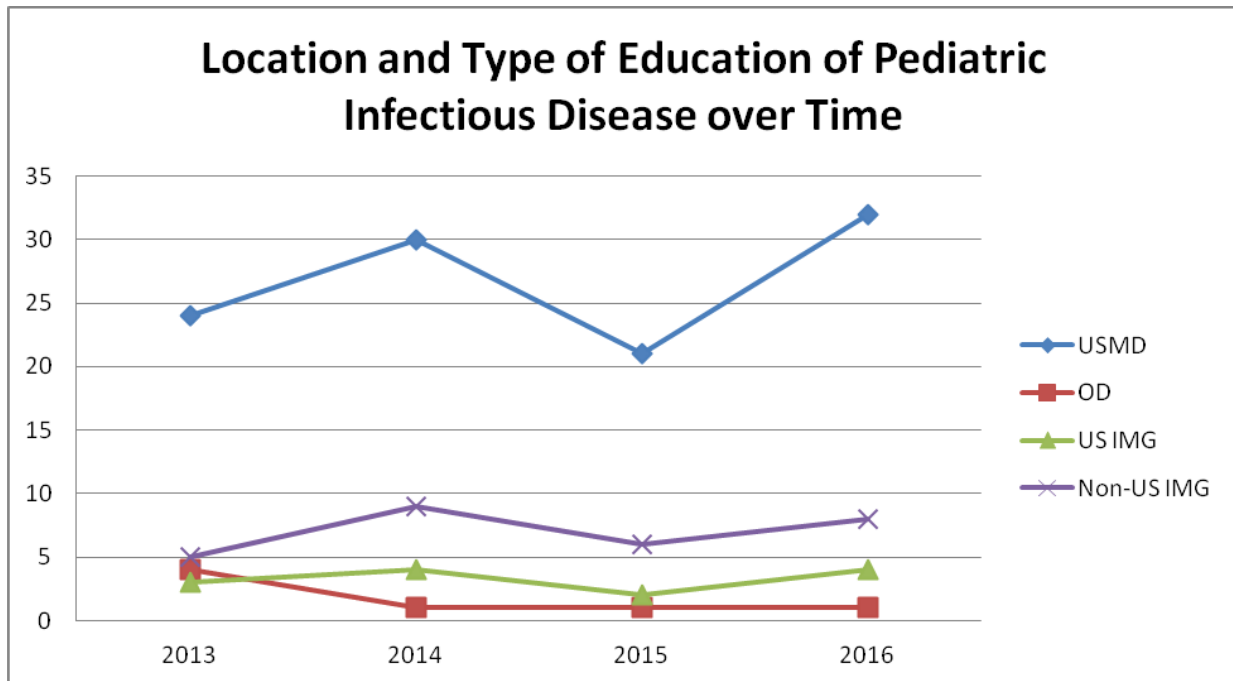


Exhibit 18



V. Trends in Infectious Disease Fellowship Training⁷

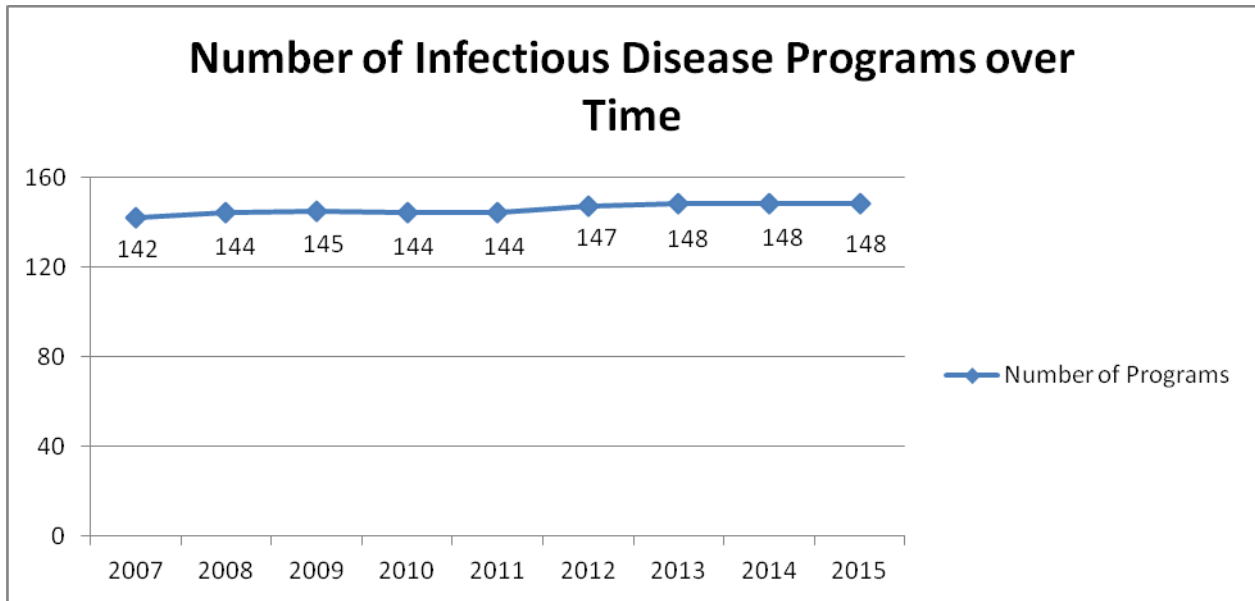
In this section we review trends in the number, type of medical education and gender of ID fellows over the past 8 years using the ACGME annual Data Resource Book. The most recently available detailed ACGME data on fellows is from Academic Year 2014/15.

A. Adult Infectious Disease

The number of ID programs grew slowly from 142 in 2007/08 to 148 in 2015/16 but has since held steady (Exhibit 19).

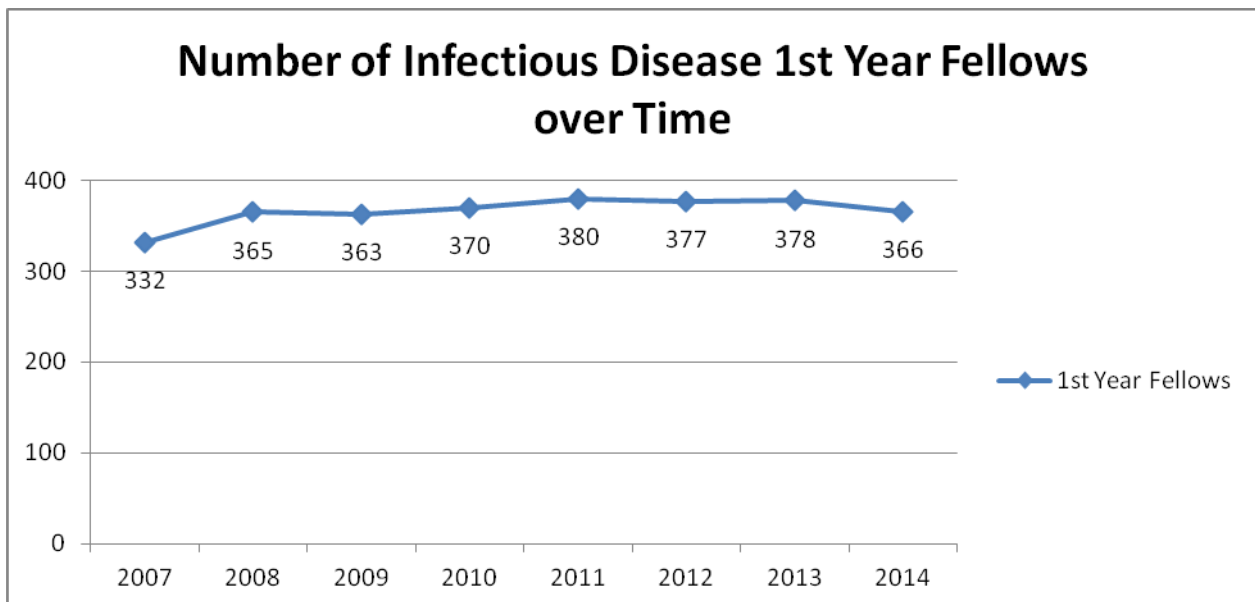
⁷ The data in this section are from the ACGME annual Data Resource Book. ACGME data is considered the most complete and accurate source of data on ACGME accredited residency and fellowship programs. This data includes osteopathic physicians in ACGME programs but does not include osteopaths in AOA accredited training programs. Data on 2015/16 is from the ACGME's Public Accredited Programs Summary as of April 2016.

Exhibit 19



After an initial jump from academic year (AY) 2007/08 the number of first year ID fellows grew only slightly till 2011/12, since when the number of entrants has fallen from a peak of 380 in 2011/12 to 366 in 2014/15, a decrease of 14 (3%; Exhibit 20).

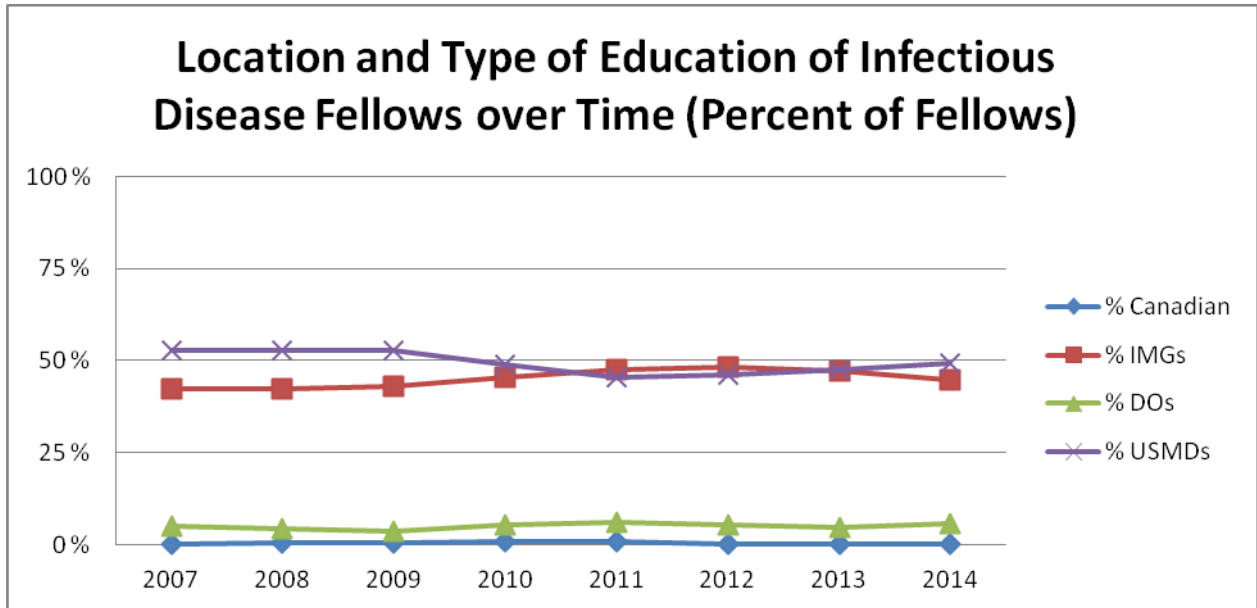
Exhibit 20



The number and the percent of all fellows who were US medical school graduates dipped slightly from AY 2009/10 to 2011/12 but was relatively constant over the past four years at just over 50%. The percent of fellows who were IMGs rose slowly from 2007/08 to 2011/12 but has

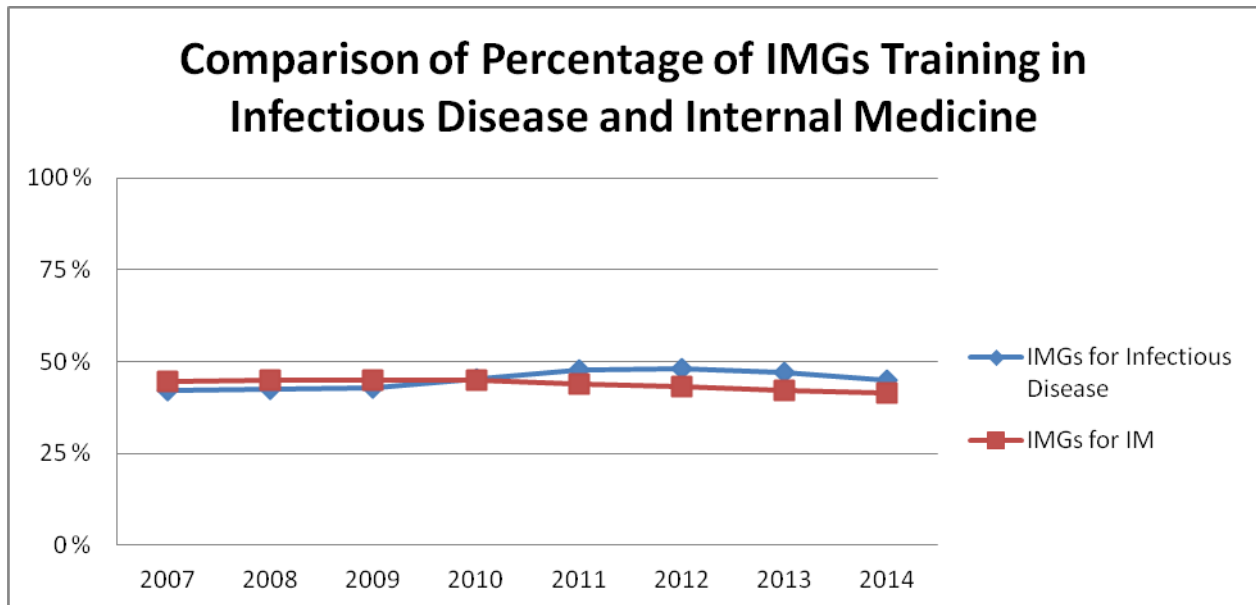
declined slightly since then. The net result was that while the number of IMGs slightly exceeded US MDs in 2011/12 and 2012/13, US MDs exceeded IMGs in 2014/15. The percent of fellows who are DOs and who are Canadian graduates has been stable over the past 8 years (Exhibit 21).

**Exhibit
21**



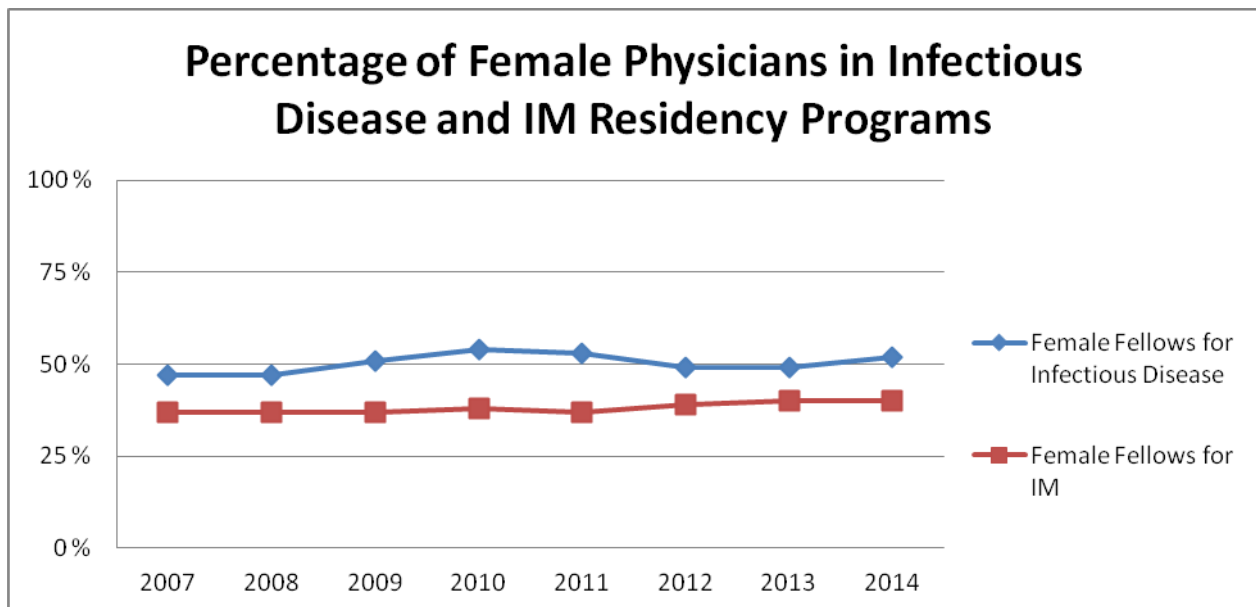
As a benchmark, it's helpful to compare the percent IMGs in ID to the percent in internal medicine residency programs. As seen in Exhibit 22, the percent of ID fellows who were IMGs is similar to the percent in internal medicine as a whole over the past 8 years, although ID was a little below IM during the earliest years and slightly above over the past 4 years.

**Exhibit
22**



As seen in Exhibit 23, the percent of females in ID fellowship programs has been around 50%, and has consistently been above the percent of females in IM residency programs. It appears that the ID specialty is attractive to females.

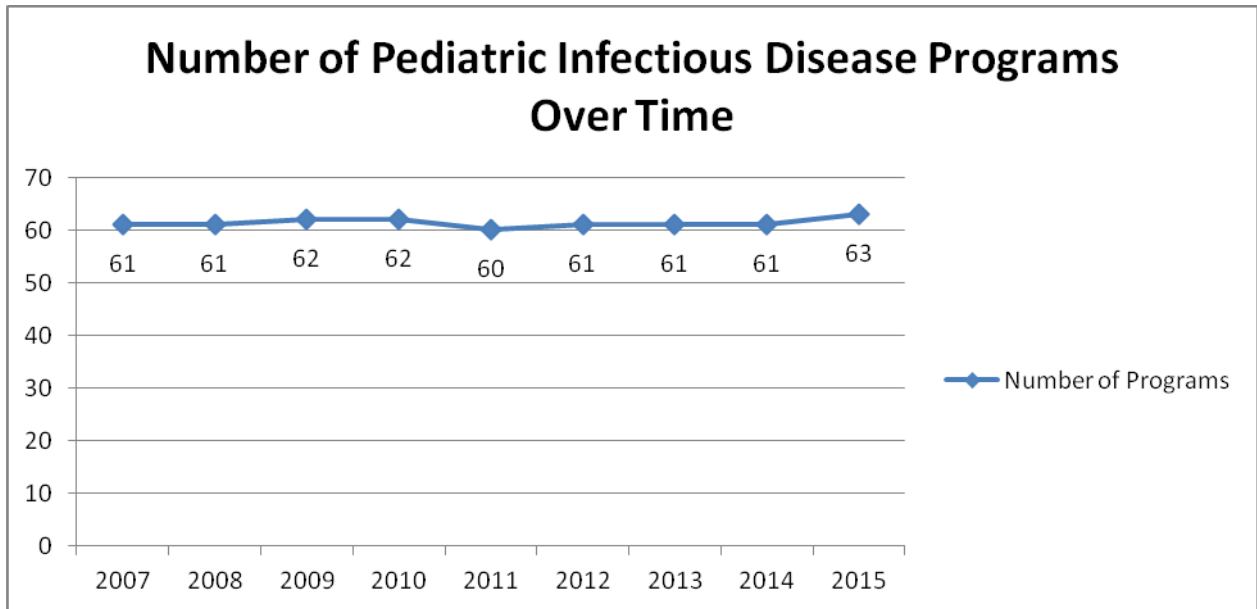
**Exhibit
23**



B. Pediatric Infectious Disease Fellows

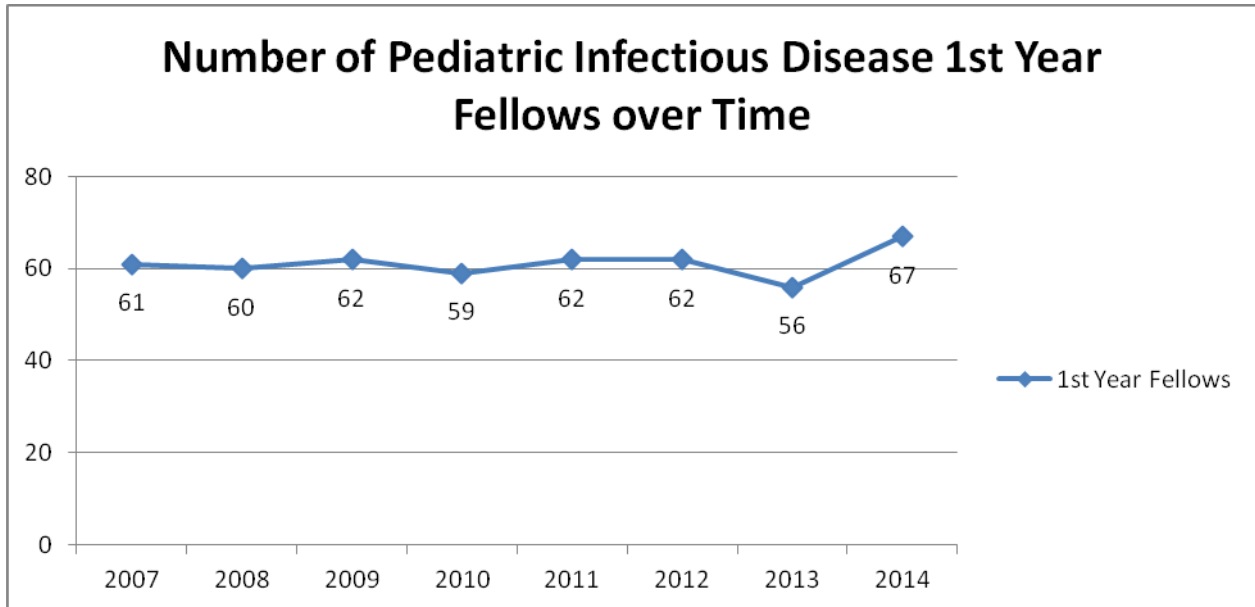
As with the data on adult ID programs and fellows, the following data on pediatric fellowship programs and fellows comes from the ACGME. As indicated in Exhibit 24, the number of pediatric ID fellowship programs was stable from 2007/08 to 2014/15.

**Exhibit
24**



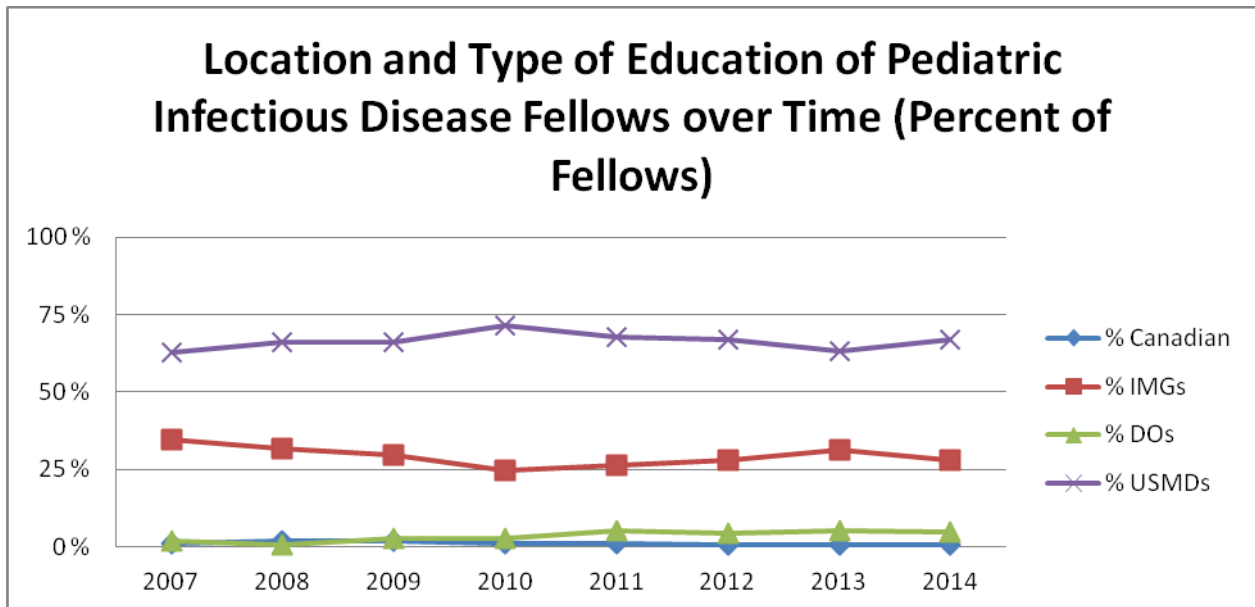
The trend in the number of first year pediatric ID fellows is a little difficult to interpret. The total number was relatively stable ranging between 59 and 62 between 2007/08 and 2012/13 but then dropped to 56 in 2013/14 only to rise to 67 in 2014/15. It is not possible to know from this data whether the bump up in 2014/15 was catch-up for the prior year or the beginning of a trend of additional training slots and long-term growth in the specialty (Exhibit 25).

**Exhibit
25**



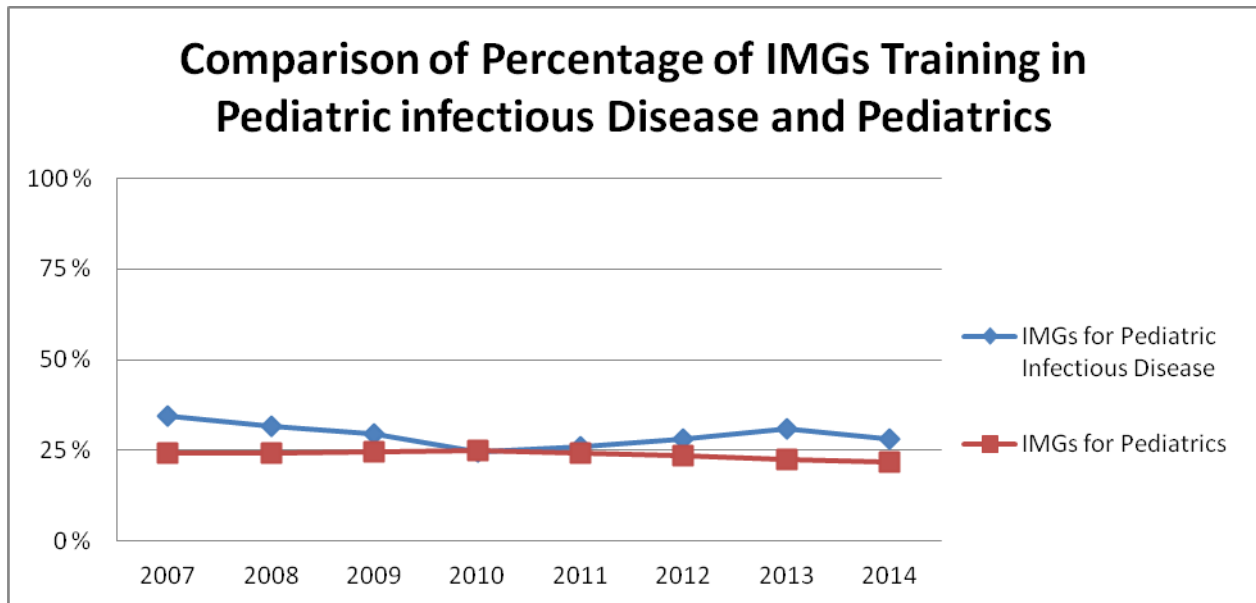
- The percent of US MDs rose between 2007/08 and 2010/11, declined slightly for several years thereafter and then rose in 2014/15. The percent IMGs had the reverse pattern. (Exhibit 26)

**Exhibit
26**



Pediatric ID has had a slightly higher percent of IMGs over the years than pediatric residency programs (Exhibit 27).

**Exhibit
27**



Both pediatrics and pediatric ID appear very attractive to women. While females make up about 48% of all residents and fellows, more than 65% of the pediatric residents in 2014/15 were female and more than 70% of the pediatric ID fellows were female. While the percent of the pediatric fellows who are female has been slightly less than the percent female training in pediatrics in some years, beginning in AY 2013-14 a higher percent of pediatric ID fellows have been women than in pediatric residency programs.

