



# Indian Health Service Programs – A Retention Analysis

*Final Report*

HEALTHCARE AND HUMAN SERVICES POLICY, RESEARCH, AND CONSULTING—WITH REAL-WORLD PERSPECTIVE.



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## Executive Summary

In this study we analyze the retention patterns of medical providers who serve in Indian Health Service (IHS) under the Loan Repayment Program (LRP) and the Scholarship Program (SP). Our focus is on assessing whether providers participating in these incentive programs remain in Indian, Tribal and Urban (I/T/U) sites beyond their completion of service obligation with IHS. Higher retention rates in these sites in the post-obligation years would be a desirable outcome for IHS, as providers who remain in these areas to serve American Indian and Alaska Native populations contribute to the alleviation of provider shortages in these areas. Moreover, participants in the IHS programs who move out of I/T/U sites may relocate to other designated Health Professional Shortage Areas (HPSA) to serve populations that have needs similar to those of the populations served in I/T/U sites. Understanding retention and migration patterns of IHS program participants in I/T/U sites and HPSAs would provide valuable information to DHHS in its broad effort to address provider shortages in high need areas.

In two previous projects (Lewin, 2014; Lewin, 2016), we examined short- and long-term HPSA retention of providers who participated in the National Health Service Corps (NHSC) LRP and SP and compared their post-service retention with the retention of non-participants working in those areas, using data from the period 2000-2015. We employ a similar methodology in this study, while focusing on IHS program participants. We use IHS administrative records on providers participating in IHS LRP and SP between 2008 and 2016, as well as many data elements from the previous two studies to track the location of individual IHS providers in their post-program period.

For this study we create two analytic datasets by combining IHS administrative records with two provider-level datasets. The first provider dataset is a proprietary dataset, called Provider360 (P360), and it offers snapshots of virtually the entire universe of medical providers in the nation at given points in time. We use five such snapshots, one every year, between 2011 and 2015. The second dataset is based on CMS annual data on all providers billing Medicare between 2012 and 2015. With some limitations, both these datasets contain detailed and up-to-date information on the location where providers practice in any given year in these respective timeframes. Finally, to determine whether a given place of service is an I/T/U site or whether it is located in a HPSA, we combine the provider datasets with publicly available data on the list of HPSAs and I/T/U sites.

Using our analytic datasets, we construct the following retention variables:

- Serving in the same I/T/U site in the period after completion of IHS service obligation. This variable takes the value of 1 in the years when the IHS provider practices in the same location as during service, and 0 otherwise.
- Serving in any I/T/U site in the post-obligation period. This variable takes the value of 1 in the years when the provider serves in the same or any other I/T/U site after IHS obligation completion, and 0 otherwise.

To assess retention patterns of IHS participants in HPSAs, we follow the logic from Lewin (2014) and Lewin (2016) and construct these additional retention variables:

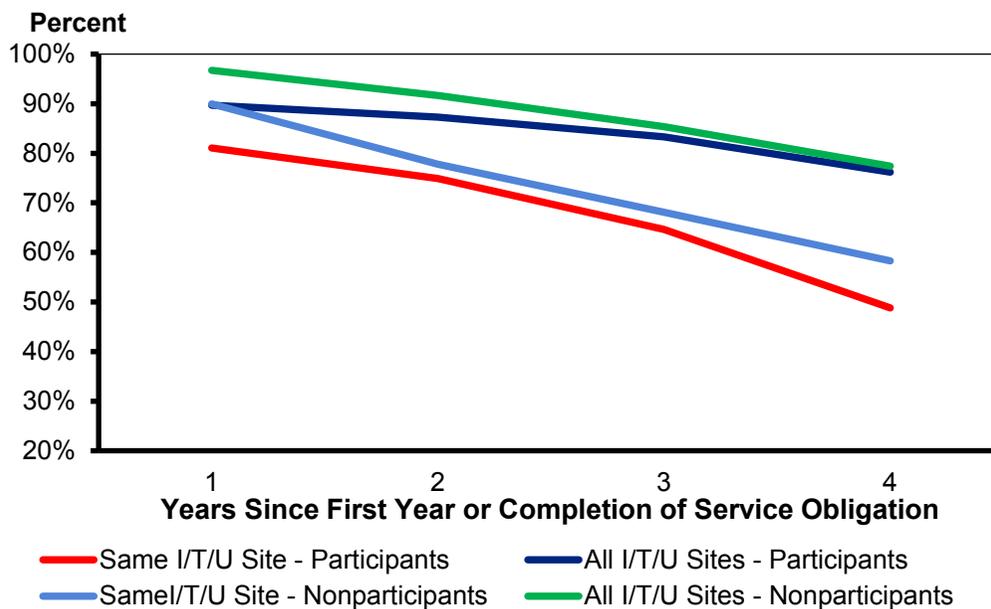
- Serving in a HPSA. This variable takes the value of 1 if the IHS provider serves in a HPSA county at a location that is not an I/T/U site, and 0 otherwise.

We create these measures for providers who do not participate in IHS LRP or IHS SP, but the reference point is not the year when they left service, but the first year they appear in the analytic datasets. Using the above variables, we construct retention rates as the ratios between the number of providers in a location type (same I/T/U, any I/T/U, or HPSAs) and the total number of providers leaving IHS service in a given year. These rates are calculated one year after obligation completion, two years after obligation completion and so on. In the case of non-participants, the annual retention rates are calculated one year after providers are first observed in the data, two years after they are first observed in the data, and so on.

### Post-Service Retention Analysis of IHS Program Participants

In Figure ES.1 we show that about 81% of the IHS program participants serve in the same I/T/U site one year after completion of their service obligation. Their retention in the same site where they practiced while in IHS service remains high in the following years: 75% after 2 years, 65% after 3 years, while in the 4th year after obligation completion drops to about 50%. We find that some of the IHS participants who stop serving in the same site after obligation completion move in fact to other I/T/U sites, such that the retention of IHS participants in any I/T/U site is, respectively: 90%, 87%, 85% and 76% in each of the 4 years after obligation completion.

**Figure ES.1: Retention Rates of Medical Providers in I/T/U Sites**



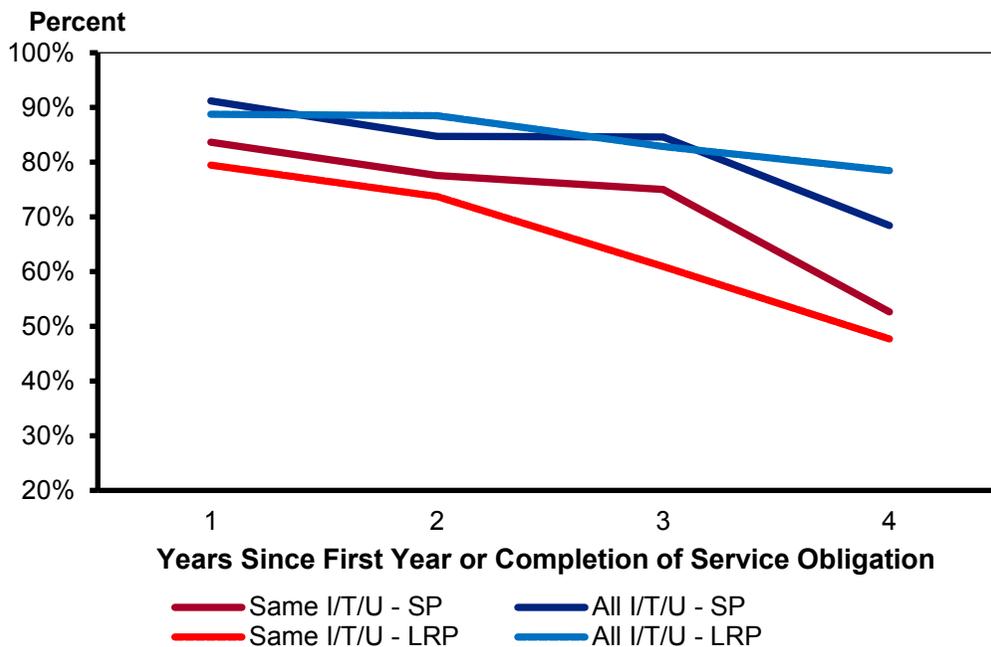
Focusing on non-participants, we note that in the first two years after they appear in the data, their retention rates are higher than the retention rates of participants, both in terms of retention in the same I/T/U site, as well as in terms of retention in any I/T/U sites. One year after we first observe non-participants in I/T/U sites, 90% of them are still in the same site, while 97% are in ‘any I/T/U’ site. The retention rates of non-participants drop faster than those of participants, such that by the 4th year since their first year, their retention rates are about the same as those of participants (77%). Note that IHS Program participants serve a minimum two year service obligation prior to this analysis measuring their retention. This finding of higher retention for non-participants is consistent with a conceptual framework we developed in Lewin (2014) for

the comparison between the retention of NHSC and non-participating NHSC providers. In brief, our conceptual framework yields the prediction that since (some, if not all) program participants are induced to serve in target areas (in this case, I/T/U sites) only as a result of the benefit award, these providers are on average less likely to remain in the target areas after completion of their program obligation than those providers who serve in the same areas without the program incentive. In addition, the retention profiles from Figure ES.1 follow the same pattern as those of non-NHSC participants from Lewin (2014), relative to the retention of participants: a higher retention differential in the first years, followed by a steeper decline in the retention of non-participants. Relative to non-participants, the retention of participants tends to stabilize after a few years since obligation completion.

In Figure ES.2 we present the retention rates of IHS participants in the same I/T/U site or in any I/T/U program by whether they participated in LRP or SP. It is noteworthy that the retention of LRP participants in the same I/T/U site is across-the-board lower than that of SP participants. While the difference is minimal in the first two years after obligation completion (about 2-3 percentage points), it becomes larger in the 3rd and 4th year after obligation completion. This gap can potentially be explained – at least in part - by the requirement that SP participants be American Indian/Alaska Natives (AI/AN). If they are choosing to complete their obligation in an I/T/U site that is closer to the community they grew up in, they may be more inclined than LRP participants to remain in the same site after obligation completion. Instead, LRP participants are not required to be AI/AN. Moreover, the retention differential in the further out years between SP and LRP participants helps explain the relatively steep decline in ‘same I/T/U’ retention of IHS participants in Figure ES.1.

However, despite the differences in the ‘same I/T/U’ retention between SP and LRP participants, the ‘any I/T/U’ retention rates are very close to each other for the two groups. This finding reflects higher migration rates across I/T/U sites for LRP participants relative to SP participants.

**Figure ES.2: Retention Rates of IHS Program Participants by Program**



Next we wanted to determine the extent to which the differences in retention from Figures ES.1 and ES.2 are explained by other relevant local characteristics. We collected publicly available information from the Census Bureau and the Bureau of Labor Statistics at the county level over the 2011-2015 period on the: unemployment rate, median household income, percent with high school diploma, percent over the age of 65, percent of minorities and total population. We then estimated regression models for the probability of being in the ‘same I/T/U site’ and ‘any I/T/U site’ for every year as a function of IHS program participation and these local area characteristics. We find that the regression-adjusted differences in retention are virtually the same as the unadjusted differences. This means that the local area characteristics do not serve to explain the unadjusted retention differences discussed above.

### **Sites with Higher Retention**

In order to determine which I/T/U sites are more successful than others, we conducted a retention by site analysis. While no clear patterns emerge from this analysis, it appears that retention of IHS program participants is more likely to be higher in sites that typically offer a larger array of services, adopted state-of-the-art procedures and medical technology, and/or are located in more urban or more easily accessible areas. These findings are consistent with the results from past literature on determinants of retention.

There are important data limitations in this retention by site analysis, so the results should be viewed with caution, as they only provide tentative evidence on the factors determining retention. These results represent a first step into a more in-depth retention analysis that should necessarily include more sites, and rely on more extensive information on the individual program participants, clinical practices, services offered and professional opportunities for providers in those sites

### **A Comparison with Previous Retention Results**

To our knowledge there are no similar post-obligation retention studies centered on IHS program participants. Lewin (2014) and Lewin (2016) focused on NHSC participants and their post-obligation retention rates in HPSAs. In the case of NHSC, the retention rates in ‘any primary care HPSA’ ranged between 79% in the first post-service year to 68% in the 10th post-service year. For mental health HPSAs, the post-service retention in any HPSA was smaller (ranging between 67% and 56%).

However, these results are not directly comparable with the results from the current study, since the study population and the retention metrics are different: NHSC retention is measured at the HPSA level (since NHSC eligibility is tied to HPSAs), while IHS retention is measured at the I/T/U site level. To the extent that NHSC and IHS program participants are providers applying for similar incentives a more direct comparison would be between IHS and NHSC participants in I/T/U sites, and between IHS and NHSC participants in HPSAs.

In Lewin (2016) we conducted a comparison between NHSC participants in general and NHSC participants serving at some point during their obligation in an IHS site. The ‘any HPSA’ retention rates of NHSC participants serving in IHS sites ranged between 85% in the first post-service year and 68% in the out years. In this study we find that the NHSC profile of post-obligation retention in any I/T/U sites shows a lower retention than that of IHS program

participants. In the first year after obligation completion, about 61% of NHSC providers who served in I/T/U sites are still in I/T/U sites. The retention rate drops to 48% in the second post-obligation year, and then to 44% and 38% in the third and fourth years.

We interpret the lower retention rates of NHSC participants in I/T/U sites as indicative of a lower preference to serve in these sites than that of IHS program participants. However, as explained in our conceptual framework, the fact that the NHSC program managed to attract in I/T/U sites providers who would not have gone there in the absence of the award is a measure of program success, not failure. The previous finding that NHSC participants who served in I/T/U sites have high retention rates in HPSAs, is consistent with the notion that although these providers have lower I/T/U retention rates (as we find in the current study), they still tend to serve in HPSAs, albeit to some extent, non-I/T/U HPSA locations.

## I. Introduction

This study is focused on the analysis of the retention patterns of medical providers who serve in Indian Health Service (IHS) under the Loan Repayment Program (LRP) and the Scholarship Program (SP). Our focus is on assessing whether providers participating in these incentive programs remain in Indian, Tribal and Urban (I/T/U) sites beyond their completion of service obligation with IHS. Higher retention rates in these sites in the post-obligation years would be a desirable outcome for IHS, as providers who remain in these areas (to presumably serve American Indian populations) contribute to the reduction of provider shortages in these areas without additional resources from IHS (in the form of LRP and SP). Moreover, participants in the IHS programs who move out of I/T/U sites may relocate to Health Professional Shortage Areas (HPSA) to serve populations that are similar to the populations served in I/T/U sites. Understanding retention and migration patterns of IHS program participants in I/T/U sites and HPSAs would provide valuable information to DHHS in its broad effort to address provider shortages in high need areas.

The main policy research questions that are addressed in this study are the following:

- What is the long term retention experience of participants IHS LRP and IHS SP?
- Does retention vary by provider type and discipline?
- By whether the participant is an American Indian or Alaska Native (AI/AN)? (The participant must be an AI/AN to participate in the scholarship program but that is not a requirement for the Loan Repayment Program)
- If participants are no longer practicing at an I/T/U facility, are they practicing in a HPSA?
- Can sites with especially good retention records be identified?
- How does the experience of these programs compare with that of the NHSC? Are there lessons to be learned from this comparison?

In this study we employ the same general methods as two earlier projects conducted by The Lewin Group (Lewin, 2014 and Lewin, 2016) that examined retention in the National Health Service Corps (NHSC). This analysis calls for the creation of longitudinal analytic datasets that permit the tracking of providers in the period after completion of their initial obligation with IHS.

Specifically, we create two datasets by combining IHS administrative records with two provider-level datasets. The first provider dataset is a proprietary dataset, called Provider360 (P360), and it offers snapshots of virtually the entire universe of medical providers in the nation at given points in time. We use five such snapshots, one every year, between 2011 and 2015. The second dataset is based on CMS annual data on all providers billing Medicare between 2012 and 2015. Both these datasets contain detailed and up-to-date information on the location where providers practice in any given year in these respective timeframes. Finally, to determine whether a given place of service is an I/T/U site or whether it is located in a HPSA, we combine the provider datasets with publicly available data on the list of HPSAs and I/T/U sites.

These datasets allow us to construct annual descriptive measures of post-service retention in I/T/U sites by participation in the LRP and SP programs, geographical area, and specialty, as well as by a limited number of observable individual characteristics. These datasets also allow for the identification of NHSC participants serving in I/T/U facilities. We therefore compare the post-service retention of IHS participants with that of NHSC participants in I/T/U facilities (the same or any other such facility). We also construct retention profiles in I/T/U facilities for those providers that do not participate in either of the IHS or NHSC programs. In addition to our I/T/U sites retention analysis, we analyze the retention of all three groups of providers mentioned above (i.e., IHS participants, NHSC participants and non-participants) by tracing their location over time to determine the extent to which they continue to serve in HPSAs.

These retention analyses include physicians, but also non-physician health professions, like nurse practitioners (NP), physician assistants (PA), or dental care providers. Provider 360, as well as the other data set mentioned above, includes information on PAs, NPs and dental care clinicians.

The body of the report is organized as follows: in Chapter II we discuss the policy context and provide a description of the IHS SP and LRP programs, in Chapter III we present our data and methodology, in Chapter IV we present the main findings, while in Chapter V we provide a retention-by-site analysis. In Chapter VI we compare the retention profiles in I/T/U sites and HPSAs of IHS and NHSC program participants, and in Chapter VII we present our conclusions.

## II. Indian Health Service Programs

Sustaining a sufficient workforce of skilled health professionals within I/T/U facilities has been a long-standing challenge. The Indian Health Service Scholarship and Loan Repayment Programs (LRP) were established as two approaches to address this challenge, offering financial incentives to participants in return for a period of obligated service. By analyzing post-obligation retention rates, this project provides evidence on the extent to which these programs have long-term effects on attracting providers to practice in Indian Territory, as opposed to serving as short-term solutions with a lower return on investment. In this chapter we provide more details about the two programs, in terms of benefit amounts, eligibility criteria, and conditions for a contract extension.

### A. IHS Scholarship Program

The IHS Scholarship Program began providing scholarship support to AI/AN students to pursue health profession careers in 1978. Over time, the program has grown to support, educate and place health care professionals within medically underserved Indian health programs throughout the continental United States and Alaska. Since its inception, the IHS SP has offered awards to about 7,000 AI/AN students. Some of them pursued their health profession careers at IHS sites, while others returned to serve in Tribally-operated programs.

The program provides financial support in exchange for a minimum two-year service commitment within an Indian health program in a health professional discipline of choice. IHS offers three scholarships for AI/AN students in order to educate and train health professionals to staff Indian health programs:

- **Preparatory Scholarship** – Provides financial aid to qualified AI/AN undergraduate students. Recipients must be members or descendants of federally recognized, state-recognized or terminated Tribes enrolled in preparatory courses or prerequisite courses leading to enrollment in an eligible health professions degree program.
- **Pre-Graduate Scholarship** – Provides financial aid to qualified AI/AN undergraduate students. Recipients must be members or descendants of federally recognized, state-recognized or terminated Tribes enrolled in courses leading to a bachelor's degree in pre-medicine, pre-dentistry, pre-podiatry and other subjects needed by the Indian health programs.
- **Health Professions Scholarship** – Provides financial aid to qualified AI/AN undergraduate- and graduate-level students. Recipients must be members of federally recognized Tribes and enrolled in an eligible health profession degree program. In exchange for financial aid, scholarship recipients agree to fulfill a service commitment in full-time clinical practice upon completion of their academic or post-graduate clinical training.

The IHS Scholarship Program provides financial aid covering tuition, required fees and other educational and living expenses. IHS makes direct payment to the school attended by the program recipient, covering tuition and required fees for the academic year. Summer school is excluded unless specifically requested and approved in advance.

IHS also provides a monthly stipend of no less than \$1,500/month to assist recipients in covering living expenses. Stipends are distributed beginning in August and are paid at the end of each month. Preparatory and Pre-Graduate scholarship recipients receive a stipend for a 10-month period while Health Professions scholarship recipients receive a stipend for 12 months. In addition, IHS includes a one-time payment for educational expenses as part of a first stipend deposit. This payment covers:

- School-required books, laboratory expenses, dental/medical/optometric/podiatric/nursing equipment and other miscellaneous educational expenses.
- Tutorial services – \$400 (full time) or \$200 (part time) to assist with tutorial services or licensure/board certification preparatory classes.
- \$300 to offset travel expenses to and from school for the year.
- \$35 to offset the expense for a post office box rental.

The IHS Scholarship Program awards scholarships based on a 100-point ranking system divided among three categories:

- *Academic Performance* (40 points) – Performance is based on official transcripts. A minimum 2.0 cumulative GPA is required.
- *Faculty/Employer Evaluations* (30 points) – the evaluators assess the candidate’s education and work achievements, interpersonal skills and overall potential, and how those qualities translate into a successful career as an Indian health professional.
- *Applicant Essays* (30 points) – the essays provide the applicants with an opportunity to explain the reason(s) why they are applying for a scholarship, what their career goals are, and how these career goals will help to meet the needs of AI/AN. The essays weigh heavily toward the applicants’ ranking and are based on how well they are written and how well candidates express their career goals and desire to serve Native communities.

The cumulative score is then used to rank all applicants applying in the same degree program. Priority is given to applicants with the earliest projected graduation date.

It is the responsibility of the scholarship recipients to maintain their enrollment status as a full-time, or part-time students throughout the academic year and to be in good academic standing at all times. This means maintaining a minimum 2.0 GPA. Recipients must also report on their academic program progress and immediately report any problems or changes in academic status to their Program Analyst.

## **B. IHS Loan Repayment Program**

The IHS LRP was created to support the mission of IHS while providing dedicated Indian health professionals with a financial incentive to serve in areas with AI/AN communities. An LRP award provides \$20,000 per year toward the repayment of health profession education loans. In exchange for this support, IHS LRP award recipients agree to serve at an Indian health facility identified as having a staffing need. The typical LRP contract is two years.

Importantly, LRP participants are eligible to extend their contract annually beyond their initial two-year obligation period, until their qualified student debt is paid. This creates substantial incentives for providers to extend their contract. It is also likely that it increases the probability of eligible candidates to submit an application.

There is a great deal of anecdotal evidence that many health professionals would initially enter the program only because of the financial incentives offered by the program. Once immersed in the community and realizing the extent of professional rewards offered in these locations, many of those providers tend to spend their entire careers working in Indian health. In this project we attempt to shed more light on this hypothesis.

There is a broad array of disciplines that make the applicant eligible to apply for an LRP award including advanced practice nurse, behavioral health, dentistry, nursing, optometry, pharmacy, physical rehabilitation and other health professions, including nutritionists and dietitians.<sup>1</sup> Applications are received between October 1 and August 15, and then are evaluated monthly beginning in January, or as soon as funds become available. AI/ANs who are members of federally recognized Tribes, or IHS Scholarship Program recipients receive priority consideration for an LRP award. IHS Scholarship Program recipients need to submit proof that they have fulfilled their service commitment under the Scholarship Program.

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<sup>1</sup> More details on the discipline that qualify for LRP are available at:  
<https://www.ihs.gov/loanrepayment/lrpbasics/eligiblehealthprofessions/>.

### III. Data and Methodology

Our empirical approach follows two main steps. First, we construct retention profiles in I/T/U sites for IHS participants and non-participating providers serving in I/T/U sites. Second, we compare the retention rates of participants and non-participants to determine whether there are differences between these two categories, and to understand what the potential explanations for these differences are. The comparative analysis is descriptive in nature, while the analysis aimed at understanding and quantifying the factors behind these differences relies on a regression approach.

#### A. Data

In this section we provide a detailed description of the analytic datasets we create for this study.

In the IHS administrative data we received for this project, spanning the period between 2008 and 2016, we identified a number of 3,011 unique program participants serving under program obligation in any year of this period. We dropped IHS SP providers who had a program status code of “No Support” or “Declined Support”, and kept only individuals who had a program status of “Full Support” for at least one year in this timeframe. This brought down the number of IHS participants to 2,683 providers – 1,345 LRP participants and 1,338 SP participants.

As in our previous work, we attempt to identify in P360 as many program participants as possible by first, middle, last name and other individual characteristics that are available in both P360 and the administrative IHS data, such a year of graduation from medical school and date of birth. As shown in Table III.1, of the 2,683 IHS participants we identify in P360 a number of 646 LRP participants and a number of 565 SP participants in P360 (for a total of 1,211 unique program participants). We also identify 5,670 providers working in I/T/U sites in 2011, the first year of available data from P360. A number of additional 348 non-participants appear in the P360 data in 2012, 453 in 2013, 216 in 2014 and 292 in 2015, for a total of unique 6,979 individual providers working in the I/T/U sites where we found IHS program participants.

**Table III.1: Number of IHS Participants in Administrative Data and P360 Data**

Year of Obligation Completion	IHS Administrative Data		Identified in P360		
	IHS LRP	IHS SP	IHS LRP	IHS SP	Non-Participants
2006	1	0	-	-	-
2008	204	129	93	60	-
2009	257	105	132	47	-
2010	139	126	52	53	-
2011	178	88	89	37	5,670
2012	235	147	118	59	348
2013	176	140	85	62	453
2014	101	151	60	62	216
2015	41	160	17	59	292
2016	8	292	0	126	-
Missing	5	0			-
<b>All</b>	<b>1,345</b>	<b>1,338</b>	<b>646</b>	<b>565</b>	<b>6,979</b>

P360 is a dataset that offers a comprehensive perspective of the population of medical providers in the nation at a given point in time. It is updated at relatively regular intervals, such that although it is not meant to be a truly longitudinal dataset, it allows one to track most providers over time from one extract to another. For the purposes of this study we assemble five extracts, one from each year between 2011 and 2015.

It is important to note that although the IHS administrative data includes the site name where providers serve during their service obligation, it lacks the actual address of the site. This poses a complication, as P360 includes the actual address where providers practice, rather than the name of the site. As of May 2017, there were 825 unique I/T/U sites.<sup>2</sup> Using a number of matching criteria, we were able to identify in P360 data 292 of these addresses. However, since the number of IHS program participants serving in these 292 sites is lower than the total number of IHS participants we identify in P360, we flag as I/T/U sites those facilities where we observe IHS participants in their last year of obligated service. We thus end up with a total of 629 unique I/T/U site addresses over the 2011-2015 period. The non-participating providers from Table III.1 are the providers who serve in these sites.

Given that the number of medical providers serving in I/T/U sites across the country is about 15,000 in every year,<sup>3</sup> we appear to under-count the number of non-participating providers identified in P360. This could be because of two reasons. First, P360 may not do a good job identifying provider categories such as registered nurses, pharmacists or technicians. Second, our lower number of non-participants is potentially the result of not using all I/T/U 825 sites, but only the 629 sites where we identified IHS program participants.

Another potential limitation comes from the possibility that some of the non-participants serving in I/T/U sites are in fact IHS participants that we fail to identify in our P360 data. As such, these true IHS participants are erroneously flagged as non-participants. However, we believe this is unlikely to be the case, given our matching criteria across the IHS and P360 datasets. It is more likely the case that those IHS participants we cannot identify in P360 are simply not captured in P360.

Also, although P360 does not identify providers strictly by NPI (the national provider identifier) - but by a combination of individual information, including first name, last name, and NPI – it is likely that providers without an NPI are less likely to be recorded in P360. As discussed in Chapter II, virtually the entire spectrum of provider disciplines is eligible for practicing in IHS sites, as well as participating in IHS programs. In many cases, such as social work or nurse midwifery, providers do not have an NPI and therefore are less likely to show up in P360.

In Table III.2 we provide a breakdown of IHS participants and non-participants by provider type using P360 data. The distribution of provider types is similar across the three groups. One exception is dentists, who represent about 12% in the sample of IHS LRP and SP participants, while in the sample of non-participants, they represent only 6%. Also, physicians represent 13% of the LRP sample, 14% of the SP sample, while in the sample of non-participants they represent a slightly higher fraction, of 16%.

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<sup>2</sup> Available at: <https://www.ihs.gov/locations/>.

<sup>3</sup> Available at: <https://www.ihs.gov/careeropps/index.cfm/healthprofessions>.

**Table III.2: Distribution of IHS Participants and Non-Participants by Provider Type**

Provider Type	IHS Participants		Non-IHS Participants
	IHS LRP	IHS SP	
Physician	81	77	1,086
NP	25	33	367
PA	18	40	229
Dentist	75	65	398
Other	447	350	4,899
<b>All</b>	<b>646</b>	<b>565</b>	<b>6,979</b>

We construct an alternative analytic file using publicly available provider-level data from a dataset made available by CMS.<sup>4</sup> This dataset has annual extracts over the period between 2012 and 2015 and it includes all providers who bill Medicare in a given year. We follow the same steps as in the case of the P360 file in an attempt to identify IHS program participants in this Medicare provider-level dataset.

In Table III.3 we present the number of IHS participants that we were able to identify in the Medicare data. Given that many IHS participants are providers that do not bill Medicare, it is not surprising that the number of providers identified in the Medicare data is lower than the number of participants identified in P360.

**Table III.3: Number of IHS Participants in Medicare Provider Data**

Year of Obligation Completion	IHS LRP	IHS SP
2008	26	11
2009	30	12
2010	13	11
2011	18	12
2012	19	17
2013	28	17
2014	15	20
2015	6	26
2016	2	35
<b>All</b>	<b>157</b>	<b>161</b>

<sup>4</sup> Available at: <https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/medicare-provider-charge-data/physician-and-other-supplier.html>

## B. Retention Measures

Using our analytic datasets, we construct the following retention variables:

- Serving in the same I/T/U site in the period after completion of IHS service obligation. This variable takes the value of 1 in the years when the IHS provider practices in the same location as during service, and 0 otherwise.
- Serving in any I/T/U site in the post-obligation period. This variable takes the value of 1 in the years when the provider serves in the same or any other I/T/U site after IHS obligation completion, and 0 otherwise.

To assess retention patterns of IHS participants in HPSAs, we follow the logic from Lewin (2014) and Lewin (2016) and construct these additional retention variables:

- Serving in a HPSA. This variable takes the value of 1 if the IHS provider serves in a HPSA county at a location that is not an I/T/U site, and 0 otherwise.

We create these measures for providers who do not participate in IHS LRP or IHS SP, but the reference point is not the year when they left service, but the first year they appear in the analytic datasets. Using the above variables, we construct retention rates as the ratios between the number of providers in a location type (same I/T/U, any I/T/U, or HPSAs) and the total number of providers leaving IHS service in a given year. These rates are calculated one year after IHS obligation completion, two years after obligation completion and so on. In the case of non-participants, the annual retention rates are calculated one year after they first appear in the data, two years after they first appear in the data and so on.

In past literature, retention was approached in multiple ways, with a focus on the length of retention in high need areas, the interval at which retention is measured, or by the location's level of need. Previous retention studies that used retention measures defined by these criteria include Konrad et al. (2000), Holmes (2004), Holmes (2005), Pathman et al., 2012(a), Pathman et al., 2012(b), or Pathman and Konrad (2012).

## C. Econometric Model

Next, we propose an econometric approach to determine how much of the retention differential between participants and non-participants is due to the program, and how much due to other characteristics.

In our previous projects (Lewin, 2014 and Lewin, 2016), we estimated a number of regression models based on data on program participants and non-participants to determine how retention patterns beyond service obligation differ between the two groups. Specifically, we estimated regression models in which we controlled for observable characteristics on each individual ( $\mathbf{X}_i$ ), local area characteristics ( $\mathbf{Z}_j$ ) and an indicator for program participation ( $Prog_i$ ):

$$y_{ij} = \alpha \cdot Prog_i + \mathbf{X}'_i \cdot \beta + \mathbf{Z}'_j \cdot \delta + \varepsilon_i \quad (1)$$

Model (1) can be estimated using a 'same I/T/U facility' indicator and an 'any I/T/U facility' indicator as dependent variables. As explained in the previous section, these variables take the value of 1 if the participating provider serves in the same I/T/U facility (or any I/T/U facility) in

any of the years after service completion, and 0 otherwise. These models are based on data on IHS program participants and non-participants who work in the same I/T/U facility to determine whether program participants have a longer or a shorter retention in I/T/U facilities than non-participating providers. As many providers who work in I/T/U facilities can be NHSC participants, we attempt to estimate models in which we compare the retention of IHS participants with that of NHSC participants in the same or any I/T/U facility. To the extent identification of NHSC providers working in I/T/U facilities is feasible, a more complete version of the model would be one in which we compare IHS and NHSC participants' retention with that of non-participants who work in I/T/U facilities.

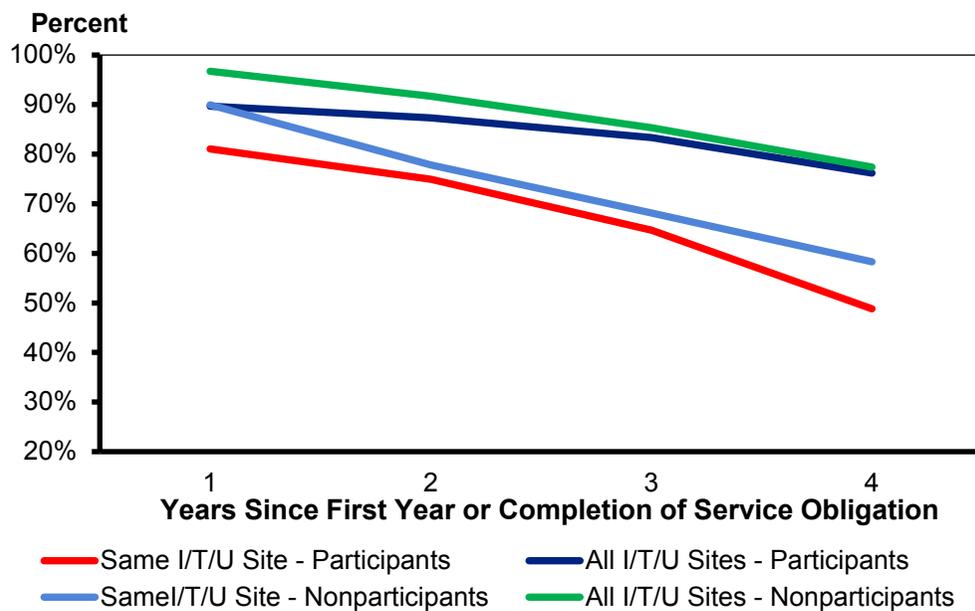
The coefficient of interest,  $\alpha$  indicates the impact of program participation on the number of years served in an I/T/U facility or a HPSA (depending on the version of the model). The **X** vector included individual-level characteristics like age and gender, while the **Z** vector included Census division indicator variables and local area characteristics (at the zip code level), such as: the unemployment rate, family income, fraction of the population with a high school degree, fraction of minority population and percent of the population over the age of 65. Model (1) can be estimated using a logit specification, separately for: I/T/U facilities, HPSAs, by the number of years elapsed since obligation completion (for participants) and by the number of years after they first appear in I/T/U sites or HPSA (for non-participants).

## IV. Retention of IHS Program Participants

### A. Post-Service Retention Analysis of IHS Participants

In Figure IV.1 we show that about 79% of the IHS program participants serve in the same I/T/U site one year after completion of their service obligation. Their retention in the same site where they practiced while in IHS service remains high in the following years: 72% after 2 years, 67% after 3 years, while in the 4th year after obligation completion drops to about 50%. We find that some of the IHS participants who stop serving in the same site after obligation completion move in fact to other I/T/U sites, such that the retention of IHS participants in any I/T/U site is, respectively: 90%, 86%, 84% and 78% in each of the 4 years after obligation completion.

**Figure IV.1: Retention Rates of Medical Providers in I/T/U Sites**



Focusing on non-participants, we note that in the first two years after they first appear in the data their retention rates are higher than the retention rates of participants, both in terms of retention in the same I/T/U site, as well as in terms of retention in any I/T/U sites. One year after we first observe non-participants in I/T/U sites, 90% of them are still in the same site, while 97% are in ‘any I/T/U’ site. The retention rates of non-participants drop faster than those of participants, such that by the 4th year since their first year, their retention rates are about the same as those of participants.

This finding of higher retention for non-participants is consistent with a conceptual framework we developed in Lewin (2014) for the comparison between the retention of NHSC and non-participating NHSC providers. In brief, our conceptual framework yields the prediction that since (some, if not all) program participants are induced to serve in target areas (in this case, I/T/U sites) as a result of the benefit award, these providers are on average less likely to remain in the target areas after completion of their program obligation than those providers who serve in the same areas without the program incentive. If the proportion of IHS participants who are induced

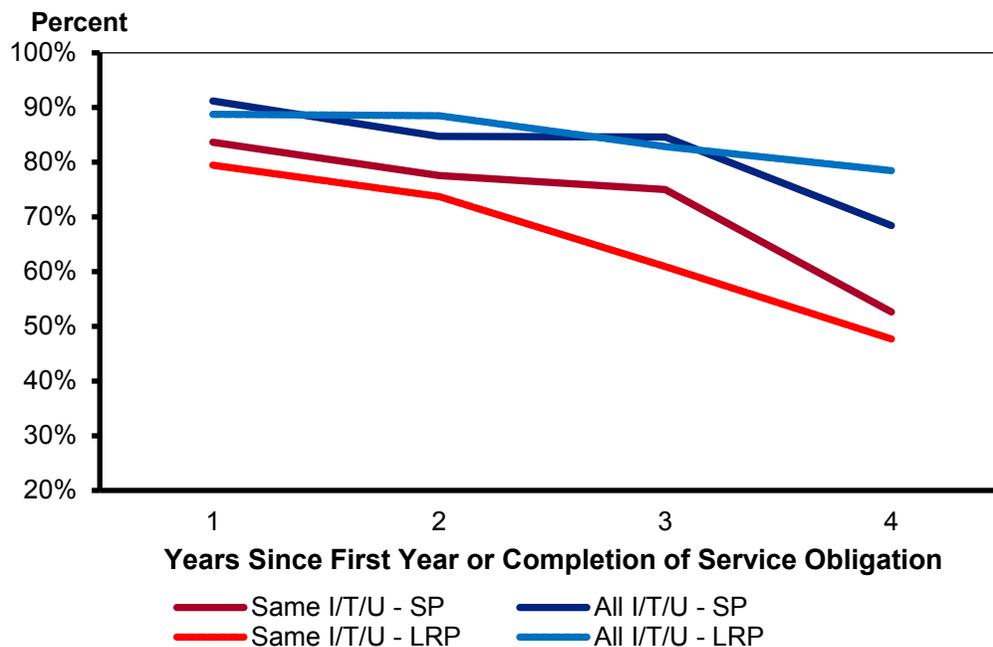
to serve in I/T/U sites exclusively because the benefit award is larger in the population of all IHS participants, the retention differential between participants and non-participants becomes larger.

In addition, the retention profiles from Figure IV.1 follow the same pattern as those of non-NHSC participants from Lewin (2014), relative to the retention of participants: a higher retention differential in the first years, followed by a steeper decline in the retention of non-participants. Relative to non-participants, the retention of participants tends to stabilize after a few years after service obligation.

In Figure IV.2 we present the retention rates of IHS participants in the same I/T/U site or in any I/T/U program by whether they participated in LRP or SP. It is noteworthy that the retention of LRP participants in the same I/T/U site is across-the-board lower than that of SP participants. While the difference is minimal in the first two years after obligation completion (about 2-3 percentage points), it becomes substantial in the 3rd and 4th year after obligation completion (about 12-13 percentage points). This widening gap can potentially be explained – at least in part - by the requirement that SP participants be AI/AN. If they are choosing to complete their obligation in an I/T/U site that is closer to the community they grew up in, they may be more inclined than LRP participants to remain in the same site after obligation completion. LRP participants are not required to be AI/ANs. Moreover, the retention differential in the further out years between SP and LRP participants helps explain the relatively steep decline in ‘same I/T/U’ retention of IHS participants in Figure IV.1.

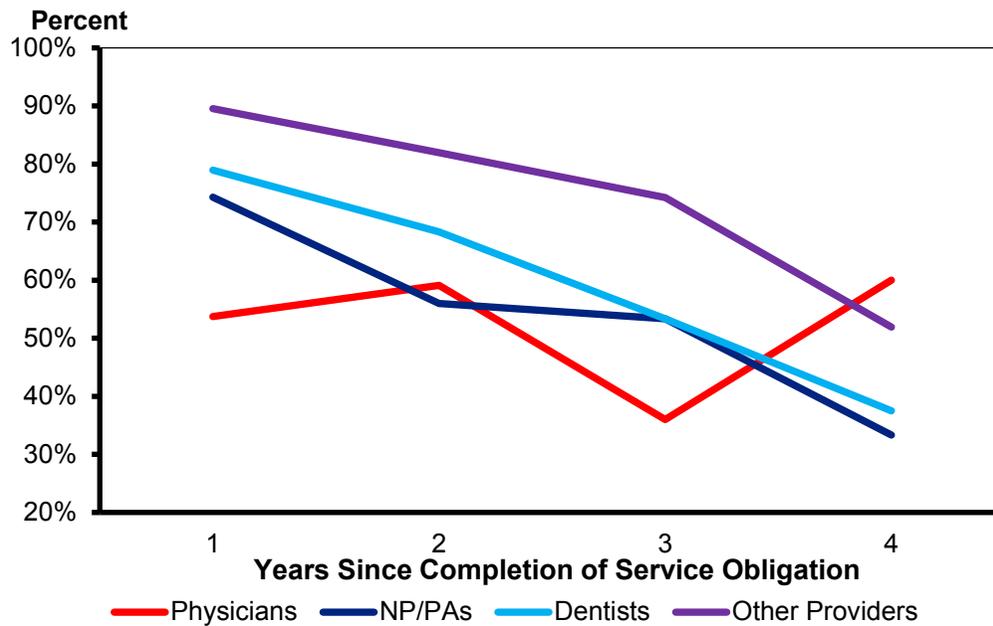
However, despite the differences in the ‘same I/T/U’ retention between SP and LRP participants, the ‘any I/T/U’ retention rates are very close to each other for the two groups. This finding reflects higher migration rates across I/T/U sites for LRP participants relative to SP participants.

**Figure IV.2: Retention Rates of IHS Program Participants by Program**



In Figure IV.3 we show the retention rates in the same I/T/U by provider type. As can be noticed, physicians tend to have the lowest ‘same I/T/U’ retention rates, with values ranging between 53% and 34%, followed by NP/PAs with retention rates between 67% and 41%. Dentists have a slightly higher retention than NP/PAs in the first two years post-obligation, but a slightly smaller retention in the 3rd and 4th year after obligation completion. Finally, other providers (including behavioral health providers, or registered nurses) have a much higher retention in the first three years than the other provider categories. Interestingly, their retention drops steeply in the 4th year after obligation completion (from 80% in year 3 to 57%).

**Figure IV.3: Retention Rates of IHS Program Participants in the Same I/T/U Site by Provider Type**



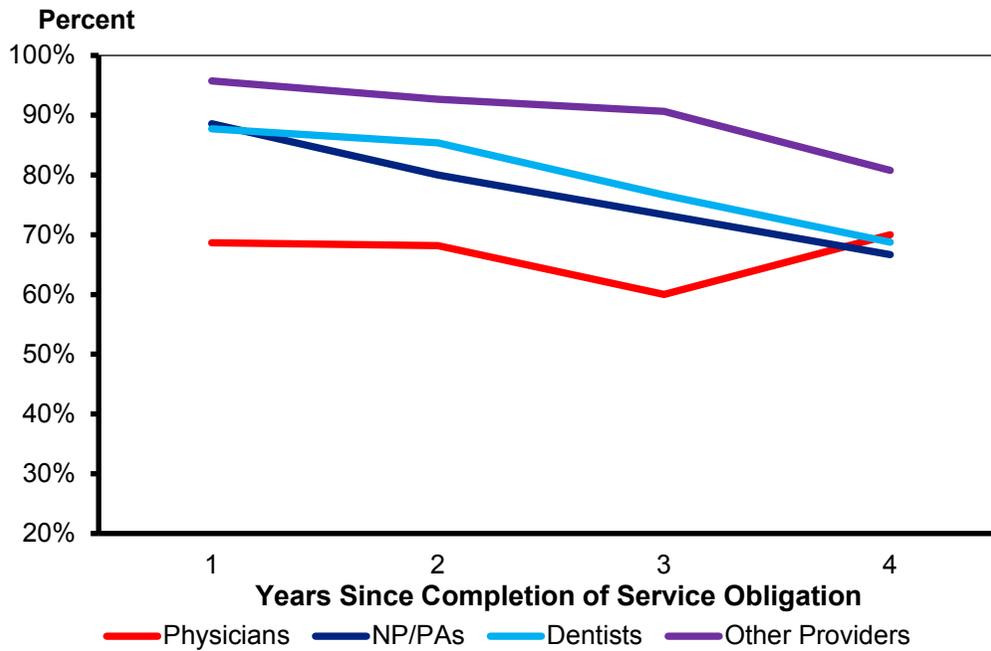
Next, in Figure IV.4 we plot the retention profiles in any I/T/U by provider type. The retention rates are much higher than the ‘same I/T/U’ retention rates in Figure IV.3 for all provider types. Physicians and dentists have retention rates between 80% and 70% in the four years after obligation completion that fall within the analysis window, while NP/PAs start with higher retention rates than physicians and dentists, but end up with lower retention rates in the further out years.

It is noteworthy that the ‘any I/T/U’ retention of the group of other providers is much flatter than the ‘same I/T/U’ retention profile from Figure IV.3. This appears to indicate that this category of providers becomes increasingly more mobile as years go by since IHS obligation completion. However, this migration from the I/T/U site in which they served under IHS obligation is to a large extent toward other I/T/U sites.

Regardless, it is clear that the providers from the ‘Other Providers’ category are the most inclined to remain in I/T/U sites. This could be a reflection of the fact that these providers could have potentially served in these sites without the program awards (in other words, they have a high preference for being in these locations, and serving Indian communities). However, it could

also be the case that at least some of these providers are initially attracted strictly by the monetary value of the benefits, but once they realize the extent of professional opportunities and professional fulfilment they can achieve in the longer run in these locations, they change their perspective and decide to remain in I/T/U sites for longer periods of time than anticipated, or perhaps for the rest of their professional career. This is, of course, valid for all provider types, but to the extent that such providers make up a high fraction of the ‘Other Providers’ category, the return to an initial IHS investment is significantly enhanced.

**Figure IV.4: Retention Rates of IHS Program Participants in Any I/T/U Sites by Provider Type**



**B. Retention Differentials for Providers Ending Service Before 2011**

As mentioned in Section III, our data from Provider360 starts in 2011. IHS administrative files include providers who ended their IHS obligation between 2008 and 2016. While the lack of address information in the IHS data preclude us from conducting a ‘same I/T/U site’ retention analysis, we can conduct an ‘any I/T/U site’ retention analysis. In other words, we can determine whether providers who ended their service obligation before 2011 (the year when we can first observe their post-obligation location in Provider360) are located in I/T/U sites. These sites may be the sites where they served while in service, as well as any other I/T/U site.

**Table IV.1: ‘Any I/T/U Site’ Retention of IHS Participants who End Service Before 2011**

Years Since Completion of Service Obligation	All IHS Participants	IHS LRP	IHS SP	Physicians	NP/PAs	Dentists	Other Providers
5	61.1	63.7	56.70	56.7	36.6	61.2	66.0
6	61.0	62.5	57.9	57.4	42.9	63.4	64.4
7	61.3	60.6	62.3	51.6	43.8	64.7	67.0

Table IV.1 presents the retention rates of these providers – overall, by program, and by provider type. As expected, these rates are lower than the ‘any I/T/U’ retention rates from Figures IV.1-IV.4. In some cases, the retention rates appear to increase slightly as the number of post-obligation year’s increases. It is unlikely that these patterns indicate real increases in the retention rates after year 5; they likely indicate cohort-specific differentials. For instance, providers that are tracked for 7 years come only from the cohort of alumni ending their service in 2008. Providers who are tracked for 6 years come from the 2008 and 2009 cohorts, and so on. In fact, we do find that retention differs across the 2008, 2009 and 2010 cohorts, with the earlier cohorts having a higher retention.

### **C. Retention Differentials and Local Area Characteristics**

Next we wanted to determine the extent to which the differences in retention from Figures IV.1-IV.4 are explained by other relevant local characteristics. We collected publicly available information from the Census Bureau and the Bureau of Labor Statistics at the county level over the 2011-2015 period on the: unemployment rate, median household income, percent with high school diploma, percent over the age of 65, percent of minorities and total population. We then merged this information to the analytic dataset based on Provider360 data and estimated regression models like the ones described in Chapter III, in which the probability of an individual provider to serve in the same (or any) I/T/U site is modeled as a function of IHS program participation and these county-level characteristics. We also include provider type indicators in the models.

Table A.1 in the Appendix shows the estimates from logit regressions for the probability of being in the same (or any) site one year after, two years after and so on. All models indicate that IHS participants are less likely to remain in I/T/U sites after obligation completion than providers working in I/T/U sites who are not program participants. The magnitude of these statistically significant differences – obtained by calculating marginal effects (not shown for space consideration) - is virtually the same as the magnitude of the differences shown in Figure IV.1. This means that the local area characteristics do not serve to explain the unadjusted retention differences discussed above.

However, it is important to note that these models clearly indicate that providers serving in I/T/U sites (program participants and non-participants) are more likely to serve in areas where the median income and percent of high school graduates is lower and the percent of minorities and population aged 65 and above is higher. These estimates indicate that these providers have a clear preference to serve in areas that are typically associated with provider shortages.

### **D. Average Time Spent in I/T/U Sites by IHS Program Participants**

IHS program participants spend a typically two years in I/T/U sites during their service obligation. It is important to determine – based on the retention analysis presented above – the average duration these providers actually spend in I/T/U sites. While in service, the vast majority of program participants remain in I/T/U sites, so the average time in these sites while in service is basically two years. Determining the average duration in I/T/U sites in the post-obligation period is complicated by two issues. First, the entire timeframe over which we can observe program participants in their post obligation period is four years in our data. If the interest is only

in average time in any I/T/U sites, the timeframe is larger (up to seven years).<sup>5</sup> Second, the four year timeframe is the maximum over which we can track providers in their post-obligation period. For instance, providers leaving IHS programs in 2013 can be observed in our data in 2014 and 2015, but we cannot determine whether they continue to serve in I/T/U sites beyond 2015. While we can make adjustments for second issue, the fact that the maximum timeframe is four years in the main analysis makes our average time in I/T/U sites the lower bound estimate of the actual average.

In Table IV.2, we present the average time spent in I/T/U sites by IHS program participants and non-participants. In the case of IHS program participants, these are years spent in I/T/U sites in the post-obligation period, while in the case of non-participants, these are the years spent in I/T/U sites after they are first observed in an I/T/U site in our P360 data. As shown in Table IV.2, our calculations indicate that IHS program participants spend 3.18 more years in the same I/T/U site in their post-obligation period, and about 3.63 years in any I/T/U sites in their post-obligation period. Importantly, these are years in I/T/U sites in addition to the two years these providers serve in I/T/U sites during their obligation period.

**Table IV.2: Average Time (in Years) Providers Serve in I/T/U Sites**

Type of Participants		All	IHS LRP	IHS SP
IHS Participants	Same I/T/U Site	3.18	3.11	3.35
	Any I/T/U Site	3.63	3.65	3.59
Non-Participants	Same I/T/U Site	3.29	-	-
	Any I/T/U Site	3.71	-	-

Non-participants serve in I/T/U sites 3.29 years in the same I/T/U site and 3.71 years in any I/T/U in the period after they are first observed in an I/T/U site in our data. The slightly higher number of years for non-participants reflects the retention differences presented in Table IV.1. The calculations performed in Table IV.2 use the retention rates from Tables IV.1 and IV.2, which are turned into “survival” rates, that is, probabilities of not leaving I/T/U sites, conditional on not having done so in the previous year. These survival rates are then used as weights in the calculation of the average years in I/T/U sites.

It is important to note that the maximum value that can be reached in Table IV.2 is 4, given our data timeframe of four years. While program participants who end their obligation, for instance in 2011 already have two years of service (as part of their obligation), for non-participants that appear for the first time in our data in 2011, that year may or may not be their first year in an I/T/U site.

Finally, performing the same calculation for the IHS participants that can be tracked up to seven years, we obtain an average time of 4.75 years in any I/T/U site.

<sup>5</sup> Note that while we can track the location of program participants leaving service between 2008 and 2010 five, six and seven years after obligation completion, we cannot track their location in the 2008-2010 timeframe.

## V. A Retention by Site Analysis

In this Chapter we provide a brief discussion of the factors influencing retention in high need areas, based on previous literature. We assess the relevance of these factors in the context of IHS and then provide a preliminary analysis of retention of IHS program participants in the larger I/T/U sites we identified in our analytic dataset.

### A. Past Literature on Determinants of Retention

To our knowledge, literature on the potential determinants of retention of providers in I/T/U sites is scarce. However, given that most I/T/U sites are located in high need areas, and the population served by IHS providers is similar in terms of socio-demographic characteristics and medical needs to populations from HPSAs and other provider shortage areas, it is likely that the literature stemming from the analysis of providers participating in other programs is relevant for IHS program participants as well.

A study funded by The Multi-State NHSC Retention Collaborative, a consortium of 11 state Primary Care Offices, on the retention of clinicians within their states who serve in NHSC or in similar state-based programs (Pathman et al. 2012(b)) is particularly relevant in the context of retention of IHS program participants. Using data from two key surveys—the 2012 national NHSC medium and long-term retention study and the survey of clinicians in NHSC and state programs in 11 states participating in the Collaborative, this evaluation sought to identify the circumstances and characteristics of clinicians, service sites, and service experiences that contribute to longer retention. Examining the current and recent NHSC and state-program participants' plans to remain in their original service sites for one, two, and up to ten years, the authors find that of the 1,558 NHSC and state service program participants surveyed, 69 percent remained or anticipated remaining in their service sites for at least one year beyond their service terms, 48 percent anticipated remaining at least three years, and 20 percent anticipated remaining at least ten years. Consistent with previous studies, a significantly higher proportion of NHSC Loan Repayment Program participants anticipate remaining in service sites beyond contractual terms (70 percent compared to 36 percent at one year, 35 percent compared to 13 percent at five years, and 19 percent compared to 2 percent at 10 years, respectively). Within the NHSC Loan Repayment Program, anticipated retention rates are similar across the eleven states.

After simultaneously controlling for the clinicians' disciplines and demographics, factors relating to principal reason for service and type of practice account for 16.3 percent of variation across clinicians in their plans to remain in their service sites for at least two years beyond their service term, and for 18.7 percent of the variation at five years (Pathman et al., 2012(b)). The factors that have a positive effect on retention include:

- Being age 30 or over, non-Hispanic White race/ethnicity, having children, and serving in a state where one grew up and where one trained;
- Principally motivated by the chance to work with underserved populations rather than for the programs' financial support; and
- Serving in a rural health facility, mental health or substance abuse treatment facility, a prison, or "other" type of facility.

Factors relating to clinicians' satisfaction with work and practice, family integration into the broader community, and overall assessment of their service program explain 28.6 percent of variation across clinicians in their plans to remain in their service sites for at least two years beyond their service term and for 27.1 percent at five years (Pathman et al., 2012(b)). These factors include:

- Feeling of belonging and safety within the community for the clinician and clinician's family;
- Satisfaction with the program administrator, salary, the assessment of the practice overall, and access to specialist consultation; and
- Overall satisfaction with the service program and the program staff support.

Finally, the study finds that higher proportions of clinicians working in hospital-based clinics anticipate remaining in their sites over time than those working in any other type of site.

There is a substantial literature on the factors affecting providers' decisions to locate in high need areas. Although this literature is not directly focused on factors influencing retention, it may be useful to briefly review it, given that most likely the factors determining providers to locate in high need areas in the first place are going to play a role in their retention decisions as well. For instance, Hancock et al. (2009) argue that in order to reduce persistent provider shortages in rural areas, before evaluating provider incentive programs the focus of policymakers should be directed toward a thorough understanding of the factors and influences that determine individual providers' decisions to locate in rural areas. They interview, in-depth, 22 physicians who were born in rural and urban areas from northeastern California and northwestern Nevada to investigate the reasons behind their practice location choice. The study finds that exposure to rural life through education, recreation, or upbringing increases the chances of future rural practice as it addresses the provider's desire for familiarity, sense of place, community involvement and self-actualization. These results support a health policy focus on the recruitment of rural-raised and community-oriented applicants to medical school, residency, and rural practice. In addition, local mentorship and "place-specific education" can further support the integration, and thus longer-term retention, of new rural physicians.

Walker et al (2010) also find that personal motivators, career motivators and clinic support are paramount to the decision primary care providers make to locate in underserved areas. Identifying key personal motivators during medical school and while providers are serving in underserved areas may enhance strategies for recruiting and retention of these providers in the long run. Through interviews with 42 primary care physicians from Los Angeles county, Walker et al (2010) identify a number of personal motivators, such as opportunities for personal growth, self-identity (or common background with the patients) and mission-based values (or being dedicated to serving particular communities). They also identify career motivators like salary and benefits, work hours and lifestyle, career satisfaction, family, geography and loan repayment programs. Finally, clinic support factors included positive work environment, provider team quality, effective reimbursement mechanisms and availability of information technology. Another potential solution to reduce shortages in high need areas may be to attract primary care providers that are close to retirement to serve in those areas on a part-time basis (Nusbaum, 2009).

Another study by Duffrin et al (2014) examined what factors influence primary care physicians to choose rural practice locations to better develop the rural workforce in North Carolina. The authors sent a survey to all primary care physicians licensed in the state of North Carolina, a total of 2829, and received 975 usable responses (return rate 34.5%). They found that solo practice, critical access hospital, community health center, or federally qualified health center sites were strongly associated with rural practice. Physician pay was also a factor in choosing a work site, financial support from a hospital, and medical school loan repayment also was correlated with rural practice. The majority rural physicians (72%) reported being from a town of less than 11,000. The authors argue that the current definition of rural being used to identify students most likely to practice in rural areas is inaccurate. They also propose a definition of rural as an area with a population of less than 11,000, as they found that such an area is the best predictor of choice to practice in rural North Carolina. Competitive pay, medical student loan repayment, and involvement with civic organizations were also found to be positively correlated with choosing a rural practice location. The survey indicated that financial support from a hospital or other healthcare organization was found to increase the chance of choosing a rural practice location. The authors argue that financial incentives, such as loan repayment, salary guarantees, and practice assistance, should continue to assist in attracting primary care physicians to rural areas. The authors suggest tailoring recruitment efforts to students being raised in an area of less than 11,000.

Using logistic regressions in which they modelled the decision of a number of primary care physicians to serve in medically underserved communities (MUC), Wayne et al. (2010) measure how predictive several factors identifiable at the time of enrollment in medical are for the probability of subsequent practice in a MUC. They find that providers who attended high school in a rural area were three times more likely to work in an MUC. Also, physicians who began medical school at age 25 or older, and who were members of an underrepresented minority were twice as likely to work in a MUC relative to their counterparts. The information used in this analysis comes from a survey of attitudes toward serving in MUCs that all students who enrolled after 1993 in the University Of New Mexico School Of Medicine were asked to complete at matriculation.

Similarly, Boscardin et al (2014) find that community health field experience, learning another language, becoming more aware of perspectives of individuals from other backgrounds and attending schools with a higher social mission score represent educational and individual factors that were strongly associated with the medical students' intention to practice in underserved areas.

Price et al (2009) used a Web-based survey to investigate medical students' interest in loan repayment programs. The survey was sent to medical students and residents at 6 university programs in Texas during the 2005–2006 academic year. A total of 818 students and 529 residents responded to the survey. Of the respondents, 96% of students and 85% of residents had taken out loans for education with about 62% of students and residents expected their debt to exceed \$100,000. More than half of students and residents expected educational debt to influence their choice of practice type and practice area. About 52% of students and 38% of residents indicated an interest in participating in a loan repayment program that involved service in a medically underserved area, and women and members of minority groups were more likely to express interest.

## B. Retention in Larger I/T/U Sites

With these literature findings in mind we conducted a retention-by-site analysis to determine whether we can come up with relevant evidence on which I/T/U sites performed better than others in terms of retaining IHS program participants beyond the initial IHS obligation period.

It is important to note that there are a number of limitations in this analysis. First, most of the program participants (about 70%) we identified in Provider360 appear in sites where there is just one program participant during our timeframe. Second, given that the actual address of the site where participants served is not available for those providers separating from IHS service between 2008 and 2010, we cannot link these providers with the site where they last served while in service to determine whether they remained in the same site or not. Therefore, the number of participants used in this retention-by-site analysis is further reduced. Third, even if the address site where the participant served while under program obligation is known in our data, it is possible that the provider's post-obligation address is not accurately recorded in Provider360. In many such cases, the provider's post-obligation address only includes the state. In most cases, the state on these individual records is: Alaska, Arizona, Montana, Nevada, New Mexico, North Dakota, Oregon, or South Dakota, states with higher concentrations of AI/AN populations. While it is possible that these providers work in the same site as the site where they served under IHS obligation, it is also possible that by remaining or locating in any of these states that they continue to serve AI/AN populations. However, this cannot be determined with certainty from our currently available data. Finally, while the retention of program participants by site may reflect actual moves of providers from the initial location, they can also reflect instances when, say, providers ending their IHS obligation in 2013 simply cannot be tracked in our data for more than two years in their post-obligation period (a typical instance of data "censoring").

In Table V.1 we provide statistics on the number of program participating providers that are still serving in the same I/T/U site in the years after separating from IHS service. A value of zero for 'years since completion of service obligation' indicates the last year of IHS program, while values 1 through 4 indicate the number of years elapsed after separating from IHS service. We restricted the sites to include only those sites with at least 4 IHS program participants in their last year of service obligation.

The site with most program participants in our data was the Gallup Medical Indian Center in Gallup New Mexico, a 99-bed hospital offering virtually the entire spectrum of medical services. A number of 25 providers (of the initial 26 observed in their last year of service in that location) were still practicing there one year after their program completion. Their number drops to 18 by the second year, 8 by the third year, and to 4 by the fourth year. It is possible that the count of providers in the fourth year (for this site as well as for all sites shown in Table V.1) is influenced by censoring, as discussed above.

**Table V.1: Post-Obligation Retention of IHS Program Participants by Site**

Site Name	Number of Participants After Completion of Service Obligation				
	Years Since Completion of Service Obligation				
	0	1	2	3	4
Gallup Medical Indian Center, NM	26	25	18	8	4
Naytahwaush Health Station, Ogema MN	21	16	12	2	2
Phoenix Indian Medical Center (Hospital), AZ	12	9	7	5	1
Cherokee Nation Hastings Hospital, OK	8	7	5	3	1
Tuba City Regional Health Care, AZ	6	5	2	2	
Cass Lake Hospital, MN	6	6	3	2	2
Northern Navajo Medical Center, Shiprock NM	6	5	3	0	
Lawton Hospital, OK	5	5	4	1	1
Alaska Native Medical Center, Anchorage AK	5	5	3	3	1
Dilkon Health Center, Winslow AZ	5	5	5	3	
Albuquerque Indian Health Center, NM	4	2	4	2	2
Claremore Indian Hospital, Claremore OK	4	4	4	3	2
Rapid City Hospital, SD	4	3	3	1	1
Cherokee Indian Health Hospital, NC	4	4	4	3	1
AZ	33	28	23	15	8
MT	7	6	4	3	1

While no clear patterns emerge from this analysis, it appears that retention of IHS program participants is more likely to be higher in sites that typically offer a larger array of services, adopted state-of-the-art procedures and medical technology, and/or are located in more urban or more easily accessible areas. These findings are consistent with the results from past literature on determinants of retention.

Given the important limitations discussed above, the results of this retention-by-site analysis should be viewed with caution, as they only provide tentative evidence on the factors determining retention. These results represent a first step into a more in-depth retention analysis that should necessarily include more sites, and rely on more extensive information on the individual program participants, clinical practices, services offered and professional opportunities for providers in those sites.

## VI. Post-Obligation Retention of IHS and NHSC Program Participants

Both IHS and NHSC programs offer similar incentives to providers willing to serve in high need areas. While there are some important differences in terms of eligibility criteria, award structure (e.g., NHSC is more generous than the IHS LRP award), and shortage area targeted by the program (I/T/U sites in the case of IHS programs vs. HPSAs in the case of NHSC programs), the degree of similarity across programs warrants a comprehensive comparison between the retention rates of IHS participants and the retention rates of NHSC participants in their post-obligation period.

Given that NHSC eligibility is tied to working in a HPSA, while IHS eligibility is tied to serving in I/T/U sites, a direct comparison between the two groups of providers needs to be focused in turn on each of the two shortage areas definitions.

### A. Retention in I/T/U Sites

We start with a comparison of retention in I/T/U sites between IHS program participants and NHSC program participants. For this purpose, we use the IHS program participants from the above analyses of retention, and the NHSC program participants who are observed to serve in I/T/U sites over the 2011-2015 period.

**Figure VI.1: Retention Rates of IHS and NHSC Program Participants in I/T/U Sites**

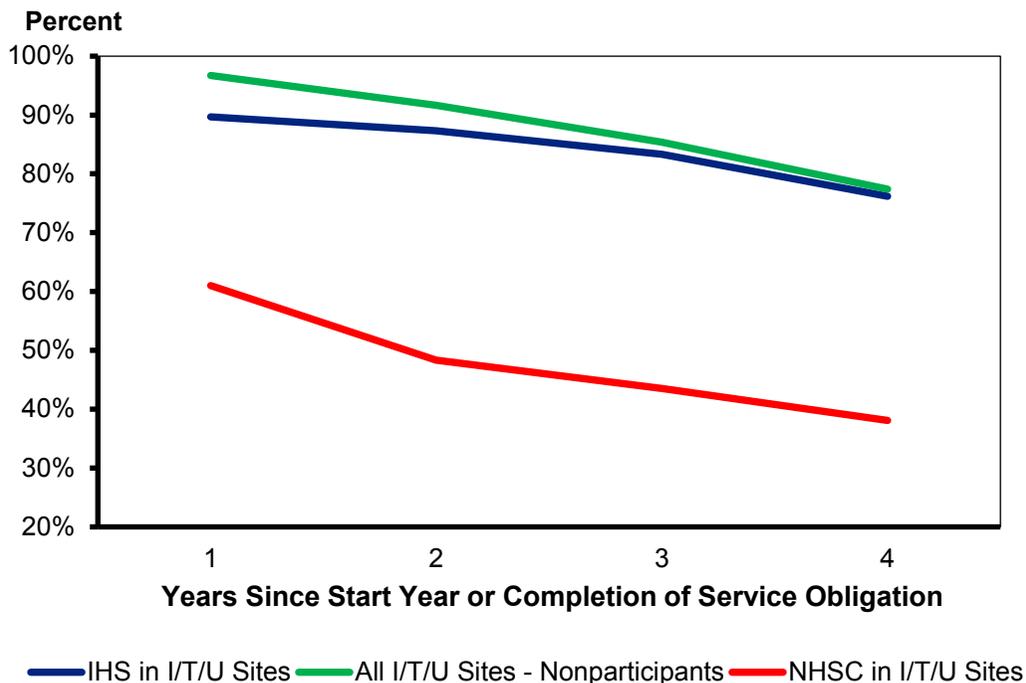


Figure VI.1 shows the same retention profiles of IHS program participants (‘same site’ and ‘any site’) from Figure IV.1. The NHSC profile of post-obligation retention in any I/T/U sites shows a lower retention than that of IHS program participants. In the first year post-obligation, about 61% of NHSC providers who served in I/T/U sites are still in I/T/U sites. The retention rate drops to 48% in the second post-obligation year, and then to 44% and 38% in the third and fourth years.

We interpret the lower retention rates of NHSC participants in I/T/U sites as indicative of a lower preference to serve in these sites than that of IHS program participants. However, as explained in our conceptual framework, the fact that the NHSC program managed to attract in I/T/U sites providers who would not have gone there in the absence of the award is a measure of program success, not failure. Services provided in I/T/U sites increased as a result of these providers being there as part of their obligation. Moreover, if some of these providers with a low preference of being in an I/T/U site remained in the same or other I/T/U sites after obligation completion, they provide additional services in the area (with the added bonus of not being awarded program benefits) that would not be available in the absence of the initial benefit.

In Lewin (2016) we conducted a comparison between NHSC participants in general and NHSC participants serving at some point during their obligation in an IHS site. At the time, lack of data on all categories of providers serving in I/T/U sites (i.e., IHS program participants, NHSC program participants, and providers that are participating in none of the IHS or NHSC programs) precluded us from conducting meaningful retention analyses at the I/T/U site level. Hence, the comparison was done at the HPSA level. We found that the ‘any HPSA’ retention rates of NHSC participants serving in IHS sites ranged between 85% in the first post-service year and 68% in the out years. It is important to note that the data used for these previous results was based on Medicare provider files (rather than P360 data, as in the current analysis). As discussed in Chapter II, Medicare data only includes individuals who bill Medicare in a given year. Nonetheless, the previous finding that NHSC participants who served in I/T/U sites have high retention rates in HPSAs, is consistent with the notion that although these providers have lower I/T/U retention rates, they still tend to serve in HPSAs, albeit non-I/T/U HPSA locations.

As in the main analysis, we also attempted to measure the extent to which the unadjusted retention differentials from Figure VI.1 may be explained by relevant local area characteristics. Using a similar approach as in Chapter IV, we estimated logit models by for each retention metric (‘same site’ and ‘any site’) and number of out years (1 to 4) in which we included a term indicating whether the provider was a NHSC program participant in an I/T/U site. These models are shown in Table A.2 in the Appendix.

The coefficients on IHS and NHSC participation are large, negative and statistically significant, indicating that program participation is associated with a lower retention probability in any of the four out years and for any of the two retention metrics considered. After calculating the marginal effects of these coefficients we found that the magnitude of these marginal effects was virtually the same as the unadjusted retention differences from Figure VI.1. This indicates that these retention differences are not explained by the other county-level covariates included in the models. As in the case of the models from Table A.1, providers working in I/T/U have on average a preference for serving in areas with poorer, older and less educated populations. Also, they tend to be less likely to remain in I/T/U sites when the county-level unemployment increases. This may be due to the fact that when economic conditions worsen, employment in medical facilities declines as these facilities reduce their workforce or even close.

## B. Retention in HPSAs

Next, in Table VI.1 we compare the retention rates of IHS and NHSC program participants in HPSAs. HRSA’s data on HPSAs allows us to break the retention analysis by whether the HPSA is a primary care HPSA or mental health HPSA.

As shown in Table VI.1, the retention rates of IHS program participants in both primary care and mental health HPSAs is high, ranging from 88% to 84% over the first four years after IHS obligation completion. This is perhaps not surprising, since most I/T/U sites are in HPSAs. However, it is worth pointing out that while the fourth year ‘any I/T/U site’ retention is 77.4% (Figure IV.1), the fourth year ‘any HPSA’ retention is 84.2%. This indicates that many of even those IHS program participants who leave I/T/U sites at some point remain in HPSAs to continue to practice in underserved communities.

In lower part of able VI.1 we also present retention rates of IHS LRP and IHS SP participants in primary care and mental health HPSA, respectively. Retention rates are similar across these combinations, with IHS SP participants having a slightly lower retention in their third and fourth year after service completion than the IHS LRP participants.

**Table VI.1: Retention Rates of IHS and NHSC Participants in HPSAs**

	Years since Completion of Service Obligation	Any HPSA' Primary Care		Any HPSA' Mental Health	
		IHS	NHSC	IHS	NHSC
All	1	88.1	77.9	86.3	80.8
	2	85.9	75.0	85.4	77.9
	3	85.3	73.4	85.9	76.4
	4	84.2	71.5	84.2	74.7
LRP	1	87.8		87.2	
	2	85.5		85.5	
	3	86.2		86.7	
	4	86.1		85.5	
SP	1	88.6		84.8	
	2	86.6		85.2	
	3	83.6		84.5	
	4	80.9		82.0	

The retention of NHSC participants in any primary care HPSA beyond their obligation period ranges between 78% after one year out of service, to 72% after four years out of service. Although these estimates are obtained with P360 data, they are virtually the same as reported in Lewin (2016), using Medicare provider data.

However, the retention rates of NHSC participants in mental health HPSAs are higher than the ones reported in Lewin (2016). As many health providers do not bill Medicare, it is likely that the retention results in Table VI.1 are obtained using a more representative sample of providers working in mental health HPSAs than the sample afforded by the Medicare data in Lewin (2016).

## VII. Conclusions

Using administrative data on IHS program participants, we find high retention rates in I/T/U sites of these providers in the post-obligation period. About 81% of the IHS program participants serve in the same I/T/U site one year after completion of their service obligation. Their retention in the same site where they practiced while in IHS service remains high in the following years: 75% after 2 years, 65% after 3 years, while in the 4th year after service completion drops to about 50%. We find that some of the IHS participants who stop serving in the same site after obligation completion move in fact to other I/T/U sites, such that the retention of IHS participants in any I/T/U site is, respectively: 90%, 87%, 85% and 76% in each of the 4 years after obligation completion.

We compare these retention rates with the retention in I/T/U sites of those providers who serve in the same sites without being IHS program participants. In the first two years after we first observe these providers in I/T/U sites, their retention rates are higher than the retention rates of participants, both in terms of retention in the same I/T/U site, as well as in terms of retention in any I/T/U sites. One year after we first observe non-participants in I/T/U sites, 90% of them are still in the same site, while 97% are in ‘any I/T/U’ site. The retention rates of non-participants drop faster than those of participants, such that by the 4th year after they first appear in the data, their retention rates are about the same as those of participants (77%).

We also find that the retention of LRP participants in the same I/T/U site is across-the-board lower than that of SP participants. While the difference is minimal in the first two years after obligation completion (about 2-3 percentage points), it becomes larger in the 3rd and 4th year after obligation completion. This gap can potentially be explained – at least in part - by the requirement that SP participants be American Indian/Alaska Natives (AI/AN). If they are choosing to complete their obligation in an I/T/U site that is closer to the community they grew up in, they may be more inclined than LRP participants to remain in the same site after obligation completion. Instead, LRP participants are not required to be AI/AN. However, despite the differences in the ‘same I/T/U’ retention between SP and LRP participants, the ‘any I/T/U’ retention rates are very close to each other for the two groups. This finding reflects higher migration rates across I/T/U sites for LRP participants relative to SP participants.

We also conducted a retention by site analysis and found tentative evidence that the retention of IHS program participants is more likely to be higher in sites that typically offer a larger array of services, adopted state-of-the-art procedures and medical technology, and/or are located in more urban or more easily accessible areas. These findings are consistent with the results from past literature on determinants of retention.

In Lewin (2016) we conducted a comparison between NHSC participants in general and NHSC participants serving at some point during their obligation in an IHS site. The ‘any HPSA’ retention rates of NHSC participants serving in IHS sites ranged between 85% in the first post-service year and 68% in the out years. In this study we find that the NHSC profile of post-obligation retention in any I/T/U sites shows a lower retention than that of IHS program participants. In the first year after completion of service obligation, about 61% of NHSC providers who served in I/T/U sites are still in I/T/U sites (then 48% in the second post-obligation year, then 44% and 38% in the third and fourth years). The previous finding that

NHSC participants who served in I/T/U sites have high retention rates in HPSAs, is consistent with the notion that although these providers have lower I/T/U retention rates (as we find in the current study), they still tend to serve in HPSAs, albeit to some extent, non-I/T/U HPSA locations.

Overall, the results from this study are consistent with the conceptual framework we developed in Lewin (2014) and Lewin (2016). We faced a number of data limitations in our analyses, as discussed in the previous chapters. For future work, it would be desirable for the IHS to collect more detailed and systematic information on program awardees, including their NPI (if applicable), address where they practice, and a number of relevant socio-demographic characteristics, such as age, gender, race/ethnicity, place of birth and tribe they belong to (when applicable). These additional characteristics would help in the better measurement of the importance of personal characteristics in the providers' decision to practice in sites with large concentrations of AI/AN populations.

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## Appendix

**Table A.1: Logistic Regressions of the Probability of Retention in the Same or Any I/T/U Site**

	Same I/T/U Site				Any I/T/U Site			
	1 Year	2 Years	3 Years	4 Years	1 Year	2 Years	3 Years	4 Years
IHS Participant	-0.490*** (0.16)	-1.295*** (0.19)	-2.192*** (0.22)	-3.263*** (0.29)	-0.544*** (0.18)	-1.780*** (0.21)	-2.801*** (0.27)	-4.100*** (0.42)
Unemployment Rate	-0.033 (0.03)	-0.091*** (0.02)	-0.090** (0.04)	-0.143*** (0.05)	-0.049 (0.03)	-0.072* (0.04)	-0.051 (0.05)	-0.104* (0.06)
Median Household Income (in \$1000s)	-0.016* (0.01)	-0.018** (0.01)	-0.018* (0.01)	-0.022** (0.01)	-0.022** (0.01)	-0.016 (0.01)	-0.018* (0.01)	-0.025** (0.01)
Percent High School Graduates	-0.007 (0.02)	-0.046*** (0.02)	-0.040** (0.02)	-0.040** (0.02)	-0.000 (0.02)	-0.031 (0.02)	-0.027 (0.02)	-0.021 (0.02)
Percent Over 65	0.027 (0.02)	0.049*** (0.02)	0.039* (0.02)	0.055*** (0.02)	0.042* (0.02)	0.060*** (0.02)	0.055** (0.02)	0.088*** (0.03)
Percent Minority	0.015*** (0.00)	0.011*** (0.00)	0.008** (0.00)	0.017*** (0.00)	0.023*** (0.01)	0.028*** (0.01)	0.022*** (0.01)	0.029*** (0.01)
County Population (in 1,000s)	0.000 (0.00)							
Physician	-1.649*** (0.14)	-1.824*** (0.15)	-1.889*** (0.15)	-2.054*** (0.15)	-1.584*** (0.12)	-1.572*** (0.12)	-1.394*** (0.15)	-1.695*** (0.13)
Nurse Practitioner	-1.258*** (0.17)	-1.525*** (0.15)	-1.547*** (0.15)	-1.798*** (0.15)	-1.173*** (0.16)	-1.307*** (0.14)	-1.279*** (0.17)	-1.708*** (0.13)
Physician Assistant	-1.314*** (0.19)	-1.765*** (0.21)	-1.755*** (0.21)	-1.919*** (0.22)	-1.180*** (0.16)	-1.385*** (0.15)	-1.445*** (0.17)	-2.017*** (0.15)
Dentist	-0.804*** (0.14)	-1.081*** (0.12)	-1.122*** (0.12)	-1.216*** (0.12)	-0.700*** (0.14)	-0.972*** (0.12)	-0.709*** (0.14)	-0.938*** (0.14)
Constant	2.458 (1.52)	5.774*** (1.23)	5.175*** (1.40)	5.044*** (1.72)	2.180 (1.70)	4.231** (1.76)	4.018** (1.83)	3.502* (1.90)
Observations	8,043	7,458	7,002	6,303	8,043	7,458	7,002	6,303

**Table A.2: Logistic Regressions of the Probability of Retention in the Same or Any I/T/U Site Including IHS and NHSC Program Participants**

	Same I/T/U Site				Any I/T/U Site			
	1 Year	2 Years	3 Years	4 Years	1 Year	2 Years	3 Years	4 Years
IHS Participant	-0.320*	-1.205***	-2.140***	-3.242***	-0.321*	-1.671***	-2.728***	-4.072***
	(0.17)	(0.20)	(0.22)	(0.30)	(0.19)	(0.22)	(0.28)	(0.43)
NHSC Participant	-3.528***	-3.488***	-3.290***	-4.342***	-3.861***	-3.999***	-3.831***	-5.432***
	(0.35)	(0.41)	(0.43)	(1.09)	(0.34)	(0.43)	(0.45)	(1.11)
Unemployment Rate	-0.031	-0.090***	-0.090**	-0.142***	-0.045	-0.070*	-0.051	-0.104*
	(0.03)	(0.02)	(0.04)	(0.05)	(0.03)	(0.04)	(0.04)	(0.06)
Median Household Income (in \$1000s)	-0.017*	-0.018**	-0.019*	-0.022**	-0.022**	-0.016	-0.018**	-0.025**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Percent High School Graduates	-0.005	-0.045***	-0.039**	-0.040**	0.002	-0.030	-0.027	-0.021
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Percent Over 65	0.027	0.049***	0.039**	0.055***	0.041*	0.060***	0.055**	0.087***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Percent Minority	0.015***	0.010***	0.008**	0.017***	0.023***	0.027***	0.021***	0.029***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
County Population (in 1,000s)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Physician	-1.628***	-1.808***	-1.879***	-2.053***	-1.557***	-1.549***	-1.375***	-1.692***
	(0.14)	(0.15)	(0.15)	(0.15)	(0.12)	(0.12)	(0.15)	(0.13)
Nurse Practitioner	-1.249***	-1.520***	-1.545***	-1.797***	-1.160***	-1.298***	-1.271***	-1.706***
	(0.17)	(0.15)	(0.15)	(0.15)	(0.15)	(0.14)	(0.17)	(0.13)
Physician Assistant	-1.293***	-1.753***	-1.748***	-1.918***	-1.152***	-1.369***	-1.432***	-2.014***
	(0.19)	(0.21)	(0.21)	(0.22)	(0.17)	(0.15)	(0.17)	(0.15)
Dentist	-0.770***	-1.059***	-1.109***	-1.213***	-0.655***	-0.940***	-0.686***	-0.932***
	(0.14)	(0.12)	(0.12)	(0.12)	(0.14)	(0.12)	(0.15)	(0.14)
Constant	2.255	5.692***	5.114***	5.031***	1.926	4.135**	3.945**	3.485*
	(1.51)	(1.22)	(1.40)	(1.72)	(1.68)	(1.75)	(1.80)	(1.89)
Observations	8,250	7,609	7,133	6,365	8,250	7,609	7,133	6,365