

Supplementary Online Content

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eAppendix 1. Sample frame

eAppendix 2. Audit call scripts and flow charts

eAppendix 3. Clinics excluded owing to administrative barriers

This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix 1. Sample Frame

SK&A's database of physicians has over 740,000 office-based physicians. Every entry is telephone-verified every six months and updated monthly. This Appendix provides additional information on the quality of the SK&A database which formed the sampling frame. The primary commercial purpose of the dataset is to support pharmaceutical marketing activities, although it has been used in several other studies on healthcare workforce and organizational structure¹. It includes a record for each physician including the physicians specialty and characteristics of the office where the physician sees patients including the office name, address, and phone number. We use the included specialty code for each physician to identify primary care providers as those in Family Medicine, General Practice, and Internal Medicine without sub-specialization. We use the office address and phone number to identify the office of practice.

In addition to the internal validation that SK&A conducts (offices are contacted every 6 months), we sought to validate the dataset for use in this study in two ways. We first confirmed that physicians included in the SK&A database were practicing physicians by matching it to the AMA Masterfile. Next, we used the database of National Provider Indices (NPIs) in the National Plan and Provider Enumeration System (NPPES) to ascertain whether providers were systematically excluded from the SK&A database.

Given the expense of the AMA Masterfile, this validation was done in a single state: Iowa. There were 1,533 primary care providers in Iowa in SK&A, and 1,452 in the AMA Masterfile. 90% of the SK&A physicians matched to the AMA through some combination of name, date-of-birth, and county of residence. Those that did not were predominantly in counties bordering other states. Because the AMA Masterfile addresses are primarily home addresses whereas the SK&A database is exclusively work addresses, these are presumably physicians who live in Iowa but work in neighboring states. The other observed pattern of physicians present in the AMA but without a corresponding entry in the SK&A database was that of age: the AMA database appears to be faster at picking up newly-graduated physicians when they finish their training.

Because the NPI dataset has addresses of office location, unlike most AMA records, it offers an alternative to the SK&A for identifying the full scope of physician offices with PCPs. The NPI is believed to be comprehensive (since an NPI is necessary to bill CMS, although individual providers can bill under a practice's NPI). We tested whether using it to identify primary care offices that might be missing from SK&A. Within the NPI dataset we first attempted to remove out-of-scope physicians. First, we excluded post-graduate trainees and those without a license in the state of interest through identification of these cases by their license numbers. We also excluded non-PCPs. NPI was then linked to SK&A based on NPI number.

Among the unlinked physicians, we consolidated them into physician offices to identify those physician offices that were missing from the SK&A data. For the purpose of this study, a physician office is a unique address and phone combination. Those NPI physicians in locations not listed on the SK&A were added to the office-based sample frame. We called 290 unique "offices" identified through the NPI and the 886 offices from the SK&A. At first it seemed that

1 <http://content.healthaffairs.org/content/32/10/1781.short>
<http://onlinelibrary.wiley.com/doi/10.1111/jrh.12050/full>
<http://onlinelibrary.wiley.com/doi/10.1002/chp.20043/abstract>

the SK&A might have missed 25% of eligible physician offices, but we verified the information by calling every office. Only 21% of NPI entries that were called were eligible to be in the sampling frame, as compared to 86% eligibility of SK&A entries. Thus we determined that the SK&A sample frame missed only 7.4% of eligible offices.

Amongst those eligible, there was no substantial or significant difference in the observable characteristics (T-statistic was .95 for rural counties and .30 for income of county). Thus including the NPI supplement resulted in an extra 61 clinics in Iowa who received audit calls. Among these calls, appointment availability did not differ to any meaningful degree, as the table demonstrates.

Insurance type	NPI	SKA
Commercial	1.00 (n=27)	0.88 (n=361)
Public	0.82 (n=28)	0.73 (n=351)
None	0.33 (n=6)	0.18 (n=50)

Table: Comparison of NPI to SKA appointment availability

Therefore, SK&A was used as the sampling frame for this study.

Federally-Qualified Health Center coverage

Although we were comfortable with the completeness of the SK&A sample frame from the previous analysis, we did an additional check for the completeness of the sample from for Federally Qualified Health Centers (FQHC) because of the focus on Medicaid and the uninsured. To assess whether any Federally Qualified Health Centers were missed in our frame, we used the list of "Community Health Centers" within the Commonwealth of Massachusetts and matched this list to the SK&A by name, address, and/or phone number. We called each one of the 57 not already in the SK&A list to assess whether it was in the sampling frame or not. Most on the list were not in the sample frame, but ultimately we found FQHCs in Massachusetts were missing from the SK&A list at rates no higher than that of non-FQHC primary care clinics—approximately 10%. If the situation in Massachusetts is representative of the situation in the rest of the country, FQHCs are treated no differently than other primary care clinics in our sampling frame, and are thus adequately represented.

Medicaid plan acceptance

In most states Medicaid has moved towards a model of limited networks of physicians in an effort to lower costs. Our study design therefore called for making Medicaid audit calls only to those physician offices with a Medicaid managed care contract. We used a two-step approach to identify whether an office was in a Medicaid managed care network.

In our first step, we utilized data from the preliminary "call-through" survey. During this call-through, we asked the office scheduler "Which Medicaid plans are accepted at your location? For example, do you take Medicaid through..." What followed was a pre-populated list of Medicaid managed care plans accepted in the county of the physician office (obtained from HealthLeaders InterStudy). As soon as the office scheduler mentioned a plan name, we did not read any more plan names from the list. If we got to the end of the list without an affirmative

response, we asked “something else?” From this question we identified both a plan name for the audit call and the particular offices that had a Medicaid managed care contract.

A second step was added because this first step was found insufficient for two reasons. First, while 53% provided a plan name, 11% said they did not know and another 3.5% refused to answer (3.5%). Another 31% indicated they were certain they did not take any Medicaid managed care plans. Second, the rate at which offices were certain they took none of the plans offered in the call-through was alarmingly high in states where PCCM predominates.

In the second step we identify all lists of providers for both MMC and PCCM plans and match them to our offices, as described in the section “Network list matching process” below. Having matched the network provider lists to our clinic database, we supplemented the list of self-reported Medicaid providers obtained in the call-through in the first step as follows. For PCCM, we added all clinics identified via a state-provided PCCM provider list: 127 clinics in Arkansas, 99 in Illinois, 52 in Montana, and 21 in Pennsylvania. For MMC, we added clinics identified as Medicaid providers via the list matching process only where the respondent in the call-through did not know or refused to answer when asked if they accepted particular plans: 27 clinics in Georgia, 27 in Illinois, 120 in Massachusetts, 42 in New Jersey, 32 in Oregon, 32 in Pennsylvania, and 41 in Texas.

Sensitivity analysis around these choices indicated that the inclusion resulted in an 8 percentage point deviation in Texas, a 7 percentage point deviation in Georgia, a 4 percentage point deviation in New Jersey, and 2 percentage points or less in other states.

	Appointment rate (without list)	Appointment rate (with list)	Appointment rate (list only)
AR	49%	49%	N/A
GA	68%	63%	10%
IA	69%	69%	N/A
IL	59%	58%	39%
MA	52%	50%	32%
MT	77%	77%	N/A
NJ	69%	65%	35%
OR	37%	35%	10%
PA	51%	49%	20%
TX	60%	52%	6%
Total	58%	55%	20%

Table: Sensitivity of Medicaid appointment rates to source of Medicaid network information

Network list matching process

In the insurer list matching process, lists of insurers providing Medicaid Managed Care were first identified through state insurance regulators. We then systematically located the list of in-network physicians that each insurer provided to its customers. Of the 90 MMC insurer lists to be located, we located and encoded 83 via PDF-scraping and web-scraping. Of the 7 which

could not be located, 2 were PCCM. The encoded physician lists were then matched to our list of physician offices.

The same physician office might have multiple addresses (for instance, a billing address might be on a side street, whereas patients were told to go in the main office entrance around the corner) or variations in how the address was spelled. Consequently, to match a physician address of an insurer network list to a physician office address in our sampling frame, we geocoded all addresses and considered a clinic address to be the same if it fell within a radius of 11 meters. The number of clinics considered to be a match was not sensitive to a wide range of radii chosen. Clinics from the two lists were considered a match if they had identical location, suite number (when available), and phone numbers.

eAppendix 2. Audit Call Scripts And Flow Charts

1. GENERAL APPOINTMENT: **Hi, I want to schedule a check-up with {PCP NAME}.**

- **I'm new to the area.**
- **I haven't seen a doctor for a couple of years.**
- **I'm looking for somebody to be my regular doctor.**
- **I'm feeling fine now, but I haven't had a check up in a few years and want to get one.**

2. URGENT CONDITION APPOINTMENT: **Hi, I think I might have high blood pressure, so I need to have it checked and get set up with a regular doctor. [WHEN ASKED IF SEEN THERE BEFORE, SAY, No. Can I get an appointment with {PCP NAME}]?**

BACKSTORY A: I got a high blood pressure reading from a pharmacy machine and they told me I should have my regular doctor check it. They told me it was pretty high. I don't have a regular doctor, and I would like to get set up with {PCP NAME} if possible.

BACKSTORY B: I went to this school health fair and got a pretty high blood pressure reading. I don't have a regular doctor, so I need to get one and get this checked. I was looking for {PCP NAME}.

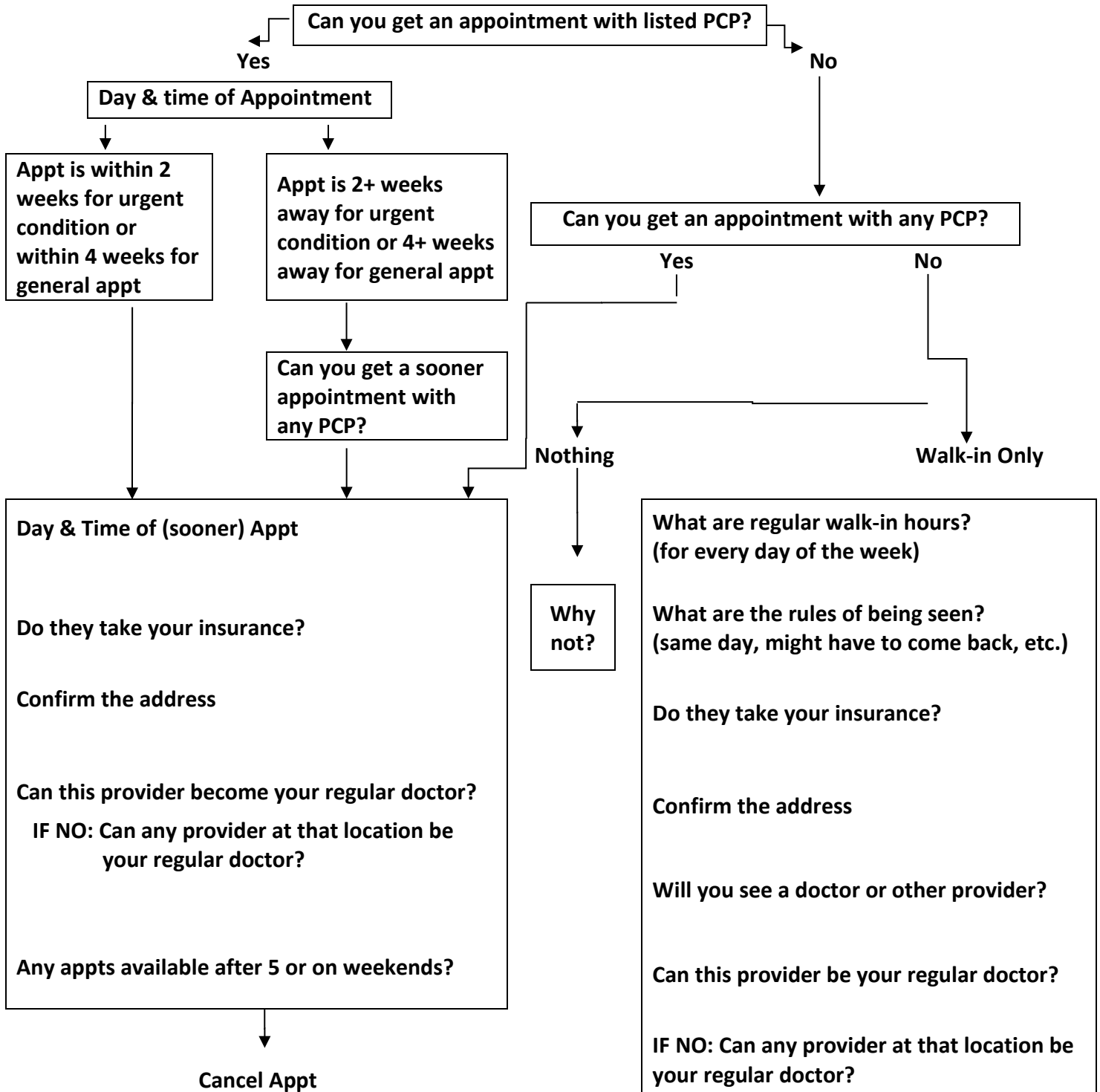
- I don't remember exactly what the reading was – maybe 200 over 100 something. They told me it was pretty high and I should have it checked soon.
- I haven't seen a doctor for a couple of years.
- Both my parents and my [sister/brother] have high blood pressure.
- **IF ASKED IF YOU HAVE OTHER SYMPTOMS:** No, I feel fine otherwise.
- I'm not on any medications.

IT IS EXTREMELY IMPORTANT TO CANCEL ALL APPOINTMENTS IMMEDIATELY!

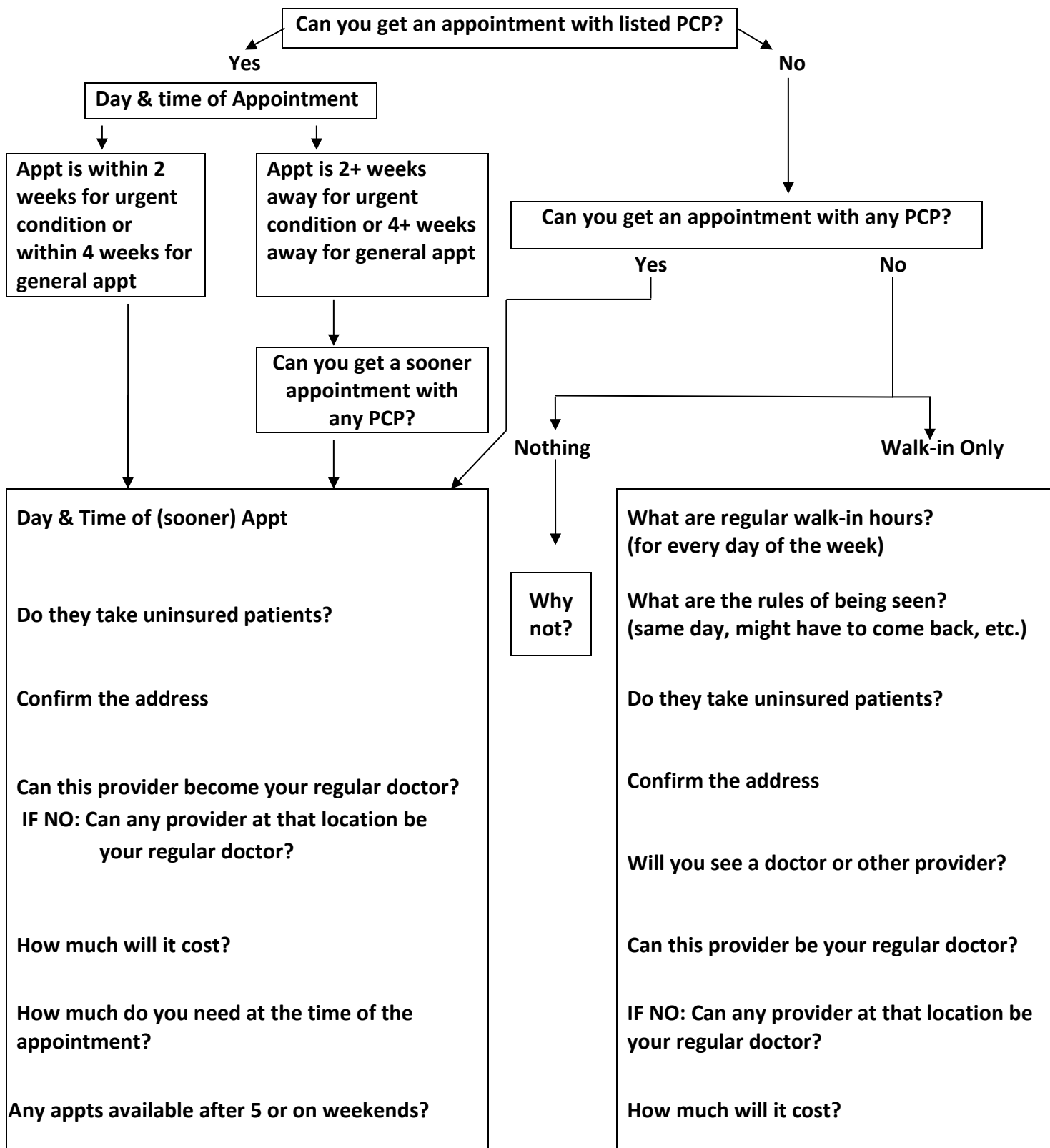
IF YOU ARE SUCCESSFUL IN GETTING A DATE/TIME, BE SURE THIS IS NOT BEING HELD FOR YOU BEFORE GETTING OFF THE PHONE.

IF YOU ARE UNABLE TO CANCEL AN APPOINTMENT BEFORE GETTING OFF THE PHONE, CALL RIGHT BACK AND CANCEL.

Private Insurance and Medicaid Flow Chart



Uninsured Flow Chart



Cancel Appt

How much do you need at the time of the appointment?

eAppendix 3. Clinics Excluded Owing to Administrative Barriers

Fraction of Audit Calls in each state by insurance status excluded because of administrative barriers

	Private	Medicaid	Cash
AR	18%	19%	14%
GA	7%	10%	9%
IA	12%	14%	9%
IL	8%	10%	5%
MA	17%	19%	12%
MT	14%	8%	11%
NJ	5%	7%	6%
OR	18%	21%	12%
PA	14%	13%	15%
TX	6%	9%	8%
Total	12%	13%	10%