Provider Analysis Methodology

August 12, 2008

Introduction

Purpose

Explanation of processes and methodologies used in the CareFirst BlueCross BlueShield (CareFirst) and CareFirst BlueChoice, Inc. (CareFirst BlueChoice) Provider Analysis Report Cards for 27 Peer Group Specialties that are identified in the specialty to peer group map in the appendix of this document.

Background

CareFirst and CareFirst BlueChoice provider profiling program includes specific methodological considerations to achieve the goal of analyzing provider practices to compare patterns and assess performance. Considerations include analysis level, provider accountability, risk adjustment, calculation of costs and comparison groups.

In this document

This document contains the following topics.

** MedStat Advantage Suite is a registered trademark of Thomson MedStat.*

MedStat Advantage Suite®*

Introduction

MedStat Advantage Suite® is a medical decision support system comprised of an integrated data warehouse of medical claims data, eligibility information, provider information and performance measures.

Background

MedStat Advantage Suite® uses advanced data models that integrate multiple sources of information, then groups medical claims into clinically similar, severity stratified episodes of care. Case-mix and clinically-based severity adjustment methods are applied to ensure fair and equitable comparisons across conditions and treatment programs between practices.

Claims Data

Claims Data are currently being pulled into *MedStat Advantage Suite*® on a monthly basis from the following systems:

- Flexx (DC-based business)
- CARE (Maryland-based business)
- NASCO
- FEP
- LabCorp Encounter Data

Claim types within *MedStat Advantage Suite*® include but are not limited to:

- Inpatient
- Outpatient (including office visits)
- Durable Medical Equipment
- Laboratory
- Radiology

All Lines of Business are included for the purposes of the provider analysis.

Note: While Pharmacy claims are pulled into Advantage Suite, they are not included in the provider analysis used to generate report cards.

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MedStat Advantage Suite®, Continued

Eligibility Data

Membership data are currently being pulled into *MedStat Advantage Suite*® on a monthly basis from the following systems:

- EAB (Maryland business)
- FACETS (DC business)
- FEP
- NASCO MD & DC

Provider Data

Provider information is being pulled on a monthly basis from the following systems:

- PA&R (DC provider)
- PIMS (Maryland provider)

Exclusions

The following information is not a part of *MedStat Advantage Suite*®:

- Eligibility – Catastrophic Members with Catastrophic Coverage only
- Eligibility – BlueCard® Host Members (Members with other Blues Plans using medical services in our service area)
- Claims – Fully denied and denied rows of partially denied claims (F2 claims).
- Claims – Claims for members with Catastrophic coverage only.
- Claims – BlueCard® Host Claims (Note: All Home claims are included)
- All duplicates between NASCO MD and NASCO DC (claims are processed in both systems.)

Provider Analysis Background

Background

In 1992, CareFirst and CareFirst BlueChoice began using profiling data to evaluate performance of providers in the DC plan.

- System used 350 different measures and a series of weighted averages to arrive at a single score.
- There was no user access to the data, only final summary report of providers and their scores and a report card.
- Report card showed each provider their score, peer comparison in aggregate and their score for approximately 30 measures.

Issues included:

- It was not possible to tell how scores were calculated.
- Information on reports was not actionable, and measures to improve provider performance were not identified.

In December 1998, CareFirst and CareFirst BlueChoice began to develop a list of desirable attributes for both a system and a partner company.

- January 1999, began soliciting marketing materials from known vendors.
- Utilized GartnerGroup, a company that had completed an extensive analysis of this market, the Blue Cross Blue Shield Association who was compiling information on this market and Blue Cross Blue Shield of Delaware, who had just completed a selection process for provider profiling.
- February 1999 – issued a request for information (RFI) resulting in 5 vendors presenting a demonstration.
- March 1999 – issued a request for proposal (RFP) to the 5 vendors, 4 were invited for full day demonstrations.
- April 1999 – Each vendor was given a specific format for their demo and given a set of reporting requirements to meet. *MedStat Advantage Suite*® was recommended by the CareFirst and CareFirst BlueChoice workgroup.
- May 1999 – CareFirst and CareFirst BlueChoice obtained external validation of the selection process and the vendor was chosen. Reference checks were conducted with BCBS Arizona, BCBS Michigan, BCBS Massachusetts and Highmark BCBS.
- May 2000 – *MedStat Advantage Suite*® was the product selected.

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Provider Analysis Background

Analysis Level

Analysis reports and corresponding scores are completed at the practice level, rather than for each individual physician for the following reasons:

- Contracting and network selection are performed at practice level.
- Difficult to assign responsibility to individual physicians within group practice.
- Patients may be seen and treated by multiple physicians within a group.
- Data analysis at the practice level creates larger sample sizes, allowing for statistically meaningful results.

Provider Accountability

Provider analysis includes both primary care practices (Family Practice, Internal Medicine and Pediatrician) and non-primary care specialties. An aggregate of all claims for individual patients pertaining to specific conditions are placed into unique "episodes" (see page 6). Each episode can then be assigned to a practice. Creation of episodes allows for comparison of practice patterns across patients with similar clinical conditions.

Each episode is assigned to the practice with the highest sum of total Relative Value Units (RVU's), excluding anesthesiology, radiology and pathology, during the episode of care. This will be the practice with the greatest volume of activity for the episode.

Note: To be included in the analysis, practices must have a minimum of 30 episodes of care during a one year time period.

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Provider Analysis Background, Continued

Peer Groups

CareFirst and CareFirst BlueChoice recognizes different specialties have different practice patterns and should be compared to their "peers" or providers in the same specialty, rather than averages across all specialties.

Multiple specialty groups are divided into individual peer specialty for analysis. For example, a practice that consists of Family Practice, Internal Medicine and Pediatrics will be divided into three separate peer specialties for reporting purposes.

In addition, this methodology requires us to group some smaller specialties, e.g. pediatric cardiology into larger peer groups in order to improve statistical validity. In this example, pediatric cardiology would be placed into Cardiovascular Disease/Cardiology.

Practices which are contracted as "Multispecialty" (with no specific specialties defined) are not currently included in the provider analysis.

Note: See Appendices for Peer Group Specialty Map.

Episodes

A component of *MedStat Advantage Suite*® is Medical Episode Groups (MEGs). MEGs create clinically meaningful episodes of care such as heart failure or diabetes. Episodes are based on a peer reviewed disease staging model and are constructed by grouping related claims using diagnoses that appear on the claim record.

A patient may have one or more episodes during the time period being analyzed. Some patients may have no episodes during this timeframe.

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Provider Analysis Background, Continued

Episodes (continued)

Every episode is assigned to a Primary Practice. They are assigned to the Practice with the highest sum of total RVU's (excluding anesthesiology, radiology and pathology) during the episode of care. This will be the practice with the greatest volume of activity for the episode.

In order to avoid a practice being unfairly penalized for a single catastrophic episode, CareFirst is excluding episodes that are beyond the normal range of cost for a particular episode.

- Episodes costing less than 1/15 of the average cost for that episode/severity combination.
- Episodes costing more than 15 times the average cost for that episode/severity combination.

Measures

Six performance measures are used to evaluate physician practice performance:

- Cost Per Episode
- Office Visits Per 100 Episodes
- ER Visits Per 100 Episodes
- Admissions Per 100 Episodes
- Laboratory Services Per 100 Episodes
- Radiology Services Per 100 Episodes

The metrics reported for each of these 6 measures are:

- Actual Performance
- Expected Performance
- Ratio (Actual Performance divided by Expected Performance)
- Z Score (A statistical measure of the distance in standard deviations from a performance ratio of 1)

Note: The overall score on the report card uses the metrics related to Cost Per Episode.

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Provider Analysis Background, Continued

Calculation of Costs

Claims data include a variety of cost variables, such as amounts charged by the provider and amounts allowed by the plan. In order to adjust for differences in fee schedules across the CareFirst and CareFirst BlueChoice networks and products, a normalized professional fee schedule has been applied to the services rendered, using a PPO fee schedule. This helps reduce differences in "costs" that may be attributable to differences in payment schedules and produces a more accurate measurement of resource use.

Claim Type	Ambulatory	Admit
Professional	Allowed amount (Normalized Fee schedule)	Net Paid
Facility	Allowed amount (Non-Normalized)	Net Paid

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Provider Analysis Background, Continued

Risk Adjustment

CareFirst and CareFirst BlueChoice recognize that some practices treat more severe episodes and more comorbidities than others. In order to perform valid comparisons, CareFirst and CareFirst BlueChoice adjust for the mix of episodes in each practice, and the illness burden of the patient, as measured by DxCG's relative risk score (RRS)[1]. Performance measures, previously defined above, are risk adjusted using the following process.

- Case-mix adjustment is completed using the episode, disease stage and range of RRS within the peer group specialty.
- The actual average peer cost at each episode/severity/RRS range combination is compared to the overall average cost.
- The expected value of each episode/severity/RRS range combination is calculated.
- The expected values are aggregated within a practice to give the total expected practice cost.
- Expected practice cost per episode is what a practice cost per episode would be if they performed exactly as average for their peer group for their mix of episodes and RRS ranges. Total expected practice cost is then divided by the number of practice episodes to give the expected practice cost per episode.
- A practice performance ratio is then calculated using the actual practice cost per episode and the expected practice cost per episode.
- Actual practice cost per episode is the total cost per practice of all episodes divided by the total number of episodes for that practice.

Note: See Appendices for example of the Risk Adjustment Methodology. Below are the steps used in the example.

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[1] DxCG Relative Risk Score (RRS) is a measure of a patient's illness burden. It is based on 12 months of claims experience for a member and is designed for predictive modeling.

Provider Analysis Background, Continued

Below are the steps used in the example located in the Appendix.

Step	Description	Action
1	Calculating Actual Peer Cost Per Episode	Actual Peer Cost Per Episode = *TotalPeerCost* ÷ *NumberofPeerEpisodes*
2	Calculating Average Cost Peer Episode Severity RRS Combination	Average Cost Peer Episode Severity combination = *TotalCostPeerEpisodeSeverityRRSrangeCombo* ÷ *TotalNumberPeerEpisodeSeverityRRSrangeCombo*
3	Calculating Expected Value Per Episode Severity RRS Combination in Each Practice	Within each practice: 1 Expected Value = *NumberofpracticeEpisodes* × *AvgCostPeerEpisodeSeverityRRSrangeCombo* 2 Total Expected Practice Cost = Aggregate of the expected value across all episode severity RRS range combinations calculated in previous step. 3 Expected Practice Cost per Episode = *TotalExpectedpracticeCost* ÷ *NumberofpracticeEpisodes*
4	Comparison of Actual to Expected	Performance Ratio = *ActualpracticeCostPerEpisode* ÷ *ExpectedpracticeCostPerEpisode*

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Provider Analysis Background, Continued

Practice Comparison

Once the performance ratios are calculated for each practice, they are compared to assess efficiency.

- The performance ratios are weighted by practice volume.
- Determine how much practice performance deviates from expected. This is calculated using the weighted z-scores.
- The weighted Z-scores for each practice are numerically ranked.

Weighting of Practices

Each practice is weighted based on the volume of episodes the practice represented relative to the average of the peer group. This ensures that one or two high volume practices are not over represented in the peer group norms.

Step	Action
1	Step 1 is to determine the average number of episodes per practice within a peer group: Average Number Episode Per Practice = $NumberofPeerEpisodes \div NumberofpracticesWithinPeer$
2	For each practice, a weight(w) is calculated as follows: $w = NumberofpracticeEpisodes \div AveEpisodesPerpractice$
3	The weighted sum and weighted sum of squares are calculated for each of the 6 performance measure ratios referenced previously in Measures.
4	The weighted sum of each performance ratio is calculated as a sum across all practices of the ratio multiplied by the weight (w) in Step 2. • $WeightedCostSum = Sum(CostRatio \times w)$
5	The weighted cost sum of squares is the sum across all practices of the performance ratio squared multiplied by the weight (w): • $WeightedCostSumSq = Sum(CostRatio \times CostRatio \times w)$
6	The weighted sums and weighted sum of squares are used to calculate the weighted standard deviation that, in turn, is used as a component of the adjusted Z-score calculation.

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Provider Analysis Background, Continued

Statistical Calculations: Standard Deviations

The weighted Standard Deviation is calculated for each of the 6 performance ratios. This calculation is derived from the weighted sum and weighted sum of squares that were calculated for each performance ratio in the Weighting of Practices (see previous page).

Step	Action
Standard Deviations	(w)Cost Standard Deviation $= \sqrt{\frac{WeightedCostSumsq - \frac{WeightedCostSum * WeightedCostSum}{NumberofpracticesWithinPeer}}{NumberofpracticesWithinPeer - 1}}$ Where WeightedCostSumsq and WeightedCostSum are as defined in steps 4 and 5 on the previous section.

Statistical Calculations: Weighted Z-Scores

A weighted Z-Score is calculated and then weighted by the square root of the weight (w). This weighting takes into consideration the size of the particular practice within a peer specialty. The weighted Z-score uses the weighted standard deviation calculated above, to measure how many standard deviations a practice performance ratio is from 1.

Note: 1 means the practice's actual value is equal to their expected value.

Step	Action
Weighted Z-Score	Weighted Cost Z Score = $\left(\frac{CostRatio - 1}{WeightedCostStd}\right)\sqrt{w}$

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Provider Analysis Background, Continued

Statistical Ranking

Ranking of Z-Scores:

Weighted Z-scores are numerically ranked and a practice is given a rank relative to their peer group, e.g. 213 out of 372 total practices within peer.

Any practices that have the same weighted Z-score will be given the same numerical rank.

Episode Mix Index

The Episode Mix Index is calculated using the overall expected practice cost per episode and the average cost per episode for the practice peer group.

$$\text{Episode Mix Index} = \frac{ExpectedpracticeCostPerEpis}{ActualPeerCostPerEpisode}$$

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Appendices

Adjustment Methodology Example

Calculating Internal Medicine Factors

Average Cost per Episode	
Episode and Severity Level	Total
Asthma with Complication, Asthma with respiratory failure, RRS range 0 to 50	**$6,798**
Asthma with Complication, Asthma with shock,	$2,867
Asthma with Complication, Status asthmaticus or severe asthma	$584
Asthma, Chronic Maintenance, Mild intermittent bronchial asthma	$1,308
Diabetes Mellitus Type 1 Maintenance, Diabetes mellitus type 1	$375
Diabetes Mellitus Type 1 Maintenance, Symptomatic diabetes mellitus type 1	$655
Diabetes Mellitus Type 2 Maintenance, Impaired glucose tolerance	$187
Diabetes Mellitus Type 2 Maintenance, Symptomatic diabetes mellitus type 2	$470
Diabetes Mellitus with Complications, Diabetes mellitus with acute cerebral vascular accident	$3,037
Diabetes Mellitus with Complications, Diabetes mellitus with acute myocardial infarction	$2,843
Diabetes Mellitus with Complications, Diabetes mellitus with cellulitis	$7,804
Diabetes Mellitus with Complications, Diabetes mellitus with coma	$4,705
Diabetes Mellitus with Complications, Diabetes mellitus with gangrenous infection	$6,876
Diabetes Mellitus with Complications, Diabetes mellitus with glomerulosclerosis	$175
Diabetes Mellitus with Complications, Diabetes mellitus with ketoacidosis	$1,641
Diabetes Mellitus with Complications, Diabetes mellitus with neuropathy	$195
Diabetes Mellitus with Complications, Diabetes mellitus with pyelonephritis	$4,710
Diabetes Mellitus with Complications, Diabetes mellitus with renal failure	$8,763
Diabetes Mellitus with Complications, Diabetes mellitus with retinopathy	$175
Grand Total	**$2,606**

2. The average cost per episode of Asthma with Respiratory Failure with RRS ranging from 0 to 50 managed by Internal Medicine providers is **$6,798.**

1. The average cost per episode of ALL episodes managed by ALL Internal Medicine Providers is **$2,606.**

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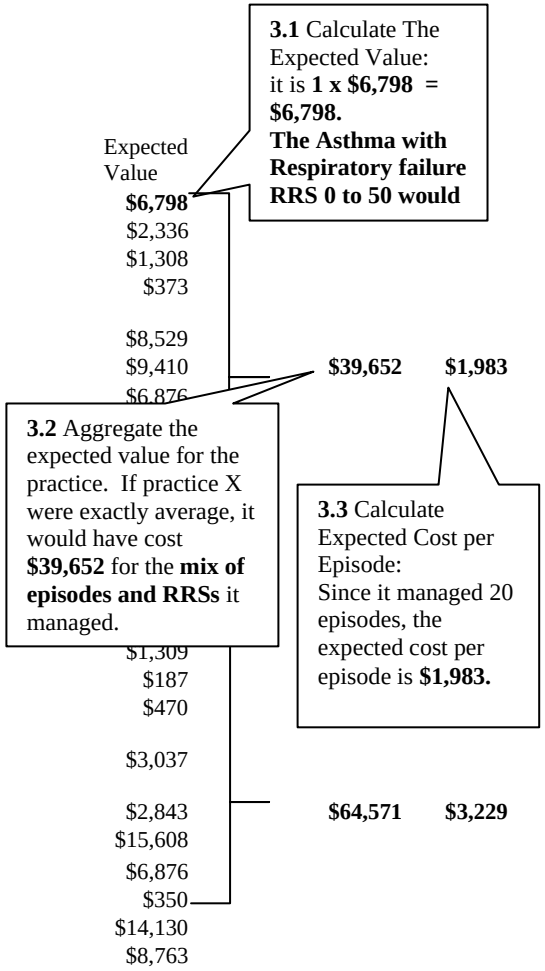
Appendices, Continued

Adjustment Methodology Example (continued)

Applying Factors		Data	
Practice	Episode and Severity Level	Count of Episodes	Total Actual Cost
Practice X	Asthma with Complication, Asthma with respiratory failure RRS 0 to 50	**1**	$7,854
	Asthma with Complication, Status asthmaticus or severe asthma	4	$2,358
	Asthma, Chronic Maintenance, Mild intermittent bronchial asthma	1	$1,308
	Diabetes Mellitus Type 2 Maintenance, Impaired glucose tolerance	2	$385
	Diabetes Mellitus with Complications, Diabetes mellitus with acute myocardial infarction	3	$8,619
	Diabetes Mellitus with Complications, Diabetes mellitus with coma	2	$9,410
	Diabetes Mellitus with Complications, Diabetes mellitus with gangrenous infection	1	$6,927
	Diabetes Mellitus with Complications, Diabetes mellitus with ketoacidosis	2	$3,281
	Diabetes Mellitus with Complications, Diabetes mellitus with neuropathy	2	$389
	Diabetes Mellitus with Complications, Diabetes mellitus with retinopathy	2	$350
Practice X Total		20	$40,881
Practice Y	Asthma with Complication, Asthma with respiratory failure	1	$5,741
	Asthma with Complication, Asthma with shock	1	$2,867
	Asthma with Complication, Status asthmaticus or severe asthma	1	$563
	Diabetes Mellitus Type 1 Maintenance, Diabetes mellitus type 1	2	$751
	Diabetes Mellitus Type 1 Maintenance, Symptomatic diabetes mellitus type 1	2	$1,309
	Diabetes Mellitus Type 2 Maintenance, Impaired glucose tolerance	1	$175
	Diabetes Mellitus Type 2 Maintenance, Symptomatic diabetes mellitus type 2	1	$470
	Diabetes Mellitus with Complications, Diabetes mellitus with acute cerebral vascular accident	1	$3,037
	Diabetes Mellitus with Complications, Diabetes mellitus with acute myocardial infarction	1	$2,754
	Diabetes Mellitus with Complications, Diabetes mellitus with cellulitis	2	$15,608
	Diabetes Mellitus with Complications, Diabetes mellitus with gangrenous infection	1	$6,825
	Diabetes Mellitus with Complications, Diabetes mellitus with glomerulosclerosis	2	$350
	Diabetes Mellitus with Complications, Diabetes mellitus with pyelonephritis	3	$14,130
	Diabetes Mellitus with Complications, Diabetes mellitus with renal failure	1	$8,763
Practice Y Total		20	$63,342
Grand Total		40	$104,223



Appendices, Continued

Adjustment Methodology Example (continued)

	Comparing Actual to Expected		
	Cost Per Episode		
Practice	Actual	Expected	Ratio
Practice X	$2,044	$1,983	1.03
Practice Y	$3,167	$3,229	0.98
Overall	$2,606	$2,606	

4. Calculate the Performance Ratio:
Actual/Expected. In this case, practice X's cost per episode is **1.03** times what an average practice would have managing the same episodes.

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Appendices, Continued

Specialty Map Map of specialty to peer group.

Specialty Code	description	Peer Group Specialty Code	description
004	Allergy	230	Allergy & Immunology
005	Allergy Pediatric	230	Allergy & Immunology
015	Cardiac Electrophysiology	250	Cardiovascular Disease/Cardiology
017	Cardiology Pediatric	250	Cardiovascular Disease/Cardiology
018	Cardiovascular Disease	250	Cardiovascular Disease/Cardiology
024	Colon and Rectal Surgery	510	Colon & Rectal Surgery
029	Dermatology	215	Dermatology
030	Dermatopathology	215	Dermatology
036	Endocrinology	270	Endocrinology & Metabolism
037	Endocrinology Pediatric	270	Endocrinology & Metabolism
039	Family Practice	240	Family Practice (General Practice)
040	Family Practice and Geriatric Medicine	240	Family Practice (General Practice)
041	Gastroenterology	275	Gastroenterology
042	Gastroenterology Pediatric	275	Gastroenterology
043	General Practice	240	Family Practice (General Practice)
046	Geriatrics	204	Internal Medicine (NEC)
047	Gynecologic Oncology	280	Hematology & Oncology
048	Gynecology	320	Obstetrics & Gynecology
049	Gynecology (Osteopath Only)	320	Obstetrics & Gynecology
052	Hematology	280	Hematology & Oncology
058	Immunology	230	Allergy & Immunology
059	Immunology Diagnostic and Dermatological	230	Allergy & Immunology
060	Immunology Pediatric	230	Allergy & Immunology
061	Infectious Disease	285	Infectious Disease
062	Infertility	320	Obstetrics & Gynecology
063	Internal Medicine	204	Internal Medicine (NEC)
074	Maternal & Fetal Medicine	320	Obstetrics & Gynecology
080	Multispecialty	206	Multispecialty
083	Nephrology	290	Nephrology
084	Nephrology Pediatric	290	Nephrology
085	Neurology	260	Neurology
086	Neurology Pediatric	260	Neurology
087	Neurophysiology Clinical	260	Neurology
088	Neurosurgery	520	Neurological Surgery
096	Ob/Gyn and Critical Care Medicine	320	Obstetrics & Gynecology
097	Obstetrics	320	Obstetrics & Gynecology
098	Obstetrics (Osteopath Only)	320	Obstetrics & Gynecology
099	Obstetrics and Gynecology	320	Obstetrics & Gynecology
103	Oncology	280	Hematology & Oncology
104	Oncology Pediatric Hematology	280	Hematology & Oncology

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Appendices, Continued

Specialty Map (continued)

Specialty Code	description	Peer Group Specialty Code	description
105	Ophthalmology	330	Ophthalmology
107	Ophthalmology Pediatric	330	Ophthalmology
114	Otolaryngology	340	Otolaryngology
115	Outpatient Surgery	500	Surgeon (NEC)
130	Pediatrics	400	Pediatrician (NEC)
133	Peripheral Vascular Disease and Surgery (Osteopath Only)	500	Surgeon (NEC)
135	Physical Medicine and Rehabilitation	350	Physical Medicine and Rehabilitation
138	Podiatry and Surgical Chiropody	130	Podiatry
153	Pulmonary Disease	295	Pulmonary Disease
154	Pulmonary Disease, Pediatric	295	Pulmonary Disease
164	Reproductive Endocrinology	320	Obstetrics & Gynecology
166	Rheumatology	300	Rheumatology
167	Rheumatology Pediatric	300	Rheumatology
171	Sports Medicine Family Practice	240	Family Practice (General Practice)
172	Sports Medicine Internal	204	Internal Medicine (NEC)
175	Surgery Cardiovascular	500	Surgeon (NEC)
177	Surgery General	500	Surgeon (NEC)
178	Surgery Hand	530	Orthopaedic Surgery
179	Surgery Hand-Orthopedic	530	Orthopaedic Surgery
180	Surgery Hand-Plastic	530	Orthopaedic Surgery
181	Surgery Oral	525	Oral Surgeon
182	Surgery Orthopedic	530	Orthopaedic Surgery
183	Surgery Pediatric	500	Surgeon (NEC)
184	Surgery Plastic	355	Plastic Surgery
185	Surgery Thoracic	585	Thoracic Surgery
186	Surgery Vascular	500	Surgeon (NEC)
190	Urology	210	Urology
191	Urology Pediatric	210	Urology
196	Oncology Surgical	500	Surgeon (NEC)
197	Infectious Disease Pediatric	285	Infectious Disease
198	Surgery Pediatric Orthopedic	530	Orthopaedic Surgery
199	Vascular Disease	250	Cardiovascular Disease/Cardiology