

OVERVIEW AND METHODOLOGY OF THE VIRGINIA WORKERS' COMPENSATION MEDICAL FEE SCHEDULES

VIRGINIA WORKERS' COMPENSATION COMMISSION

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1. Executive Summary

Purpose and Scope

The Virginia Workers' Compensation Commission (the Commission) engaged Oliver Wyman Actuarial Consulting, Inc. (Oliver Wyman) to assist the Commission in the development of a set of medical fee schedules (MFS) as outlined in Title 65.2, Section 605 of the Code of Virginia. The law, which was passed by the General Assembly and signed by the Governor on March 7, 2016, specifies the utilization of a 10-member regulatory Advisory Panel to assist in the development of the MFS.

As prescribed in legislation, the MFS segment reimbursement for the provider community based on provider group (e.g., physician non-surgeon, surgeon, Type-One Teaching Hospitals, etc.). It also segments the reimbursement by six unique medical communities, which the law defines explicitly based on three digit ZIP Code.

Further, the law requires that the MFS produce overall reimbursements in the same category of providers in the same medical community that are equal to the amounts that were paid during calendar years 2014 and 2015. This revenue neutrality provision requires that the application of the resulting MFS produces the overall reimbursement observed in 2014 and 2015. The law addresses other requirements of the MFS, including maximum reimbursement, hospital outlier provisions, future adjustments to the MFS, reimbursement for new technology, and services which are to be excluded from the MFS.

The MFS are not explicitly developed to reflect resource use for each procedure, but rather they are intended to reflect average historical reimbursement rates. Specifically, the Commission and Advisory Panel stressed the need to recognize historical variation in reimbursement by provider groups, medical community, and where statistically credible, by individual procedure. As a result, there will be differences in rate relativities across medical communities and between certain provider groups, and these relationships will vary at the procedure level.

The data underlying the MFS include aggregate claims information supplied by the National Council on Compensation Insurance, Inc. (NCCI) that were collected through the medical data call, and claims supplied by Virginia's provider community. Although there were other suppliers of claims information (including self-insured organizations and third party administrators), the Commission, Advisory Panel, and Oliver Wyman elected to rely exclusively on data from NCCI and provider respondents. Our examination of the data considered claims accuracy, claims representativeness, and market representativeness.

With significant volumes of data underlying the MFS development, we applied a number of adjustments to ensure that the claims supported the requirements of the engagement.

- We removed certain services not reflected in the MFS (e.g., transportation reimbursement). As part of this first tier of adjustments, we also reclassified a number of claims that fell within NCCI-defined categories but were not consistent with the law's provider groups.

- We supplemented NCCI data for outpatient facilities and ambulatory surgical centers with claims supplied by the provider community. Some of NCCI's facility data lacked complete procedure codes, while revenue codes were largely consistent between data from NCCI and the providers. We allocated data from NCCI to procedure code using provider information.
- We introduced definitions of surgeon and physician non-surgeon based on the requirements of the law, guidance from the Advisory Panel, and the available taxonomy codes. Where claims appeared unique to physician non-surgeons, we grouped all corresponding claims for a sub-classification of procedures in order to support the MFS development.
- In response to concerns from stakeholders that certain modifiers may be under-represented, we evaluated the historical experience for clusters of costs that might be suggestive of un-coded modifiers. This evaluation was focused on a handful of modifier types and ultimately resulted in the reclassification of a number of services.
- Finally, the aggregate NCCI claims data included service categories where claims and coding were not sufficiently stable or precise to allow the development of a fee scheduled amount. The experience did not support an adjustment to the data that would enable these services to have a prescribed fee scheduled payment. For example, revenue code 278, medical implants could represent items ranging in costs from a catheter to an implantable defibrillator or neurostimulator. After recognition of these data limitations, the Commission and Advisory Panel determined that the applicable services should be reimbursed as a percentage of billed charges.

Even with data adjustments described above, there were a number of methodological steps required to develop the MFS. For example, most procedures do not have sufficient volume to enable a stable estimate of average reimbursement. In order to address this claims instability, we employed actuarial credibility methods. In addition, we evaluated several fee schedule design alternatives, including what were identified as the "structured" and "flexible" approach. Ultimately, the credibility standard and fee schedule design decisions were informed by the desire to reflect, as closely as possible, the historical payments by provider group and medical community.

Methodologically, the MFS development recognized the influence of the lesser-of clause (requiring that reimbursement not exceed a provider's charges) and inpatient outlier provisions. In addition, we employed smoothing methods to families of fees so that irrational reimbursement relationships were not introduced within a given family. We also adjusted the data supporting the MFS to reflect the influence that payment modifiers might have on the MFS fee estimates.

Although there were many alternative methodologies that were introduced and considered, revenue neutrality remained the overarching requirement across all discussions. For a given provider group and medical community, any method that did not maintain revenue neutrality was disregarded.

The draft MFS were exposed to the public in January 2017. Respondents provided unique and thoughtful observations about the MFS, offering suggestions on how it might be improved. We incorporated many of the suggestions raised through that comment period. Ultimately, the MFS

produced for the Commission and Advisory Panel reflect internal consistency across many services, while also reflecting the reimbursement and experience unique to Virginia.

Finally, the Commission, the Advisory Panel and Oliver Wyman developed a set of ground rules to guide the implementation of the fee schedule. The ground rules were designed to be consistent with the law and the MFS development, while also providing supporting context around the process that created the MFS.

2. Fee Schedule Background

Oliver Wyman Actuarial Consulting, Inc. (Oliver Wyman) was engaged by the Virginia Workers' Compensation Commission (the Commission) to assist in the development of a set of medical fee schedules (MFS). The MFS outline the maximum pecuniary liability of an employer for medical services rendered by health care providers, hospitals, and ambulatory surgical centers to injured employees, pursuant to the Virginia Workers' Compensation Act (the Act), Title 65.2 of the Code of Virginia. The MFS apply in the absence of a contract under which the provider has agreed to accept a specified amount in exchange for the medical service. The MFS will apply to health care services provided to an injured person for any dates of service on or after January 1, 2018, regardless of the date of injury.

Key Elements of the Law

The MFS were developed in accordance with Chapters 279 and 290 (amended) of the 2016 Acts of Assembly and Chapter 478 of the 2017 Virginia Acts of Assembly of the Commonwealth of Virginia, which amend and reenacted §65.2-605 of the Code of Virginia titled *Liability of employer for medical services ordered by Commission; fee schedules for medical services; malpractice; assistants-at-surgery; coding*. The Virginia General Assembly passed this law providing for the development and implementation of the MFS, and Governor Terry McAuliffe approved the law on March 7, 2016.

The law specifies the utilization of a 10-member regulatory Advisory Panel composed of relevant stakeholders, including potentially affected citizen groups, to assist in the development of the MFS. The Advisory Panel was comprised of one member from each of the following groups:

The American Insurance Association	A Local Government Group
The Virginia Self-Insurers Association, Inc.	The Medical Society of Virginia
The Virginia Hospital and Healthcare Association	Type One Teaching Hospitals
The Virginia Orthopaedic Society	The Virginia Trial Lawyers Association
A Group Self-Insurance Association	The Property and Casualty Insurance Association of America

The law identifies several requirements that guided and shaped the development of the MFS, the most significant of which are discussed below.

Categories of Providers

The law identifies seven distinct categories of providers of fee scheduled medical services, and requires that separate MFS be developed for each.

- **Provider Group 1** – Physicians, exclusive of surgeons

- **Provider Group 2** – Surgeons
- **Provider Group 3** – Type One Teaching Hospitals
- **Provider Group 4** – Hospitals, exclusive of Type One Teaching Hospitals
- **Provider Group 5** – Ambulatory surgical centers
- **Provider Group 6** – Providers of outpatient medical services not covered by provider groups 1, 2 or 5
- **Provider Group 7** – Purveyors of miscellaneous items and any other providers not covered by provider groups 1 through 6, as established by the Commission in regulations

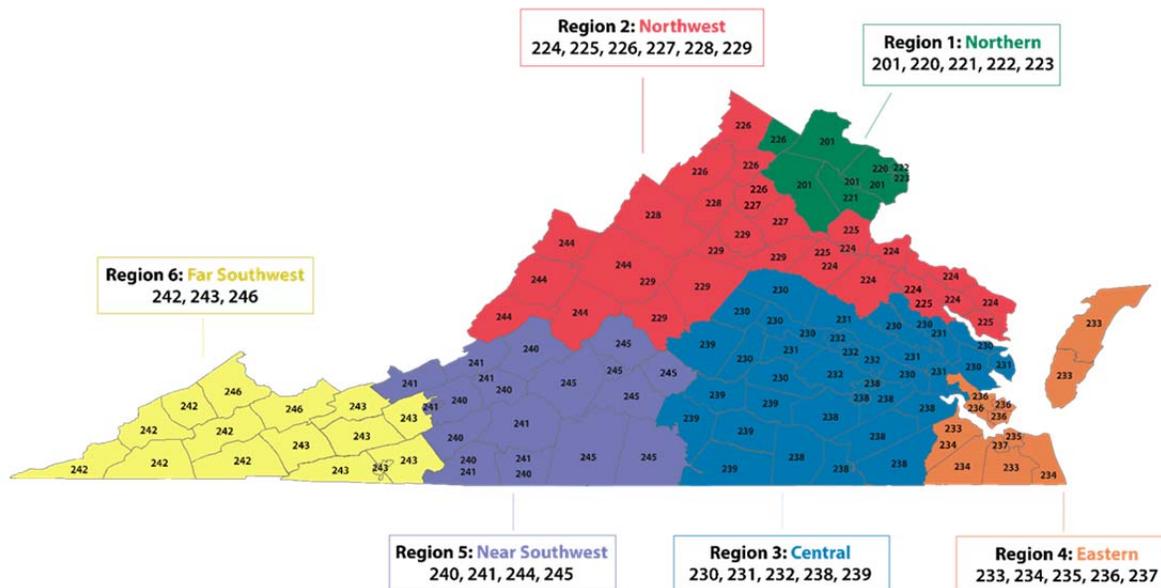
This provision recognizes that the various categories of providers outlined above may differ with respect to their cost structures, the services they provide, and the coding conventions they utilize, and allows for these differences to be reflected in the MFS.

Medical Communities

The law identifies six distinct medical communities defined by three-digit ZIP Code prefixes, and requires that the maximum fees appearing on the MFS for each category of provider vary based on these geographic definitions.

- **Region 1 (Northern Region)** - The area for which three-digit ZIP Code prefixes 201 and 220 through 223 have been assigned by the U.S. Postal Service.
- **Region 2 (Northwest Region)** - The area for which three-digit ZIP Code prefixes 224 through 229 have been assigned by the U.S. Postal Service.
- **Region 3 (Central Region)** - The area for which three-digit ZIP Code prefixes 230, 231, 232, 238, and 239 have been assigned by the U.S. Postal Service.
- **Region 4 (Eastern Region)** - The area for which three-digit ZIP Code prefixes 233 through 237 have been assigned by the U.S. Postal Service.
- **Region 5 (Near Southwest Region)** - The area for which three-digit ZIP Code prefixes 240, 241, 244, and 245 have been assigned by the U.S. Postal Service.
- **Region 6 (Far Southwest Region)** The area for which three-digit ZIP Code prefixes 242, 243, and 246 have been assigned by the U.S. Postal Service.

The six defined medical communities are shown visually below:



Similar to the provision to recognize differences in the defined categories of providers, this provision of the law recognizes that historical reimbursement for a given service may vary significantly by geography, and allows for these differences to be preserved in the MFS going forward.

Reimbursement Objective

The law requires that statistically valid estimates of reimbursement for fee scheduled medical services within the defined medical communities be developed. These estimates are to be reflective of reimbursement paid to providers for fee scheduled services subject to the Act. Where possible, and to the extent statistically valid data are available, these estimates are to be based on actual historical Virginia experience.

The law requires that the MFS produce overall reimbursements and other amounts paid to providers in the same category of providers in the same medical community that are equal to the amounts that were paid during calendar years 2014 and 2015. Specifically, this revenue neutrality provision requires that, when developing the MFS for each category of provider within a given medical community, application of the resulting MFS produces the same overall reimbursement as that which underlies the 2014 and 2015 experience used in its development. It should be noted that this requirement applies in aggregate to a given category of provider and medical community. Reimbursement under the MFS is not required to and not expected to

The law requires that the MFS reflect reimbursement consistent with levels that were paid in calendar years 2014 and 2015

produce the same overall reimbursement observed in 2014 and 2015 for any given provider or any given procedure.

The law does not recognize inflationary adjustments between the 2014 and 2015 reimbursement amounts used in developing the MFS, and the MFS are to be effective January 1, 2018. It is expected and understood that aggregate anticipated 2018 reimbursement (i.e., across all providers and medical communities) under the MFS will likely be less than reimbursement levels that would have been observed in 2018 in the absence of the MFS. However, the MFS may be adjusted in 2019 and biennially thereafter to reflect inflation or deflation relative to 2018, as reflected in the medical care component of the Consumer Price Index for All Urban Consumers for the South, as published by the Bureau of Labor Statistics.

Determination of Maximum Reimbursement

The law indicates that reimbursement for a fee scheduled medical service shall be limited to the amount provided for the payment for the fee scheduled medical service, as set forth in a contract under which the provider has agreed to accept a specified amount as payment for the service provided. The agreed to specified amount may be less than or exceed the maximum fee for the service as set forth in the MFS.

In the absence of a contract as described above, the law indicates that the maximum reimbursement shall be the lesser-of the provider's billed charge amount or the maximum fee listed for the fee scheduled medical service, as set forth in the applicable MFS that is in effect on the date the service is provided. As noted later in this report, it was not feasible to establish a fixed maximum fee for certain services based on standard coding conventions used by providers, and the maximum fee for these services are instead based on a stated percentage, multiplied by the provider's billed charge amount for the service.

In the absence of a provider contract or a provision in the MFS that sets forth the maximum reimbursement for a medical service, the law states that the employer's maximum liability for the medical service shall be determined by the Commission, and that amount shall be effective until the Commission sets a maximum fee for the fee scheduled medical service and incorporates such maximum fee into adjusted MFS.

Hospital Outlier Payments

When the total charges of a hospital, based on the provider's charge master, for non-rehabilitation inpatient hospital services exceed a stated charge outlier threshold, reimbursement for the inpatient hospital service shall equal the total of:

1. The maximum fee for the service, as set forth in the applicable MFS, plus
2. 80 percent of the provider's total charges for the service which are in excess of the charge outlier threshold.

The initial charge outlier threshold is set equal to 300 percent of the maximum fee for the service as set forth in the applicable MFS. However, the law also allows the Commission to adjust the percentage biennially if it is found that the number of claims exceeding the threshold is less than five percent or greater than ten percent of all inpatient claims.

Adjustments to Fee Scheduled Amounts

For specific cases, the law outlines the amounts by which the fees presented in the MFS are to be adjusted. Nurse practitioners or physician assistants are to be reimbursed no more than 20 percent of the amount shown on the MFS when serving as an assistant-at-surgery, and an assistant surgeon in the same specialty as the primary surgeon is to be reimbursed no more than 50 percent of the amount shown on the MFS. The law indicates that multiple procedures completed on a single surgical site are to be “coded and billed with appropriate CPT codes and modifiers and paid according to the National Correct Coding Initiative rules.”

Reimbursement for New Technology or Procedures

The law specifies that new medical technology approved by the Federal Food and Drug Administration (FDA) after January 1, 2018 and prior to the date the medical service is provided, including an implantable medical device or an item of medical equipment, shall be reimbursed at 130 percent of the provider's invoiced cost. If the new technology was not approved by the FDA prior to the date the service was provided, the provider will not be entitled to reimbursement unless the employer or its insurer agrees.

The law specifies that a new medical procedure introduced after January 1, 2018 shall be reimbursed at 80 percent of the provider's charge for the service, based on the provider's charge master, provided that the employer and the provider mutually agree to such a procedure.

Exclusions from the MFS

The law excludes certain services from the MFS, specifically the inpatient treatment of a traumatic injury or a serious burn. A traumatic injury is defined as an injury for which admission or transfer to a Level I/II Trauma Center is medically necessary, and that the admission is assigned one of the DRGs outlined in the law.¹ A serious burn is defined as a burn for which admission or transfer to a Burn Center is medically necessary.

Services associated with the inpatient treatment of a traumatic injury or serious burn are to be excluded from the MFS under the law. Instead, these services, when not set forth in a contract under which the provider has agreed to accept a specified amount as payment for the service provided, are to be reimbursed no more than 80 percent of the provider's billed charge for the service, based on the provider's charge master. This applies to both the facility and the professional services provided during the admission. However, if the claim is contested and benefits for medical services are awarded which benefit a third-party insurance carrier or health care provider, then reimbursement for these services shall be equal to 100 percent of the provider's charge for the service, based on the provider's charge master.

Pharmaceuticals, other than those administered by a provider as part of the delivery of medical care, and durable medical equipment dispensed through a retail facility, are excluded from the MFS, with no specification in the law governing the reimbursement of such items.

¹ Inpatient admissions with a DRG number of 003, 004, 011, 012, 013, 025 through 029, 082, 085, 453, 454, 455, 459, 460, 463, 464, 465, 474, 475, 483, 500, 507, 510, 515, 516, 570, 856, 857, 862, 901, 904, 907, 908, 955 through 959, 963, 998, or 999 are defined as a traumatic injury when the admission occurs at a Level I/II Trauma Center.

Additional Guiding Principles

While the provisions outlined in law served as the primary framework for the development of the MFS, Oliver Wyman worked closely with the Advisory Panel to develop additional guiding principles for our work. The Advisory Panel provided critical and valuable input in areas such as the structure, methodology and goals of the MFS. These additional guiding principles served as the philosophical foundation for the construction of the fee schedules, and are summarized below.

Principle	Comment
The MFS should employ commonly used coding conventions, while promoting reporting that precisely identifies the applicable services	The MFS should limit administrative burden to payers and providers, but it should ensure that services are completely documented to support future analysis
MFS cost estimates should tend toward reliance on Virginia's experience rather than an outside source	Statistically credible Virginia-specific data, supplemented where necessary, should be used, but not at the cost of enhancing disruption to Virginia's marketplace
Between services, the MFS should be internally consistent	Unless in violation of other principles, the fee schedule should not penalize providers for delivering sufficient but not excessive levels of service
The MFS should aim to limit disruption to Virginia's marketplace	While each fee schedule is to target revenue neutrality in total, it may be beneficial to review revenue neutrality at finer cuts of the fee schedule (e.g., radiology, lab/pathology, etc. for the physician fee schedules)
The MFS should be developed taking into account broad based input	Ensure stakeholders have sufficient opportunity to provide input and feedback throughout the construction of the MFS
A scheduled fee should not be imposed if historical current coding practices do not capture service and resource utilization	Current coding practices for certain services may reflect wide variation in reimbursement, where the average reimbursement may not reflect systematic differences in resource utilization for a corresponding code

More than workers' compensation medical fee schedules utilized by many other states, the approach being taken in Virginia is unique to its medical communities. The MFS are not explicitly developed to reflect resource use for each procedure, but rather they are intended to reflect average historical reimbursement rates, including the recognition of historical variation in reimbursement by provider groups, medical community, and where statistically credible, by individual procedure. As a result, there will be differences in rate relativities across medical communities and between certain provider groups, and these relationships will vary at the procedure level.

A core requirement set forth by the Advisory Panel was that the MFS be based on actual Virginia reimbursement during the experience period, to the extent that statistically credible and reliable information were available. As a result, extensive and broad-based data sets of Virginia-specific workers' compensation experience were gathered for the analyses from the various sources previously mentioned. Only data that was found to be valid and statistically reliable was ultimately used for the analyses.

The MFS were not explicitly developed to reflect resource use for each procedure, but rather they are intended to reflect average historical reimbursement rates based on actual Virginia data

There was strong intent to minimize the level of disruption that any group of workers, providers or insurers would experience as a result of implementing the MFS. However, there was also recognition that the current marketplace reflects a mix of service utilization at different levels of reimbursement. With a move to a common fee schedule, it is inevitable that some providers will see increases in their reimbursement while others will see decreases.

There was also recognition that the mix of services and associated costs underlying the experience likely varies by provider. As a result, the experience for certain procedures, even if fully credible by a statistical standard, could lead to anomalous results simply due to differences in the underlying mix of services by provider. Specifically, the observed average reimbursement for a given procedure may be greater than the average reimbursement observed for a similar procedure with additional resource use (e.g., a specific type of MRI vs. that same type of MRI with contrast agent used). While the Advisory Panel's desire was to rely on Virginia experience at the procedure level as much as possible, overarching this aim was the desire to develop a fee schedule that did not produce irrational relationships among similar procedures.

Finally, it was the desire of the Advisory Panel to develop the MFS in a manner that would not invite unintended consequences, which could lead to higher overall costs to the workers' compensation system in Virginia, decreases in quality of care provided, or create barriers to accessing care. To the extent that these concerns could be addressed through the design of the MFS, the methodology selected, or the ground rules and corresponding regulations, they were. However, there was no explicit attempt to anticipate broad market response to the presence of the MFS beyond the parameters addressed by the law. These potential responses include but are not limited to the potential for employers and payers to shift care to less expensive medical communities, use of the fee schedules as leverage in contract negotiations, and changes to a provider's practice patterns or overall charge master in response to the fee schedule design.

Project Investment and Timing

Significant time, effort and resources were invested by the Commission, the Advisory Panel members, and Oliver Wyman in developing the MFS. These parties participated in numerous working sessions over the course of several months. The regulatory Advisory Panel provided valuable guidance and direction to Oliver Wyman in the selection of the actuarial methodology used, and the desired structure for each of the various MFS. Meetings were conducted between the Commission, the Advisory Panel, and Oliver Wyman on the following dates:

Meeting Dates

September 1, 2016	December 1, 2016
September 15, 2016	December 13, 2016
October 11, 2016	January 4, 2017
November 10, 2016	February 15, 2017
November 16, 2016	March 9, 2017
November 22, 2016	March 23, 2017

As previously mentioned, extensive and broad-based data sets were gathered from various sources, without which the project could not have been completed with the level of detail, rigor, and recognition of Virginia experience that it was. We worked with NCCI to gather aggregate data representing a majority of the insured workers' compensation medical claims subject to the Act. Data was initially received in October 2016 with various supplemental files provided throughout the project.

Data was also gathered from group self-insureds, individual self-insureds, third party administrators, and numerous medical providers and facilities. A data call was issued on September 20, 2016, and data was provided over the course of several weeks leading up to October 21, 2016. Oliver Wyman assisted data contributors by answering numerous questions related to the data call to ensure the data was provided in a manner consistent with expectations, and not used in a manner for which it was not intended. After receiving the data, Oliver Wyman reconciled the data to control totals provided and performed several validation checks, working with data contributors to resolve any issues.

A majority of the analyses performed by Oliver Wyman were conducted during the months of October, November and early December of 2016. Initial draft MFS were delivered in early December for review by the Advisory Panel, and the Advisory Panel proposed revisions that were subsequently made by Oliver Wyman. On January 4, 2017 the Final Draft MFS were approved by the Advisory Panel.

The Final Draft MFS and corresponding feedback questionnaire were made available on the Commission's website starting January 19, 2017. These documents were downloaded from the Commission's website by 219 unique entities. Over the period January 19, 2017 through February 15, 2017 interested stakeholders were able to test, analyze and provide feedback on the Final Draft MFS. Feedback was received from 21 distinct entities, with responses received from multiple individuals at four of these entities.

Over the period February 15, 2017 through March 9, 2017 Oliver Wyman compiled the feedback received on the Final Draft MFS, and shared it with the Advisory Panel. Roughly 200 comments were received from the 21 distinct entities. Oliver Wyman worked with the Advisory Panel to identify revisions to the Final Draft MFS that the Advisory Panel recommended as a result of the feedback received. On March 23, 2017 Oliver Wyman delivered the Final MFS reflecting the desired changes. On April 10, 2017 the Commission reviewed and approved the Final MFS.

The Final MFS were posted on the Commission's website on April 10, 2017, and public comments were received from April 10, 2017 through May 10, 2017. A public hearing is scheduled for May 23, 2017.

3. Data Sources and Validation

The law specifies that the MFS should use certain common coding conventions, such as procedure codes, DRGs, revenue codes, etc. In order for the fee schedule to reflect reimbursement at this level of specification, the data used to develop the fee schedule had to be sufficiently granular that service costs could be reviewed at the appropriate code levels. From the project's outset, there was the expectation from the Advisory Panel that data from payers and providers would be considered in supplementing the development of the MFS.

Data Sources

With regard to insurer data, we sought and were granted access to Virginia-specific claims from NCCI. NCCI maintains data obtained from a majority of the workers' compensation insurers across the country. NCCI was able to provide summarized data but due to restrictions, could not provide claim line level detail. As a consequence, Oliver Wyman was not granted access to claim-line level detail. Instead, we were granted access to distributions of claims data, segmented on various provider and procedure characteristics important for the development of the MFS. The presentation of claims data has certain weaknesses; for example, except for those claims where procedures were bundled together under a single procedure code for billing purposes, we were unable to evaluate all procedures associated with a single encounter because member and claim number were not reflected within each record.

Members of the Advisory Panel facilitated a request for data from a number of the providers, third party administrators, and self-insured employers. Submitting organizations received a non-disclosure agreement and business associates agreement from Oliver Wyman. As such, Oliver Wyman was only able to share aggregated information with the Commission and Advisory Panel. We received the following information from provider respondents:

Claim Type	Providers
Inpatient Facility	21
Outpatient Facility	20
Ambulatory Surgical Centers	3
Professional	15

In addition, we received comprehensive data from three third party administrators and three self-insured employers.

The volume of data received varied significantly by medical community. For example, the amount of data received for Region 3 (Central Region) was roughly five times the amount of data received for Region 6 (the Far Southwest region). To examine whether this variation raised any concerns, the distributions of data received by medical community were compared to the distribution of the general population by medical community.

Medical Community	General Population	NCCI Data	Self-Insured Employers	TPA Data	Provider Data
Region 1 – Northern	29%	26%	10%	27%	16%
Region 2 – Northwest	13%	16%	21%	11%	14%
Region 3 – Central	20%	23%	37%	28%	31%
Region 4 – Eastern	19%	17%	11%	23%	24%
Region 5 – Near Southwest	14%	14%	15%	10%	11%
Region 6 – Far Southwest	5%	4%	6%	1%	5%

The table above shows that the variation in the volume of NCCI data received by medical community largely aligns with the distribution of the population in general. The self-insured employer data was skewed toward Region 2 and Region 3, however this skewing results because one of the self-insured groups is the Commonwealth of Virginia (the Commonwealth) which has employees heavily concentrated in these two regions. The provider data appears slightly over-represented in Region 3 and Region 4 and slightly under-represented in Region 1, which results from differences in the provider response rates to the data call by medical community. It is important to note that the distribution of data by medical community does not impact the resulting MFS, only to the extent that the MFS in medical communities with smaller populations, and therefore data sets (e.g., Region 6), will be based less on actual Virginia experience at the procedure level and more on a Virginia-specific manual rate.

All claims data gathered for the MFS development represented workers' compensation claims subject to the Act. While data gathered from NCCI, third party administrators and self-insured employers included claims for services delivered both within the Commonwealth and by out-of-state providers which are subject to the Act, data gathered directly from providers did not include claims from out-of-state providers for services subject to the Act. However, only claims for services delivered within one of the six medical communities were used in the MFS development. Data from all of these sources reflected claims for services that were provided during calendar years 2014 and 2015. Additionally, we received claims for services provided during calendar years 2011, 2012 and 2013 from NCCI to supplement certain analyses.

Data Source Election

Ultimately we relied on the self-insured and TPA data for validating the NCCI data and our conclusions, but felt that including it directly within the fee schedule estimates might introduce potential bias into the results. For example, the TPA data may have been duplicative as the TPAs may have submitted data to NCCI, and this data would also be duplicative of any provider data that was relied upon. There were some characteristics of the self-insured employers that made us question whether or not the value of including it in the direct development of the MFS would justify the cost. Our review of the data did not suggest a significant difference from information provided by NCCI, but scrubbing and revising the data to flow into the model would have represented an additional series of steps without a clear source of additional value.

In reviewing the NCCI inpatient facility claims data, it became clear that the NCCI data would not be appropriate for establishing a DRG-based fee schedule. Nearly 65% of admissions were

not assigned a DRG code. With no ability to supplement the data with the necessary coding information and the Advisory Panel's desire to have inpatient MFS based on DRG, the decision was made to develop the inpatient fee schedule from data submitted by provider respondents. The providers' data largely reflected coding and claim parameters that were necessary for the fee schedule development, including the presence of a DRG on 100% of the claims used, and reimbursement and billed charges for each applicable admission. In addition, the providers' data satisfied the validation steps that we discuss in subsequent subsections of this section of the report.

We chose to rely on the NCCI data instead of the provider data for all non-inpatient MFS for the following reasons:

Only 15 provider organizations submitted professional data. These respondents represented a small proportion of professional fees in Virginia's workers' compensation market (less than 20% of the professional claims that were included in the NCCI data), introducing risks that there were systematic differences between the providers submitting data and the rest of the market. We also received very little data from important segments of the provider community, including physical therapists.

Regarding the facility data, there were compelling differences between the data needed to create the fee schedule and the data the providers could supply. For example, many facilities provided outpatient data, but they were only able to precisely identify billed charges associated with needed codes. Providers were only able to submit reimbursement from the payer for the entire claim, not at the procedure level (i.e., there was no line-item presentation of payment). Although many of the providers were generous enough to allocate their reimbursement in proportion to billed charges, we felt it inappropriate to rely entirely on these a posteriori attributed claims. If the providers' charge masters did not reflect the relationship of reimbursement between services, then the relationship within the fee schedule would be skewed. Similarly, some line-items likely represent payments that were reduced (e.g., multiple procedure reductions) and this allocation method would tend to overstate the reimbursement for these line-items and understate the reimbursement for all other line-items on the claim. Finally, many of the providers' claims lacked coding that was important for the fee schedule development (e.g., recognition of various modifiers that impact reimbursement).

In summary, all MFS were developed from NCCI data, except the inpatient fee schedules, which were developed from data submitted by providers. All other data sources were used to validate the NCCI and provider information used as the primary sources.

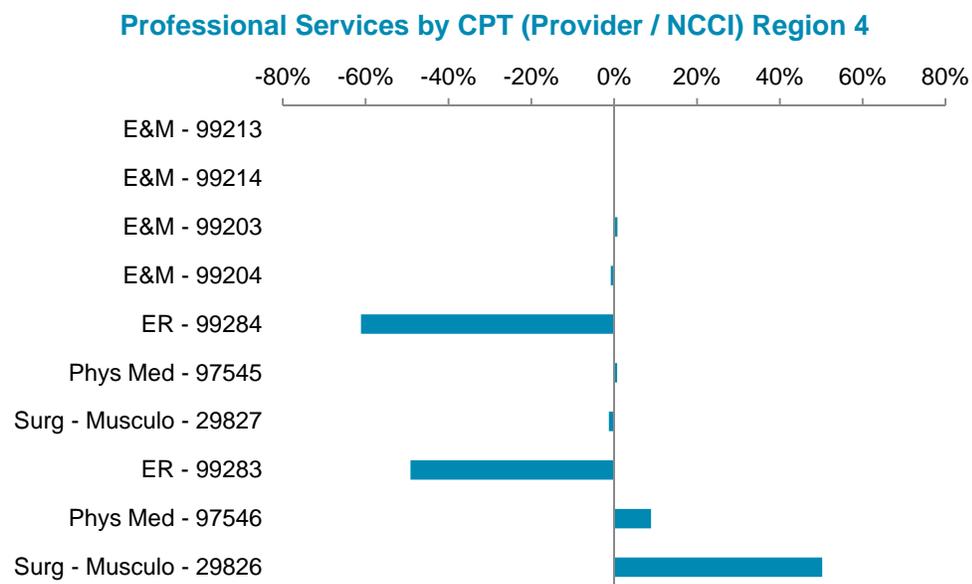
Ultimately the MFS were developed from NCCI data, except for the inpatient fee schedules, which were developed from data submitted by providers

Data Validation

Throughout the process, stakeholders raised questions about the use and validity of different data sources. We employed three levels of validation to ensure that the data we received were consistent with actual payments. We sought to evaluate data accuracy at the code level; we sought to ensure that codes were well represented; we sought to ensure that the data broadly represented the market.

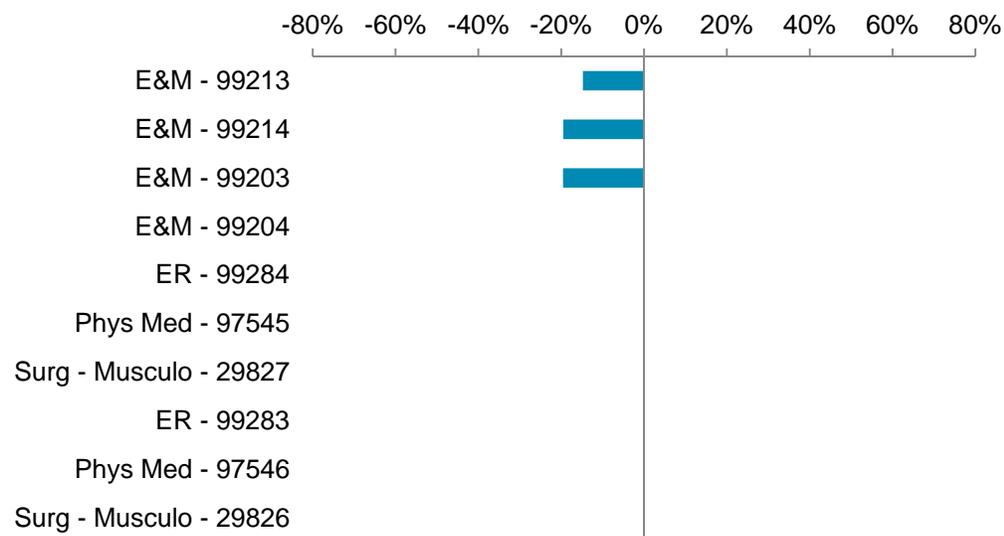
Claims Accuracy

First, we evaluated both NCCI and the inpatient provider data for code-level accuracy relative to other sources. To evaluate this code-level accuracy, we examined the procedure by procedure cost associated with certain codes. This comparison was perhaps the most challenging because even the most common procedure and DRG codes were often reflected with insufficient frequency. For example, the following chart of the most common professional services shows a comparison of average reimbursement between the NCCI data and data submitted by providers in Region 4. For most of the services, the payments are reasonably close, but for some of the codes, there is a significant difference.



The chart above shows reimbursement from the provider data that is substantially lower on CPT code 99284 (ER), but shows much higher reimbursement for CPT code 29826. As we examined other medical communities, this kind of comparison became even more complicated. The following chart shows a comparison of the same services for Region 1.

Professional Services by CPT (Provider / NCCI) Region 1



Within Region 1, there are many services where there was no provider data, and even where the provider data was present, it was uniformly lower than what was reflected within NCCI.

Ultimately, we elected to rely on market basket comparisons of unit cost to understand how much deviation we might expect for given groups of codes. The following table compares the top 180 procedures in the NCCI data against the provider data.

Region	Provider Service Pct against NCCI	Provider Reimb against NCCI	Reimb Needed to Balance to Total ²
1	1%	45%	0%
2	39%	-7%	4%
3	22%	5%	-2%
4	47%	3%	-3%
5	27%	8%	-3%
6	34%	-27%	14%
	[X]	[Y]	$= \frac{(1 - ([X]*(1 + [Y]))}{(1 - [X]) - 1}$

The “Provider Service Pct against NCCI” field shows that, when a procedure code was present, there were fewer data points in the provider data than in NCCI. For example, the provider data only reflected 1% of the transactions in Region 1 relative to the number of services in the NCCI data (conditioned on the service being present in both data sets). The “Provider Reimb against

² Reimb Needed to Balance to Total is the reimbursement relative to aggregated NCCI data that would be needed by non-responders to balance the equation; an unlikely result is more suggestive of potential data bias

NCCI" field shows the difference in average reimbursement between the two sets. So, for those common codes in Region 1, the provider data reflected average reimbursement that was 45% higher than the NCCI data. The two regions that are the largest outliers are Regions 1 and 6.

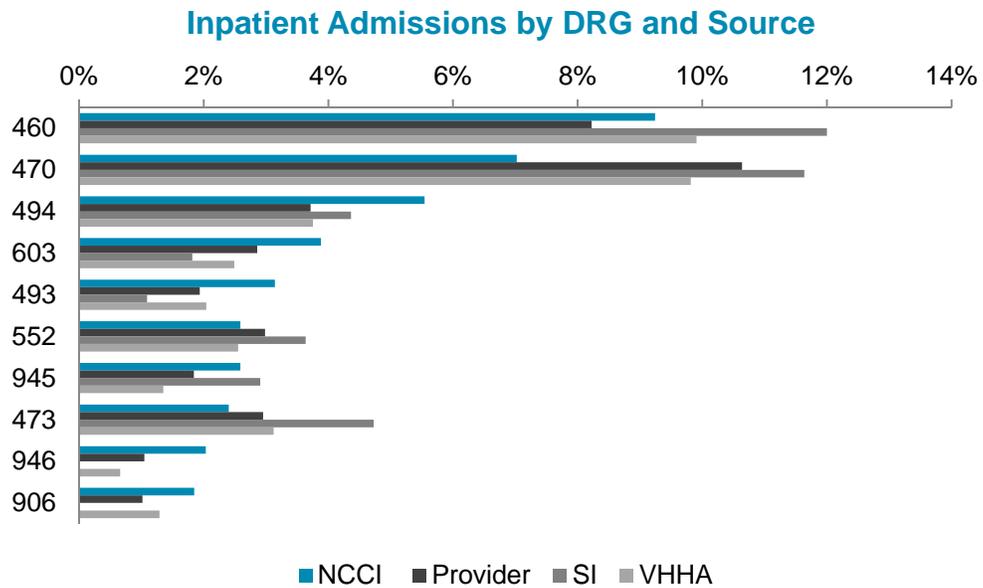
However, the "Reimb Needed to Balance to Total" shows what non-respondent providers would have to be reimbursed in order to balance with the NCCI data. An unusually high or low value in the "Reimb Needed to Balance to Total" column would raise concerns about the potential accuracy of the NCCI data. For example, even though the provider data received in Region 1 has much higher reimbursement than the NCCI data, it represents a very small part of the total reimbursement reflected in the NCCI data. If the other 99% of providers in Region 1 had responded with average reimbursement at roughly the same rates as those present in the NCCI data, then the data would have been consistent between the two sources. The provider data cannot enable us to "reconcile" the NCCI data, but high or low values in the Reimb Needed to Balance to Total" could indicate a potential deviation. Almost none of the regions suggested that the NCCI data and the provider data were inconsistent.

The only region that caused concern was Region 6, where non-respondent physicians would have had to have shown reimbursement that was 14% higher than the aggregated NCCI data in order to balance those that did respond. This difference in reimbursement may mean that the Region 6 physician fee schedule is more likely to be overstated than what we see in other regions. However, the low overall credibility of even the NCCI data in Region 6 ultimately led us to rely heavily on a manual rate in this region, while still achieving revenue neutrality.

We conducted a similar exercise with inpatient services. Generally, we found that there were few NCCI records with DRGs, so the resulting comparisons were highly leveraged. The removal of one or two claim records would make the NCCI data consistent or inconsistent with the provider data when reviewed at the code level. Generally, the claims were sufficiently close that we felt there was no loss of accuracy by using the provider inpatient data in constructing the MFS. Further, the provider data received for inpatient claims had more volume than the NCCI data that was considered usable.

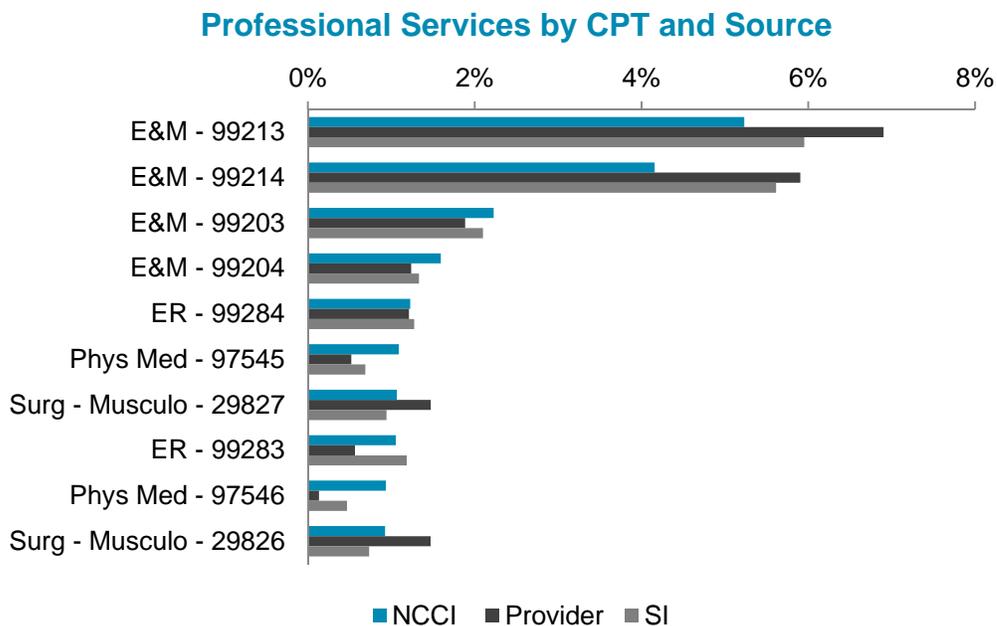
Claims Representativeness

We examined all data sources to assess whether or not important codes were underrepresented for certain provider groups. Generally, there was consistency between data from NCCI, providers, and other sources (including data which the Advisory Panel assisted us in obtaining from the Virginia Hospital and Healthcare Association (VHHA)). The following chart shows a distribution of admissions by DRG for inpatient services.



Within the NCCI data, there is not as much utilization (1% to 3% less representation as a percent of total admissions) in DRGs 460, 470, and 473³ as what was observed in some of the other sources. Otherwise, the distribution is generally consistent across other sources. If we perform a similar exercise on frequently performed professional services, the distribution is generally consistent across sources.

³ 460 - Spinal Fusion Except Cervical W/O MCC, 470 - Major Joint Replacement or Reattachment of Lower Extremity W/O MCC, 473 - Cervical Spinal Fusion W/O CC/MCC

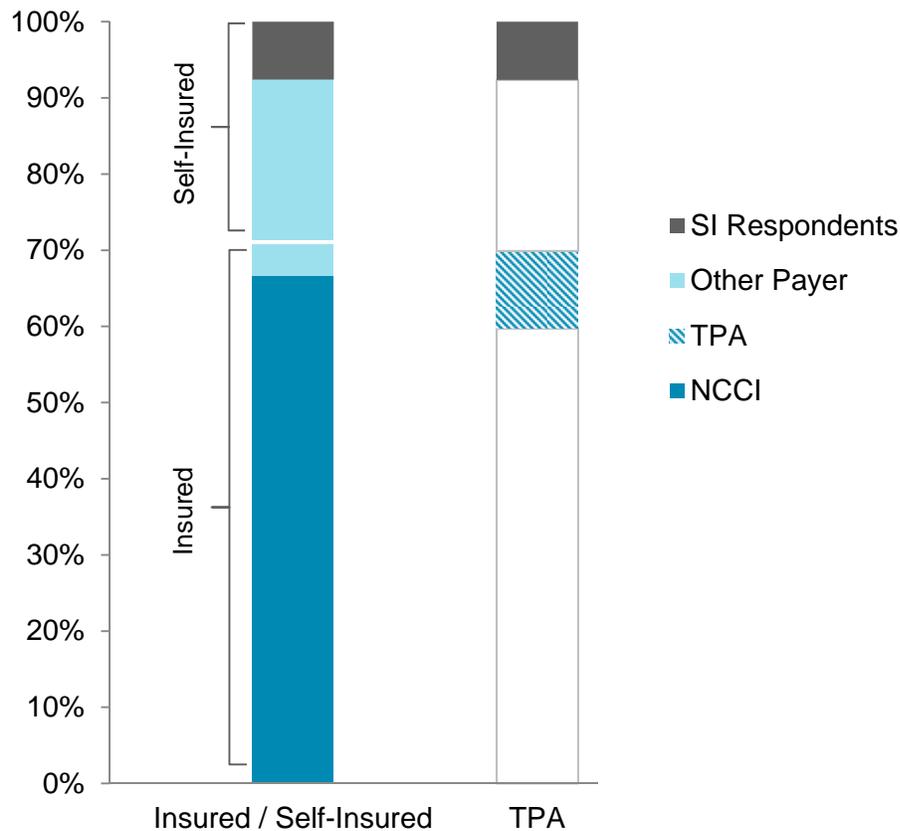


The observed variation (+/- 1%) is not surprising given the difference in size between each data set.

Market Representation

We also examined the NCCI data to assess whether or not it adequately reflected workers' compensation services delivered within the Commonwealth. The examination of the market is based on payroll data from the US Bureau of Labor Statistics, Federal Government Payroll in Virginia, Longshore Payroll, publicly available information from NCCI, and TPA and self-insured employers that submitted data. We estimated that NCCI data reflected approximately 66% of reimbursement for those workers' compensation claims.

Representation of the Market



The chart shows that the NCCI data represent a majority share of payroll across the Commonwealth for employers subject to the Act. We also assessed the aggregated NCCI claims data against other submitters. Those claims reflected the following relativities:

Respondent	Inpatient Facility	Outpatient Facility	Professional
NCCI	1.00	1.00	1.00
TPA	0.99	1.07	1.00
Self-Insured	0.97	0.99	0.90

The cost comparison employs a common market basket of procedures across all medical communities. The data show some outliers (e.g., self-insured respondents had professional charges that were beneath the NCCI data, while the TPA data were higher for outpatient facility charges), but generally, the NCCI data were sufficiently representative of the entire market

subject to the MFS. In evaluating the inpatient facility data (supported by providers), we compared those submitting facilities' data against all hospitals' data.

When we examine the total claims employed in the primary development of the MFS, we estimate that between the provider (inpatient) and NCCI (all other provider groups) data used, approximately 74% of the entire workers' compensation market in the Commonwealth that is subject to the Act was used in the analysis.

4. Adjustments to the Data

For the construction of the non-inpatient MFS, we relied on the NCCI data with some revisions. As part of these revisions, we removed claims satisfying the following conditions:

- Place of service as pharmacy, skilled nursing facility or assisted living facility
- DME, prosthetic / orthotic and transportation codes where the place of service was home, other or blank
- Certain taxonomy codes, including taxi, private vehicle and case manager
- Any claim without a useable revenue code or CPT code in the primary or secondary procedure code field

In the aggregated insurer data, NCCI reflected proprietary type-of-service identifiers that were not necessarily consistent with the fee schedule requirements. For example, a number of facility charges with place of service codes not equal to 24 (i.e., ASC) were classified as ASC. We ensured that the claims were re-classified in accord with our understanding of how the fee schedule will be administered. As an example, all claims in the non-inpatient file with place of service equal to 24 and a revenue code present on the claim were classified as ASC claims. Likewise, all claims in the non-inpatient NCCI file with a place of service other than 24 and a revenue code present on the claim were classified as hospital outpatient facility claims.

Distribution to Claim Line Translation

NCCI provided summarized data which included the number of transactions, total reimbursement, and percentiles (10th, 20th, ... , 90th, 95th). NCCI provided these summary measures for each unique combination of available fields that were requested (e.g., procedure code, modifier, ZIP Code, provider taxonomy, etc.). For some combinations of fields, the data was sufficiently granular that the actual claim amounts could be derived. The following tables show an example of this exact derivation:

Information Received		Derivation of Actual Claims	
Percentile	Value	Claim	Value
10th	1,472	1	1,380
20th	1,564	2	1,687
30th	1,656	3	6,294
40th	2,608	4	6,963
50th	3,990	Transactions	4
60th	5,372	Average	4,081
70th	6,361		
80th	6,561		
90th	6,762		
95th	6,862		
Transactions	4		
Average	4,081		

When the data was not sufficiently granular to determine the actual claim amounts underlying the percentiles, we employed an approach that used the exact percentiles as they were given. The total number of transactions were spread across the percentiles weighted based on the “range” the percentile covers (e.g., the 10th percentile was given twice as much weight as the 95th percentile). An adjustment was then applied consistently to each percentile, if necessary, to keep the overall average cost the same between the actual experience and the weighted average amount using the percentiles.

These two approaches were combined to move from the percentiles in the NCCI data to “claim line” detail used as the main data source for the non-inpatient fee schedules.

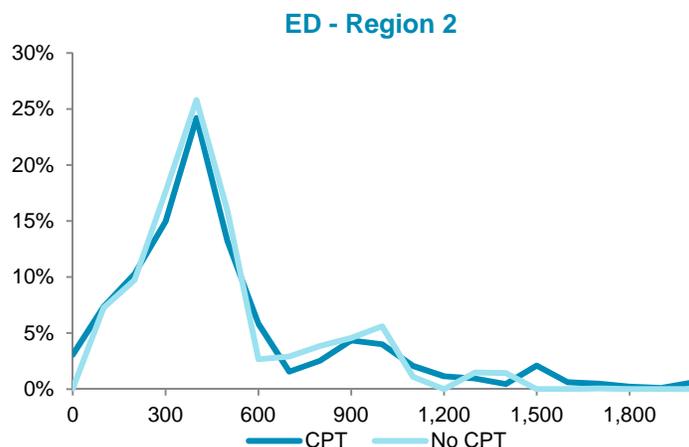
Revenue-Code-Only Facility Claims in the NCCI Data

Much of NCCI’s outpatient facility and ASC data included both revenue codes and procedure codes (i.e., CPT or HCPCS codes). But, because the inclusion of these fields was dependent on the submitting insurer, the NCCI data also reflected a majority of records that were only populated with revenue codes. The following table summarizes the percentage of claim dollars that contained procedure codes for each type of service in the outpatient facility data, as well as the percentage of total outpatient facility claims represented by each type of service.

Type of Service	Percent of Claims Containing a Procedure Code	Percent of Total Claims
Operating Room	46%	18%
Emergency Room	44%	15%
Med/Surg Supplies	37%	12%
PT/OT/ST	48%	8%
CT Scans	47%	8%
Other Radiology	45%	7%
MRT (Mag. Res. Tech.)	49%	5%
Other	41%	7%
Recovery Room	0%	4%
Anesthesia	2%	4%
Pharmacy (25X)	7%	4%
Drug with Detailed Coding (636)	62%	3%
Laboratory	47%	2%
Cardiology	39%	0%
Ambulatory Surgical Care	47%	2%
Nuclear Medicine	46%	0%
Radiology Chemo	85%	0%
Total	40%	100%

The table above shows that only 40% of all outpatient facility claims in the NCCI data contained a procedure code. For some of these types of service, such as Pharmacy, it was expected that a majority of these claims would not contain a procedure code as they are typically identified by NDC codes rather than procedure codes. Ultimately, it was recommended that the types of service that are highlighted grey be reimbursed as a percentage of charges. Therefore, when removing these claims, roughly 46% of the remaining claims contained a procedure code on the claim record.

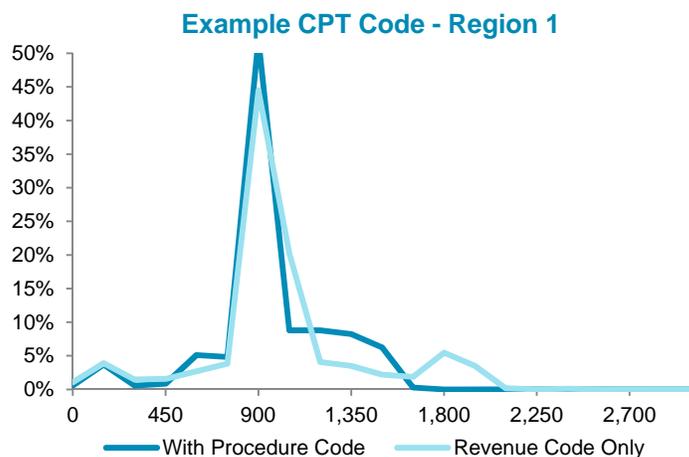
With guidance from the Advisory Panel, we incorporated these revenue-code-only claims into the development of the MFS rather than discard them. In incorporating the revenue-code-only data, we wanted to evaluate its consistency with claims from other submitters. Across a number of revenue codes, we compared the distribution of costs between those claims with a procedure code and those without a procedure code. The distributions were largely similar, implying that the absence of a procedure code was random, and that there was a similar mix of services for the data underlying each set. An example category is shown below:



In addition, we compared the NCCI data and provider data by distribution of reimbursement for each category (e.g., operating room, emergency room, etc.). The two data sets on these category dimensions also appeared to be similar, implying that the provider data could serve as a proxy for imputing the CPT/HCPCS distribution of the revenue-code-only NCCI data.

For each category and region grouping, the revenue-code-only NCCI data was assigned procedure codes based on the distribution and average costs underlying the provider data. The overall reimbursement for each type of service and medical community was kept constant to ensure that no reimbursement was added or removed.

The results of this process were then compared to the NCCI data where procedure codes were present to ensure that the adjustment method produced appropriate results. This review supported the mapping procedure, suggesting that the NCCI data generally have cost distributions that are consistent with NCCI data initially containing a procedure code, as shown below.



This process allowed for more data to be included in the development of the outpatient and ASC fee schedules. As a result, more credibility could be assigned to the actual experience and less to a manual rate.

Surgeon vs Physician Non-Surgeon Definition

The law specifies that separate fee schedules are required for surgeons and physician non-surgeons. However, the law does not offer a definition for these two separate categories. As a result, the Advisory Panel, the Commission, and Oliver Wyman reviewed various approaches to determine the most appropriate way to split the professional data into surgeon and physician non-surgeon for the creation of the fee schedules. To retain consistency between the MFS and the base experience, it is important that the definitions used to segment the NCCI data be consistent with how the fee schedules will be implemented.

The Advisory Panel, the Commission, and Oliver Wyman, ultimately decided to segment the historical reimbursement for surgeons and physician non-surgeons based on provider specialty code. These groupings are sufficiently detailed to segment providers into the two categories while also not being so granular that they invited separate, procedure-specific classification. The specialty codes used to identify providers that will be reimbursed under the surgeon fee schedule are listed below. All other provider specialty codes will be reimbursed under the physician non-surgeon fee schedule.

Code	Description	Code	Description
02	General Surgery	28	Colorectal Surgery
04	Otolaryngology	33	Thoracic Surgery
14	Neurosurgery	40	Hand Surgery
18	Ophthalmology	77	Vascular Surgery
19	Oral Surgery (dental only)	78	Cardiac Surgery
20	Orthopedic Surgery	85	Maxillofacial Surgery
24	Plastic and Reconstructive Surgery	91	Surgical Oncology

The NCCI data includes provider taxonomy code but not provider specialty code. Consequently, we mapped taxonomy code to provider specialty code as each taxonomy code maps to only one provider specialty code (e.g., taxonomy code 207X00000X for Orthopaedic Surgery maps only to specialty code 02 for General Surgery).

The NCCI data was aggregated, based on procedure code, to review the prevalence of procedures between surgeons and physician non-surgeons. We performed this aggregation and comparison to identify categories which have been predominantly performed by physician non-surgeons (i.e., 95% or more of the time). For those categories of services which historically have been predominantly performed by physician non-surgeons and are expected to be infrequently provided by a surgeon, it was decided to set the surgeon and physician non-surgeon fee schedules equal, and base the fee on the combined experience of surgeons and physician non-surgeons rather than employing a manual rate for surgeons. Where there were categories with limited experience for both surgeons and physician non-surgeons, we calculated

separate fee scheduled amounts for surgeons and physician non-surgeons, based largely on the respective manual rates. The table below displays examples of various categories of professional services, the prevalence of experience, and the decision as to whether or not the fee scheduled amounts were set to be the same or different between the surgeon and physician non-surgeon categories.

Category	Physician Non-Surgeon	Surgeon	Fee Schedule Decision
Musculoskeletal Grafts	Dark Blue	Dark Blue	Different
Intro / Removal Procedure Shoulder	Dark Blue	Light Blue	Same
Body / Upper Extremity Cast	Dark Blue	Dark Blue	Different
Sinus Endoscopy	Light Blue	Light Blue	Different
Vascular Injection Procedure	Dark Blue	Dark Blue	Different
Arterial Procedures	Dark Blue	Light Blue	Same
Spinal Reservoir / Pump Implant	Dark Blue	Dark Blue	Different
Excision Procedure on Nerves	Light Blue	Light Blue	Different
Work Related E&M	Dark Blue	Dark Blue	Different

← Low to High Volume →

Identification of Claims at Burn Centers and Level I/II Trauma Centers

The law specifies that medical services provided for the treatment of a serious burn at a Burn Center or a traumatic injury at a Level I/II Trauma Center are to be excluded from the fee schedule and instead reimbursed at 80 percent of charges when a contract with the provider is not in place. The services impacted by this carveout are inpatient facility and professional services.

Since provider submitted data was used in the creation of the inpatient fee schedules, the appropriate services and locations could be identified and the claims could be removed. NCCI was unable to disclose which professional and inpatient claims were for the same episode, and the professional NCCI data did not identify those professional services that were performed for treatment of a serious burn at a Burn Center or a traumatic injury at a Level I/II Trauma Center.

Diagnosis codes were reviewed in the provider inpatient data to determine if there was a concentration of diagnosis codes present on inpatient claims for serious burns and traumatic injuries at a Level I/II Trauma Center that could then be applied as a proxy to identify corresponding professional claims. No reliable concentration of diagnosis codes was observed in the data, and as a result, it was decided that all professional claims in the NCCI data should be used in the development of the professional fee schedules.

Mixture Modeling

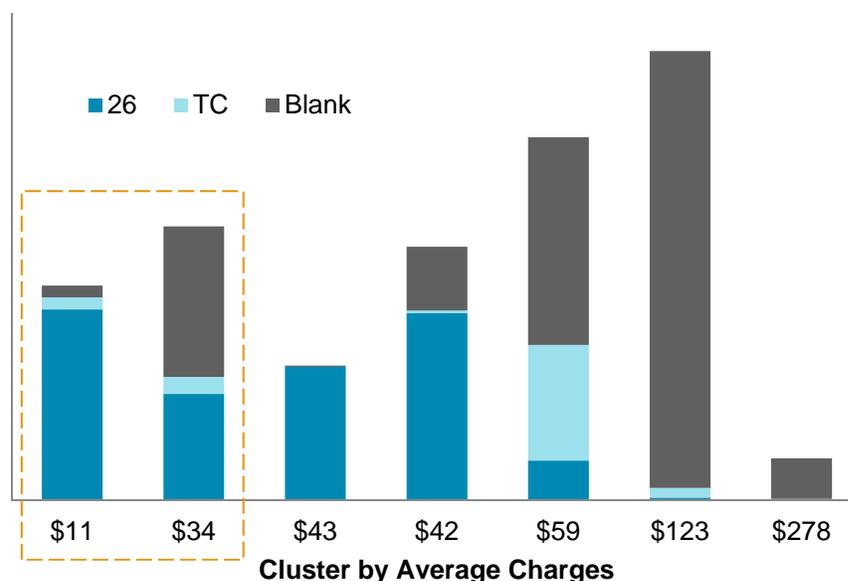
During the data call and other phases of the MFS development, stakeholders in the provider community expressed concern about possible under-reporting of certain CPT modifiers. In particular, there were concerns that claims would reflect reductions for radiological procedures or multiple surgical procedures without including a corresponding modifier. To the extent such omissions were present, the MFS development might have understated the base reimbursement for these procedures.

The data received from NCCI aggregated claims along certain categories (e.g., by medical community, provider taxonomy, etc.). As outlined earlier, claim line level detail was not received, which would have helped provide a clearer indication of the absence of modifiers in certain circumstances (e.g., with multiple procedure reductions).

To assess the frequency of missing modifiers, we relied on a technique known as mixture modeling. Within this modeling approach, we assumed that services with reduced reimbursement would cluster around each other in ways that might distinguish them from non-reduced services. The specific approach we employed assumed clusters would be normally distributed, with the assessment performed using maximum likelihood estimation.⁴

If for a specific procedure, in a specific medical community, we found clusters of services with reimbursement beneath other procedures that were not explicitly identified with the applicable modifier, we assumed that those services with lower reimbursement had been reduced but that the modifier was missing. The following chart identifies a specific case:

Example of application of mixture modeling applied to a radiology procedure



⁴ The specific model employed was the MClust package within R, using the Gaussian mixture model solved using the expectation maximization algorithm.

Working right to left, we reclassified all records with no modifier and charges beneath the nadir of the raw distribution. We also applied minimum thresholds to ensure that we would not reclassify claims in a cluster without that cluster being meaningfully lower than the preceding cluster. In the chart above, we would have reclassified all claims with no modifier present in the first and second clusters so that they would reflect modifier 26.

The approach has a few weaknesses that are worth addressing. First, we have applied the process assuming there is some local consistency between base claims and modified claims. If, for example, claims with omitted modifiers were part of a very expensive base procedure, the high cost, modified claim would most likely be assigned to a higher reimbursement cluster where most of the blank claims are truly unmodified. These higher cost modified procedures would have been regarded as though they were appropriately coded and recorded. Second, the approach requires a sufficient number of claims with explicitly identified modifiers in order to reclassify any claims that might have reflected omissions. This weakness means that there are some procedures where claims are either not reclassified or disregarded entirely because of low volume. Third, we are assuming that all claims below a certain threshold should be reclassified, which would potentially inflate the reimbursement for that specific procedure. Given the aggregated nature of the data we received, this mixture modeling approach was the most appropriate way to account for missing modifiers in the data.

Of those procedures that we tested, we revised the follow proportion of claims:

Category	Percent of Claims Reclassified ⁵
Modifier 51	1.9%
Radiology 26	2.2%
Radiology TC – Outpatient Hospital (non-teaching)	7.1%
Radiology TC – Outpatient Hospital (teaching)	0.4%
Radiology TC – ASC	7.6%

Services Reimbursed as a Percent of Billed Charges

The desire of the Advisory Panel was to have reimbursement vary by procedure code for each non-inpatient fee schedule. For the majority of services this was possible, and the final fee schedules reflect this desire. However, in certain instances, procedure specific reimbursement was not possible due to coding conventions, highly variable reimbursement, and/or data limitations.

Some outpatient facility services (e.g., revenue codes 27X for medical/surgical supplies and implantable devices) have not historically been recorded to consistently include a procedure code on the claim. Claims for these services were reviewed to determine if a consistent fee per

⁵ Percent of claims for those CPT/HCPCS codes which the listed modifier is “prevalent” in the underlying data; we were unable to develop clusters of uncommon codes, and so we excluded them from the analysis and from the above ratios

transaction could be applied by individual revenue code. The data for these revenue codes showed too much variation in reimbursement to appropriately set a fee per transaction for each revenue code. Using revenue code 278, medical implants, as an example, this revenue code could represent items ranging in costs from a catheter to an implantable defibrillator or neurostimulator. As a result, the Advisory Panel, the Commission, and Oliver Wyman decided that reimbursing these un-coded services as a percentage of billed charges would be the most appropriate payment design.

There were some procedure codes (e.g., injectable drugs) where the data was also too limited to appropriately set a fee by procedure code. A review of the data showed inconsistent recognition of 'units' on the claim, which made determination of a precise fee schedule amount impossible. As an example, it was unclear from the data if one unit for HCPCS J0129, Abatacept (or Orencia), represented a consistent dosage across all claims, as different providers or payers may populate the units field differently. As a result, the Advisory Panel, the Commission, and Oliver Wyman decided that reimbursing these procedures as a percentage of billed charges would be the most appropriate payment design.

A breakdown of the percentage of historical reimbursement specified as being reimbursed as a percent of billed charges is below:

Claim Type	Percent of Reimbursement for Claim Type Tied to Charges	Percent of Total Reimbursement Tied to Billed Charges
Inpatient Facility	0.0%	0.0%
Outpatient Facility	27.6%	8.7%
Ambulatory Surgical Centers	6.9%	0.4%
Professional	2.6%	1.1%
Total		10.2%

In total, we estimate that approximately 10.2% of all claims will be reimbursed as a percentage of billed charges.

5. Modeling Methods

While the law prescribes certain characteristics and constraints that are to underlie the MFS, such as the medical communities, provider categories, and the reimbursement objective, it does not provide specific methodologies that must be used to develop the fee schedules. Rather, it indicates that the actuarial firm retained by the Commission is to work with the Advisory Panel to develop the methodologies to be employed. The law also provides guidance that statistically valid estimates of reimbursement are to be developed based on available data and that the fee schedules may, but are not required to, be based on applicable codes. Therefore, Oliver Wyman worked with the Advisory Panel to make a number of methodological decisions to ensure that all provisions of the law were fully satisfied when developing the MFS. Each method used was presented to the Advisory Panel, in many cases alongside alternate methods, and ultimately the Advisory Panel selected the desired methodology that was applied by Oliver Wyman.

Design of Fee Schedules

The Advisory Panel determined early on that it was their desire to develop fee schedules that were largely based on common coding conventions, and to minimize the number of services for which reimbursement was tied to a provider's billed charges. The decision to use common coding conventions (i.e., those currently used in practice and readily available on claim records) enabled consistency between the data supporting the MFS and the implementation requirements. It was, however, determined that certain procedures would ultimately need to be reimbursed as a percent of billed charges. The law specifies certain procedures that are excluded from the MFS and are instead reimbursed as a percent of charges as outlined in law (e.g., serious burns, certain traumas), and as previously discussed, the nature of certain other claims do not lead themselves to be reimbursed based on codes appearing on the claim record (e.g., claims billed using only revenue codes where services with wide variation in reimbursement are grouped together). However, fee schedules were developed with reimbursement based on various codes for roughly 90% of all claims that are subject to the MFS. The primary structure selected by the Advisory Panel for each fee schedule is summarized in the table below.

Fee Schedule Category	Primary Reimbursement Structure
Inpatient Facility, Non-rehabilitation	Specified reimbursement per admission based on DRGs, with outlier provisions applied
Inpatient Facility, Rehabilitation	Specified reimbursement per diem, varying by DRG or CMG
Outpatient Facility	Fixed amount per CPT or HCPCS code, adjusted for applicable modifiers
Ambulatory Surgical Centers	Fixed amount per surgery based on CPT code, adjusted for applicable modifiers
Anesthesia	A regional conversion factor multiplied times the sum of base units, time units, and physical status units, where base units vary based on CPT code

Fee Schedule Category	Primary Reimbursement Structure
Professional	Fixed amount per CPT or HCPCS code, adjusted for applicable modifiers
Other Providers of Medical Services	Mixture of fixed reimbursement per CPT or HCPCS code, and reimbursement per unit varying by HCPCS code, adjusted for applicable modifiers
Ambulance	Fixed amount per trip plus additional amount per mile

For simplicity, throughout the remainder of this section, we used the term “procedure” to at times broadly refer to the various services that fall under the MFS which include professional procedures, outpatient facility services, inpatient admissions, etc. Similarly, we use the term “code” to broadly describe the set of all coding conventions selected as the basis for the fee schedule structures (e.g., CPT, HCPCS, DRG).

Credibility

Credibility methods are foundational to the work supporting the MFS. The law requires that the MFS reflect statistically valid estimates of the reimbursement objective. These methods ensure that experience with sufficient stability and of sufficient number are relied upon appropriately, while ensuring that experience which is more volatile or comprised of fewer procedures are not inappropriately recognized.

Credibility is used to understand the degree to which we should regard an outcome as typical. For example, ten claims for the same procedure code with the following payments might be reflective of a typical result:

Example 1

1	2	3	4	5	6	7	8	9	10
\$99.80	\$99.90	\$100.00	\$100.00	\$100.00	\$100.00	\$100.00	\$100.00	\$100.10	\$100.20

These observations reflect an average reimbursement of \$100.00, and they do not reflect very much variation. Alternatively, the following pattern also reflects an average payment of \$100.00 with substantially more variation.

Example 2

1	2	3	4	5	6	7	8	9	10
\$65.22	\$69.17	\$69.17	\$73.12	\$77.08	\$84.98	\$96.84	\$116.60	\$148.22	\$199.60

With the first example, it is more appropriate to believe that \$100.00 is a typical result than it would be to make the same conclusion about the second example given the wide variation observed.

The specific technique that we applied is called limited fluctuation credibility theory (LFCT). For any given procedure, LFCT was used to establish the number of observations necessary to rely exclusively on Virginia's own experience to develop the proposed reimbursement amount. In other words, LFCT set a threshold beyond which the experience for a procedure could be deemed fully credibility. LFCT depends on the unit variance of a given set of observations, along with the number of those observations. We first calculated the unit variance by normalizing claims first for any geographic differences and then second by the average payment for a given procedure. From these normalized costs, we were able to estimate the approximate unitless standard deviation for any procedure. We then grouped procedures with similar dispersion measures into quartiles.

In addition to variance measures, credibility requires a specification of the confidence needed to ensure that the estimate is within some tolerance of the true underlying mean (i.e., average). Given a normal probability distribution, LFCT establishes a threshold around the mean that will not be exceeded with some specified level of statistical confidence. For example, if we target a threshold of +/- 5% around the mean with a confidence of 90% this means that we are only willing to accept a fee schedule where the scheduled amount is within +/-5% from the true mean at least 90% of the time. It is common actuarial practice to assume a threshold of 5% with a confidence of 90%. However, we explored different threshold levels and different confidence levels with the Advisory Panel. Relaxing either the threshold (allowing it to increase above 5%) or the confidence level (allowing it to fall below 90%) would allow more weight to be placed on the Virginia experience, but in trade would make the results less certain.

With guidance from the Advisory Panel, we employed a confidence level of 90% that the estimate would be within 10% of the true underlying mean. These estimates together support the following limits to assess full credibility of the observed average for inpatient services.

Inpatient Unitless Variation and Credibility Standards

Quartile	Coefficient of Variation	Full Credibility Threshold
1	0.38	39
2	0.49	65
3	0.57	87
4	0.82	181

For inpatient procedures with low variability (i.e., at the lowest quartile), we estimate that we would need at least 39 procedures in the experience to deem the experience fully credible. As the variability present increases with each subsequent quartile, a larger number of procedures must be present in the experience before full credibility is assigned. A higher level of confidence or tighter range for the thresholds would have increased the number of observations needed to achieve full credibility. A similar approach was taken when assigning credibility to the experience for other provider groups.

Structured versus Flexible Approach

As previously noted, the approach to developing the MFS as prescribed by law is very different than medical fee schedules utilized by many other states which base their medical fee schedules on Medicare, or other resource based approaches. The approach taken in Virginia is unique, and has the goal of preserving average historical differences in reimbursement by provider group and medical community. To accomplish this goal, the Advisory Panel set forth a core requirement that the MFS be based on actual Virginia reimbursement during the experience period, to the extent that statistically credible and reliable information were available.

The approach to the MFS development taken in Virginia is unique

We presented two primary overarching approaches for the Advisory Panel's consideration: a structured approach designed to reflect variation in average historical reimbursement rates by provider group and medical community observed in Virginia, and a more flexible approach that additionally allows for the recognition of differences in reimbursement at the procedure level, where statistically credible.

Structured Approach

The structured approach relies on developing a set of experience based relative value units (RVUs) for the various codes to define the expected cost differential between two given procedures, and a set of geographic factors to define the expected cost differential between two given medical communities. To the extent that when examining experience across all regions, total services/admissions for a given procedure are determined to be fully credible, actual data would be used to develop the RVU for that code. If the experience for a given code, when examined across all regions, is not considered fully credible, the development of the corresponding RVU would need to be supplemented with an alternative fully credible data set. By examining data across all regions, the structured approach increases the ability to rely on Virginia specific experience for these RVUs because experience across all regions will be more credible than the experience within a region.

Under the structured approach, a statewide average reimbursement per RVU is then developed from the experience. The average reimbursement represents the cost for a hypothetical procedure with a 1.0 RVU and a 1.0 geographic factor. This statewide average reimbursement per RVU is developed by solving for the value, that when combined with the RVUs and geographic factors developed, would produce fees that generate the same overall reimbursement as that underlying the experience used to develop these factors. Once the statewide average reimbursement per RVU, the RVUs, and the geographic factors are determined, the reimbursement for procedure i in region j is developed using the following formula:

$$\text{Statewide Average Reimbursement per RVU} \times \text{RVU}_i \times \text{Geographic Factor}_j$$

Flexible Approach

The flexible approach differs from the structured approach in that Virginia experience is relied upon to determine the reimbursement amount for each procedure within each provider group

and medical community. To the extent that the experience for a given procedure in a given medical community is determined to be fully credible, the fee schedule amount for that procedure in that medical community is based on the actual experience. When the experience is not determined to be fully credible, the experience is relied on only to the extent it is credible, and is blended with a fully credible manual rate. Under the flexible approach, the reimbursement for procedure i in region j is developed using the following formula:

$$[Actual\ Average\ Reimb_{i,j} \times Credibility_{i,j} + Manual\ Rate_{i,j} \times (1 - Credibility_{i,j})] \times Scaling\ Factor_j$$

The formula above requires a unique scaling factor for each region, whereas the structured approach did not. The need for a scaling factor in this approach is due to the reliance on a manual rate which may be higher or lower than the actual experience, and therefore when the experience is blended with the manual rate, the results will likely not produce the same level of overall reimbursement for a fee schedule (i.e., by provider group and medical community) as that which underlies the experience used to develop the fee schedule. Due to the revenue neutrality requirement outlined in law, the scaling factor is adjusted until the application of the resulting fee schedule to the claims underlying the experience used to develop the fee schedule produces reimbursement equal to that underlying the experience.

The following chart summarizes some of the strengths and weakness of the two approaches that were considered.

Structured Design	<p>Strengths</p> <ul style="list-style-type: none"> • The fee schedule would have greater consistency across services • The fee schedule would be easier to update and administer 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Could lead to significant reimbursement changes for some providers and certain procedures • Variation in costs among procedures will be less representative of actual reimbursement in Virginia
Flexible Design	<p>Strengths</p> <ul style="list-style-type: none"> • Providers and carriers will see less variation from 2015 to 2018 on a service-by-service reimbursement basis • The variation in reimbursement among procedures will more closely reflect actual experience • The values are relatively easy to estimate with limited reliance on outside sources 	<p>Weaknesses</p> <ul style="list-style-type: none"> • The fee schedule design may lack consistency from service-to-service (e.g., reimbursement for a 20 minute office visit could be only a few dollars more than a 10 minute office visit) • Estimates will rely on data with potentially few observations and limited credibility

Selected Approach

The Advisory Panel ultimately elected to employ the flexible approach. The flexible approach allowed for greater recognition of observed historical variation in reimbursement by individual procedure; this recognition of historical variation was one of the attractive features that led to its selection. As a result, however, there will be differences in rate relativities across medical

communities and between certain provider groups, and these relationships will vary at the procedure level. For example the relative cost between procedure A and procedure B could be very different in Region 1 than in Region 2.

The Advisory Panel selected a flexible approach to developing the MFS

There was also recognition that the mix of services and associated costs underlying the experience likely varies by provider. As a result, application of the flexible approach to the experience for certain procedures, even if fully credible by a statistical standard, could lead to anomalous results simply due to differences in underlying mix of services by provider. For example, the experience may indicate that the reimbursement for a specific type of MRI should be greater than the reimbursement for that same type of MRI with contrast agent used, simply because more MRIs with contrast agent are provided by lower cost providers than MRIs without contrast agent. While there was great desire to employ a methodology that relied on actual Virginia experience to the maximum extent possible, the type of result presented in this example would be irrational. Therefore, additional adjustments were applied, as described later in this report.

Manual Rate

As described above, for procedures with claims that are not considered fully credible, credibility theory requires that we identify a “manual rate.” This manual rate represents a theoretical estimate of the underlying costs and is blended with the experience in a prescribed fashion when the experience is not fully credible. The formula to blend the experience and the manual rate is the following:

$$\text{Procedure Estimate}_i = Z_i \times \text{Average Experience Claims}_i + (1 - Z_i) \times \text{Manual Rate}_i$$

where

$$Z_i = \sqrt{\frac{\text{Observed Claims}_i}{\text{Claims Needed for Full Credibility}_i}}$$

One of the primary challenges we faced when developing the manual rate for the MFS was that we were only able to assess the reimbursement relationship among procedures when the experience was sufficiently credible. In cases where there was no historical experience (or little historical experience), there was very little to suggest what the appropriate fee should be.

We addressed these issues by building the manual rate from resource based relative value units. For non-inpatient procedures, NCCI experience for the five year period 2011 – 2015 across all medical communities was utilized to develop the relative value units for each procedure, separately by provider group. In developing the relative value units for a given code within a provider group and medical community, the experience was first normalized for geographic differences and trended to January 1, 2015, the midpoint of the reimbursement objective period outlined in the law. For inpatient admissions, 2014 and 2015 experience statewide was used. This allowed for the manual relative value units to be based on relative differences in reimbursement among procedures as observed in the Virginia market.

To the extent that the claims for a given code across all available years of experience and all medical communities was determined not to be fully credible, the manual relative value units were supplemented with an external set of fully credible relative value units. The relative value units used to develop the manual rate were then based on a credibility blend of the relative value units developed from all available years of statewide experience across all medical communities and the external source of relative value units based on the following formula, where Z_i represents the credibility of the relative value units based on the statewide experience for procedure i .

$$\text{Manual Rate RVU}_i = Z_i \times \text{Statewide RVU}_i + (1 - Z_i) \times \text{External Source RVU}_i$$

Once a set of fully credible relative value units are developed, the manual rate was produced using a formula similar to that described above for the structured approach. Specifically, a base conversion factor was multiplied times a geographic factor and the manual relative value units. The manual rate for procedure i in region j is developed using the following formula:

$$\text{Manual Rate}_{i,j} = \text{Base Conversion Factor} \times \text{Manual RVU}_i \times \text{Geographic Factor}_j$$

Lesser-of Clause

The law specifies that fees will be limited to “the lesser of the billing amount or the amount for the fee scheduled medical service.” This lesser-of clause creates some challenges when determining revenue neutrality with regard to the fee schedule. The following table will illustrate the issue:

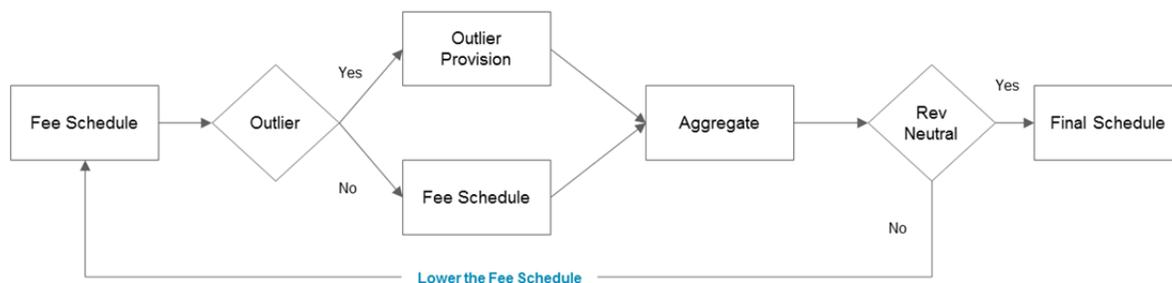
Services	Billed Charge	Reimbursement
10	\$156	\$125
20	\$138	\$110
40	\$125	\$100
20	\$113	\$90
10	\$94	\$75

The sample claims above are intended to represent the experience for a given procedure within a provider group and medical community. The service-weighted average reimbursement observed in the experience is \$100 per service. However, if we assume the fee schedule would recognize \$100 per service, then there is a provider (or group of providers) that have billed charges of \$94 which are less than the fee scheduled amount and would theoretically be reimbursed \$94, bringing the average down to something below revenue neutrality (in the example above, bringing the service-weighted average reimbursement down to \$99.40 per procedure). Given the \$99.40 service-weighted average reimbursement is below the service-weighted average reimbursement of \$100 reflected in the experience, the fee schedule would need to be adjusted. The process of adjusting the fee schedule is described further in the revenue neutrality section that follows.

Outlier Provisions

The law recognizes the potential for inpatient service costs exceeding the fee scheduled reimbursement. This recognition is reflected as an outlier provision in §65.2-605 H. Specifically, the provision, as originally passed, clarified that inpatient facilities with billed charges in excess of 150% of the fee scheduled reimbursement rate will receive the fee scheduled reimbursement plus 80% of the provider's billed charges in excess of that 150% threshold. However, the law further clarifies that the Commission is instructed to lower the outlier threshold if fewer than 5% of claims reach that threshold; it is also instructed to increase the outlier threshold if more than 10% of claims reach that threshold.

In evaluating the inpatient fee schedule for revenue neutrality, we considered the degree to which this outlier provision would influence the final results. Our initial evaluation of the inpatient fee schedule suggested that a significant percentage of inpatient services would be subject to the outlier provision as outlined in the law. Just as the lesser-of clause served to reduce the effective reimbursement (necessitating an upward adjustment to the fee schedule), the outlier provision served to increase the effective reimbursement. However, unlike the lesser-of clause, reductions to the fee schedule to correct for these enhanced payments, created a recursive process that reduced the fee schedule to unacceptable levels. The following diagram addresses the issue:



As the fee schedule is reduced to ensure revenue neutrality, more and more services become subject to the outlier provision, which necessitates an additional reduction to the fee schedule, etc.

As a result, the Advisory Panel elected to increase the initial outlier threshold so that inpatient facilities with billed charges in excess of 300% of the fee would receive reimbursement beyond what is contemplated in the fee schedule, and this higher initial outlier threshold was subsequently enacted in law. In our analysis, Oliver Wyman estimates that approximately 6.4% of admissions are expected to breach the 300% outlier threshold.

Smoothing

Because the MFS are based on experience, not expected resource use, there was the possibility that related services might reflect inappropriate relativities (e.g., pneumonia with complications showing lower reimbursement than pneumonia without complications). In order to correct for inappropriate rate relativities of this kind, we applied a smoothing technique to the

initial MFS results to ensure these inappropriate relativities were corrected where possible. For non-inpatient claims, we relied heavily on procedure groupings as found in the *Physicians' Current Procedural Terminology* (CPT®) published by the American Medical Association (AMA) along with RVUs from the Resource Based Relative Value System (RBRVS). For inpatient claims, we relied on the DRG weights from the Inpatient Prospective Payment System. The RBRVS RVUs and DRG weights were used as a guide to identify directionally inconsistent fees. In general, CPT groupings of eight procedures or less were targeted, while inpatient DRGs were typically placed into groups of three.

For all procedures that fell within the same procedure grouping, the relative differences in reimbursement found on the initial fee schedule were compared to the relative differences suggested by the corresponding RVUs or DRG weights. Where counterintuitive results were found, the initial reimbursement for the procedures in that grouping were smoothed to produce relative reimbursement differences with directional relationships more in line with those suggested by the RVUs and DRG weights. For example, assume procedure A was assigned an RVU of 1.0 and procedure B was assigned an RVU of 1.5. If it was found that the reimbursement on the initial MFS for procedure B was less than the reimbursement for procedure A, the reimbursement amounts for all procedures in the group were adjusted to align more closely with the RVUs.

In making the adjustments, the credibility assigned to the experience underlying each procedure in the grouping was considered. Therefore, the relationships for the most credible codes in the grouping could continue to be somewhat inconsistent with the relationships suggested by the RVU or DRG weights after the smoothing technique was applied. When employing this smoothing technique, the adjustments applied to the initial MFS amounts were constrained to ensure that, within each procedure grouping, total reimbursement produced by the adjusted fee scheduled amounts was equal to the reimbursement produced by the initial fee scheduled amounts.

Adjustments for Modifiers

As discussed in the prior section, we believed that many of the modifiers in the data reflected revisions to reimbursement that necessitated adjustment to the base data. For example, we were concerned that the presence of claims with modifiers 50 (bilateral procedures) and 51 (multiple procedure reductions) had the potential to over or understate the underlying fee if they were included in the estimates without adjustment. These changes were particularly challenging for radiology services, where it was important to not only identify the presence of the modifier, but estimate its effect on reimbursement.

Proper treatment of claims with modifiers was crucial to the development of accurate MFS

Therefore, when a modifier adjustment for a given claim was unclear, that claim was removed from the data when developing the initial fee scheduled amounts. However, these withdrawn claims were reintroduced for the calculation of revenue neutrality. We were able to gather information on various payment adjustment multipliers utilized by several large commercial carriers. We found that the reimbursement adjustments were quite similar across the carriers.

The following table reflects the adjustment percentages published and employed by commercial carriers for modifiers 50 (bilateral procedures) and 51 (multiple procedure reductions).

Commercial Carrier Treatment of Key Modifiers Impacting Payment

Carrier	Modifier Adjustment	
	50	51
Anthem	150% bilateral adj.	100% for primary surgery, 50% for each additional
UnitedHealthcare	150% bilateral adj.	100% for primary surgery, 50% for secondary surgery, 25% for each additional
Humana	150% bilateral adj.	100% for primary surgery, 50% for secondary surgery, 25% for each additional
Cigna	150% bilateral adj.	100% for primary surgery, 50% for each additional
Empire BlueCross BlueShield	150% bilateral adj.	100% for primary surgery, 50% for each additional
Tufts	150% bilateral adj.	100% for primary surgery, 50% for each additional
Assumption Selected	150% bilateral adj.	100% for primary surgery, 50% for each additional

We worked with the Advisory Panel to establish desired payment adjustment multipliers to assign to each type of modifier. The selected payment adjustment multipliers will be used for making adjustments to the fee scheduled amounts once the MFS are implemented. For consistency, we also used the selected payment adjustment multipliers in applying the re-adjudication methodology for determining revenue neutrality as described below.

Further, not all CPT codes are subject to bilateral procedure or multiple surgery adjustments. The applicability of modifiers 50 and 51 to each procedure was determined based on whether they apply under the RBRVS fee schedule. These determinations were employed consistently in the revenue neutrality calculation and were also included in the final MFS.

Revenue Neutrality

Revenue neutrality is a critical requirement of the law and was a paramount consideration in all steps taken to develop the fee schedule. Specifically, the law requires that the MFS must produce reimbursement that is consistent with reimbursement for fee scheduled medical services provided during 2014 and 2015. We satisfied this requirement by ensuring that the claims used to develop the MFS would, in aggregate, be reproduced when applying the final fee schedule to every encounter in the claim files. The criterion was applied separately for each

combination of provider group and medical community, as outlined in the law. For example, the MFS developed for surgeons in Region 2 must produce the same overall reimbursement when applied to all encounters for surgeons in Region 2 in the claim files used to develop the MFS.

Further, all other MFS provisions (e.g., outlier provisions, lesser-of clause, modifiers) were applied when determining revenue neutrality. This was accomplished by utilizing a re-adjudication methodology that examined the data fields available on each claim record to simulate reimbursement, and adjusting the applicable amount presented on the MFS where necessary. For example, if the billed charge amount present on a claim was less than the applicable amount on the MFS, the modeled reimbursement was set equal to the billed charge amount. Likewise, if an inpatient facility claim reflected billed charges that breached the outlier threshold, the applicable outlier provisions were applied to determine the appropriate reimbursement amount. The adjusted procedure estimates were then aggregated across all claims to determine the total reimbursement for the provider group and medical community.

The law requires that the MFS must produce reimbursement that is consistent with reimbursement for fee scheduled medical services provided during 2014 and 2015

To the extent that the total reimbursement produced for the provider group and medical community did not reproduce the aggregate claims used to develop the MFS, each procedure within a given provider group and medical community was adjusted by a scalar to ensure that revenue neutrality was maintained. Put differently, a scalar was determined to satisfy the following equation for each fee schedule,

$$Total\ Reimbursement = \sum_i Observed\ Claims \times Procedure\ Estimate_i$$

The scalar was adjusted so that total reimbursement resulting from the equation above was equal to the actual reimbursement underlying the data used to develop the fee schedule, for each provider group and medical community combination. To reflect the application of the scalar, the earlier credibility equation above can be restated as follows:

$$Procedure\ Estimate_i = [Z_i \times Average\ Experience\ Claims_i + (1 - Z_i) \times Manual\ Rate_i] \times Scalar$$

We note that in developing the MFS to achieve revenue neutrality we made no assumption about changes in charge masters, reactions of carriers, or changes in patterns of care.

6. Feedback Summary and Results

Stakeholder Feedback

As outlined in the Fee Schedule Background section of the report, Final Draft MFS were made available to the public through the Commission's website from January 19, 2017 through February 15, 2017. These documents were downloaded from the Commission's website 277 times, by 219 unique entities. The following table summarizes the download activity by week, and by type of entity.

Draft Fee Schedule Download Activity

Type of Entity	Week of 1/16	Week of 1/23	Week of 1/30	Week of 2/6	Week of 2/13	Total
Health Provider	33	16	19	20	6	94
Claims Administrator	6	5	1	0	3	15
Self Insured	6	9	1	6	3	25
Group Self-Insured	0	1	0	0	0	1
Attorney	6	0	1	2	0	9
Advisory Panel Member	2	0	0	0	0	2
RFP Respondent	3	0	0	0	0	3
Insurance Carrier	1	16	6	5	2	30
Case Management	0	4	3	2	0	9
State Agency	0	3	1	0	0	4
Bill Review Company	0	0	0	1	0	1
Association Group	0	2	0	0	0	2
Home Health Agency	0	0	0	0	1	1
Information Technology	0	0	0	0	1	1
Consultant	0	0	0	0	1	1
Unknown	6	11	3	4	0	24
Total Entities	63	67	35	40	14	219
Total Downloads*	69	80	48	52	28	277

*Total downloads are greater due to multiple individuals from some entities downloading the Medical Fee Schedule

The MFS were released in draft format in order to obtain preliminary feedback from stakeholders related to the following:

- The proposed structure of the MFS,
- Stakeholders' estimates of the impact the MFS would have on their reimbursement,
- Areas of the MFS that were confusing or where application of the MFS was unclear,
- Suggestions for revisions or improvements in the layout or presentation of the MFS, and
- Any other concerns that stakeholders may have had

Over the period January 19, 2017 through February 15, 2017 interested stakeholders were able to test, analyze, and provide feedback on the Final Draft MFS. Although stakeholders were invited to provide any feedback they felt was relevant, a feedback questionnaire was provided with the Final Draft MFS that included a series of targeted questions in which Oliver Wyman and the Advisory Panel were most interested. In addition to receiving written feedback during this period, Oliver Wyman participated in several phone calls with stakeholders to answer questions on the Final Draft MFS, while receiving additional verbal feedback.

At the close of the stakeholder review and feedback period, written responses were received from 21 distinct entities. Feedback was provided by a variety of stakeholders including employers, insurers, hospitals, physicians, bill review companies and associations. Over the period February 15, 2017 through March 9, 2017, Oliver Wyman compiled the feedback received on the Final Draft MFS and provided the Advisory Panel with a summary. Roughly 200 comments were received from the 21 entities covering a wide range of topics.

Oliver Wyman highlighted for the Advisory Panel those comments which were frequent, and those areas that seemed likely to lead to potential changes. Many comments expressed stakeholders' discontent with certain provisions of the Final Draft MFS that were specified within the law (e.g., dislike for the medical communities selected). Given that revisions could not be introduced that would be in direct conflict with the law, these comments were not considered when developing a list of potential changes for the Advisory Panel's consideration. However, these comments were noted in the detailed summary provided to the Advisory Panel for consideration when making changes to the law in the future.

Several providers also submitted their assessment of how they felt the MFS would impact their overall reimbursement. Comments were diverse, with providers indicating that reimbursement would increase, decrease, or stay relatively the same. This is to be expected given the goal of the MFS is to reflect average reimbursement levels. Areas where feedback was either common or had the potential to impact revisions to the MFS are summarized in the following table.

Fee Schedule Topic	Type of Feedback Received
Surgeon/Physician Non-surgeon Fee Relationship	<ul style="list-style-type: none"> Questions/concerns related to the definition of surgeons, codes included on the physician non-surgeon fee schedules, and relationship between fees on the surgeon and physician non-surgeon fee schedules
Modifiers and Multiple Procedures	<ul style="list-style-type: none"> Request to provide clarification on how multiple surgical procedures are to be identified and inclusion of payment adjustment percentages for modifiers not outlined in law
Data Limitations and Issues	<ul style="list-style-type: none"> Questions/confusion around the data used, volume of data used, and data validation
Revenue Neutrality	<ul style="list-style-type: none"> Questions on how revenue neutrality was achieved or could be achieved, lack of consideration for market reactions
Fluoroscopy Services	<ul style="list-style-type: none"> Request to include reimbursement for stand-alone fluoroscopy procedures in an ASC
Trauma/Burn Center Claims	<ul style="list-style-type: none"> Questions around how traumas/burns are defined, how associated professional claims will be identified

Fee Schedule Topic	Type of Feedback Received
Implantable Devices	<ul style="list-style-type: none"> Stakeholders questioned why a cost plus method was not used, and requested clarity around invoice requirements
Anesthesia	<ul style="list-style-type: none"> Request for clarification of reimbursement for CRNAs
Billed Charges	<ul style="list-style-type: none"> Concerns over reimbursement as a % of billed charges
New Technology	<ul style="list-style-type: none"> Clarity around definition of new technology, require manufacturer invoice

Several comments were received related to stakeholder’s lack of understanding of how the MFS were developed. We note that the information provided with the Final Draft MFS was not intended to provide an overview of the process used to develop the MFS, but rather instruction and guidance as to how the MFS would be implemented. However, it is anticipated that many of the stakeholders’ questions related to data and methodology would be addressed by this report.

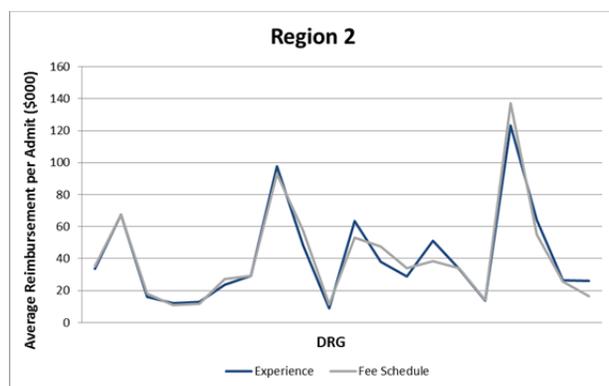
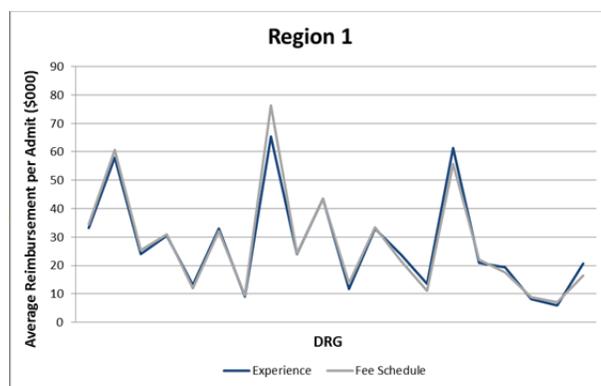
Based on the stakeholder feedback, Oliver Wyman worked with the Advisory Panel to identify revisions that would better support the principles underlying the MFS development. On March 23, 2017 Oliver Wyman met with the Advisory Panel to review the proposed changes and their impact, and the Final MFS were delivered on April 8, 2017. On April 10, 2017 the Commission reviewed and approved the Final MFS.

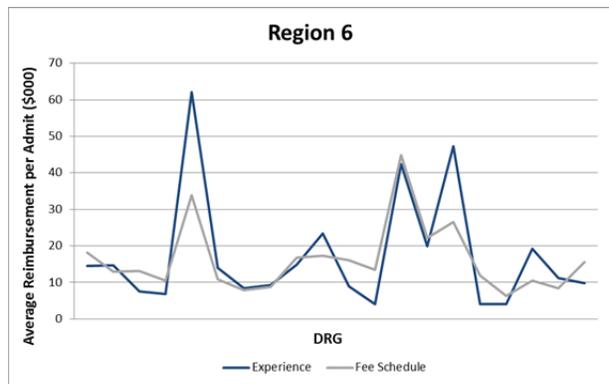
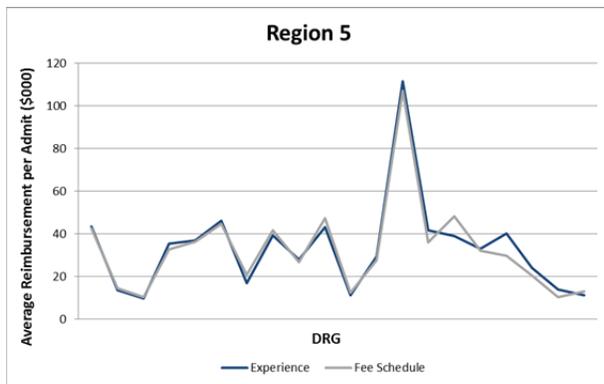
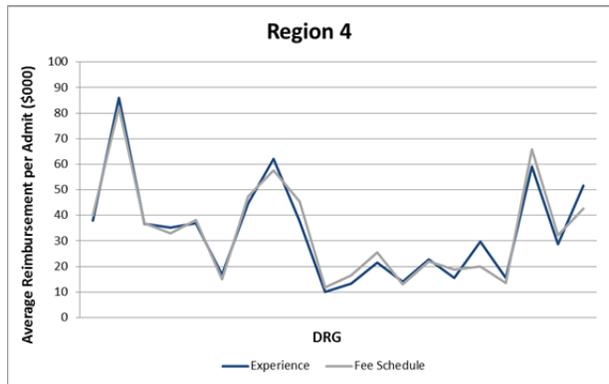
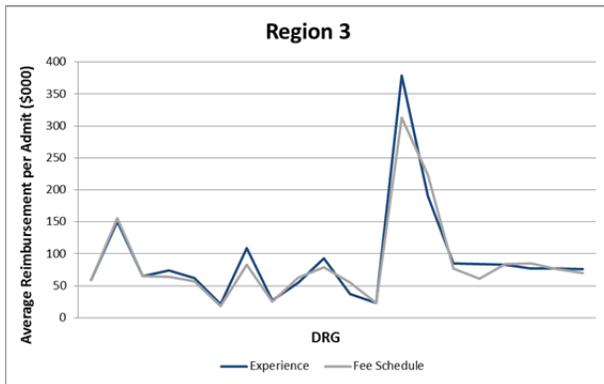
Final MFS Results

This section, primarily through a series of graphs and charts, presents summaries of the results from applying the methodology described in the prior section. These graphs and charts provide various information such as how the final MFS compare to the underlying base experience and how the relative reimbursement differential between procedures compares across the medical communities. They are a subset of the information examined throughout the MFS development.

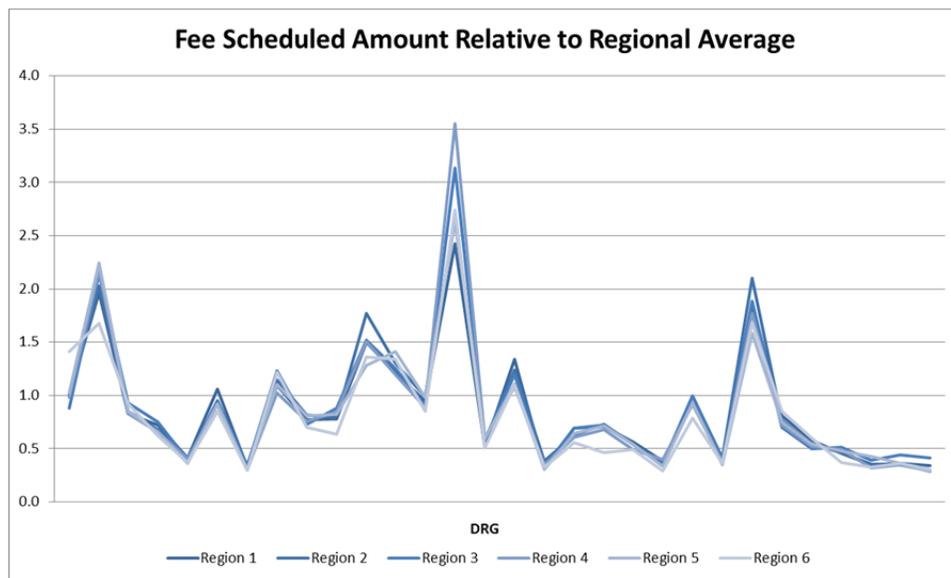
Inpatient – Other than Type One Teaching Hospitals

In all six medical communities, the final fee scheduled amounts align well with the experience underlying the development of the MFS for the 20 most frequent DRGs. The fit in Region 6 shows more variation, however the experience in Region 6 possesses very low credibility. Note that the 20 most frequent DRGs shown are specific to each region. Further, the procedures in each region are placed along the x-axis from most frequent in that region to the 20th most frequent as you move from left to right across the graphs.





A comparison of the ratio of the fee scheduled amount to the regional average reimbursement per admission for the 30 most frequent DRGs shows there is general consistency by region in the relative cost among these 30 DRGs. These 30 DRGs represent 56% of all admissions at Other than Type One Teaching Hospitals.



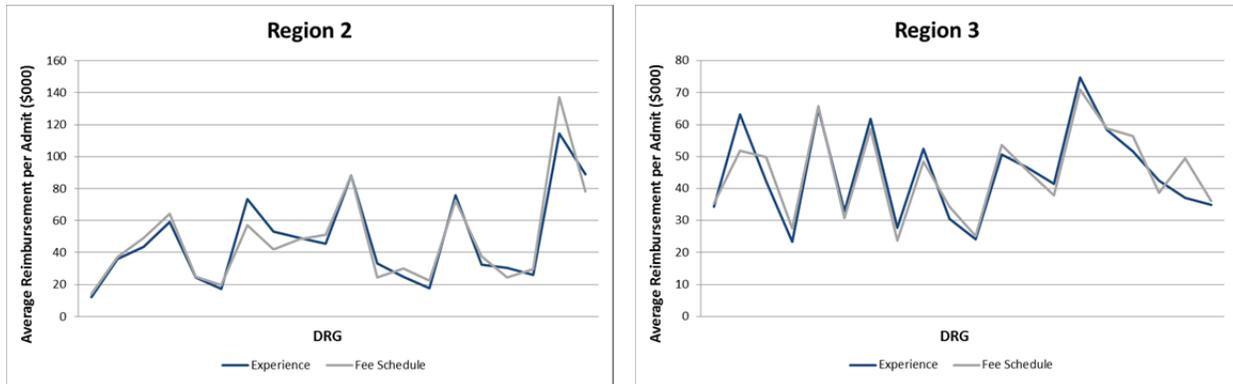
Given the goal of the MFS is to develop reimbursement that represents the historical observed average in each medical community and is revenue neutral in aggregate, the impact of implementing the MFS will vary significantly by hospital. Higher cost hospitals will experience decreases in their revenue while lower cost hospitals will experience increases. The following table demonstrates the expected impact in inpatient revenue for each of the 14 Other than Type One Teaching hospitals that submitted valid data for use in developing the MFS. As can be seen from the table, the impact to provider's overall reimbursement will range from a 16.4% decrease to a 31.0% increase. The overall variance is 0.1% rather than 0.0% due to limited data in Region 6 which did not allow us to achieve complete revenue neutrality in that region while also creating a fee schedule that was rational.

Impact on Reimbursement by Hospital

Provider	Variance to Actual
Provider A	-16.3%
Provider B	0.9%
Provider C	1.0%
Provider D	31.0%
Provider E	-16.4%
Provider F	-8.4%
Provider G	-0.6%
Provider H	-0.7%
Provider I	-3.2%
Provider J	-2.2%
Provider K	5.3%
Provider L	9.4%
Provider M	11.9%
Provider N	25.3%
Total	0.1%

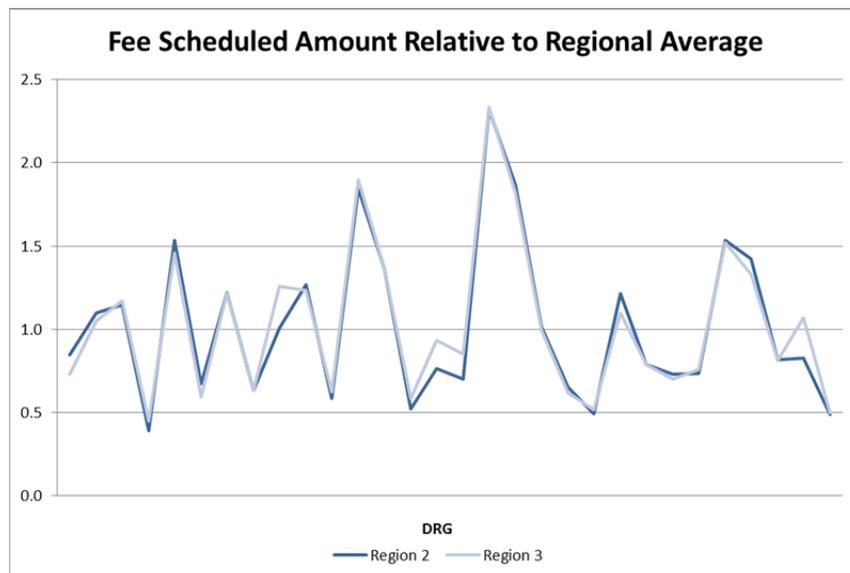
Inpatient – Type One Teaching Hospitals

There are two Type One Teaching Hospitals in the Commonwealth which are located in separate medical communities. Below is a comparison of the fee scheduled amounts to the average reimbursement in the data underlying the development of the MFS for the 20 most frequent DRGs in each region.



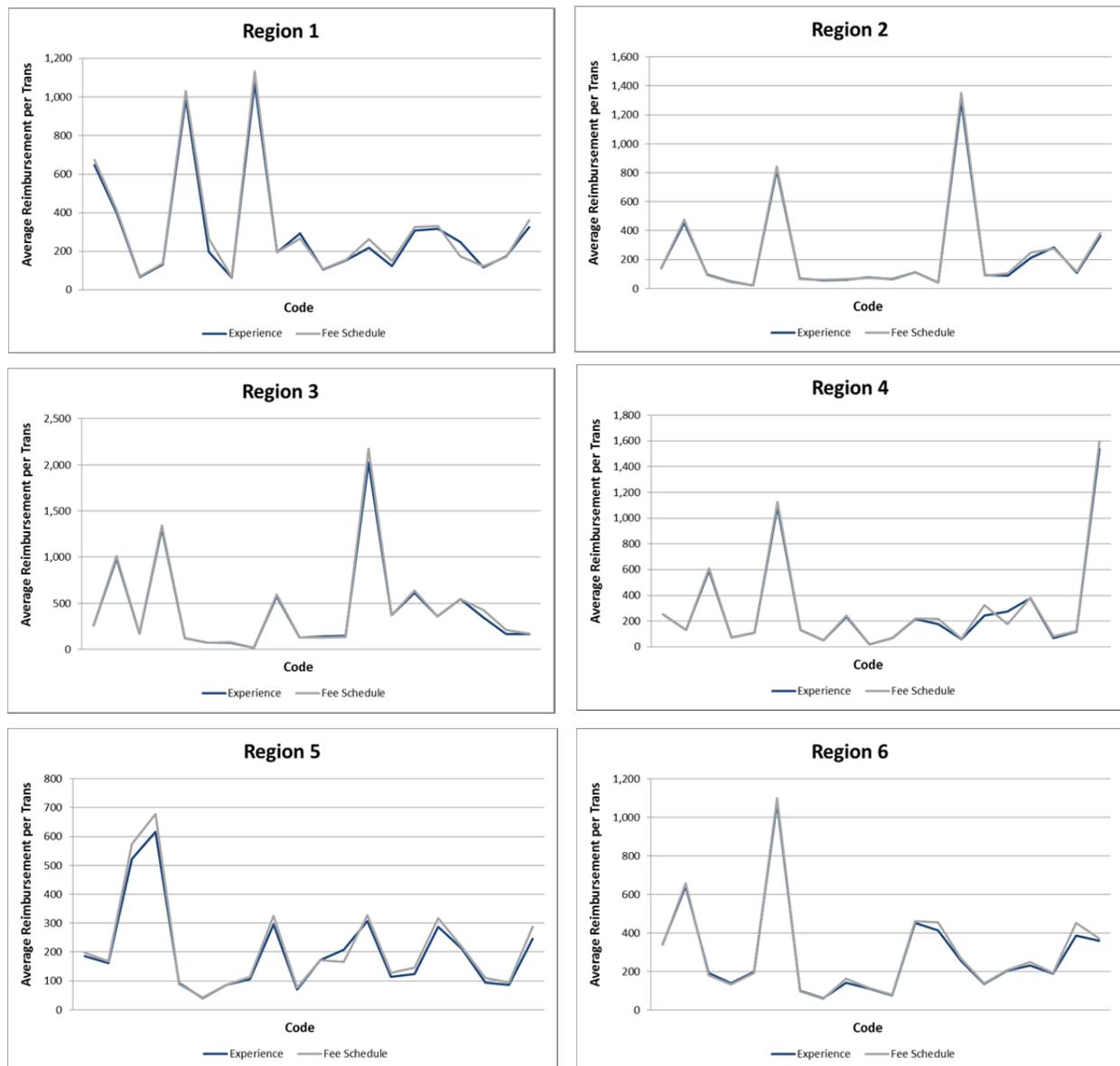
Teaching Hospitals submitted data for the analysis, therefore it is not surprising that when comparing the fee scheduled amounts to the data underlying the development of the MFS for the 20 most frequent DRGs they align well. At the same time, given there is only one hospital in each medical community, the experience for any given DRG was limited, and a manual rate was relied on where necessary. The graphs above show that manual rates aligned well with the actual experience, and the introduction of the manual rate did not lead to rate relativities within the MFS that were significantly different from the experience.

Similar to the Other than Type One Teaching Hospitals, a comparison of the ratio of the fee scheduled amount to the regional average reimbursement per admission for the 30 most frequent DRGs shows there is general consistency by region in the relative cost among these 30 DRGs. These 30 DRGs represent 67% of all admissions at Type One Teaching Hospitals.

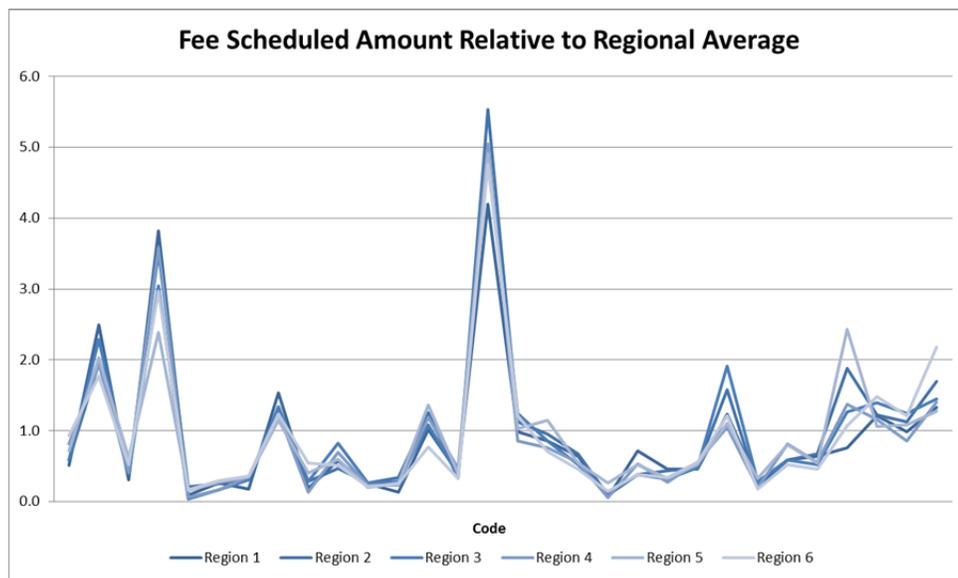


Outpatient – Other than Type One Teaching Hospitals

In all six medical communities, the final fee scheduled amounts for the 20 most frequent outpatient procedures align well with the experience underlying the development of the MFS. Please note that the 20 most frequent procedures shown are specific to each region. Please also note that these graphs only consider results for services that will be reimbursed based on a CPT or HCPCS code. Services that will be reimbursed on a percentage of billed charge basis under the MFS are not included.



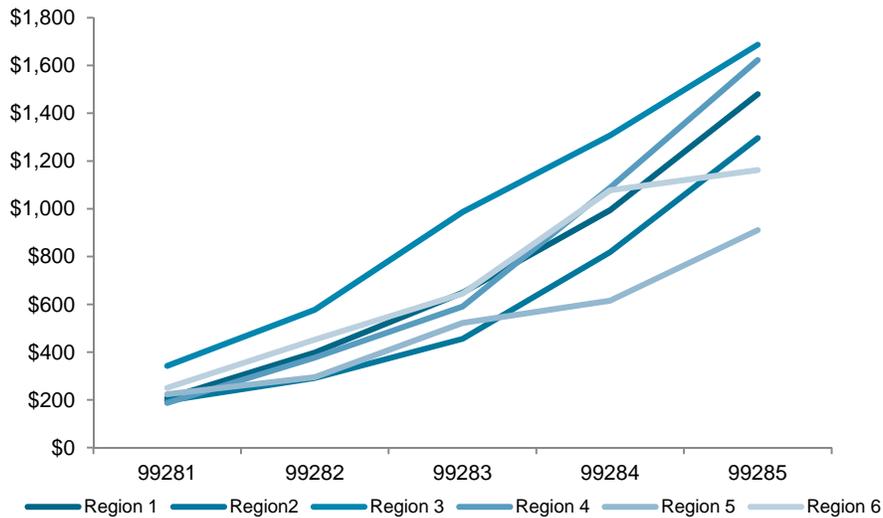
A comparison of the ratio of the fee scheduled amount to the regional average reimbursement per service for the 30 most frequent CPT/HCPCS codes shows there is general consistency by region in the relative cost among these 30 DRGs. The most frequent codes are shown on the far left of the graph, so the cause of additional variability toward the right side of the graph is due to less credibility being assigned to these codes. These 30 CPT/HCPCS codes represent 60% of all services at Other than Type One Teaching Hospitals that will be reimbursed based on a CPT/HCPCS code.



The chart below and the graph that follows provide a sample of the final Outpatient fee schedule for Other than Type One Teaching Hospitals for emergency room visits. These are high frequency CPT codes with experience that is largely credible in each region. The smoothing technique employed helps ensure that reimbursement under the MFS will, in general, increase as the intensity of the service increases. However, there are some cases such as for codes 99284 and 99285 in Region 6, where the experience suggests the reimbursement for these two codes should be much closer than in other regions. Given this did not violate the directional relationships suggested by the RVUs employed as part of the smoothing technique, this relationship was allowed to persist. This is consistent with the Advisory Panel’s desire to reflect these types of patterns present in the Virginia market, to the extent that the data were credible.

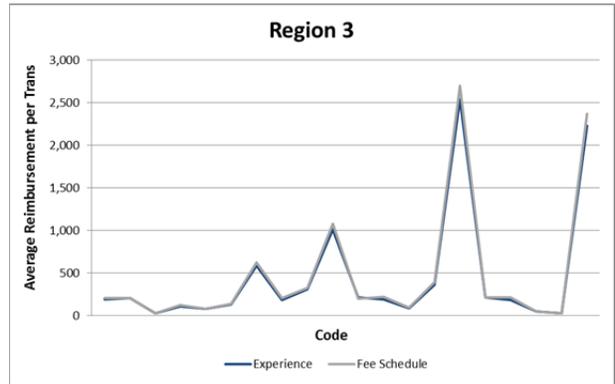
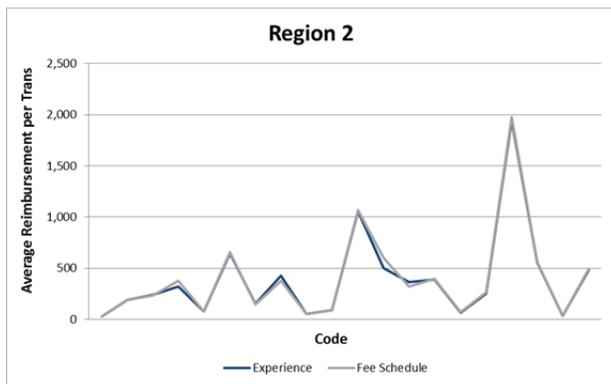
Emergency Room Cost per Service

Region	99281	99282	99283	99284	99285
1	\$215	\$414	\$675	\$1,033	\$1,538
2	206	310	479	859	1,366
3	352	594	1,016	1,346	1,734
4	194	392	614	1,131	1,688
5	249	326	581	681	1,004
6	256	463	663	1,115	1,208



Outpatient – Type One Teaching Hospitals

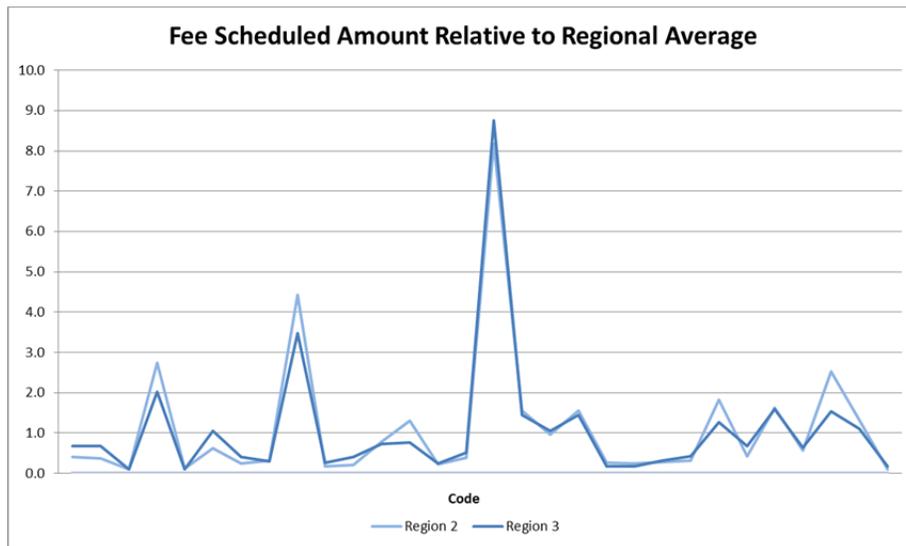
As with inpatient, there are two Type One Teaching Hospitals in the Commonwealth that provide outpatient services. Below is a comparison of the fee scheduled amounts to the average reimbursement in the data underlying the development of the MFS for the 20 most frequent procedures in each region. Please note that the most frequent procedures are unique to each region.



Again, there is only one Type One Teaching Hospital in each region. When comparing these 20 fee scheduled amounts to the data underlying the development of the MFS, it is not surprising that they align well when compared to their own experience. In fact, the alignment is better than was present in the inpatient fee schedules. The experience for most of the frequent inpatient

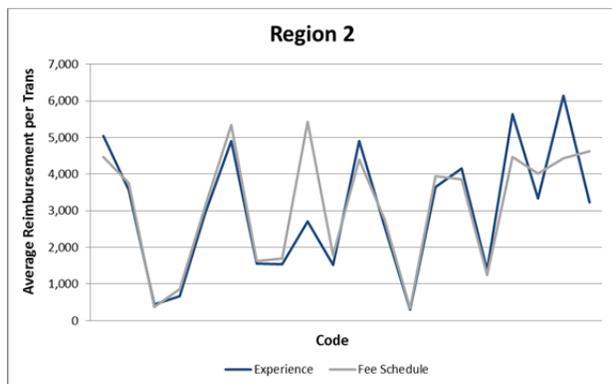
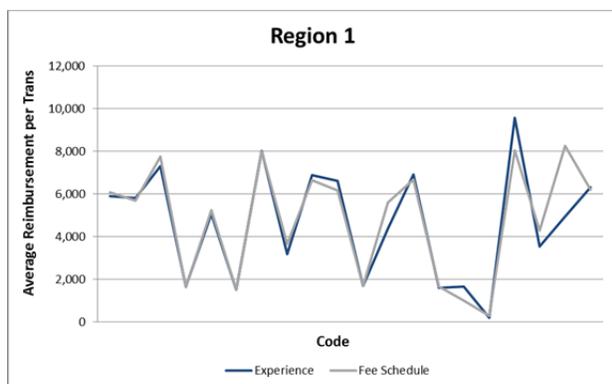
procedures is not fully credible, while the credibility of these 20 procedures is much higher for outpatient services.

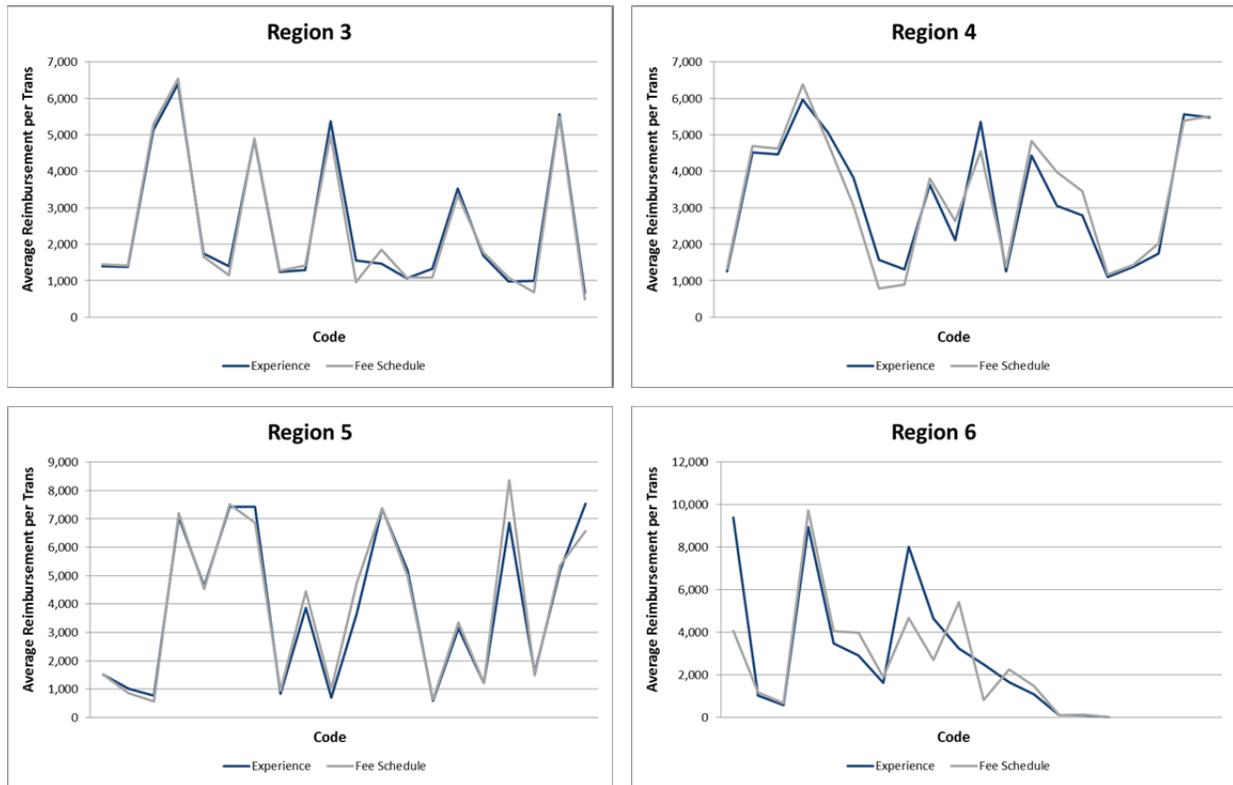
Similar to the Other than Type One Teaching Hospitals, a comparison of the ratio of the fee scheduled amount to the regional average reimbursement per admission for the 30 most frequent CPT/HCPCS shows there is general consistency by region in the relative cost among these 30 CPT/HCPCS. These 30 CPT/HCPCS represent 45% of all services at Type One Teaching Hospitals that will be reimbursed based on a CPT/HCPCS code.



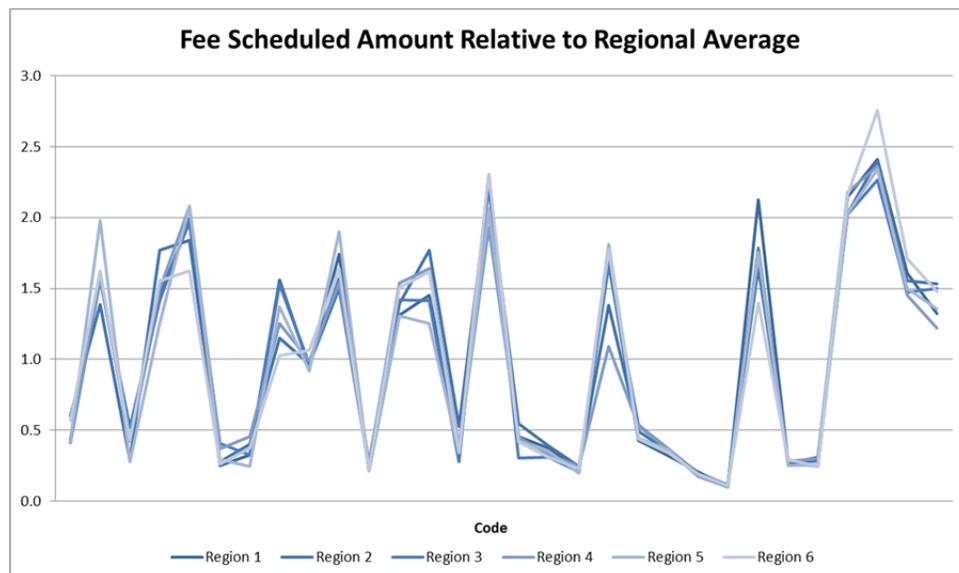
Ambulatory Surgical Centers

In all six medical communities, the final fee scheduled amounts for the 20 most frequent ASC procedures align relatively well with the experience underlying the development of the MFS. While the alignment is not as close as was observed for hospital outpatient, these differences are largely due to fewer procedures being performed at ASCs, resulting in lower credibility and more volatility. This variation is particularly true in Region 6 where the graph shows that there were less than 20 unique CPT codes in the data. As a result, the ASC fee schedules were more heavily influenced by a manual rate, with the manual rate being higher than the experience in some cases and lower in others. But, as with all of the fee schedules, the initial fees were scaled to achieve revenue neutrality.





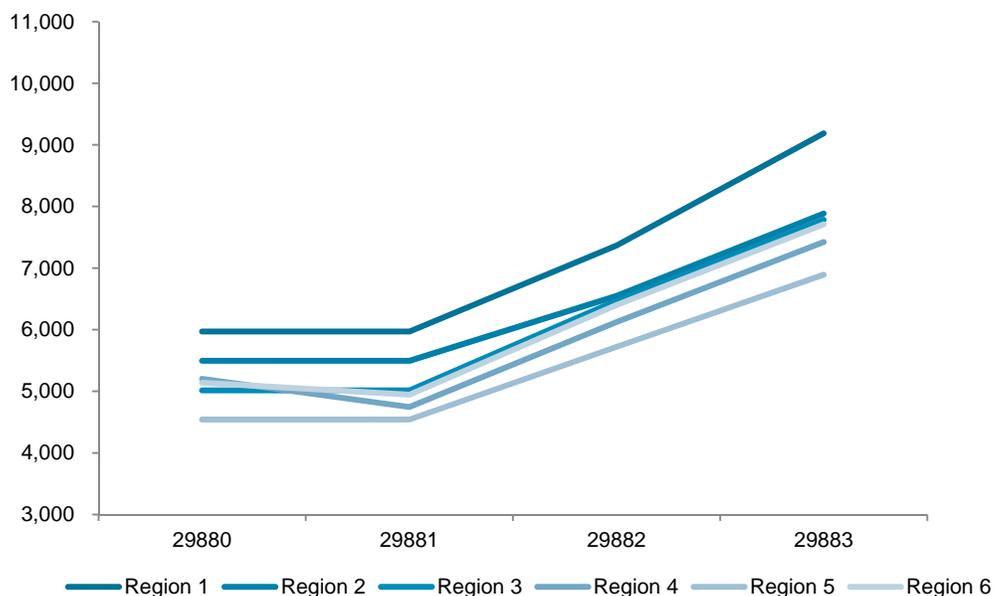
A comparison of the ratio of the fee scheduled amount to the regional average reimbursement per admission for the 30 most frequent CPTs shows there is general consistency by region in the relative cost among these 30 CPTs. These relativities are similar by region despite the experience being less aligned with the underlying data because the lower credibility of the experience leads to greater reliance on the manual rate. These 30 CPTs represent 60% of all services at ASCs that will be reimbursed based on a CPT/HCPCS code.



The chart below and graph that follows provide a sample of the final ASC fee schedule for arthroscopies of the knee. These codes represent a mix in terms of frequency which means they possess varying levels of statistical credibility. Therefore there is heavy reliance on the manual rate for some codes when developing the fee scheduled reimbursement amounts. The smoothing technique employed also helps ensure that reimbursement under the MFS will, in general, vary with the intensity of the service. Similar relational experience across regions and the impact of the smoothing technique combine to create relative differences between fees for these procedures across medical communities that are relatively constant.

Arthroscopy of the Knee

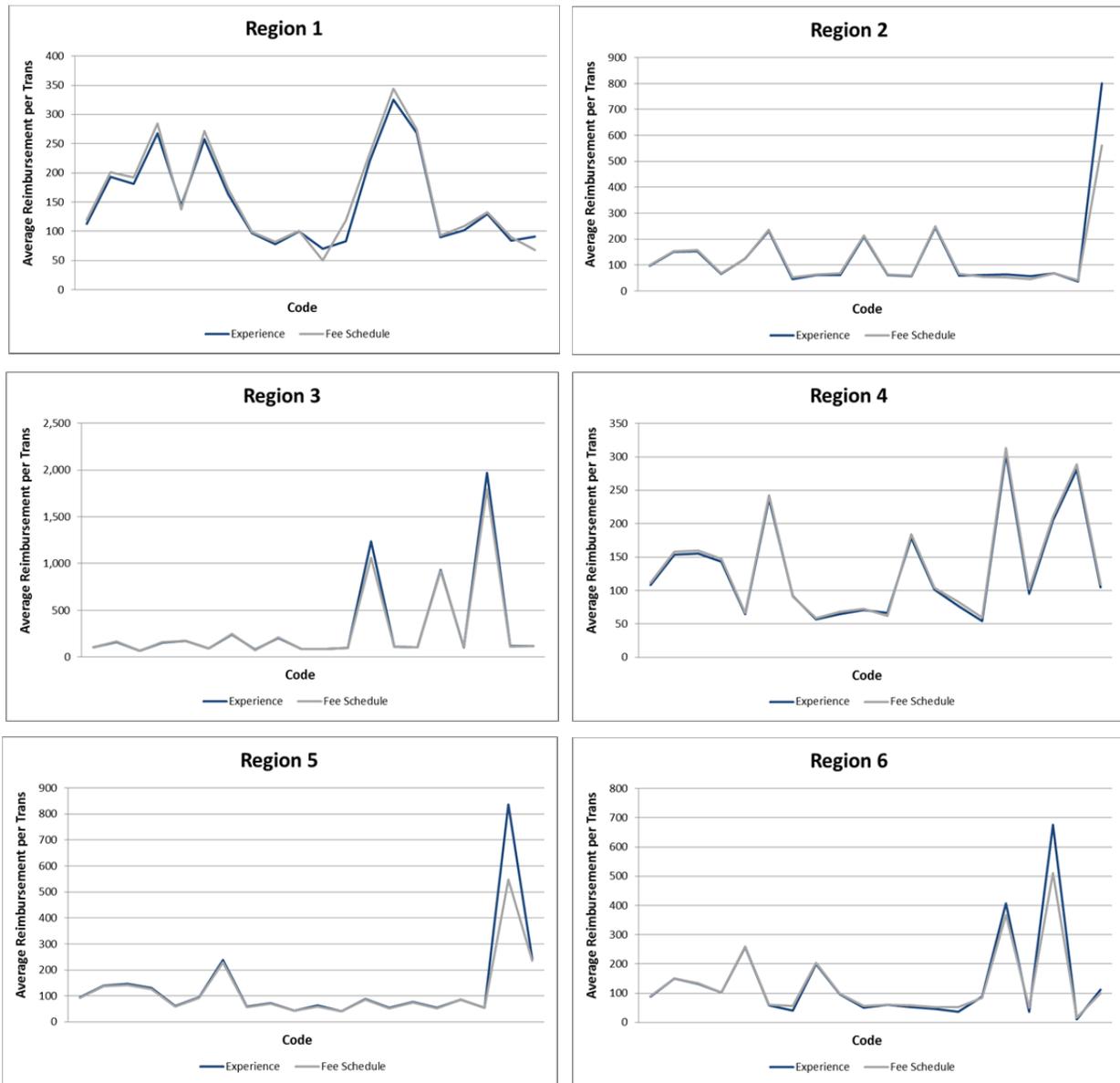
Region	29880	29881	29882	29883
1	5,969	5,969	7,366	9,186
2	5,495	5,495	6,547	7,885
3	5,014	5,014	6,469	7,784
4	5,203	4,746	6,123	7,422
5	4,541	4,541	5,722	6,892
6	5,138	4,943	6,400	7,708



Surgeons

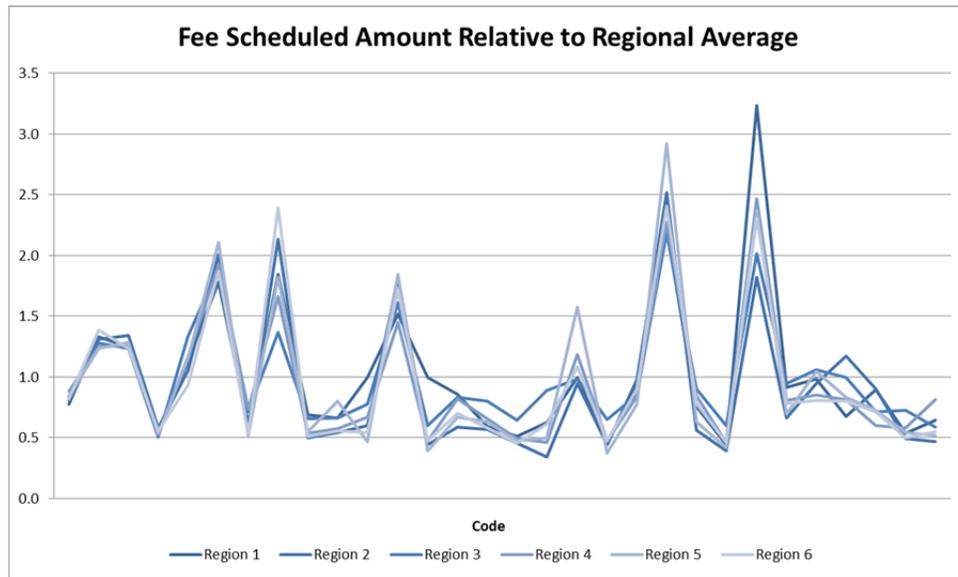
In all six medical communities, the final fee scheduled amounts for the 20 most frequent procedures performed by surgeons align well with the experience underlying the development of the MFS. A few of the procedures near the right side of the graphs show differences between the experience and the fee scheduled amount, however moving from left to right the experience

of the procedures becomes less credible. Please note that the 20 most frequent procedures shown are specific to each region.



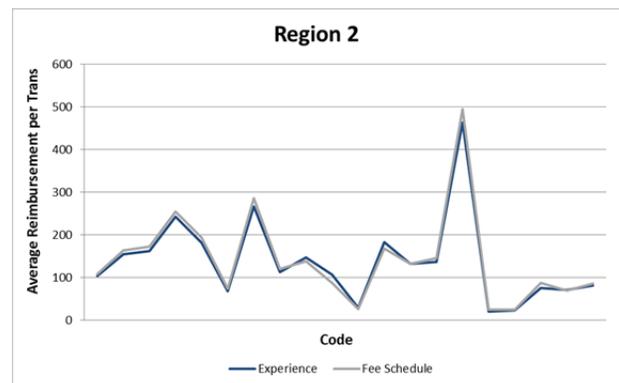
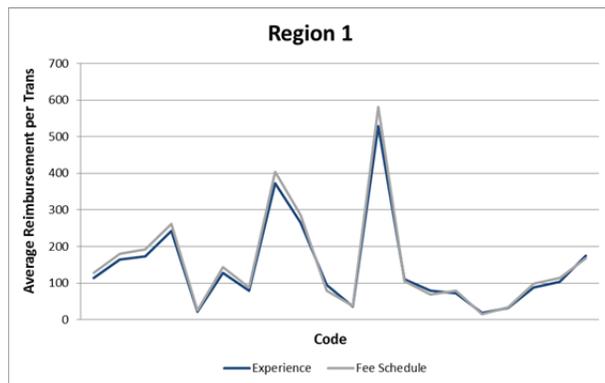
The following chart includes a comparison of the ratio of the fee scheduled amount to the regional average reimbursement per service for the 30 most frequent CPT/HCPSC codes. The chart shows there is general consistency by region in the relative cost among these 30 CPT/HCPSC codes. These are very frequent codes so the differentials shown largely reflect differences in experience for each medical community as the reliance on the manual rate is minimal. The graph does show that across the medical communities the pattern of relative differences in reimbursement among these codes has been historically the same. These 30

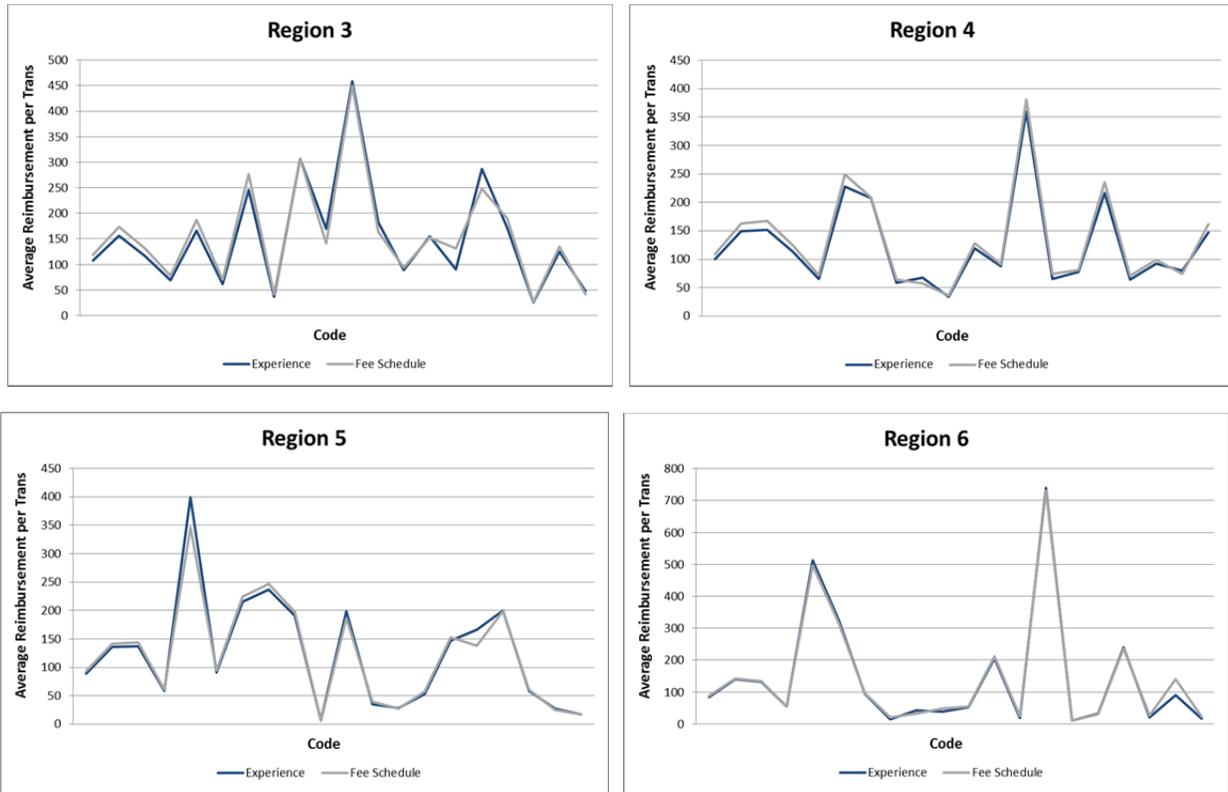
CPT/HCPCS codes represent 70% of all services provided by surgeons that will be reimbursed based on a CPT/HCPCS code.



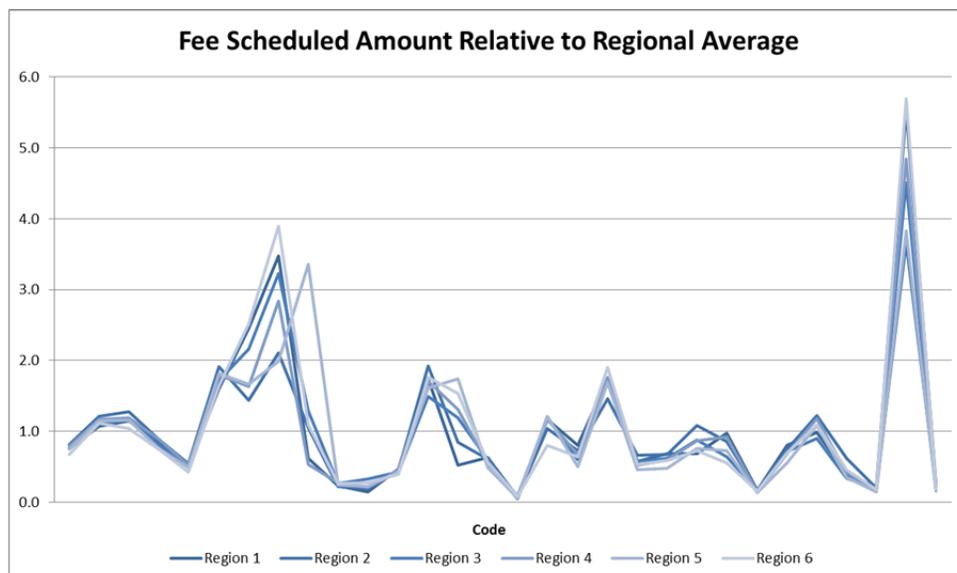
Physician Non-Surgeons

In all six medical communities, the final fee scheduled amounts for the 20 most frequent procedures performed by physician non-surgeons align well with the experience underlying the development of the MFS. Similar to the results for surgeons, the experience for these most frequent procedures possess significant credibility, so the differentials shown largely reflect differences in experience, as reliance on the manual rate was minimal. Please note that the 20 most frequent procedures shown are specific to each region.





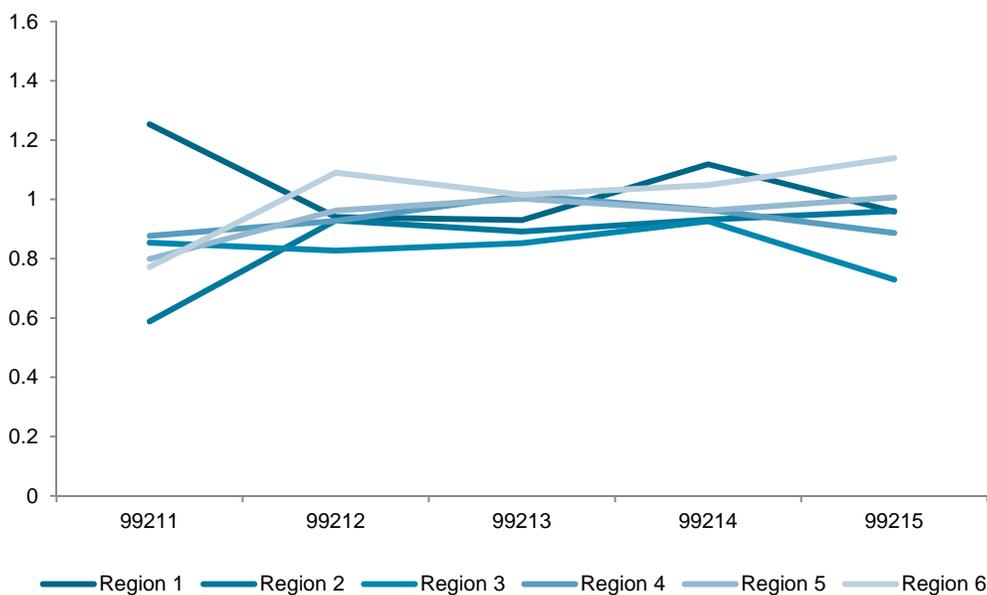
The following chart includes a comparison of the ratio of the fee scheduled amount to the regional average reimbursement per service for the 30 most frequent CPT/HCPSC codes. The chart shows there is general consistency by region in the relative cost among these 30 CPT/HCPSC codes. The graph does show that across the medical communities the pattern of relative differences in reimbursement among these codes has been historically the same. These 30 CPT/HCPSC codes represent 54% of all services provided by physician non-surgeons that will be reimbursed based on a CPT/HCPSC code.



The chart below and graph that follows offer a comparison of frequent office visits provided by both surgeons and physician non-surgeons. The values in the chart and graph represent the ratio of the final fee scheduled amount for surgeons to the final fee scheduled amount for physician non-surgeons for each CPT code in each medical community. The unique approach taken in Virginia is highlighted in these results. Specifically, in Region 1, surgeons (as defined based on the provider specialty codes elected by the Advisory Panel) were reimbursed significantly more in 2014/2015 for a 99211 office visit than physician non-surgeons, while physician non-surgeons were reimbursed more in all other regions. For a 99215 office visit, surgeons, compared to physician non-surgeons, enjoyed higher reimbursement in Region 6 while they received lower reimbursement in other regions.

Office Visit: Ratio of Surgeon to Physician Non-Surgeon Cost per Service

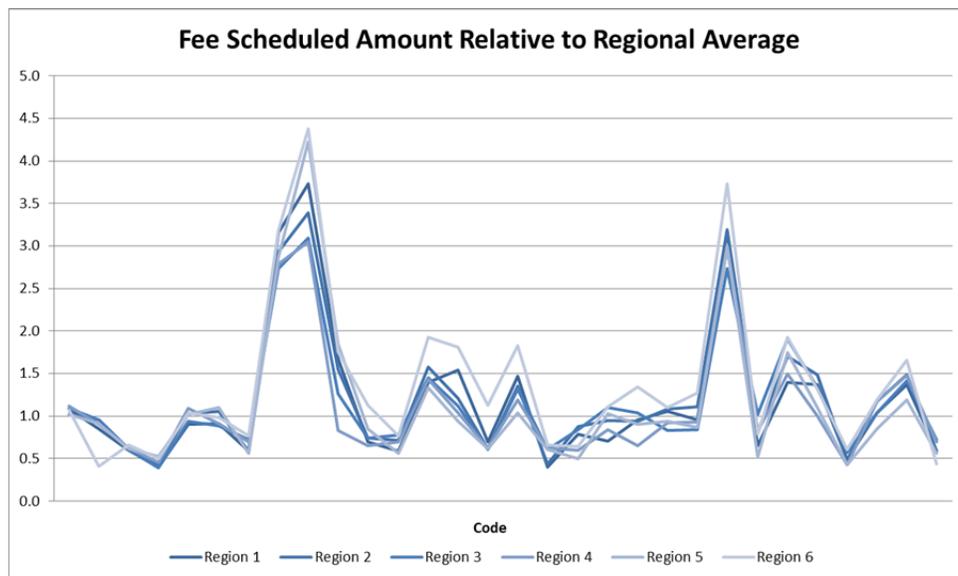
Region	99211	99212	99213	99214	99215
1	1.25	0.94	0.93	1.12	0.96
2	0.59	0.93	0.89	0.93	0.96
3	0.85	0.83	0.85	0.93	0.73
4	0.88	0.93	1.01	0.96	0.89
5	0.80	0.96	1.00	0.96	1.01
6	0.77	1.09	1.02	1.05	1.14



Other Providers of Outpatient Services

This category of providers reflects professionals that provide outpatient services which are not captured by one of the other fee schedules. This category primarily includes therapy (physical, speech and occupational), chiropractic services, dental services, acupuncture, and ambulance. Below we provide a sample of the results for these other providers.

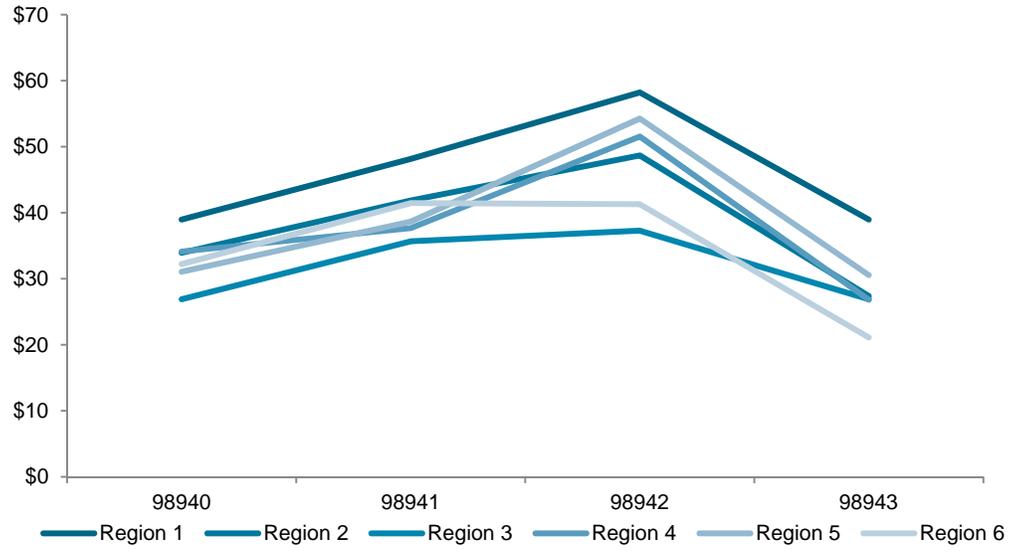
The chart below provides a comparison of the ratio of the fee scheduled amount to the regional average reimbursement per service for all therapy services. As with the results for the other provider groups, the relative difference in fees between procedures is consistent across the regions.



The chart below and graph that follows provide the fee scheduled amounts for select chiropractic services. The relative difference in fees by CPT code is largely the same in each region, however historical differences in the level of reimbursement by region leads to higher overall fees for some regions and lower overall fees for others.

Chiropractic Services

Region	98940	98941	98942	98943
1	\$39	\$48	\$58	\$39
2	34	42	49	27
3	27	36	37	27
4	34	38	52	27
5	31	39	54	31
6	32	41	41	21



7. Methodology for Ground Rules

To ensure that the MFS are implemented in the desired manner, the Commission developed a detailed set of ground rules. The ground rules contain necessary general information, definitions, instructions, and rules that outline the proper implementation of the MFS. While many aspects of the ground rules reflect a summarization of various key provisions that are outlined in law, certain definitions and parameters are the result of decisions made by the Advisory Panel as part of the process of developing the MFS. These decisions influenced the manner in which the data was used by Oliver Wyman when developing the MFS. It is critical that the MFS implementation and development be consistent, and so, Oliver Wyman assisted the Commission in developing certain key aspects of the ground rules.

Specific Considerations Around Definitions and Modifiers

Surgeons and Non-surgeons

The law requires that separate fee schedules be developed for surgeons and physicians non-surgeons. Therefore, our work required a definition of surgeons and physician non-surgeons beyond that which is outlined in law. Specifically, it required these categories of providers be defined based on coding that was on the claims information available to Oliver Wyman for use in developing the MFS, and could reasonably be expected on claims once the MFS are implemented. We worked with the Advisory Panel to review the various codes available, and ultimately, it was decided to base the definitions on the CMS provider specialty codes, which are a function of the rendering provider's taxonomy codes. The ground rules were developed to define surgeons and physician non-surgeons using the same CMS provider specialty codes as those used to segregate the physician data when developing the MFS, and as such, the ground rules require that the rendering provider's taxonomy code must be included on the claim record when submitted for the claim submission to be considered complete.

Non-physician Practitioners

The Advisory Panel provided guidance around the treatment of certain non-physician practitioners (NPPs) such as a nurse practitioner, physician assistant, clinical nurse specialist, clinical psychologist, clinical social worker, physical therapist, occupational therapist, or speech therapist. Specifically, the Advisory Panel clarified that these practitioners should be reimbursed according to the rules outlined in the MFS with no adjustment. When developing the MFS, and in particular in the determination of revenue neutrality, no adjustment was applied to the applicable maximum fee appearing on the MFS, regardless of whether the NPP billed for the service under the physician's NPI or their own NPI. Therefore, it was important that the ground rules reflect this same provision.

CPT/HCPCS Modifiers

Reimbursement for certain procedures identified by CPT or HCPCS codes are subject to adjustment, based on the presence of certain modifiers on the claim line record. Key modifiers for which the maximum reimbursement presented in the MFS is subject to adjustment include

but are not limited to those for multiple surgical procedures, bilateral procedures, and assistant surgeons. Based on stakeholder feedback provided in relation to the Final Draft MFS, adjustment percentages were developed for each modifier that, when present, impacts reimbursement (i.e., informational modifiers were ignored). In testing the MFS and adjusting them to achieve the revenue neutrality goals previously discussed, Oliver Wyman applied the modifier adjustment percentages agreed to by the Advisory Panel. To ensure consistency between the development of the MFS and their implementation, ground rules were developed that outline these same reimbursement adjustment percentages, which are to be applied when the MFS are implemented.

Hospital Outlier Payments

The law requires that certain hospital claims meeting the definition of an outlier be reimbursed in excess of the fee specified in the MFS. In order to achieve consistency and revenue neutrality, the ground rules had to communicate the precise formula for assessing outlier payments recognized in the MFS development and agreed to by the Advisory Panel. To ensure consistency, Oliver Wyman developed a specific example demonstrating the outlier payment calculation for inclusion in the ground rules document.

Specific Considerations around the Application of the MFS

New Types of Technology and Procedures

The law recognizes there are new types of technology and procedures that will emerge as the MFS mature. Specifically, reimbursement for new types of technology, including implantable devices and medical equipment supplied by a third party, shall not exceed 130 percent of the provider's invoiced cost. A new type of procedure that has not been assigned a maximum fee on the MFS shall not exceed 80 percent of the provider's charge for the service. It was important that ground rules be developed to clearly identify when the aforementioned reimbursement provisions apply.

Exclusions

Certain services were excluded from governance of the MFS. While excluded services are largely outlined in law, we worked with the Advisory Panel to identify a specific list of services that were to be excluded from the experience used for our analyses when developing the MFS. For consistency, it was crucial that the ground rules reflect the same set of exclusions.

Reimbursement for Unlisted Services and Procedures

Certain services and procedures are too variable, too unusual, or too new to have a maximum fee listed in the MFS, and are instead identified as needing to be justified "by report." After appropriate support, as outlined in the ground rules, has been provided, the unlisted service or procedure shall be reimbursed at a percentage of billed charges as specified in the MFS. To ensure consistency with the development of the MFS, a section was included in the ground rules to clearly identify which procedures in the MFS are to be justified "by report" and use this alternate method to determine the maximum reimbursement.

8. Considerations and Limitations

The Virginia Workers' Compensation Commission engaged Oliver Wyman Actuarial Consulting, Inc. to assist the Commission in the development of a set of medical fee schedules as outlined in Title 65.2, Section 605 of the Code of Virginia. This report summarizes the data used, methodology employed, and results of the work undertaken by Oliver Wyman.

This report was prepared exclusively for the Commission and its regulatory Advisory Panel. All decisions in connection with the implementation or use of advice or recommendations contained in this report are the sole responsibility of the Commission. This report is not intended for any purpose other than those that may be set forth herein or in the definitive documentation pursuant to which this report has been issued. Our work may not be used or relied upon for any purpose other than for which it was issued by Oliver Wyman. Oliver Wyman is not responsible for the consequences of any unauthorized use.

For our analysis, we relied on a wide range of data sources and information as described in this report. This includes but is not limited to information received from the National Council on Compensation Insurance, Inc. (NCCI), group self-insureds, individual self-insureds, third party administrators, and numerous medical providers and facilities. Though we have reviewed the data for reasonableness and consistency, and performed numerous other checks as described within this report, we have not independently audited or otherwise verified this data, and it should also be noted that our review of the data may not always reveal imperfections. We have assumed that the data provided is both accurate and complete. The results of our analysis are dependent on this assumption. If this data or information is inaccurate or incomplete, our findings and conclusions may need to be revised.

In addition, our analysis is dependent upon a number of assumptions. While our analysis complies with applicable Actuarial Standards of Practice and Statements of Principles, users of this analysis should recognize that in some cases our analysis is based on estimates of future events. To the extent that future conditions are at variance with the assumptions we have made, actual results will vary, and the variance may be substantial. In particular, we have assumed that the market will behave in a manner consistent with the experience period underlying the MFS development, specifically calendar years 2014 and 2015. Market response to the presence of the MFS and the impact it could have on revenue neutrality were not reflected. These market responses could include shifting of care to less expensive medical communities, the use of the fee schedules as leverage in contract negotiations, and changes to a provider's practice patterns or overall charge master in response to the fee schedule design.

This report is intended to be read and used as a whole and not in parts. Separation or alteration of any section or page from the main body of this report is expressly forbidden and invalidates this report.

Oliver Wyman's consent to any distribution of this report (whether herein or in the written agreement pursuant to which this report has been issued) to parties other than the Commission does not constitute advice by Oliver Wyman to any such third parties and shall be solely for informational purposes and not for purposes of reliance by any such third parties. Oliver Wyman

assumes no liability related to third party use of this report or any actions taken or decisions made as a consequence of the results, advice or recommendations set forth herein. This report should not replace the due diligence on behalf of any such third party.

Finally, Oliver Wyman is not engaged in the practice of law and this report, which may include commentary on the governing statute, does not constitute, nor is it a substitute for, legal advice. Accordingly, Oliver Wyman recommends that the Commission secure the advice of competent legal counsel with respect to any legal matters related to this report or otherwise.

We are Fellows of the Society of Actuaries and members of the American Academy of Actuaries, and meet the qualifications to perform the analysis described within this report. Our analyses comply with applicable Actuarial Standards of Practice and Statements of Principles.



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