

## **Section VI**

### **Actual-to-Expected Analysis**

The actual to expected adjustment compares the actual FY 2002 VA workload to what the model projected on a national basis for the same year for the same population and adjusts for differences. The adjustment makes the model's future projections more accurate by accounting for factors such as unmeasured morbidity, reliance, and degree of community management. The Actual-to-Expected adjustment factors that are developed in this analysis fine-tune the model's predictive capabilities. In the private sector, this type of adjustment factor is referred to as an experience adjustment factor and is widely used to improve estimates of future health care utilization.<sup>1</sup> The adjustment factors are developed at the national level and therefore, they do not reflect variations by VISN, facility or county of residence. They only reflect, to the extent that it exists, VA variations at the national level. Performing actual-to-expected adjustments at greater levels of detail has been avoided due to credibility issues.

#### ***Purpose of the Actual-to-Expected Adjustment in the VA Enrollee Health Care Projection Model***

In order for projections of future utilization to be accurate and useful, the projections must be derived from a robust projection methodology. Two essential attributes of a robust projection are:

1. The projection must start from an accurate and useful assessment of the current state.
2. The projection must decompose the causes of future changes into components that can be modeled.

The modeling approach used in the VA Enrollee Health Care Projection Model (the Model) follows these attributes. First, the Model attempts to accurately model the current utilization in the VA Health Care system. Second, the Model attempts to project future changes in utilization by projecting changes in the components of those patterns.

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<sup>1</sup> It should be noted that this adjustment is not intended to adjust the model for local VA supply constraints or other variations.

The research into Morbidity, Reliance, Area, Age/Gender, Degree of Community Management and many other factors contribute an essential role to the attempt to accurately model the current utilization patterns evident in the VA healthcare system. The composite of all of these factors is referred to in the Actual-to-Expected analysis as the “Expected” utilization. This composite could also be described as “Explained” utilization. That is, the models are able to explain utilization patterns, to the extent that they match the “Expected” values.

The current utilization patterns, that is the “Actual” utilization, can be expressed as the product of the “Explained” utilization and the “Unexplained” utilization. The Unexplained utilization can be alternately described as “Model Error”. The Actual-to-Expected factor is this value.

Because the Actual-to-Expected factor represents utilization for which no explanation is available, there is no means within a projection tool to predict how the Actual-to-Expected factor would change over time. Thus, the Actual-to-Expected factor becomes a static artifact of the effort to adjust the Explained utilization to match the Actual Utilization. It is the composite of all unexplained variations in utilization, of which supply is only one small component.

Projections reflect the changes that relate to causes that can be identified. These causes include changes in the demographic makeup of the enrolled veteran population; changes in the medical benefits package offered to enrolled veterans; changes in the market demand for medical services; changes in the way VA manages health care services; and other changes such as provider practice patterns and treatment tendencies.

Once the model calibration is done via the Actual-to-Expected adjustments, all of the factors that are used to build the Expected utilization patterns take a leading role in the projections of utilization into the future. Morbidity, Reliance, Age/Gender, Area, Degree of Management and Trend all contribute to the projection of how future utilization patterns will change. These factors are designed to reflect those changes we can attempt to model: demographic changes, benefit changes, medical trend, constraints on reliance and changes in VA management.

### ***Development of Actual-to-Expected Adjustments***

The step-by-step process that is used to develop the Actual-to-Expected adjustment factors includes seven steps:

1. Develop detailed expected FY 2002 utilization estimates using the model at the Sector, Age Group (Under Age 65 and Ages 65 and Over), Enrollee Type, Priority Level and Health Care Service category (HSC) level.
2. Composite the resulting expected FY 2002 utilization rates to develop composite utilization rates for each Age Group, Enrollee Type, and Priority Level combination at the national level for each HSC.
3. Calculate the actual utilization rates for FY 2002 from VA workload for each HSC at the national level for each Age Group, Enrollee Type and Priority Level combination.
4. Compare the FY 2002 actual utilization rates with the modeled expected utilization rates to develop Actual-to-Expected adjustment factors that vary by Age Group, Enrollee Type, Priority Level and HSC. Some HSCs are combined due to credibility and/or data quality issues. These HSCs are noted parenthetically on Exhibit VI-1, to indicate their groupings.
5. Credibility adjusts the resulting raw, Actual-to-Expected adjustment factors when the actual VA workload experience for a particular HSC combination is not considered fully credible.
6. Develop detailed utilization projections at the Sector, Age Group, Enrollee Type, Priority Level and HSC level for all fiscal years included in the projection model.
7. Apply the appropriate Actual-to-Expected adjustment factor to each detailed model. (For example, for the Cook County Enrollee Pre, Ages 65 & Over, Priority Level 5 projections, the National, Enrollee Pre, Ages 65 & Over, Priority 5 Actual-to-Expected adjustment factors for each HSC would be applied.)

### ***Development of Actual-to-Expected Adjustment Factors***

FY 2002 VHA utilization experience for prescription drugs, inpatient stays, ambulatory (outpatient physician) services, and prosthetic units was obtained from VA. FY 2002 projections were developed using actual FY 2002 enrollment and the model with all FY04 ELDA enhancements and factor updates. These results were compared to actual FY 2002 VA utilization. The results of this analysis are presented in Exhibit VI-1.

Exhibit VI-1 details the Actual-to-Expected ratios by HSC on a national basis over all Age Groups, Priority Levels, and Enrollee Types. The actual utilization was developed from the FY 2002 workload and the FY 2002 Fee-Based-Care data sets combined. The expected utilization was developed using the model with assumptions that are appropriate to FY 2002. The Actual-

to-Expected utilization ratios demonstrate how well the model would have predicted FY 2002 experience. The residual adjustments to the private sector benchmarks that were not fully captured by all of the adjustments described in this document were determined from this analysis. Since the reliance and morbidity adjustments rely on survey data, they may not fully reflect the true differences in utilization for Enrollees. Also, inpatient length-of-stay analyses were used to establish the DoCM for both admissions and length of stay. The assumption was made, due to lack of data, that outpatient services were delivered at the community loosely managed level during FY 1999 and at 5% DoCM during FY 2002. To the extent that any of these estimated adjustments are not accurate, the Actual-to-Expected adjustment is used to enhance the model.

The Actual-to-Expected adjustments vary by Enrollee Type (Pre and Post), Age Group (Under Age 65 and Ages 65 and Over), Priority Level (1, 2, 3, 4, 5, 6, 7a/8a, 7c/8c), and HSC groupings. The adjustments are calculated for two age bands to be consistent with the age band detail included in the morbidity and reliance factor adjustments. The HSC groupings for inpatient care are Medical, Surgical, Psychiatric, Substance Abuse, Maternity Deliveries, Maternity Non-Deliveries and Skilled Nursing Facility. There are 22 groupings for ambulatory care including Emergency Room Visits, Office Visits, Radiology, Pathology, Surgery, and other groupings of ambulatory visits and ancillary services. For the first time in the VA Enrollee Health Care Projection Model, factors were developed for Glasses/Contacts, Hearing Aids, DME, Prosthetics and VA Program Equipment and Services using the NPPD and DDC data provided by VA. These services are shown in Exhibit VI-1 on the second page under Other services. Factors were also developed for Prescription Drugs and shown in this section of the exhibit.

For the Mental Health Non-Acute Bed Services and Mental Health Special Disability Programs (MHSDP) the Actual-to-Expected factors on a national aggregate level are all 1.00, with the exception of Non-Acute Blind Rehabilitation and Spinal Cord Injury (SCI) Bed services. This is due to the fact that the projection basis of the expected workload for these services was derived from the FY 2002 VA workload data itself. In general, these services are unique to VA, and are modeled using VA historical experience. They may also be modeled in the future to reflect higher levels of access based on VA policy decisions and planning directives. Therefore, Actual-to-Expected adjustments are not applied to these services. The Non-Acute Blind Rehabilitation and SCI Bed services are projected using models developed by VA. The FY 2002 projected workload for these services did not match the actual VA workload experience. However, under

VA direction, Actual-to-Expected adjustments were not applied to these services for the projection years included in this ELDA.

The raw Actual-to-Expected adjustment factors by the HSC groupings described above for each Enrollee Type, Age Group and Priority Level are then adjusted for credibility, as necessary. For inpatient services, the Actual-to-Expected adjustments are considered fully credible if the VA workload experience used to develop the factor represents at least 1,000 admits. Likewise, Actual-to-Expected adjustments for ambulatory services are considered fully credible if the VA workload experience used to develop the factor represents at least 1,000 services. For partially credible adjustment factors, the percent credibility was calculated by taking the square root of the actual VA workload count divided by 1,000. The partially credible adjustment factor was then weighted with an adjustment of 1.00 using the percent credibility. For example, the raw Actual-to-Expected adjustment of 0.83 (for Inpatient Surgical Admits, Priority Level 6, Enrollees Pre, Under Age 65) was calculated based on 163 actual VA services and 197 expected services, the percent credibility is 0.40 (Square root of  $[163 \div 1000]$ ). The raw Actual-to-Expected adjustment was then adjusted for credibility to 0.93 ( $0.83 \times 0.40 + 1.00 \times (1 - 0.40)$ ). The resulting set of credibility adjusted Actual-to-Expected factors for each HSC grouping were then renormalized to reproduce the national Actual-to-Expected adjustment factors over all Enrollee Types, Age Groups and Priority Levels. For this example, the renormalization adjustment was 1.001.

Credibility adjustments were used for some Age/Priority/Enrollee Type cells for almost all services. Some cells with very low enrollment such as Priority Level 6 Enrollees Post, Ages 65 and Over were credible for only a few major services, such as Prescription Drugs, Office Visits and Pathology. For other cells with more enrollees and more workload, virtually all services were credible. Credibility adjustments primarily affected low-volume services, such as Inpatient Substance Abuse and Skilled Nursing Facilities.

Complete enrollment for FY 2002 was used in this analysis. The "Cost-Only" enrollees, with demographic information attributed when not available, were included in the enrollment. Enrollee age was calculated as of April 1, 2002, the midpoint of FY 2002.

The VA workload data used for this analysis was analyzed and measured as described in Section V-VA Workload Data Manipulations. This ensured that both components of the Actual-to-Expected analysis were categorized and counted using the same set of rules.

Exhibit VI-1

Department of Veterans Affairs  
 Actual to Expected Benchmark Utilization Analysis, based on FY 2002 Workload  
 National  
 All Ages

	<u>Beg of Year</u>	<u>End of Year</u>	<u>Unique</u>	<u>Average</u>	
<b>ENROLLMENT</b>	5,968,593	6,688,010	6,850,377	6,369,400	
	<b>Total Admits</b>		<b>Admits Per 1,000</b>		<b>Actual to Expected</b>
<b>INPATIENT ACUTE HOSPITAL</b>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	
Medical	357,893	311,017	56.2	48.8	1.151
Surgical	103,557	88,423	16.3	13.9	1.171
Psychiatric	67,479	75,868	10.6	11.9	0.889
Substance Abuse	44,274	49,579	7.0	7.8	0.893
Maternity Deliveries	394	2,619	0.1	0.4	0.150
Maternity Non-Deliveries	79	258	0.0	0.0	0.306
<b>Subtotal</b>	<u>573,676</u>	<u>527,763</u>	<u>90.1</u>	<u>82.9</u>	<u>1.087</u>
			<b>Average Length of Stay</b>		<b>Actual to Expected</b>
<b>INPATIENT ACUTE HOSPITAL</b>			<u>Actual</u>	<u>Expected</u>	
Medical			5.50	7.64	0.720
Surgical			9.29	10.12	0.918
Psychiatric			9.86	8.05	1.225
Substance Abuse			6.05	8.91	0.679
Maternity Deliveries			9.56	2.53	3.778
Maternity Non-Deliveries			8.06	2.62	3.074
<b>Subtotal</b>			<u>6.74</u>	<u>8.21</u>	<u>0.822</u>
	<b>Total Days</b>		<b>Days/Units Per 1,000</b>		<b>Actual to Expected</b>
<b>INPATIENT ACUTE HOSPITAL</b>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	
Medical	1,968,389	2,377,007	309.0	373.2	0.828
Surgical	962,461	895,050	151.1	140.5	1.075
Psychiatric	665,101	610,388	104.4	95.8	1.090
Substance Abuse	268,051	441,798	42.1	69.4	0.607
Maternity Deliveries	3,767	6,628	0.6	1.0	0.568
Maternity Non-Deliveries	637	677	0.1	0.1	0.942
Skilled Nursing/Extended Care Facility	404,874	1,161,134	63.6	182.3	0.349
<b>Subtotal</b>	<u>3,868,406</u>	<u>4,331,547</u>	<u>607.3</u>	<u>680.1</u>	<u>0.893</u>

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Exhibit VI-1 (cont.)

Department of Veterans Affairs  
 Actual to Expected Benchmark Utilization Analysis, based on FY 2002 Workload  
 National  
 All Ages

AMBULATORY	Total Procedures		Procedures per 1,000		Actual to Expected
	Actual	Expected	Actual	Expected	
Allergy Immunotherapy (1)	59,329	1,075,482	9.3	168.9	0.055
Allergy Testing (1)	8,896	1,048,430	1.4	164.6	0.008
Anesthesia	129,651	365,649	20.4	57.4	0.355
Cardiovascular	2,360,474	3,549,267	370.6	557.2	0.665
Chiropractor	11,061	4,490,355	1.7	705.0	0.002
Consults (2)	1,039,822	1,466,537	163.3	230.2	0.709
Emergency Room Visits	1,245,150	549,260	195.5	86.2	2.267
Hearing/Speech Exams (2)	1,503,183	478,737	236.0	75.2	3.140
Immunizations	2,228,789	1,710,887	349.9	268.6	1.303
Maternity Deliveries	263	2,619	0.0	0.4	0.100
Maternity Non-Deliveries	1,171	1,633	0.2	0.3	0.717
Misc. Medical (1)	5,285,423	10,397,440	829.8	1,632.4	0.508
Office/Home/Urgent Care Visits	21,377,745	24,422,393	3,356.3	3,834.3	0.875
Outpatient Psychiatric	5,929,867	6,671,653	931.0	1,047.5	0.889
Pathology	42,180,903	29,526,189	6,622.4	4,635.6	1.429
Physical Exams	1,521,000	783,257	238.8	123.0	1.942
Physical Medicine	3,576,301	7,228,514	561.5	1,134.9	0.495
Radiology	5,293,612	5,980,724	831.1	939.0	0.885
Surgery (3)	2,678,443	3,316,810	420.5	520.7	0.808
Sterilizations (3)	1,215	3,350	0.2	0.5	0.363
Therapeutic Injections (1)	1,975,376	2,919,694	310.1	458.4	0.677
Vision Exams (2)	1,131,281	2,162,715	177.6	339.5	0.523
<b>Subtotal</b>	<b>99,538,955</b>	<b>108,151,596</b>	<b>15,627.7</b>	<b>16,979.9</b>	<b>0.920</b>
OTHER	Total Services		Services per 1,000		Actual to Expected
	Actual	Expected	Actual	Expected	
Prescription Drugs	189,556,570	190,024,744	29,760.5	29,834.0	0.998
Glasses/Contacts	594,250	738,790	93.3	116.0	0.804
Hearing Aids	363,202	63,138	57.0	9.9	5.752
Ambulance		98,432		15.5	
Durable Medical Equipment	1,617,233	788,199	253.9	123.7	2.052
Prosthetics	327,976	63,152	51.5	9.9	5.193
VA Program Equipment and Services	570,548	570,548	89.6	89.6	1.000
Compensation & Pension Exams	439,377	439,377	69.0	69.0	1.000
<b>Subtotal</b>	<b>327,976</b>	<b>63,152</b>	<b>51.5</b>	<b>9.9</b>	<b>5.193</b>

Note:

- (1) Allergy Immunotherapy, Allergy Testing, Misc.Medical, and Therapeutic Injections were combined and use the Other Procedures A/E adjustments.
- (2) Consults, Hearing/Speech Exams, and Vision Exams use the Other Visits A/E adjustments.
- (3) Surgery and Sterilizations use the Surgery A/E adjustments.

Exhibit VI-1 (cont.)

Department of Veterans Affairs  
 Actual to Expected Benchmark Utilization Analysis, based on FY 2002 Workload  
 National  
 All Ages

NON-ACUTE BEDS	Total Days		Days per 1,000		Actual to
	Actual	Expected	Actual	Expected	Expected
Blind Rehab	68,808	76,087	10.8	11.9	0.904
SCI	280,334	244,677	44.0	38.4	1.146
STAR	470,071	470,071	73.8	73.8	1.000
PRRTP	115,141	115,141	18.1	18.1	1.000
PTSD PRRP	134,269	134,269	21.1	21.1	1.000
SARRTP	482,725	482,725	75.8	75.8	1.000
CWT/TR	114,318	114,318	17.9	17.9	1.000
Respite	19,727	22,086	3.1	3.5	0.893
Domiciliary	1,571,278	1,571,278	246.7	246.7	1.000
<b>Subtotal</b>	<b>3,256,671</b>	<b>3,230,652</b>	<b>511.3</b>	<b>507.2</b>	<b>1.008</b>
LONG TERM CARE	Total Services		Services per 1,000		Actual to
	Actual	Expected	Actual	Expected	Expected
Nursing Home	6,113,146	-	959.8	-	
PDN/Home Health	824,924	-	129.5	-	
MHSD Programs	Total Stops		Stops per 1,000		Actual to
	Actual	Expected	Actual	Expected	Expected
Day Treatment	554,882	554,882	87.1	87.1	1.000
Homeless	300,785	300,785	47.2	47.2	1.000
Methadone Treatment	769,685	769,685	120.8	120.8	1.000
MHICM	220,134	220,134	34.6	34.6	1.000
Work Therapy	950,437	950,437	149.2	149.2	1.000
Community MH Residential Care	85,167	85,167	13.4	13.4	1.000
AMBULATORY GROUPS	Total Services		Services per 1,000		Actual to
	Actual	Expected	Actual	Expected	Expected
Other Procedures (1)	7,329,024	15,441,047	1,150.7	2,424.3	0.475
Other Visits (2)	3,674,286	4,107,989	576.9	645.0	0.894
Surgery (3)	2,679,658	3,320,160	420.7	521.3	0.807

Note:

- (1) Allergy Immunotherapy, Allergy Testing, Misc.Medical, and Therapeutic Injections were combined and use the Other Procedures A/E adjustments.
- (2) Consults, Hearing/Speech Exams, and Vision Exams use the Other Visits A/E adjustments.
- (3) Surgery and Sterilizations use the Surgery A/E adjustments.