

## VII. ANALYSIS OF LOSS OF EARNINGS RESULTS

Chapter VII presents the results of the EconSys Study Team’s analysis of average loss of earnings capacity, referred to as simply loss of earnings, by the number of multiple disabilities, combined degree of disability (CDD) rating level, Individual Unemployability (IU) status, Special Monthly Compensation (SMC) status, and demographic variables. The analysis focuses on evaluating the accuracy of CDD ratings to predict loss of earnings and how well VA disability compensation replaces loss of earnings. Chapter VII also points to policy options for combining disabilities and adjusting ratings for VA consideration.

### Combined Degree of Disability Problem

In our analysis of earnings (that is, wages and salaries data), we obtained an unexpected result that has a profound effect on ratings and comparison of earnings. We found that within each CDD level, earnings were positively correlated with the number of rated service-connected disabilities (SCDs) that veterans have. This is illustrated in Table VII-1. Empty cells indicate CDD and SCD intersections that were not observed in our data. With few exceptions, there is a clear pattern of increasing earnings by number of service-connected disabilities.

**Table VII-1. Average 2006 Earnings by CDD and Number of Service-Connected Disabilities,<sup>i</sup> Veterans Under Age 65 without IU or SMC**

CDD	Number of Rated Service-Connected Disabilities <sup>ii</sup>					
	1	2	3	4	5	6
10%	\$36,194					
20%	\$34,547	\$35,912				
30%	\$30,105	\$33,878	\$37,393			
40%	\$29,132	\$30,649	\$33,539	\$39,142		
50%	\$15,400	\$25,336	\$27,618	\$33,244	\$38,912	\$40,357
60%	\$23,623	\$28,747	\$30,015	\$28,891	\$34,934	\$37,451
70%	\$10,626	\$16,130	\$20,297	\$26,480	\$33,905	\$35,480
80%		\$30,008	\$24,989	\$21,186	\$28,216	\$35,660
90%				\$21,568	\$26,774	\$31,391
100%	\$1,573	\$6,676	\$5,480	\$6,223	\$12,287	\$12,240

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

<sup>i</sup> Data based on 2006 earnings provided by SSA in cells of 10 or more. Earnings averages include all cell members (including non-earners) and exclude veterans rated with IU or receiving SMC. Including non-earners and excluding IU/SMC veterans does not affect the observed patterns.

<sup>ii</sup> Because we were working with cell-based groups of veterans, the number of rated service-connected disabilities is the *average* for each cell. The lower the average number, the more certain we are that it is the exact number. Above one, the number is less certain. That is, at one service-connected disability, because the minimum for any veteran in the cell is one, there would be very few with more than one, on average. At two, we could be looking at a combination of veterans with one through three, on average. As we move up the scale, the uncertainty increases. For that reason, it is possible that the actual effects are even stronger than we observed. Much more precise analysis would be possible with individual-level earnings and disability data.

It is important to recognize this issue before proceeding with the rest of the analysis. Our finding was that the number of SCDs within each CDD has a profound impact on earnings. We expected that a higher disability rating level for the primary SCD used in calculating the CDD was indicative of greater impairment, which then would be associated with a higher earnings loss. What we found was that a veteran with a single 100% disability has a greater earnings loss than a veteran with six SCDs that combine to a 100% rating. Our finding was the opposite of our expectation.

We separated physical and mental primary disabilities, shown in Table VII-2 and Table VII-3. We found the phenomenon to be more pronounced for mental than physical conditions.

**Table VII-2. Average 2006 Earnings by CDD and Number of Service-Connected Disabilities-- Physical Disabilities Only, Veterans Under Age 65 without IU or SMC**

CDD	Number of Rated Service-Connected Physical Disabilities					
	1	2	3	4	5	6
10%	\$36,331					
20%	\$34,547	\$35,936				
30%	\$32,929	\$33,960	\$37,393	X <sup>i</sup>		
40%	\$29,132	\$32,375	\$33,645	\$39,142	\$54,436	
50%	\$30,199	\$39,293	\$28,938	\$33,283	\$38,912	\$40,357
60%	\$23,623	\$29,514	\$32,237	\$30,503	\$34,942	\$37,451
70%		\$35,157	\$26,025	\$28,967	\$33,945	\$35,480
80%		\$30,008	\$24,989	\$24,295	\$30,746	\$35,792
90%				\$21,568	\$31,754	\$32,800
100%	\$13,927	\$11,213	\$7,868	\$8,129	\$12,685	\$12,240

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

<sup>i</sup> While it possible for a veteran to have four disabilities rated at 10% each and have a CDD of 30%, we found no empirical observations for this table cell.

**Table VII-3. Average 2006 Earnings by CDD and Number of Service-Connected Disabilities--Mental Disabilities Only, Veterans Under Age 65 without IU or SMC**

CDD	Number of Rated Service-Connected Mental Disabilities					
	1	2	3	4	5	6
10%	\$29,514					
20%		\$32,774				
30%	\$23,689	\$30,965				
40%		\$24,456	\$27,061			
50%	\$13,083	\$20,746	\$21,628	\$24,193		
60%		\$12,590	\$20,488	\$22,803	\$33,593	
70%	\$10,626	\$15,572	\$19,812	\$21,419	\$31,004	
80%				\$19,567	\$21,951	\$25,146
90%					\$23,150	\$24,719
100%	\$820	\$2,052	\$2,316	\$2,732	\$0	

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

Exploring this finding further, Table VII-4 shows employment rates (percent of veterans with earnings) by CDD and number of SCDs. This table tends to explain where some of the unexpected correlation originates, although it does not explain why the correlation exists in the first place. Even when looking only at earners, we still found a clear correlation between the number of service-connected disabilities and earnings within CDD rating groups.

Looking at Table VII-4, if we contrast the overall column with the column for one rated SCD, we see a clear disconnect. For example, at the overall 70% CDD level, 72.8 percent of veterans were employed in 2006.

**Table VII-4. 2006 Employment Rates by CDD and Number of Service-Connected Disabilities<sup>i</sup>**

CDD	Number of Rated Service-Connected Disabilities						Overall
	1	2	3	4	5	6	
10%	83.1%						83.1%
20%	81.8%	83.0%					82.8%
30%	79.8%	80.3%	83.3%	X <sup>ii</sup>			81.8%
40%	83.3%	79.5%	78.8%	85.0%	94.2%		80.3%
50%	61.7%	75.3%	73.9%	77.5%	82.3%	84.1%	76.8%
60%	75.4%	76.1%	74.7%	73.7%	77.4%	83.9%	75.0%
70%	46.7%	59.6%	69.1%	69.4%	76.6%	77.1%	72.8%
80%		77.6%	68.0%	66.1%	70.8%	77.5%	72.3%
90%				60.0%	69.1%	75.0%	72.9%
100%	12.5%	26.1%	20.2%	24.2%	31.8%	38.2%	20.4%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

<sup>i</sup> Data based on 2006 earnings provided by SSA in cells of 10 or more. Earnings averages include all cell members (including non-earners) regardless of age (that is, includes veterans 65 and older), and exclude veterans rated with IU or receiving SMC. Including non-earners and excluding IU/SMC veterans do not affect the observed patterns.

<sup>ii</sup> While it possible for a veteran to have four disabilities rated at 10% each and have a CDD of 30%, we found no empirical observations for this table cell.

One possible reason for the disconnect has to do with how disability ratings are combined.<sup>101</sup> An examination of the rating combination system and empirical observation of earnings suggests that there might be a subtle form of rating inflation that accounts for the disconnect. We should begin by stating that the combination system considers only disabilities that are rated at 10% or higher. While there are 0% ratings, they are not considered in the calculation of CDD.<sup>102</sup>

Consider a veteran with a 30% CDD rating calculated from two disabilities, a 20% primary disability and a 10% disability, the second is multiplied by the remaining 80% capacity (10 percent of 80 (100 – 20) for a total score of 28 (20 + 8), which rounds up to 30.

If the veteran has three disabilities with a 30% CDD, then they have to have three 10% disabilities—10% for the first one, 9% for the second, and 8% for the third, for a total of 27%, which is rounded up to 30%.

The current system assumes that all disabilities are mostly additive and that they do not overlap, especially at lower rating levels. However, based on the empirical evidence, this is not an accurate assessment or premise. On average, veterans rated at 30% who have two rated disabilities “look” more like 20% rated veterans who have one rated disability. Veterans rated at 30% who have three rated disabilities “look” more like 10% veterans who have one rated disability.

Ultimately, it is not that having more disabilities causes veterans to earn more money or to be more successful in finding jobs. Rather, it appears that having more disabilities causes veterans to be misclassified and placed into higher CDD rating groups in which their earnings and employment levels are out of place, being higher than we would expect for that CDD rating group. In effect, the system for combining multiple ratings produces CDD rating inflation that otherwise distorts any attempts to analyze the relationship between earnings and CDD rating levels.

One way to deal with this scenario was to analyze different groups based upon the number of rated disabilities that contribute to their CDD level. We do this throughout our analysis, with interesting and useful results that contribute to understanding and isolate the effects of certain disabilities on earnings. Alternative policy options for dealing with this issue are discussed in the last section of this chapter.

## Employment Rate and Earnings

Both earnings and employment rate vary by the combined degree of disability. It is useful to look at both to determine whether there are two distinguishable effects, or, if CDD’s primary effects are entirely through the employment rate. That is: are earnings lower because the average employed disabled veteran earns less money? Or, are

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<sup>101</sup> The reader is referred to Chapter IV in this volume for a description of how ratings for individual disabilities are combined into a CDD rating. The look-up table for calculating the CDD is contained in Appendix F.

<sup>102</sup> SMC-K is sometimes given for veterans with a rating of 0%, but in this discussion, we are looking only at veterans who are not receiving SMC and who are not rated as IU.

earnings lower because fewer veterans with disabilities are employed to begin with? Or, do both factors contribute (lower employment rates and lower earnings)?

We can address this by comparing the effects of CDD on employment rate and earnings separately. Table VII-5 contrasts the relative changes in (1) employment rate, (2) earnings among earners, and (3) average cell earnings, using CDD 10% as a benchmark. If earnings loss were related only to loss in employment, then we would expect the changes in (1) and (3) to be the same. Earnings among earners would not be correlated with CDD. However, that is not the case. Even among veterans with earnings, we see a relationship between CDD level and earnings. By reducing the proportion of veterans employed at each incrementally higher level of CDD, disability causes a reduction in average cell earnings. The additional effects of disability, even among those with jobs, combines with the employment effect to reduce average cell earnings even further. Because average cell earnings are affected by both the proportion of veterans who are employed and by the earnings of those veterans who are employed, our subsequent analysis will be confined to data on average cell earnings.<sup>103</sup>

**Table VII-5. Relative Changes in Employment Rate, Earnings Among Earners, and Average Earnings (Includes Veterans of all Ages)**

CDD	Employment Rate		2006 Earners		2006 Cell Average Earnings	
	(1)	(2)	(1)	(2)	(3)	(3)
	Compared to CDD 10%	Compared to CDD 10%	Compared to CDD 10%	Compared to CDD 10%	Compared to CDD 10%	Compared to CDD 10%
10	82.6%	100%	\$43,537	100%	\$35,949	100%
20	82.0%	99%	\$43,118	99%	\$35,363	98%
30	80.8%	98%	\$43,017	99%	\$34,762	97%
40	79.1%	96%	\$42,282	97%	\$33,458	93%
50	75.0%	91%	\$41,170	95%	\$30,884	86%
60	73.0%	88%	\$40,896	94%	\$29,852	83%
70	69.2%	84%	\$40,546	93%	\$28,058	78%
80	66.0%	80%	\$40,647	93%	\$26,827	75%
90	61.7%	75%	\$39,723	91%	\$24,491	68%
100	21.7%	26%	\$23,730	55%	\$5,142	14%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

IU cases are excluded from the calculations in Table VII-5. Obviously, the earnings for veterans rated 60% to 90% would be much lower if veterans receiving IU were included, especially if the condition(s) rated are for PTSD and Other Mental primary diagnoses. However, IU cases are very different, and the IU evaluation system covers them instead of the Regular Schedule. Including them would make it impossible to assess the effectiveness of the Regular Schedule for the non-IU cases.

<sup>103</sup> The effects of CDD on average earnings per wage earner are not nearly so strong as the effects on employment rate. Nonetheless, there are separate and multiplicative effects. Overall, veterans rated at CDD 100% are only 26 percent as likely as CDD 10% veterans to have earnings (21.7 / 82.6). Among those who had earnings in 2006, CDD 100% veterans have only 55 percent of the earnings of CDD 10% veterans (\$23,730 / \$43,537). Multiplying those two rates—.26 x .55—yields .143, or approximately 14%, for the overall average effect on CDD 100% veterans relative to those at the CDD 10% level.

## Non-IU Versus IU Comparisons — Why They Are Not Comparable

Regular schedule veterans with service-connected disabilities are different from those with IU status. The process for evaluating IU is different. Unlike regular schedule disability ratings, the process for determining IU requires an examination of the veteran's employability. Once granted IU status, the veteran's nominal combined degree of disability rating is essentially moot. As shown in Table VII-6, IU status is granted only to veterans who have a combined degree of disability of 60 to 90 percent; however VA has the authority to grant IU status in exceptional or unusual cases. They are provided with compensation at the 100 percent level. Their average annual earnings—unlike earnings of regular schedule veterans with service-connected disabilities—are completely uncorrelated with CDD rating.

**Table VII-6. Comparison of IU and Non IU 2006 Earnings Plus Benefits (Veterans under Age 65)**

CDD	Regular Schedule (Non-IU)			2006 Earnings and Benefits	IU		Non-IU and IU	
	2006 Earnings and Benefits	Number	VA Comp		Number	VA Comp	2006 Earnings and Benefits	Number
10%	\$47,483	314,823	\$1,344				\$47,483	314,823
20%	\$46,777	187,203	\$2,616				\$46,777	187,203
30%	\$45,832	144,944	\$4,589				\$45,832	144,944
40%	\$44,271	113,291	\$6,608				\$44,271	113,291
50%	\$40,981	61,741	\$9,294				\$40,981	61,741
60%	\$39,665	54,543	\$11,720	\$373	5,893	\$30,664	\$35,834	60,436
70%	\$37,221	29,960	\$14,512	\$598	13,306	\$30,464	\$25,963	43,266
80%	\$35,521	17,164	\$16,700	\$575	12,314	\$30,595	\$20,929	29,478
90%	\$32,335	6,355	\$18,572	\$450	7,590	\$30,632	\$14,995	13,945
100%	\$7,087	30,059	\$29,600				\$7,087	30,059
Regular Schedule 100% and IU (60 – 90%) Combined							\$3,379	69,162

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

If we were to combine IU veterans with non-IU veterans using their nominal CDD ratings, we obtain the results shown in the last two columns in Table VII-6. Veterans with IU status comprise an increasing proportion of veterans at each CDD rating level, and hence lowers the observed average annual earnings (plus job-based benefits) by a larger amount at each higher step. This is because, the closer we get to the 100% CDD level, the higher the chances of someone being granted IU (due to employment circumstances), and the more alike the two populations are.

If we were to combine the IU veterans anywhere with the non-IU group, it would be most nearly correct to combine them with those at the 100% level. That is because they are 100% disabled, even though the process by which that determination is made is different from the process by which regular schedule veterans with disabilities reach the 100% level, as was done in the last row of the table. Because of the number of IU veterans and their low earnings, when combined with regular schedule veterans with

service-connected disabilities, the resulting average annual earnings is considerably lower. But, even though IU veterans are most like non-IU veterans rated at 100 percent, they are still not the same. They are still two different groups that should not be combined in the same analysis.

As we indicate elsewhere in this report, the reason that IU veterans are so different even from regular schedule veterans rated at 100 percent is because of the different process used to arrive at the IU determination. Surely, many non-IU veterans at the 100 percent are essentially unemployable. However, our examination of the data shows that some non-IU veterans rated 100% disabled had 2006 earnings as high as \$68,805. These veterans very likely were rated 100% disabled *only* because of the way that multiple disabilities are combined to produce the combined degree of disability rating.

For these reasons, the non-IU and IU populations are inherently non-comparable on several different levels. Based on our analysis of the data, IU determination and compensation are part of a process that works quite well. For the balance of this report, we analyze IU determinations separately because to include them would be a classic case of “mixing apples and oranges.”

## Expected Earnings Analysis

We analyzed the earnings of the non-SCD veterans to measure the specific effects of available human capital factors on earnings. We then used the results of those measurements to predict the earnings of the veterans with service-connected disabilities, broken down by age and by disability type. Since we cannot do exact cohort matching, we used a statistical method for achieving similar results.<sup>104</sup> Expected earnings are the earnings that we would expect SCD veterans to have in the absence of their SCDs.

## Overall Rating Equity

Table VII-7 shows the means for a variety of key factors that are related to earnings. We need to emphasize that Table VII-7 is not the bottom line. It is an overall picture that is not broken down by age or disability, even though the expected earnings levels shown do control for age. As presented here, veterans over and under the age of retirement are combined in this table, which can enhance some effects and mask others. This table also does not present compensation results. It addresses only the issue of the overall accuracy of the rating system: Is VA’s current rating system an accurate or useful way to predict loss of earnings capacity?

Table VII-6 refers to non-SCD veterans. In this report, we are careful not to refer to the non-SCD population as non-disabled. That is because non-disability is not a criterion for including them in the study as a comparison group. The non-SCD group is expected to have an ordinary distribution of disabilities and impairments that are not service-

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<sup>104</sup> Applying the non-SCD regression coefficients to SCD veterans provides a way to “predict” what the SCD groups’ earnings would have been if those groups did not have service-connected disabilities.

connected, just as SCD veterans will have an ordinary distribution of disabilities that are not service-connected in addition to disabilities that *are* service-connected.

Because of the degree of medical attention and treatment that SCD veterans undergo, it is entirely possible that veterans rated at the 10 percent level (and perhaps higher) are “healthier” in a general sense than the average non-SCD veteran who is not receiving similar attention and treatment. As discussed in the previous chapter, our analysis of 2001 National Survey of Veterans data indicates that about 21 percent of veterans without a SCD disability report having a disability (25 percent of pre-1980 veterans and 8 percent of veterans released from active duty in 1980 or later). Hence, we expect that the proportion of non-SCD veterans with earnings-impairing conditions (that are not service-connected) to be a factor affecting the earnings comparisons.<sup>105</sup>

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<sup>105</sup> To determine the extent to which this is true, it would be necessary to rate non-SCD veterans’ disabilities in a similar way that SCD veterans are rated but not conditioned on service connection. If, on average, those non-SCD veterans were to be rated at even half the incidence as SCD veterans, then we would fully expect for non-SCD veterans’ average earnings capacity to be somewhat below the “healthiest” and least impaired SCD veterans. While this would make for a very enlightening study, it is beyond the scope of the current project.



**Table VII-7. Mean Earnings, Expected Earnings, Gender, Former Officer Status, Education, Age, and Employment Rate by SCD Status and CDD Level**

SCD Status	CDD Level	2006 Earnings	Expected Earnings	% Earnings Loss	% Male	% Former Officer	Mean Education (Yrs)	Mean Age (Yrs)	% with 2006 Earnings
<b>Non-SCD</b>	0	\$42,719			86.0%	13.2%	12.6	49.6	76.2%
	10	\$47,483	\$46,792	-1%	87.6%	11.5%	12.5	45.4	82.6%
	20	\$46,777	\$46,769	0%	87.3%	11.2%	12.5	45.3	82.0%
	30	\$45,832	\$46,568	2%	86.1%	11.6%	12.5	45.8	80.8%
	40	\$44,271	\$46,623	5%	85.7%	10.9%	12.5	46.0	79.1%
	50	\$40,981	\$46,985	13%	84.2%	11.2%	12.5	46.4	75.0%
	60	\$39,665	\$46,807	15%	84.6%	11.1%	12.5	47.1	73.0%
	70	\$37,221	\$46,602	20%	84.9%	11.6%	12.6	47.8	69.2%
	80	\$35,521	\$45,948	23%	85.0%	12.6%	12.6	49.2	66.0%
	90	\$32,335	\$43,194	25%	88.4%	15.0%	12.8	51.9	61.7%
	100	\$7,087	\$45,021	84%	84.0%	8.6%	12.3	48.9	21.7%
	Total	\$43,950	\$46,647	6%	86.5%	11.3%	12.5	46.0	78.0%
<b>Rated as IU</b>	60	\$373	\$46,389	99%	85.2%	4.7%	12.0	49.0	4.8%
	70	\$598	\$45,008	99%	82.3%	5.0%	12.2	48.9	5.5%
	80	\$575	\$43,742	99%	83.0%	6.5%	12.3	50.1	5.7%
	90	\$450	\$42,265	99%	82.8%	8.2%	12.4	51.4	6.0%
	Total	\$528	\$44,285	99%	83.1%	6.0%	12.2	49.8	5.5%
<b>SMC (K) Recipients</b>	0	\$43,117	\$44,873	4%	87.4%	16.8%	12.8	47.2	77.6%
	10	\$44,755	\$44,971	0%	86.5%	17.9%	12.8	49.2	78.3%
	20	\$41,465	\$39,717	-4%	94.7%	21.2%	13.0	52.8	73.1%
	30	\$41,645	\$41,346	-1%	81.1%	17.5%	12.9	51.2	74.9%
	40	\$39,334	\$39,916	1%	83.8%	16.7%	12.8	51.9	73.4%
	50	\$37,297	\$39,904	7%	72.6%	16.6%	12.9	51.8	70.6%
	60	\$34,882	\$38,993	11%	76.2%	18.3%	12.9	52.2	67.0%
	70	\$27,383	\$39,344	30%	84.3%	14.0%	12.7	52.3	53.5%
	80	\$21,178	\$39,161	46%	86.7%	13.6%	12.7	52.5	43.2%
	90	\$14,036	\$38,627	64%	88.4%	13.1%	12.7	52.7	30.9%
	100	\$11,553	\$35,609	68%	95.6%	18.5%	13.0	55.5	27.2%
	Total	\$31,158	\$39,701	22%	85.1%	16.4%	12.8	52.1	59.3%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

Overall, using the current rating system, when all age groups are combined (including those 65 and older, most of whom are retired), and when all disability/diagnosis types are combined, for most SCD veterans (non IU and non SMC), earnings losses (where actual earnings are less than expected earnings) do not occur for veterans rated at the 10% to 20% disability rating levels. Overall, among veterans who do not have IU status or SMC, those rated at 100% experience an 84 percent earnings loss, while veterans rated at 90% experience a 25 percent earnings loss, relative to expected earnings (determined by human capital factors such as age, education, and former officer status).

However, for most veterans overall, the current rating system's combined degree of disability rating does not provide accurate predictions of earnings, indicating a problem with vertical equity of the rating system. At the lower end, for veterans rated at 10% to 20%, earnings losses do not occur. At the higher end, earnings losses occur but are not so great as the CDD level predicts.

An analysis of VA compensation rates suggests that while, historically, the CDD rating was designed to correlate with earnings impairment, a one-to-one correspondence is no longer expected. This is clear from looking at average VA compensation levels by CDD level shown in Table VII-8. Also clear from this table, however, is that the compensation paid, on average, exceeds earnings losses. Column (1) shows average VA compensation paid to veterans who were not rated as IU or receiving SMC in 2006. Using VA compensation at the 100% disability rating level as a reference point for complete earnings loss, we divided each disability compensation amount for each CDD level (for example, \$1,559, \$3,035, \$5,323, and so on) by the 100% disability compensation amount (\$34,336) to determine the percentage shown in column (2). The VA system implicitly assumes 4.5 percent earnings loss at the 10% disability rating level. At the 20% level, VA assumes 8.8 percent earnings loss. The largest increase is from the 90% to the 100% disability rating level with a predicted 84 percent earnings loss.

**Table VII-8. Average VA Compensation Paid in 2006, by CDD**

CDD Rate	(1) Average 2006 Compensation (Tax-Adjusted) <sup>i</sup>	(2) VA Comp as a Percentage of 100% Level	(3) Average Earnings Loss for Non-IU/ Non-SMC Veterans
10%	\$1,559	4.5%	-1%
20%	\$3,035	8.8%	0%
30%	\$5,323	15.5%	2%
40%	\$7,665	22.3%	5%
50%	\$10,781	31.4%	13%
60%	\$13,595	39.6%	15%
70%	\$16,834	49.0%	20%
80%	\$19,372	56.4%	23%
90%	\$21,544	62.7%	25%
100%	\$34,336	100.0%	84%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

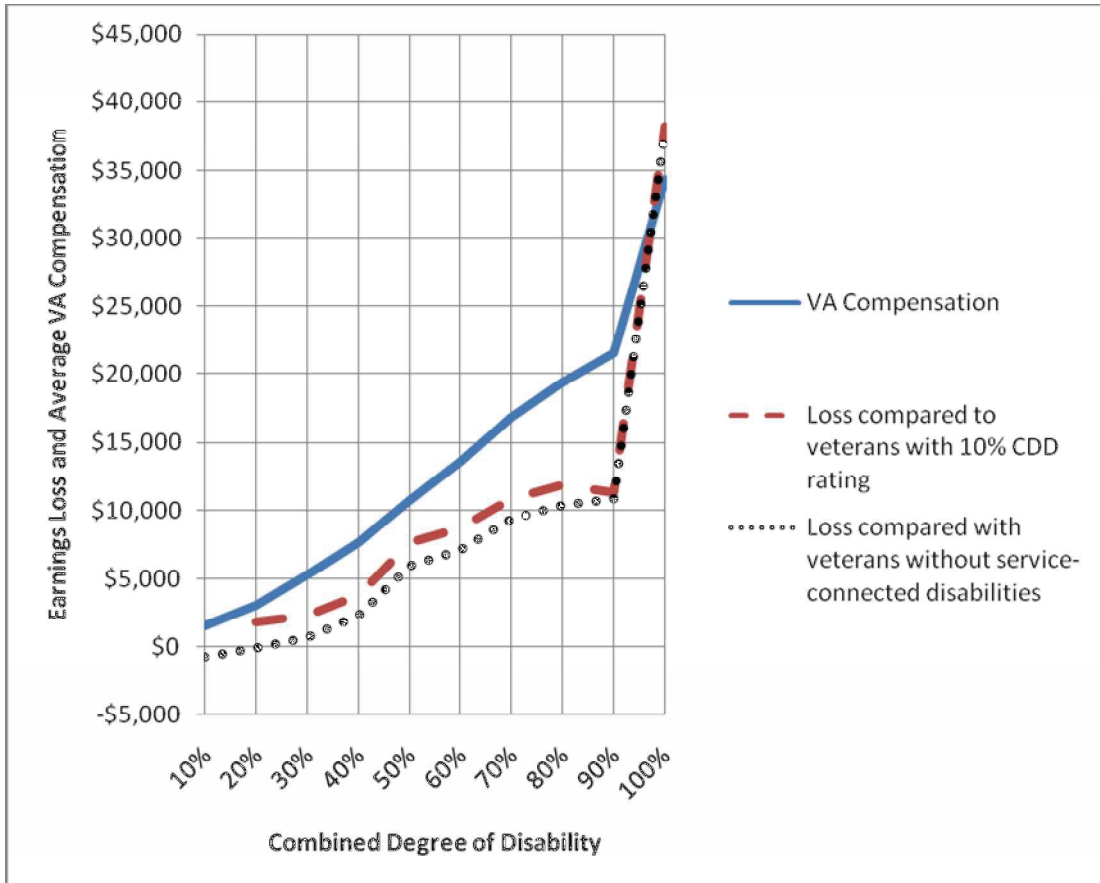
<sup>i</sup> These are the actual average amounts of compensation paid, adjusted for tax advantage. They reflect the true average value of the payments based on an average combined state and federal income tax rate of 16 percent. Because VA disability payments are not taxed, their value to the recipients is higher than the identical amounts received as taxable income. In order to use both in the same calculation, VA compensation must be adjusted so that it is comparable.

Column (3) shows earnings losses when comparing actual earnings to non-SCD expected earnings.

A different way to view this is using dollar amounts. Figure VII-1 compares average tax-adjusted VA compensation and average earnings losses by CDD for veterans under age 65 who are not rated for IU and not receiving SMC. The bottom (dotted) line computes the difference between actual and expected earnings based on our analysis of earnings of veterans without service-connected disabilities. The middle (dashed) line computes

the difference between actual and expected earnings based on our analysis of SCD veterans with a 10% CDD rating.

**Figure VII-1. Comparison of Tax-Adjusted VA Compensation and Two Measures of Earnings Losses (Veterans without IU or SMC)**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

At the 10% and 20% CDD levels, our analysis measured no earnings losses when compared to veterans without service-connected disabilities (non-SCD veterans). Compared with veterans rated 10%, other SCD veterans (veterans with service-connected disabilities) show earnings losses at the 20% level. For both measures of earnings losses, however, losses are below VA compensation paid at every CDD level except at the 100% level, where earnings losses exceed VA compensation by several thousand dollars.

This is far from a bottom line, however, because the extent of rating equity varies by age and disability type (primary diagnosis) as well as by the number of service-connected disabilities comprised by each veteran’s CDD rating. That is, while it might be true overall that VA compensation exceeds losses at 90% CDD ratings and below, this does not hold true when analyzing at the diagnostic code level. There are some diagnostic

codes for which VA compensation does fall short of earnings losses below the 100% CDD level (such as PTSD and various mental diagnoses).

We can say that overall, veterans rated with IU do indeed effectively experience total earnings losses (based on data shown in Table VII-7). On average, veterans with IU ratings earned \$528 in 2006, compared with their expected earnings of over \$44,000.

Among the nearly 189,000 veterans receiving SMC (K), the picture is mixed. Looking at the mean ages of veterans in this group, they are older on average than other veterans and the group has a higher proportion of veterans above normal retirement age. This means that their actual and expected earnings generally are lower than those of younger groups.

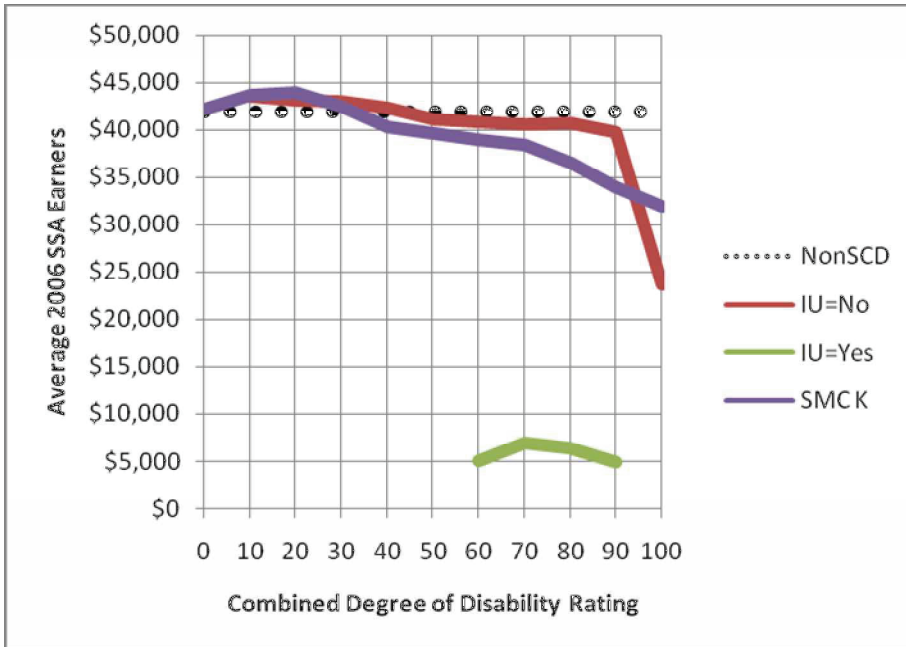
There are other types of special monthly compensation recipients not analyzed in Table VII-7: types (L, M, N, O, P, R, and S). As a group, these SMC recipients include approximately 60,000 veterans and experience earnings losses ranging from 82 to 100 percent. We will have more to say about this narrow subset of VA disability compensation recipients later in this report.

### **Earnings by CDD, IU Status, and SMC (K) Status**

While computing the underlying regression coefficients that translate the factors in Table VII-7 into “expected earnings” is not a simple calculation, the mean value of each cell can be used to explain at least part of the earnings and expected earnings differences in Figure VII-2 and Figure VII-3. Earnings losses could be assessed using any of several calculations available to us, each one derived from the earnings data provided by the Social Security Administration (SSA). Figure VII-2 shows overall average earnings by CDD, IU status, and SMC (K) status for veterans with earnings in 2006 (that is, excluding veterans who did not have earnings in that year). The dotted line shows average earnings for employed veterans without SCDs.

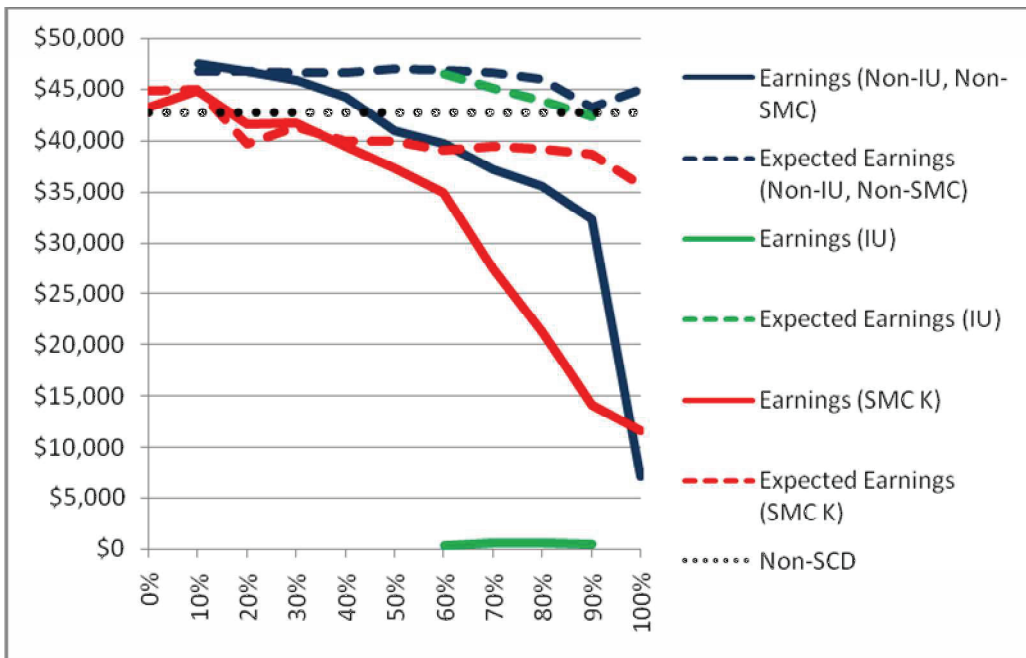
The short line at the bottom of the graph shows earnings for veterans with IU who had earnings. For SCD veterans not receiving IU, average earnings are at or above those of non-SCD veterans at the 10% through 40% rating levels. For veterans not receiving either IU or SMC (K) payments, earnings losses begin at the 50% rating level.

**Figure VII-2. Average Earnings for Employed Veterans with Service-Connected Disabilities by CDD Level**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

**Figure VII-3. Actual and Expected Earnings by IU and SMC (K) Status and CDD**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

The data used in Figure VII-2 do not control for the effects of age, education, or other factors that can affect earnings. Using the results of the regression analysis, we can show actual and expected earnings based on (controlling for) factors used in the regression. Figure VII-3 shows average actual and expected earnings for all veterans—averaging together those with and without earnings. The expected earnings amounts—graphed with dashed lines—show the earnings amounts that the given groups of veterans in each category would have made if they had not had service-connected disabilities using statistical results from the non-SCD population to predict the SCD groups earnings. Because the actual composition of different subgroups (CDD, IU, and SMC (K) status) varies by age, education, and the percentage of former officers in each group, the expected earnings vary.

Controlling for the effects of age, education, and former officer status, the expected level of earnings for SCD veterans without IU (IU=No) exceeds the actual average earnings for non-SCD veterans. This is primarily because that group's age composition differs significantly from that of the non-SCD group. This highlights why it is important to control for human capital factors to the extent possible.

Expected earnings for veterans with IU and receiving SMC (K) at some CDD levels are well below the expected earnings of SCD veterans without SMC or IU status. Again, this is due to the underlying composition of the groups being compared with respect to age and other factors. The lower expected earnings are not related to the SMC or IU status but rather to the demographic composition of the groups with those statuses.

Another finding to notice is the strong correlation between 2006 earnings and employment rate (as measured by the percentage of veterans who had earnings). Even so, when we contrast Figure VII-2 and Figure VII-3, the former shows that even after controlling for employment rate (by focusing only on earners), some veterans with service-connected disabilities—those rated from 10% to 40%—still earn more than non-SCD veterans. This might be due to a number of factors, ranging from the fact that the non-SCD population is not non-disabled (just non-*service* disabled) to the fact that there are unmeasured human capital differences that we cannot address with the available data.

## Rating and Compensation Equity

We used the non-SCD veteran regression results to “predict” the levels of expected earnings for veterans with SCDs. In this analysis, we are investigating two primary aspects of the VA rating and compensation system:

- Does the existing rating system do a good job of predicting earnings losses? If not, then what corrections are needed?
- Does the existing compensation system do a good job of compensating for loss of earnings? If not, what corrections are needed?

To address these questions, we employ two concepts: *rating equity* and *compensation equity*. Each of these has two components: *horizontal* and *vertical equity*.

## Rating Equity

Originally, the rating system was designed to be correlated with average loss of earnings capacity. However, there were only three previous efforts to measure loss of earnings capacity to determine if the system accurately achieves that outcome (Bradley 1956,<sup>106</sup> ECVARS 1972,<sup>107</sup> VDBC 2007). In the many decades since the system was established, innumerable statutory and regulatory adjustments have impacted upon the rating system. The extent to which CDD ratings are predictors of loss of earnings capacity is what here is called *rating equity*.

### Vertical Rating Equity

The *vertical* component is the extent to which the different CDD rating levels correspond to earnings losses in affected veterans. In a perfectly predictive system, veterans rated at 50% would have earnings losses of 50 percent. Veterans rated at 100% would have 100 percent earnings losses. Table VII-9 provides an overall snapshot that helps us consider this question. Numbers shown in the Percent Earnings Loss column summarize the percentage of earnings loss. Actual earnings are the average for all veterans without IU or SMC status for 2006, plus estimated employer-provided benefits, as explained in Chapter 6. The expected earnings column was calculated using the coefficients from the non-SCD regression. Hence, expected earnings represent the earnings that each group of SCD veterans would have earned in the absence of service-connected disabilities.

**Table VII-9. Overall Rating Equity for Veterans Without IU or SMC Status**

Combined Disability Rating	Actual Earnings	Expected Earnings	Earnings Loss	Percent Earnings Loss
10%	\$47,483	\$46,792	-\$691	-1%
20%	\$46,777	\$46,769	-\$8	0%
30%	\$45,832	\$46,568	\$736	2%
40%	\$44,271	\$46,623	\$2,352	5%
50%	\$40,981	\$46,985	\$6,004	13%
60%	\$39,665	\$46,807	\$7,142	15%
70%	\$37,221	\$46,602	\$9,381	20%
80%	\$35,521	\$45,948	\$10,427	23%
90%	\$32,335	\$43,194	\$10,859	25%
100%	\$7,087	\$45,021	\$37,934	84%
<b>Average for All SCDs</b>	\$43,950	\$46,647	\$2,696	6%
<b>Non-SCD</b>	\$42,719			

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

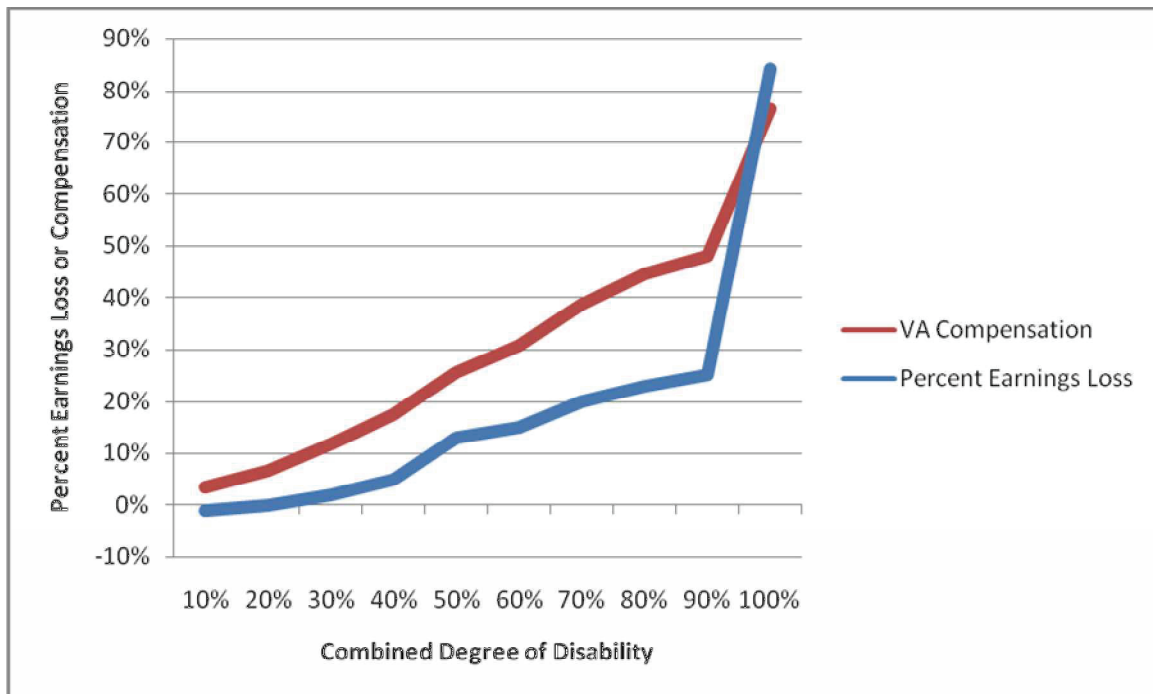
<sup>106</sup> President's Commission on Veterans' Pensions (1956). *Findings and Recommendations*. Washington, DC: U.S. Government Printing Office.

<sup>107</sup> Economic Validation of the Rating Schedule (1971), U.S. Senate, 93<sup>rd</sup> Cong., 1<sup>st</sup> sess., Senate Committee Print No. 3, Washington, DC.

Using the data on the determinants of earnings<sup>108</sup> of non-SCD veterans in the comparison group to calculate expected earnings, earnings losses do not occur below the 30% CDD level. The minus one (-1) percent for the 10% rating group indicates that earnings are about 1 percent (\$691) higher than expected. There are also “negative” earnings losses at the 20% level, albeit quite small (actual earnings exceed expected earnings by \$8).

Average earnings for non-SCD veterans is \$42,719, which is below the average earnings levels for veterans rated from 10% to 40%. This is because the demographic characteristics of the SCD veterans are, as a group, such that they earn more than the average non-SCD veteran. Notice also that their expected earnings are also higher than the observed earnings of non-SCD veterans. Again, this is based upon their demographic makeup—age, former officer status, and education. This highlights why it is vitally important to use either precise cohort matching or a technique such as regression analysis. Fortunately we were able to perform regression analysis because exact cohort matching was not possible. Overall, we can ask whether the percentage losses match the percentage disability ratings. They do not. We can also ask whether the steps between the different categories are uniform. Again, they are not, as shown in Figure VII-4.

**Figure VII-4. Overall Earnings Loss Deviation from Linearity**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

<sup>108</sup> Regression analysis was used to measure the effects of various human capital factors on earnings for veterans without service-connected disabilities and for veterans rated at 10 percent combined degree of disability. These results were then used to predict earnings for veterans with service-connected disabilities at all CDD rating levels. The methodology is explained in detail in Chapter 6.



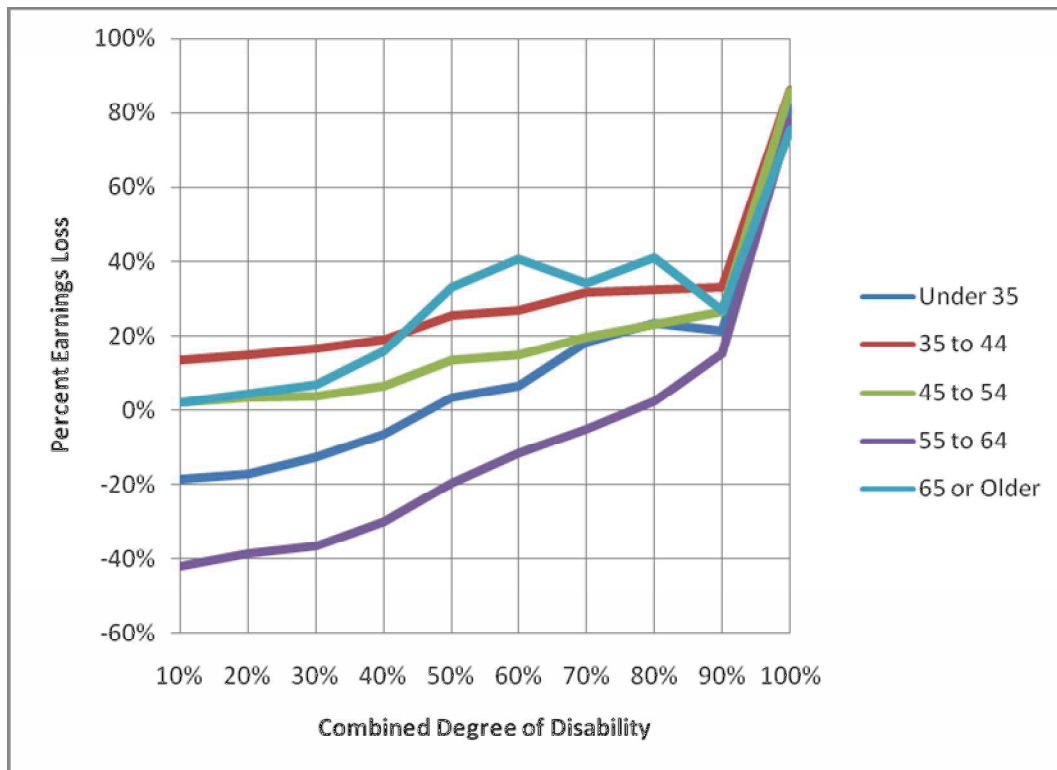
The VA compensation system itself is not linear or uniform, either. A departure from linearity is not necessarily an issue that is difficult to solve, particularly if the shape of the earnings loss curve matches the shape of the compensation curve.

In Figure VII-4, the VA Compensation line was calculated by dividing average annual VA compensation, plus 16 percent to allow for the average tax advantage of VA payments, by average expected earnings for this group of SCD veterans. The line provides a reference to show that even though the ratings of SCD veterans are not linear or uniform with respect to earnings loss, neither are the VA compensation rates. The most dramatic shifts in earnings losses are matched by shifts in compensation rates. While the match is not perfect, it does suggest that the non-linearity of the VA rating system with respect to earnings loss is not necessarily a problem so long as nothing else in the system relies upon the expectation of linearity in the scaling.

*Vertical Rating Equity by Age*

We also looked at vertical equity by age. Figure VII-5 shows percentage earnings losses by age. Values above the 0% line indicate earnings losses when comparing actual earnings to expected earnings. Values below the 0% line show negative earnings losses—that is, where actual earnings exceeded expected earnings.

**Figure VII-5. Earnings Losses by Age**



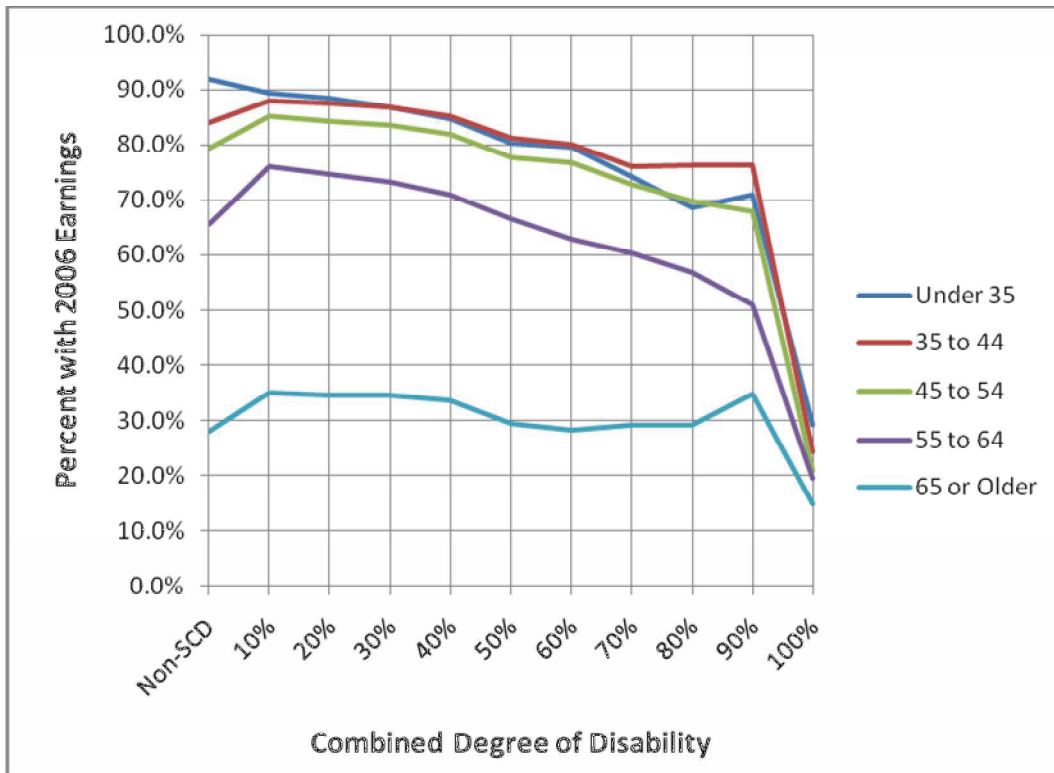
Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

All age groups show earnings losses above the 80% CDD rating level. Veterans ages 35 to 54 years show earnings losses at every CDD level. Veterans under age 35 years and between ages 55 and 64 years show negative earnings losses below the 50% CDD rating level.

Overall, veterans in the 55 to 64 age group show the least susceptibility to earnings losses when comparing actual earnings to expected earnings. This is caused at least in part by the fact that many non-SCD veterans retire before age 65. This has the effect of reducing the expected earnings of veterans in the 55 to 64 age group. As it turns out, SCD veterans in the same age group appear to have higher retirement ages, raising their actual earnings. Overall, 70 percent of SCD veterans in the 55 to 64 age group had 2006 earnings, while only 66 percent of the non-SCD veterans in that age group had 2006 earnings. This is a large difference from a population standpoint, and explains a large degree of the difference between actual and expected earnings.

Figure VII-6 shows employment rates by age group and CDD level. Earnings expectations are largely driven by the contrast between SCD and non-SCD employment rates and earnings. In a perfect data world where everything behaves according to expectations, we might be tempted to interpret non-SCD as 0% disabled. The location of non-SCD in the graph is a perfect illustration of the fact that such is not the case. As explained earlier, approximately 21 percent of non-SCD veterans surveyed report disabilities that are not related to military service. Disabilities vary by age. Rather than the non-SCD employment rate being higher than that of SCD employment rate at every CDD level, it instead is below the CDD 10% employment rate for all age groups except for those under age 35 years. Only in the youngest group are non-SCD veterans significantly “healthier” than SCD veterans rated at CDD 10% as indicated by employment rate.

**Figure VII-6. Employment Rates by Age and CDD**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

*Horizontal Rating Equity*

The *horizontal* component of equity is the extent to which the system performs its predictive mission across different kinds of disabilities. For example, do veterans rated at 50% for defective hearing experience the same earnings losses as veterans rated at 50% for lumbosacral strain, PTSD, and other conditions?

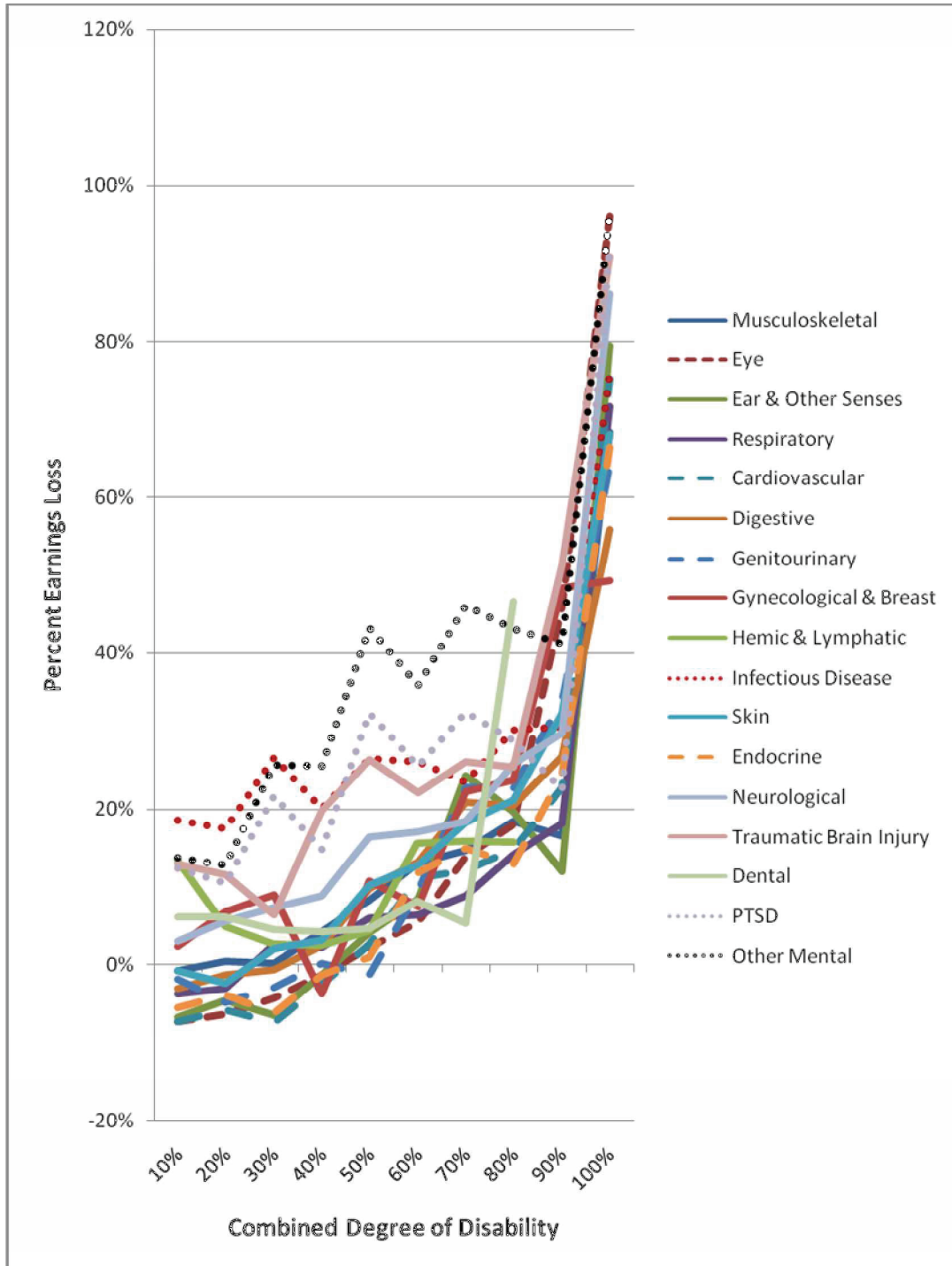
We address this question first by comparing the shape of earnings loss curves for major body systems. While not definitive—variation by actual individual conditions is the final word on this issue—this comparison can show general trends and provide a reference point for the quality of life loss analysis (Chapter 8 in this report), which uses major body systems to assess QOL losses, since sample sizes for individual diagnoses were often not sufficient for analysis.

Figure VII-7 is extremely dense and difficult to parse. However, we present all 17 lines together to show the extent and degree of variation at a single glance.

This collection of lines demonstrates dramatically the extent to which earnings losses vary across the different major body systems. The highest lines—dotted for emphasis—are those conditions with the highest degrees of earnings loss at each level of disability. These include PTSD, other mental, and infectious and immune body systems.

The conditions with the lowest earnings losses (as well as a number of points of negative earnings losses) include cardiovascular, eye, and endocrine diseases.

**Figure VII-7. Percent Earnings Loss by Major Body System<sup>i</sup>**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

<sup>i</sup> TBI, PTSD, and Other Mental are included although they are not body systems.

Because individual points are hard to see, Table VII-10 shows the percentages that were plotted for easier and more exact comparison.<sup>109</sup>

**Table VII-10. Percent Earnings Losses by CDD and Major Body System of Primary Diagnosis<sup>i</sup>**

	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Musculoskeletal	-1%	0%	0%	4%	8%	13%	15%	18%	16%	68%
Eye	-7%	-6%	-4%	-1%	2%	5%	14%	18%	46%	96%
Ear & Other Senses	-7%	-5%	-6%	-1%	4%	9%	24%	20%	12%	79%
Respiratory	-4%	-3%	3%	2%	6%	6%	9%	14%	18%	72%
Cardiovascular	-7%	-6%	-7%	-3%	3%	11%	12%	15%	23%	75%
Digestive	-3%	-1%	-1%	3%	10%	13%	21%	21%	27%	56%
Genitourinary	-2%	-5%	-3%	0%	-1%	10%	23%	23%	34%	64%
Gynecological & Breast	2%	7%	9%	-4%	11%	8%	22%	24%	48%	49%
Hemic & Lymphatic	13%	5%	3%	2%	4%	16%	16%	16%		41%
Infectious Disease	19%	17%	27%	20%	26%	26%	23%	30%	30%	76%
Skin	-1%	-2%	2%	3%	10%	13%	18%	21%	32%	68%
Endocrine	-5%	-4%	-6%	-1%	1%	12%	15%	13%	24%	66%
Neurological	3%	6%	7%	9%	16%	17%	18%	26%	30%	86%
Traumatic Brain Injury	13%	12%	6%	20%	26%	22%	26%	25%	51%	91%
Dental	6%	6%	4%	4%	5%	8%	5%	47%		100%
PTSD	12%	11%	22%	15%	32%	26%	32%	29%	23%	92%
Other Mental	14%	13%	26%	26%	43%	36%	46%	43%	41%	96%

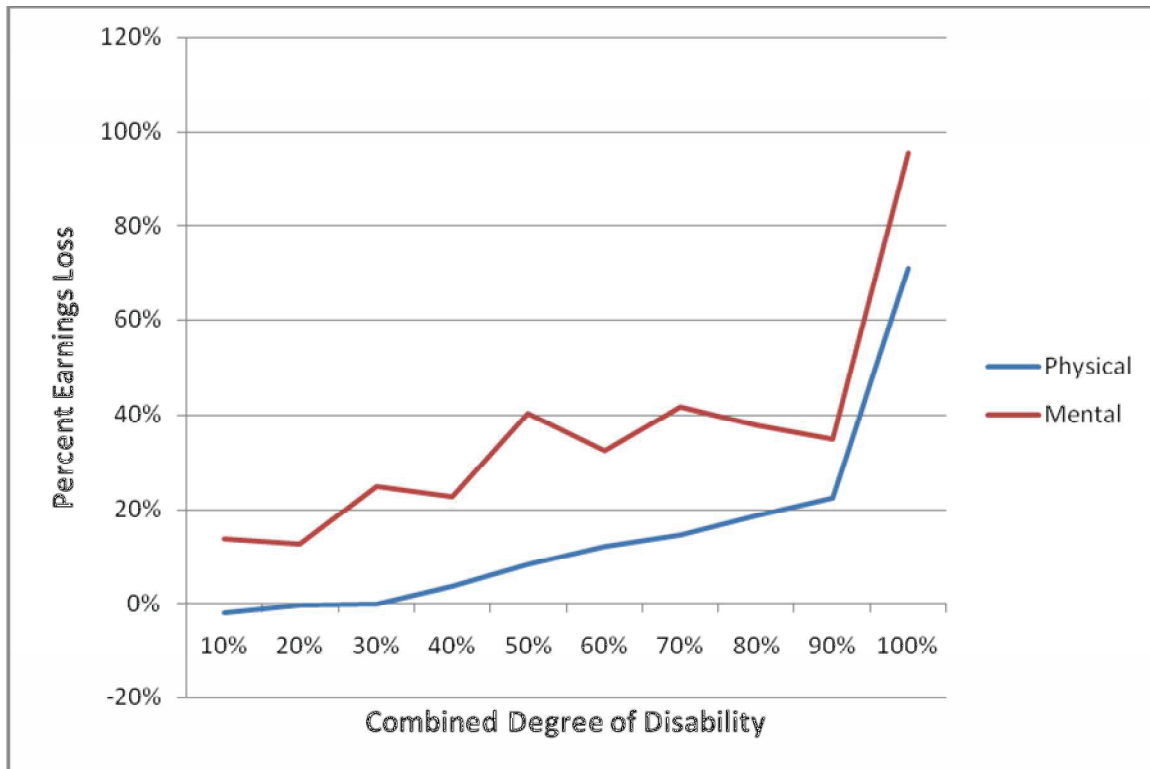
Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA

<sup>i</sup> TBI, PTSD, and Other Mental are included although they are not body systems.

We contrast earnings losses between veterans with service-connected disabilities that are mental health rather than physical in Figure VII-8. Earnings losses are higher for mental diagnoses at every CDD level. Hence, there are sharp differences in ratings with respect to earnings when dividing the SCD veteran population in this way. This result suggests that criteria in the rating schedule need revision.

<sup>109</sup> The 90% CDD levels for Hemic & Lymphatic and for Dental are omitted because the losses were based on single cell observations and therefore were not reliable. The 90% CDD earnings loss for Hemic & Lymphatic, for example, was -43 percent, based on a single cell containing 12 veterans, only 7 of whom had 2006 earnings. The mean and standard deviation for that cell's 2006 earnings (earners only) were 53,516 and 28,035, respectively. Average cell earnings and expected earnings for that cell were \$37,962 and \$26,457, respectively. Because the cell is a clear outlier, we excluded it from the graph and table. In the case of Dental, the earnings loss was -3 percent. While not as dramatically different as the Hemic & Lymphatic observation, it was a clear outlier and again based only on one cell and was therefore excluded.

**Figure VII-8. Average Earnings Losses for Veterans with Physical Versus Mental Service-Connected Disabilities**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

### Compensation Equity

*Compensation equity* refers to how well the existing VA compensation payment system corrects for earnings losses. We already know that the compensation system is not linear. That is, compensation provided at the 50% CDD level is not equal to half of that provided at the 100% CDD level. Hence, although combined degree of disability ratings are listed as percentages, it is helpful to think of them as nominal levels rather than actual percentages. That is, 50% is a label, but 50% does not necessarily mean that the veteran is 50% disabled from an earnings standpoint. Indeed, in the VA Disability Compensation Program, 50 percent monthly compensation for a veteran with a 50% CDD rating alone is \$728, which is about 29 percent of the monthly compensation for a veteran with a 100% CDD rating (\$2,517).<sup>110</sup>

From this perspective, therefore, for a compensation system to be equitable, it does not need to be linear. All that is needed is for the compensation system to replace the same percentage of earnings loss at each level of CDD corresponding to each nominal rating to replace the amount of earnings loss experienced by veterans with that rating. Hence,

<sup>110</sup> Chapter IV contains the 2008 regular schedule payment amounts.

if the 80% CDD level is associated with a 53 percent replacement rate that is acceptable if the replacement rate earnings loss at the 80% CDD level is also 53 percent.

The “replacement rate” concept is widely used in disability programs for non-veterans as a basis for assessing the equity and adequacy of those programs. In workers’ compensation, for example, a program is required to replace at least 66.67 percent of lost earnings with benefits (that is, have at least a 66.67 percent replacement rate) in order to be considered adequate. Policy makers may decide that a more generous standard of adequacy is appropriate for the Veterans Disability Benefit Program. One possible standard of adequacy is that the Disabled Veterans’ Indemnification (DVI) rate should exceed 100 percent in honor of the military service provided to the country by disabled veterans. The DVI is the disabled veteran’s actual 2006 earnings plus VA compensation divided by the expected earnings<sup>111</sup> for the veteran if she or he had not experienced a service-connected disability ( $[\text{actual earnings plus VA compensation}] / \text{expected earnings}$ ). The DVI rate can also be used to evaluate the equity of the Veterans Disability Benefit Program.

### *Vertical Compensation Equity*

Vertical equity is the extent to which the DVI rates are consistent for veterans with different CDD ratings. Table VII-11 shows variation in DVI rates by CDD. Veterans rated at 100% CDD receive actual earnings and VA compensation that on average are 9 percent less than those veterans would be expected to earn if they did not have service-connected disabilities. At all other CDD levels, earnings plus VA compensation exceeds expected earnings by amounts ranging from 5 percent for veterans rated at 10% to 20% percent for veterans rated at 90% CDD. The average DVI rate for all disabled veterans in Table VII-11 is 100 percent, but the variations in the DVI rates among veterans with different CDD ratings indicate there is a problem of vertical equity with the veterans disability benefits. The finding that the lowest DVI rate is associated with the highest CDD rating underlines the problem with vertical equity in the current benefits for disabled veterans.

Referring back to Figure VII-4, in this chapter, notice the relationship between the red VA compensation line and the blue percent earnings loss line. The distance between those two lines corresponds to the percent deviation in Table VII-11. The lines are closest together at the 10% CDD level and furthest apart at the 90% level. At the 100% level, the VA compensation line is below the percent earnings loss line. These graphical differences exactly match the numerical percent deviation in Table VII-11.

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<sup>111</sup> Based on regression analysis of 2006 earnings for veterans without service-connected disabilities.

**Table VII-11. Overall Compensation Equity for Veterans without IU or SMC Status**

Combined Disability Rating	Expected Earnings	Actual Earnings Plus VA Compensation	Percent Deviation	Difference
10%	\$46,792	\$49,042	5%	\$2,250
20%	\$46,769	\$49,811	6%	\$3,042
30%	\$46,568	\$51,155	9%	\$4,587
40%	\$46,623	\$51,937	10%	\$5,314
50%	\$46,985	\$51,762	9%	\$4,777
60%	\$46,807	\$53,260	12%	\$6,454
70%	\$46,602	\$54,055	14%	\$7,453
80%	\$45,948	\$54,893	16%	\$8,946
90%	\$43,194	\$53,879	20%	\$10,685
100%	\$45,021	\$41,423	-9%	-\$3,598
<b>All SCDs (all ages)</b>	\$43,889	\$43,693	0%	-\$196
<b>Non-SCD (all ages)</b>	\$42,719			

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

### *Horizontal Compensation Equity*

The *horizontal* equity component is the extent to which the compensation system functions equitably across different types of disabilities. The horizontal equity test can also rely on an examination of the DVI rates for different categories of veterans. Do veterans rated at 90% with a primary disability of PTSD have the same DVI rate as veterans rated at 90% with other primary disabilities?

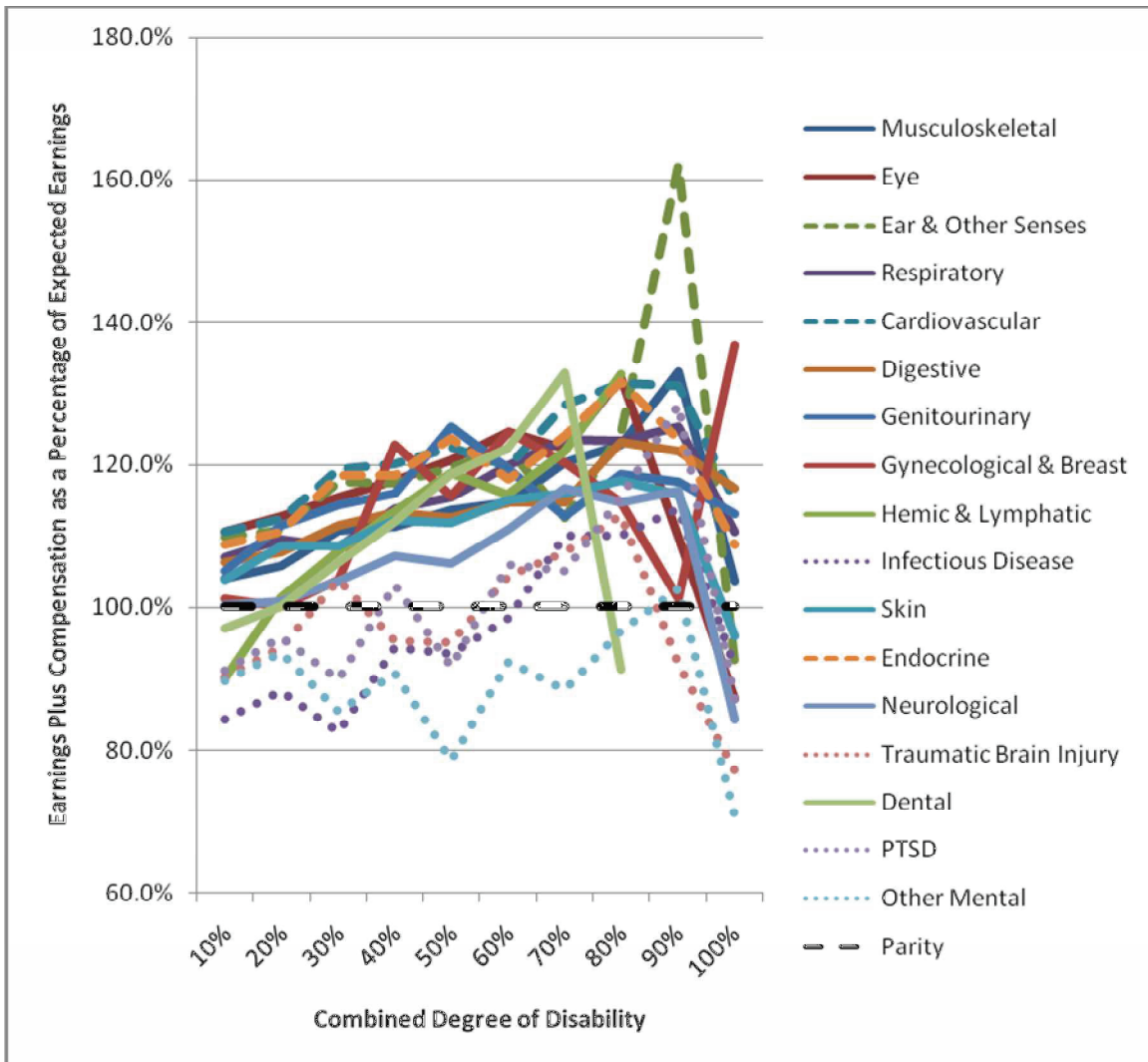
Because of the way compensation is calculated, nominal horizontal compensation equity is built into the system. Anyone rated at 50% CDD level, regardless of the primary diagnosis, receives the same compensation as anyone else rated at the 50% CDD level for any different primary diagnosis (assuming they have the same marital status and number of dependents and are not otherwise differently rated such as for IU or receiving SMC). However, to the extent that veterans with the same CDD levels but different types of injuries have different earnings losses, the DVI rates will vary among those veterans. So, any horizontal inequity in the compensation is necessarily is a function of horizontal inequity in the rating system.

Figure VII-9 depicts horizontal compensation equity for the major body systems. The heavy black dashed line at the 100 percent line indicates perfect parity—where VA compensation exactly replaces lost earnings (that is, where earnings plus VA compensation equals expected earnings). The dashed lines show those diagnostic groups for which actual earnings plus VA compensation most exceeds expected<sup>112</sup> earnings. While patterns are hard to discern, ear, cardiovascular, and endocrine are among the diagnostic groups with the highest DVI rates. PTSD, other mental, and infectious disease primary diagnoses are body systems for which compensation most falls short, by the greatest percentage, of making up for lost earnings.

<sup>112</sup> The compensation deviations in Figure VII-9 are the DVI rates minus 100 percent.



**Figure VII-9. Compensation Equity for Major Body System of Primary Diagnosis<sup>i</sup>**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA

<sup>i</sup> TBI, PTSD, and Other Mental are included although they are not body systems.

In Figure VII-9 above, we present all 17 lines so that the degree of variation—and the lack of effective horizontal compensation equity—is readily apparent even though the individual lines are hard to read. Table VII-12 shows the data points used to produce Figure VII-9. Shaded cells indicate conditions and CDD levels where VA compensation does not fully make up for lost earnings. As before, hemic and dental at the 90% CDD level are omitted due to the small and unreliable cell size. In this table, numbers above 100 percent indicate that VA compensation plus actual earnings exceeds expected earnings. Numbers below 100 percent indicate that earnings plus compensation falls below expected earnings. Looking at musculoskeletal at the 90% level, for example, actual earnings plus VA compensation exceeds expected earnings by 33 percent. Actual earnings plus VA compensation for this group was \$57,809, while the expected amount

for that group was \$43,476 (predicted using multivariate analysis in which non-SCD veterans served as the comparison group).

**Table VII-12. Rate of Earnings Loss (or Gain) After Compensation by Major Body System of Primary Diagnosis<sup>i</sup>**

Body System	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Dental	97%	100%	106%	112%	119%	122%	133%	91%		57%
Other Mental	90%	94%	85%	91%	79%	92%	88%	97%	103%	71%
TBI	90%	94%	104%	95%	95%	104%	108%	113%	92%	77%
Neurological	100%	101%	104%	107%	106%	111%	117%	115%	116%	84%
PTSD	91%	96%	90%	103%	92%	106%	105%	116%	128%	87%
Eye	111%	113%	115%	118%	121%	125%	122%	132%	110%	87%
Infectious Disease	84%	88%	83%	95%	94%	99%	110%	110%	114%	92%
Ear & Other Senses	110%	111%	118%	118%	120%	122%	113%	125%	162%	92%
Skin	104%	109%	109%	112%	112%	115%	116%	118%	116%	96%
Musculoskeletal	104%	106%	111%	111%	114%	115%	120%	123%	133%	104%
Endocrine	109%	111%	119%	119%	124%	118%	124%	132%	124%	109%
Respiratory	107%	109%	109%	114%	116%	120%	124%	123%	125%	111%
Genitourinary	105%	112%	114%	116%	125%	119%	113%	119%	118%	113%
Cardiovascular	111%	113%	120%	120%	122%	120%	128%	131%	131%	115%
Digestive	106%	108%	112%	113%	113%	115%	115%	123%	122%	117%
Gynecological & Breast	101%	100%	104%	123%	116%	125%	120%	115%	101%	137%
Hemic & Lymphatic	90%	101%	108%	114%	119%	116%	122%	133%		140%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

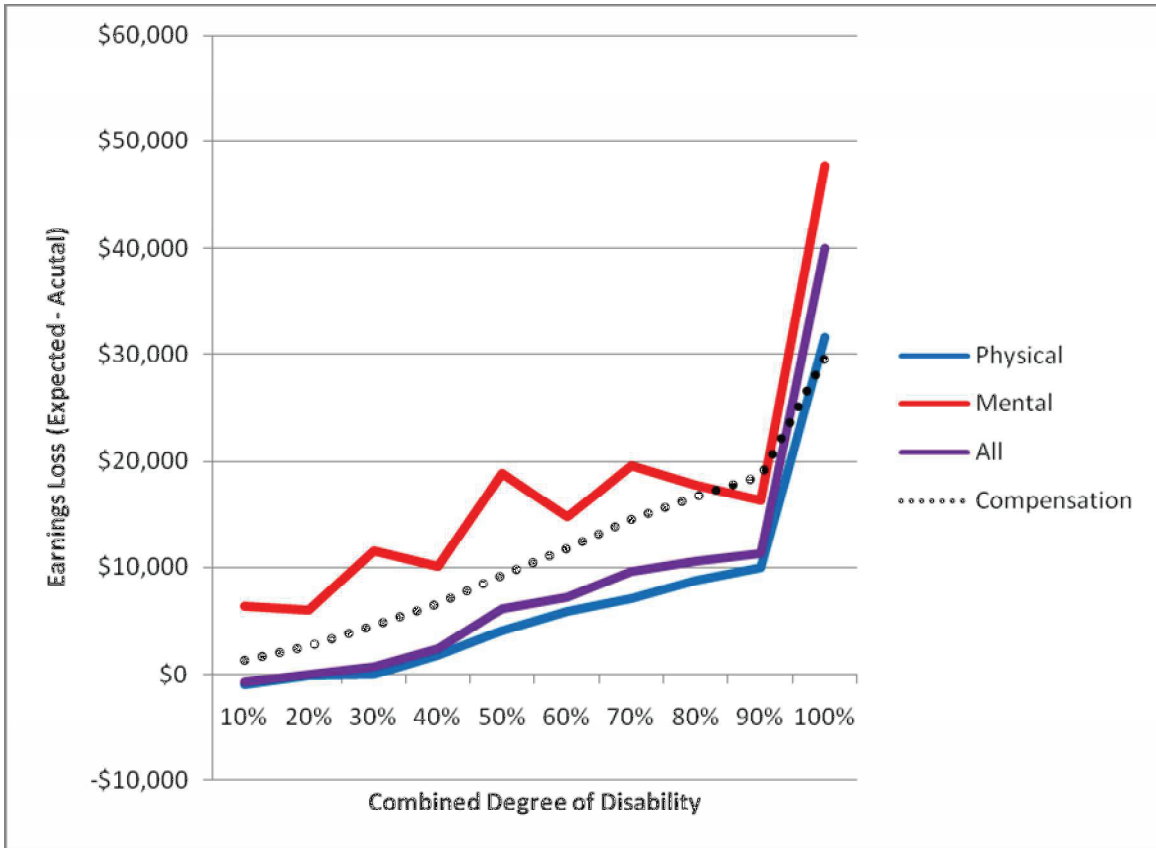
<sup>i</sup> TBI, PTSD, and Other Mental are included although they are not body systems.

In looking at PTSD at the 100% CDD level, actual earnings and compensation (\$38,888) was less than expected earnings (\$44,658) based on human capital attributes of the veterans in that group by 12.9 percent (100 - 87.1 percent).

### Medical Impairment Compared to Economic Impairment

A fundamental concept underpinning the VA Disability Compensation Program is that earnings losses are highly correlated with medical impairment. We know from earlier exhibits presented in this study that medical impairment and earnings losses are correlated but far from perfectly. If the medical impairment percentage system were a good predictor for earnings losses, then we would expect for the earnings loss lines (physical, mental, and all) in Figure VII-10 to be straight. Moreover, we would expect only one straight line for mental and physical conditions, not two lines with changing slopes. In short, there is a problem with vertical equity in the VA rating system.

**Figure VII-10. Average Earnings Losses for Veterans with Physical and Mental Primary Service-Connected Disabilities, for Veterans under Age 65**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA

This judgment that the rating system lacks vertical equity is not definitive, however, because Figure VII-10 is based on the *combined* degree of disability. This shows the end result of how the system combines disabilities of different ratings. It does not tell us whether—one impairment or diagnosis at a time—the medical impairment rating system might be correlated with earnings loss.

Nor is this something we can discern fully from the data, given the way that information is maintained, given privacy constraints placed on the way we can look at earnings data, and given the reality that individuals do not have impairments one at a time. Taken as a whole, the current medical impairment rating and calculation system does not do a perfect job of predicting earnings losses. Finally, although rough, the dramatically different shapes and levels of the physical compared to mental earnings loss curves show that the system is not internally consistent. That is, depending on the primary diagnosis, the degree to which earnings are impacted varies markedly indicating there is a problem with inter-injury horizontal equity.

In summary this analysis tells us that the combination of the VA rating criteria and the formula for determining combined degree of disability do not do a good job in

predicting likely earnings loss. In succeeding sections of this chapter, we look at intermediate steps that might be taken to bring the system into better alignment with earnings loss. However, ultimately, a different system—one that addresses functional limitations or impairments that better equate with the ability to earn—might provide better alignment between ratings and ultimate compensation. We emphasize the word “might” because the experience of the workers’ compensation programs suggests that more information does not necessarily improve the accuracy of the predictions.<sup>113</sup>

## The Permutations Problem

The discovery that earnings and the number of rated disabilities are positively correlated creates a very basic issue for the rating method since it means that there are effectively different earnings loss models depending on how many rated disabilities a veteran has as well as what those disabilities are.

Figure VII-11 shows earnings losses by CDD for veterans with an average of one through six SCDs. The dashed black line shows percentage earnings losses for all SCD veterans combined (non-IU and non-SMC). The dotted red line shows VA compensation as a percentage of expected earnings.

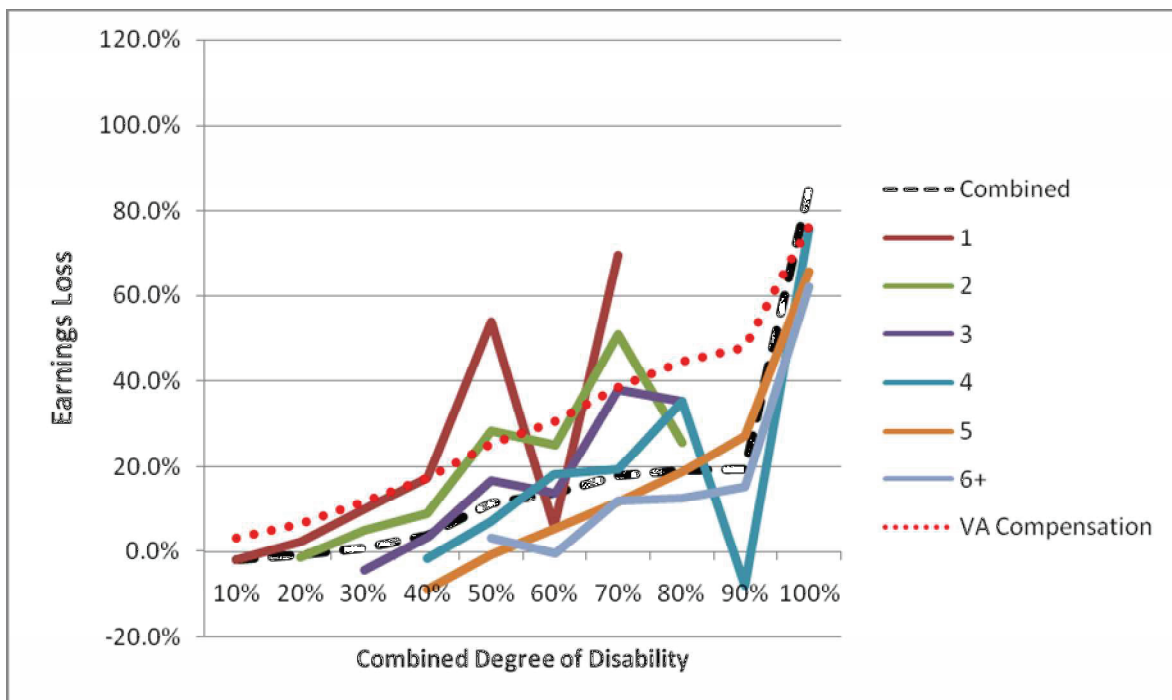
A very fundamental problem is that because of privacy constraints on earnings data—information is aggregated to provide averages only for groups of ten or more veterans—we lack additional useful information about veterans who have more than one rated disability. For veterans with more than one SCD, we do not know the nature of the second disability, the third, and so on in any way that we can match with earnings data.

This creates a dilemma of sorting out economic loss causality. Our analysis shows that some disabilities do not appear to be associated with earnings losses when those disabilities occur in isolation. For example, diagnostic code 5002 (rheumatoid arthritis (RA)) occurs as the primary diagnosis for 532 veterans who had an average of one service-connected disability. Our analysis shows that there are no earnings losses for this group. We might therefore conclude that RA does not result in earnings losses, which indeed might be the case.

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<sup>113</sup> This passage from *A 21<sup>st</sup> Century System for Evaluating Veterans for Disability Benefits* summarizes the information in that study at pages 355-56: “One issue we have considered is whether the disability rating systems would do a better job of predicting actual wage loss if they placed less emphasis on impairment as a proxy for wage loss and more emphasis on functional limitations and loss of earning capacity as proxies... The answer – based on the comparison of Wisconsin and California results – is no! ...We therefore tentatively conclude based on the workers’ compensation data that there is no reason to incorporate consequences of injuries and diseases other than medical impairment in order to improve the accuracy of predictions of actual earnings losses. We want to make clear that this tentative conclusion needs to be carefully examined in subsequent research, especially in studies of the veterans disability compensation program.”

**Figure VII-11. Percent Earnings Losses by Number of Service-Connected Disabilities and Combined Degree of Disability (Excluding Veterans with IU or Receiving SMC and Veterans 65 and Older)**



Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

However, the RA diagnostic code also occurs as the primary diagnosis for 544 veterans who had an average of two service-connected disabilities. For veterans with two SCDs, with RA as the primary condition, we see no earnings losses for veterans with a combined degree of disability below 60%. However, for veterans with two service-connected disabilities and a combined degree of disability of 60%, our analysis shows average earnings losses commensurate with a 40% to 50% CDD rating. For two-disability veterans rated at 100%, our analysis shows average earnings losses commensurate with a 100% CDD rating.

Since we observed no earnings losses for RA in isolation, what can we infer when we see a primary diagnosis of RA being associated with earnings losses *only* when the veteran has two (or possibly more) disabilities, and only when the CDD is 60% or greater?

One possible inference is that RA itself does not cause earnings losses, but that it sometimes occurs in combination with lesser-rated disabilities that *do* cause earnings losses. In other words, we know from our analysis that there is considerable horizontal inequity. There are some disabilities rated at 10% that are associated with higher earnings losses than other disabilities rated at 50% or more. This tells us that the combination of the VA rating criteria and the formula for determining combined degree of disability has not been accurate in predicting economic impairment. More than that, however, it provides a mechanism whereby—based on the primary disability

classification—we might infer earnings losses from some conditions that are not truly responsible for the losses. This is why we performed the detailed analysis by number of service-connected disabilities—so that we could isolate and measure, as much as possible, the individual contributions of specific disabilities to earnings loss.

Alternatively, we might infer that the most serious manifestations of RA *only* occur in combination with other disabilities, and that when it does, then RA itself is part of the reason underlying those losses. This kind of inference requires considerably more detailed analysis of different permutations of disabilities than permitted either by the nature of earnings data made available for this study or by the amount of time allotted. To perform the necessary level of analysis, we would need individual data not only on disabilities but on their earnings, as well, which is not available.

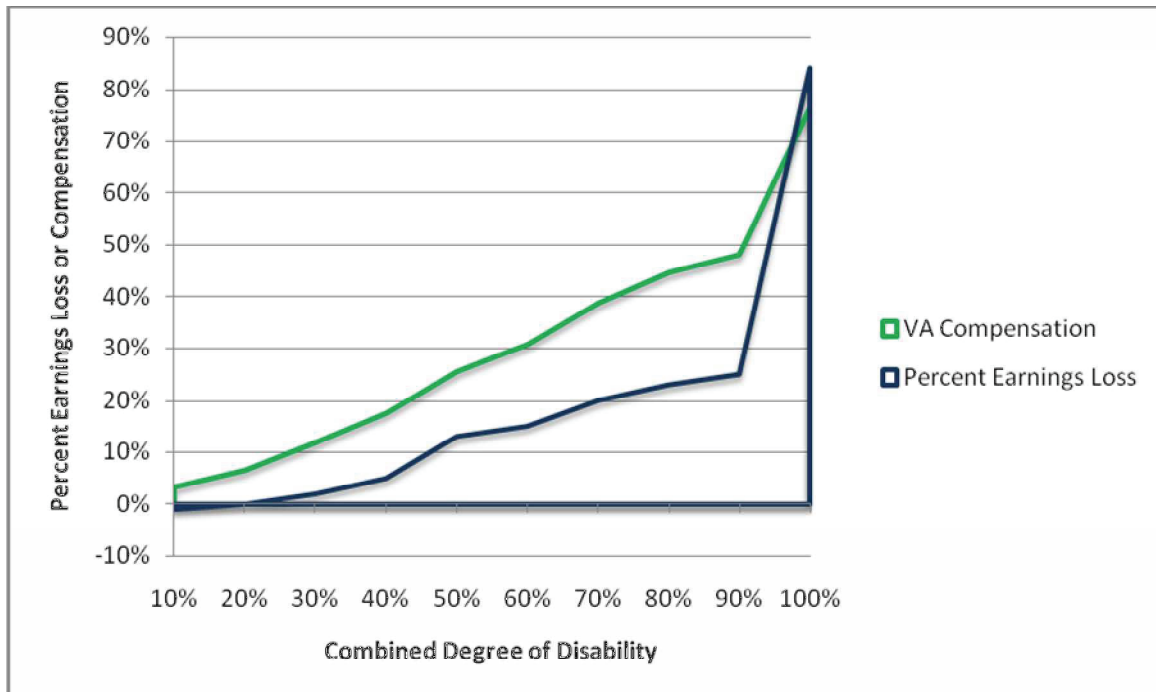
## Policy Options for Loss of Earnings Compensation

The disability rating system serves as a way to predict or estimate the impact of different disabilities on the ability of the disabled veteran to earn a living. How well the rating system serves this purpose is affected by the alignment between VA disability ratings and VA disability compensation. If, for example, the rating system under-predicts the earnings losses associated with a particular medical condition, the DVI rate for that condition will be too low. Misalignment manifests in several ways including overestimating the impact of some disabilities on earnings, assuming an impact on earnings where none exists, and combining ratings for multiple disabilities in ways that do not truly reflect the ways those disabilities affect earnings.

The primary aim in this discussion is to present policy options that have the potential to bring ratings and compensation into better alignment. Possible approaches include:

- Change the method for combining disabilities to calculate the combined degree of disabilities.
- Remove from the rating system disabilities that do not result in earning losses.
- Adjust the ratings, up or down, according to empirically-measured loss patterns associated with specific diagnostic codes.
- Completely overhaul the rating approach, replacing the medical impairment rating system with a system based upon functional impairment or a system more akin to how IU determinations are made.

Figure VII-12 provides an overview of the misalignment between earnings loss and compensation by disability rating. Because compensation equity depends entirely upon rating equity, one way of looking at the goal of the rating system is that earnings losses shown on the combined rating earnings loss line (dark blue) ultimately should match the compensation line (green). In this study we look at ways to improve this match.

**Figure VII-12. Overall Earnings Loss and Compensation<sup>i</sup>**

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

<sup>i</sup> Losses are average losses computed by CDD level using 2006 earnings and expected earnings (the latter based on the analysis of non-SCD earnings). Compensation shown is average 2006 VA compensation, plus 16 percent to allow for the average tax advantage of VA payments, divided by average expected earnings.

We begin from the position—based upon our analysis of earnings and effective losses by CDD and by the number of service-connected disabilities—that ratings based on the formula for determining CDD and the criteria contained in the rating schedule effectively cause this mismatch. Two components of this mismatch are shape and level. If the shapes match, then all veterans—regardless of disability level—are treated the same. All would be equally overcompensated, undercompensated, or compensated exactly for lost earnings. To the extent that the ratings-based earnings loss line is below the VA compensation line, then earnings losses are overcompensated on balance. That is, when the earnings loss line is lower than the VA compensation line, then compensation as a percentage of expected earnings exceeds what is needed to offset earnings losses. The earnings loss line shows how much is needed to offset earnings losses, while the compensation line shows how much VA pays to offset earnings losses.

Stated in these terms, the goal of any revised rating system would be to produce rating and compensation lines that are as close to each other as practicable. As shown in Figure VII-11, some of the lines for losses by number of SCDs are above the lines for VA compensation in places, but most are below it. Overall, therefore, it appears that VA compensation is higher than it needs to be in order to compensate only for loss of earnings. That does not necessarily mean that compensation should be lowered.

Another major part of this study is to determine levels of compensation for lost quality of life. It is possible that part of the current rating and compensation system is implicitly designed to compensate for aspects of lost quality of life. Hence, in designing a new approach to both components, it is helpful to look at both to determine the extent to which the VA Disability Compensation Program is or is not already compensating for lost quality of life.

It is not enough, however, to match only the lines. The system needs to be equitable across different types of disabilities, as well. Hence, any proposed changes should be tested against specific disabilities to ensure that both horizontal and vertical rating inequities are addressed.

### VA Compensation-Based Benchmark for Adjusting Ratings

We use empirically-derived earnings levels as a benchmark for determining whether veterans with specific disabilities and ratings experience earnings losses. More specifically, we use actual VA compensation rates as an indicator of the expected degree of earnings losses for each rating level. Table VII-13 shows the level of earnings losses expected or predicted at each of the 10 different disability rating levels. This table serves only as a benchmark for determining—based on earnings losses—how any given group of veterans should be rated based on empirical observations. The complement of earnings loss (100% minus earnings loss) is the parity ratio predicted by VA compensation. This ratio serves as the benchmark in the rating revision method described in the following discussion.

**Table VII-13. VA Compensation-based Earnings Loss and Parity Ratio by Degree of Disability**

CDD	Average 2006 Compensation	VA Compensation as a Percentage of 100% Level	VA Compensation- Based Parity Ratio
10%	\$1,344	4.5%	95.5%
20%	\$2,616	8.8%	91.2%
30%	\$4,589	15.5%	84.5%
40%	\$6,608	22.3%	77.7%
50%	\$9,294	31.4%	68.6%
60%	\$11,720	39.6%	60.4%
70%	\$14,512	49.0%	51.0%
80%	\$16,700	56.4%	43.6%
90%	\$18,572	62.7%	37.3%
100%	\$29,600	100.0%	0.0%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.



### Adjustments Based on One Diagnostic Condition

We used several different approaches to identify and measure earnings losses to determine whether there are specific diagnostic codes that do not result in earnings losses. We began with the most prevalent 20 disability diagnostic codes looking only at cases where the indicated diagnostic code is the *only* SCD. We excluded from this any veterans with multiple disabilities in order to be able to isolate the effects of the indicated diagnoses.

Table VII-14 shows earning or equity ratios for each of three different comparison points. Rows shaded in gray indicate that we had to aggregate codes in order to have large enough numbers of veterans for SSA to provide earnings data.

The last three columns are rating equity ratios. The non-SCD column (1) is the ratio of 2006 earnings divided by expected earnings predicted, using non-SCD analysis of human capital characteristics and earnings. The CDD 10% based column (2) is the ratio of 2006 earnings divided by expected earnings predicted, using veterans rated at 10% combined degree of disability.<sup>114</sup>

The final column (3) is the expected ratio based on the average amount of 2006 VA compensation paid at the indicated CDD level. At the CDD 10% level, for example, 95.5 percent means that VA compensation is 4.5 percent of 100% VA disability compensation. Hence, a CDD level of 10% compensates for a 4.5% earnings loss (95.5% of full earnings), a CDD level of 20% compensates for an 8.8 percent earnings loss (91.2 percent of full earnings), and so on. The numbers from that column were derived as shown in Table VII-13.

In the first row, for diagnostic code 5003, the 113 percent in column (1) means that average earnings for veterans rated at 10% were 13 percent higher than expected, when using non-SCD veterans as the comparison group. The 103 percent figure in column (2) means that average earnings for veterans rated at 10% for 5003 were 3 percent higher than expected, when using veterans rated at 10% as the comparison group.

We used the VA compensation-based ratio as a way to determine what CDD level the actual earnings losses are most closely associated with. For example, looking at diagnostic code 5271, we see ratios of 97 percent and 89 percent. Based on the non-SCD analysis, we would probably keep 5271 at the 10% disability rating level. Based on the CDD 10% analysis, we would consider re-rating 5271-10% as 20% disability rating level (the 20% and 30% compensation levels are 91.2 percent and 84.5 percent, respectively).

The decision criterion is how much each earns relative to how much [more] they might have earned in the absence of any disability. This is where using non-SCD and CDD 10% analyses to calculate *expected* earnings enters the picture. The question is which one we should use as the standard for assessing earnings loss.

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<sup>114</sup> The term CDD is still used to describe the final rating even when there is only one disability.

**Table VII-14. Rating Equity Ratios for Top 20 Diagnostic Codes Based on Analysis of Cells with an Average of One Service-connected Disability<sup>i</sup>**

Diagnostic Code No.	Diagnosis Description	CDD	(1) Based on Non-SCD Analysis	(2) Based on CDD 10% Analysis	(3) VA-Based Expected Ratio <sup>ii</sup>
5003	Arthritis, degenerative, hypertrophic or osteoarthritis	10%	113%	103%	95.5%
5010	Arthritis, due to trauma, substantiated by x-ray findings	10%	105%	93%	95.5%
5256, 5257, 5263	Knee, ankylosis of; recurrent subluxation or lateral instability of knee ; genu recurvatum	10%	97%	89%	95.5%
5271	Limited motion of the ankle	10%	96%	91%	95.5%
5239, 5243	Spondylolisthesis or segmental instability (5239) and Intervertebral disc syndrome (5243)	10%	109%	99%	95.5%
		20%	99%	93%	91.2%
5237	Lumbosacral strain	10%	102%	96%	95.5%
		20%	135%	167%	91.2%
5275, 5297-5299	Bones of the lower extremity, shortening of; ribs, removal of; coccyx, removal of; generalized, elbow and forearm, the wrist, multiple fingers, hip and thigh, knee and leg, ankle, foot, the spine, the skull, the ribs, the coccyx	10%	99%	95%	95.5%
6100, 6199	Defective hearing; generalized hearing impairment	10%	111%	115%	95.5%
6260	Tinnitus	10%	107%	89%	95.5%
7005	Arteriosclerotic heart disease	10%	117%	116%	95.5%
		30%	126%	144%	84.5%
7101	Hypertensive vascular disease (essential arterial hypertension)	10%	108%	90%	95.5%
7336	Hemorrhoids, external or internal	10%	107%	105%	95.5%
7800	Scars, disfiguring, head, face or neck	10%	97%	94%	95.5%
7804	Scars, superficial, tender and painful	10%	95%	91%	95.5%
7805	Scars, other	10%	103%	147%	95.5%
7806, 7817, 7820-7827	Eczema; dermatitis exfoliativa; infections of the skin; skin condition; papulosquamous disorders; vitiligo Diseases of keratinization; urticaria; vasculitis, primary cutaneous; erythema multiforme; toxic epidermal necrolysis	10%	103%	99%	95.5%
7807-7809, 7811, 7815, 7828-7833, 7899	Leishmaniasis, americana (mucocutaneous); leishmaniasis, old world (cutaneous, oriental sore); lupus erythematosus, discoid; tuberculosis luposa (lupus vulgaris); pemphigus; acne; chloracne; scarring alopecia; alopecia areata; hyperhidrosis; malignant melanoma; generalized, the skin	10%	101%	97%	95.5%
7913	Diabetes mellitus	10%	111%	118%	95.5%
		20%	105%	104%	91.2%
9400	Generalized anxiety disorder	10%	96%	92%	95.5%
		30%	97%	111%	84.5%
9411	Post-traumatic stress disorder	10%	88%	92%	95.5%
		30%	77%	80%	84.5%
		50%	37%	33%	68.6%

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

<sup>i</sup> Items shaded gray are aggregated codes. Non-aggregated, they resulted in cells containing too few veterans for SSA to provide earnings data. Earnings data used to calculate the ratios come from veterans under the age 65, and therefore [mostly] below the age of retirement. Our dataset does not contain information about retirement status and therefore has to rely upon age as an indicator.

<sup>ii</sup> Based on average 2006 VA compensation at this CDD level divided by average 2006 VA compensation paid at the 100% CDD level.

Values of ratios in the non-SCD column (1) usually are greater than those in the CDD 10% (2). Our analysis (and comparison using NSV data) indicates that SCD veterans, as a group, appear to possess greater amounts of human capital than the non-SCD comparison group. We do not know precisely why this is the case, but we believe that higher amounts of human capital account for observed earnings differences not otherwise accounted for in our analysis.

As a result, veterans with non-SCDs earn slightly less than veterans with SCDs on average even when including veterans at all CDD ratings. Non-SCD veterans under the age of 65 had average 2006 earnings of \$44,977. All SCD veterans, also under age 65, regardless of disability rating, averaged \$45,585. This might not seem like a big difference. However, it includes veterans rated at 100% (whose average 2006 earnings were only \$7,368). Average 2006 earnings for veterans rated at 10% were \$49,295—over \$4,000 more than the non-SCD group. This suggests to us that on the whole, the SCD group must have additional human capital characteristics that are unavailable to us that would otherwise explain the difference.

One can make a plausible argument for using either group (non-SCD or CDD 10%) as a reference point or comparison group for calculating expected earnings for disabled veterans. Hence, we use both for comparison. The reason that the non-SCD comparison group-based ratios are not *always* greater than the ratios for the CDD 10%-based group is that the underlying compositions of the groups vary. The equations used to calculate expected earnings are different. Hence, statistically, we occasionally find groups that are “favored” by the non-SCD analysis-based calculation. The important point in each case, however, is whether actual earnings are above or below expected earnings. That is why we look to ratios rather than the actual earnings numbers as a guide for whether a given level of earnings appears to be above or below what we would expect based on the analysis.

Another important factor here is that these veterans had only one rated SCD. Hence, any effects we observe should be due to the diagnostic code and disability rating rather than the effects of additional diagnostic codes.

Using the results of this analysis, it is possible to make a case for saying that a number of diagnoses at specific ratings do not result in earning losses. We would hesitate to make any statement about possible removal of diagnostic codes that were aggregated for this study. However, removing solitary codes at some rating levels would accomplish the aim of moving the compensation and earnings loss lines discussed earlier closer together.

Table VII-15 shows how we would use the results of our analysis with respect to these most prevalent 20 diagnostic codes. For the most part, we recommend keeping ratings when the codes we used were combinations or when both non-SCD-based and CDD 10%-based ratios were below 100 percent. When one is above 100 percent and the other is below 100 percent, we either look at the average of the two, or we give a slightly higher weight to the non-SCD ratio.

**Table VII-15. The 20 Most Prevalent SCD Diagnostic Codes that are Candidates for Adjustment Based Upon Analysis of Cells with An Average of Only One Service-Connected Disability**

VBA Diagnostic Code	Diagnosis Description	Number of Conditions	Currently Ratable	Percent of All Cases	Action
Total	Condition Count Only	8,147,808			
5003	Arthritis, degenerative, hypertrophic or osteoarthritis	169,543	10 or 20%	2.08%	Eliminate 10%
5010	Arthritis, due to trauma, substantiated by x-ray findings	222,494	10 or 20%	2.73%	Eliminate 10%
5256, 5257, 5263	Knee, ankylosis of; recurrent subluxation or instability of knee; genu recurvatum	211,753	10, 20, or 30%	2.56%	Keep
5271	Limited motion of the ankle	100,877	10 or 20%	1.24%	Keep
5239, 5243	Spondylolisthesis or segmental instability (5239) and Intervertebral disc syndrome (5243)	147,811	10, 20, 30, 40, 50, or 100%	1.81%	Keep
5237	Lumbosacral strain	172,169	10, 20, 30, 40, 50, or 100%	2.11%	Eliminate 10 and 20% ratings
5275, 5297-5299	Bones of the lower extremity, shortening of; ribs, removal of; coccyx, removal of; generalized, elbow and forearm, the wrist, multiple fingers, hip and thigh, knee and leg, ankle, foot, the spine, the skull, the ribs, the coccyx	271,413	10 to 60%	3.17%	Keep
6100, 6199	Defective hearing; generalized hearing impairment	336,546	10 to 100%	4.12%	Keep, but investigate components
6260	Tinnitus	348,055	10%	4.27%	Eliminate
7005	Arteriosclerotic heart disease	98,835	10, 30, 60, or 100%	1.21%	Eliminate 10 and 30%
7101	Hypertensive vascular disease (essential arterial hypertension)	262,238	10, 20, 40, or 60%	3.22%	Eliminate 10 and 20%
7336	Hemorrhoids, external or internal	133,757	10, or 20%	1.64%	Eliminate 10%
7800	Scars, disfiguring, head, face or neck	99,763	10, 30, 50, or 80%	1.22%	Keep
7804	Scars, superficial, tender and painful	91,351	10%	1.12%	Keep
7805	Scars, other	254,486	10, 30, or 60%	3.12%	Eliminate 10%
7806, 7817, 7820-7827	Eczema; dermatitis exfoliativa; infections of the skin; skin condition; papulosquamous disorders; vitiligo; diseases of keratinization; urticaria; vasculitis, primary cutaneous; erythema multiforme; toxic epidermal necrolysis	88,972	10, 30, 60 or 100%	0.98%	Keep, but investigate components.

**Table VII-15. The 20 Most Prevalent SCD Diagnostic Codes that are Candidates for Adjustment Based Upon Analysis of Cells with an Average of Only One Service-Connected Disability (continued)**

VBA Diagnostic Code	Diagnosis Description	Number of Conditions	Currently Ratable	Percent of All Cases	Action
7807-7809, 7811, 7815, 7828-7833, 7899	Leishmaniasis, americana (mucocutaneous); leishmaniasis, old world (cutaneous, oriental sore); lupus erythematosus, discoid; tuberculosis luposa (lupus vulgaris); pemphigus; acne; chloracne; scarring alopecia; alopecia areata; hyperhidrosis; malignant melanoma; generalized, the skin	86,093		1.06%	Keep, but investigate components.
7913	Diabetes mellitus	240,539	10, 20, 40, 60, and 100	2.95%	Eliminate 10-20%
9400	Generalized anxiety disorder	76,985	10, 30, 50, 70, and 100	0.94%	Reduce 30% to 20%
9411	Post-traumatic stress disorder	260,881	10, 30, 50, 70, and 100	3.20%	Eliminate 10% rating; use the criteria for 10% for 30%, criteria for 30% for 50%, and criteria for 50% for 70%. Combine criteria for 70 and 100% as 100%. <sup>i</sup>

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA.

<sup>i</sup> We did not observe any 70% single-diagnosis ratings for PTSD in our analysis. However, if we increase 50% ratings to 90% to achieve parity, then it would be inconsistent to leave 70% ratings unchanged, in the event that such ratings do occur but are not “visible” in our analysis because of the way that disabilities are combined.

### Adjustments Based on Two Diagnostic Conditions Combined

Using the one SCD analysis is straightforward. If there are no earnings losses associated with observed CDD levels for specific diagnoses, then there is no empirical support for those levels and diagnoses to be included as compensable conditions, that is the code(s) may be “candidates for deletion.” In the case of two or more diagnoses, however, it is not so straightforward. As indicated previously, we sometimes encounter conditions and rating levels that are not associated with earnings losses using the single-condition analysis. The identical condition, and logically the identical rating level (due to the way the combined degree of disability rating is calculated), sometimes appears *with* an earnings loss when using a two-condition analysis.

Table VII-16 shows the results of our two-diagnoses analysis for the 20 most prevalent diagnostic codes. To illustrate the problem, we contrast the results of the empirical

analysis for code 6100 in Table VII-14 and Table VII-16. In Table VII-14, the analysis based on 6100 as the only diagnostic code resulted in no earning loss at the 10% CDD level. Indeed, earnings were between 111% and 115% percent of expected earnings.

**Table VII-16. Rating Equity Ratios for Top 20 Diagnostic Codes Based on Analysis of Cells with an Average of Two Service-Connected Disabilities<sup>i</sup>**

Diagnostic Code	Description	CDD	Based on Non-SCD Analysis	Based on CDD 10% Analysis	VA Comp Based Ratio <sup>ii</sup>
5003	Arthritis, Degenerative, Hypertrophic or Osteoarthritis	20%	110%	103%	91.2%
5010	Arthritis, Due to Trauma, substantiated by x-ray findings	20%	102%	93%	91.2%
5256, 5257, 5263	Knee, ankylosis of; recurrent subluxation or lateral instability of knee; genu recurvatum	20%	96%	90%	91.2%
		30%	88%	81%	84.5%
		90%			37.3%
		100%	36%	35%	0.0%
5271	Limited motion of the ankle	20%	97%	93%	91.2%
		30%	84%	95%	84.5%
5239, 5243	Spondylolisthesis or segmental instability (523) and Intervertebral disc syndrome (5243)	20%	137%	102%	91.2%
		30%	101%	96%	84.5%
		40%	84%	80%	77.7%
		50%	68%	60%	68.6%
5237	Lumbosacral strain	20%	98%	93%	91.2%
		30%	70%	106%	84.5%
		40%	64%	54%	77.7%
5275, 5297-5299	bones of the lower extremity, shortening of; ribs, removal of; coccyx, removal of; generalized, elbow and forearm, the wrist, multiple fingers, hip and thigh, knee and leg, ankle, foot, the spine, the skull, the ribs, the coccyx	20%	98%	94%	91.2%
		30%	70%	50%	84.5%
6100, 6199	defective hearing; generalized hearing impairment	20%	95%	96%	91.2%
		30%	120%	170%	84.5%
6260	Tinnitus	20%	106%	98%	91.2%
		20%	107%	109%	91.2%
7005	Arteriosclerotic Heart Disease	40%	121%	134%	77.7%
		90%			37.3%
		100%	30%	27%	0%
		20%	109%	102%	91.2%
7101	Hypertensive vascular disease (essential arterial hypertension)	30%	91%	63%	84.5%
		90%			37.3%
		100%	13%	12%	0.0%
7336	Hemorrhoids, external or internal	20%	111%	107%	91.2%
		30%	87%	80%	84.5%
7800	Scars, disfiguring, head, face or neck	20%	98%	94%	91.2%
		30%	95%	90%	84.5%
7804	Scars, superficial, tender and painful	20%	101%	101%	91.2%
7805	Scars, other	20%	95%	91%	91.2%
		30%	83%	80%	84.5%
7806, 7817, 7820-7827	eczema; dermatitis exfoliativa; infections of the skin; skin condition; papulosquamous disorders; vitiligo; diseases of keratinization; urticaria; vasculitis, primary cutaneous; erythema multiforme; toxic epidermal necrolysis	20%	107%	102%	91.2%
		30%	97%	89%	84.5%

**Table VII-16. Rating Equity Ratios for Top 20 Diagnostic Codes Based on Analysis of Cells with an Average of Two Service-connected Disabilities (continued)**

Diagnostic Code	Description	CDD	Based on Non-SCD Analysis	Based on CDD 10% Analysis	VA Comp Based Ratio <sup>iii</sup>
7807-7809, 7811, 7815, 7828-7833, 7899	leishmaniasis, americana (mucocutaneous); leishmaniasis, old world (cutaneous, oriental sore); lupus erythematosus, discoid; tuberculosis luposa (lupus vulgaris); pemphigus; acne; chloracne; scarring alopecia; alopecia areata; hyperhidrosis; malignant melanoma; generalized, the skin	20%	106%	104%	91.2%
		30%	93%	90%	84.5%
		40%	110%	121%	77.7%
		90%			37.3%
		100%	0%	0%	0.0%
7913	Diabetes Mellitus	30%	108%	109%	84.5%
		40%	90%	85%	77.7%
		90%			37.3%
		100%	33%	30%	0.0%
9400	Generalized anxiety disorder	20%	102%	100%	91.2%
		30%	81%	77%	84.5%
		40%	81%	80%	77.7%
		50%	63%	73%	68.6%
		70%	34%	46%	51.0%
		90%			37.3%
9411	Post-Traumatic Stress Disorder	100%	5%	5%	0.0%
		20%	94%	96%	91.2%
		30%	113%	142%	84.5%
		40%	85%	89%	77.7%
		50%	61%	62%	68.6%
		70%	49%	55%	51.0%
90%			37.3%		
100%	7%	7%	0.0%		

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

<sup>i</sup> Items shaded gray are aggregated codes. When non-aggregated, they resulted in cells containing too few veterans for SSA to provide earnings data. Earnings data used to calculate the ratios come from veterans under the age of 65 and therefore veterans were [mostly] below the age of retirement. Our dataset does not contain information about retirement status and therefore has to rely upon age as an indicator.

<sup>ii</sup> Based on average 2006 VA compensation at this CDD level divided by average 2006 VA compensation paid at the 100% CDD level.

<sup>iii</sup> Ibid,

In Table VII-16, however, a two-diagnosis rating of 20%, with the primary diagnostic code of 6100, now has calculated earnings losses of 95 to 96 percent. Mathematically, there are two possible ways a two-diagnoses 20% rating can occur: (1) the veteran must have two conditions, each rated at 10% or (2) the veteran has two diagnoses, one rated at 20% and one rated at 0%. Therefore, veterans used to create the 20% entry in Table VII-16 must have had a 6100 diagnosis rated at 10%, and some other diagnosis rated also at 10% or the 20%-0% combination. The logical problem is, if 10% does not have any earnings losses when it occurs by itself, why does it have earnings losses when it occurs with another but different 10%-rated diagnosis?

We must conclude either that it is only the second diagnosis that really has any earnings losses, or that 6100-10% has a co-morbidity relationship with the second diagnosis. Still another factor may be some inconsistency in the rating process. However, our data do not allow us to make more definitive assessment because we would need earnings data for individuals to be able to analyze issues of co-morbidity. All we can say with any certainty here is that there is something more going on than meets the eye. Given the degree and extent of horizontal inequity of ratings, we are tempted to believe that a diagnosis of 6100 rated 10% disabling (6100-10%) never causes earnings losses in the SCD population of veterans, but that 6100-10% often occurs in combination with other diagnostic codes that are under-rated in terms of earnings losses.

One might ask how it could happen that a veteran with 6100-10% and another disability rated at 10% would then have 6100 listed as the primary diagnosis, rather than the other condition that has a more serious impact on earnings. We do not have an answer for this, except to say that the rating criteria used to rate veterans with service-connected disabilities are not linked empirically to economic impairment. In contrast, the IU system appears to do a good job in evaluating a claimant's unemployment.

Hence, a medical impairment rating will not necessarily yield the same result as a rating system specifically geared to correspond to earnings impairment.

As suggested by the one- versus two-condition logical problem, it is tenuous to use CDD cases as a basis for recommending changes to the rating system. The two-condition analysis can support removal of codes and ratings from the system when no earnings losses are observed. However, because earnings data will not permit examining every permutation and because the analysis becomes even more complex when we move to earnings losses for three or more conditions (and thereby effectively challenging two- and one-condition results), the two-condition analysis is far from definitive. At most, it can point to possible misalignments in the system rather than supporting specific changes.

Analysis-supported recommendations based on the two-condition analysis are presented in Table VII-17. When we observe a 20% rating with two conditions and no earnings losses, that finding supports a recommendation of eliminating the 10% rating for the primary condition (since that mathematically has to be the rating of the primary condition). At the 30% level, we know that the primary condition was rated at 20% and



the secondary condition rated at 10%. At the 40% level and above, however, we lose the ability to draw correct mathematical inferences. A 40% CDD with two conditions could be the result of two 20% conditions or a 30% and a 10% condition. At higher levels, the permutation possibilities expand. Beyond the math, however, co-morbidity and horizontal inequity issues make it difficult to draw inferences about the earnings effects of the primary diagnosis.

**Table VII-17. The 20 Most Prevalent SCD Diagnostic Codes that are Candidates for Adjustment Based Upon Analysis of Cells with an Average of Two Service-Connected Disabilities**

Diagnostic Code	Description	Number of Conditions	Currently Ratable	Percent of all cases	Action
<b>Total</b>	<b>Condition Count Only</b>	<b>8,147,808</b>			
5003	Arthritis, degenerative, hypertrophic or osteoarthritis	169,543	10 or 20%	2.08%	Eliminate 10%
5010	Arthritis, due to trauma, substantiated by x-ray findings	222,494	10 or 20%	2.73%	Eliminate 10%, perhaps, but investigate co-morbidity
5256, 5257, 5263	Knee, ankylosis of; recurrent subluxation or lateral instability of knee; genu recurvatum	211,753	10, 20, or 30%	2.60%	Keep
5271	Limited motion of the ankle	100,877	10 or 20%	1.24%	Keep
5239, 5243	Spondylolisthesis or segmental instability (5239) and Intervertebral disc syndrome (5243)	147,811	10, 20, 30, 40, 50, or 100%	1.81%	Keep
5237	Lumbosacral strain	172,169	10, 20, 30, 40, 50, or 100%	2.11%	Eliminate 10% rating, and investigate co-morbidity
5275, 5297-5299	Bones of the lower extremity, shortening of; ribs, removal of; coccyx, removal of; generalized, elbow and forearm, the wrist, multiple fingers, hip and thigh, knee and leg, ankle, foot, the spine, the skull, the ribs, the coccyx	271,413		3.33%	Keep
6100, 6199	Defective hearing; generalized hearing impairment	336,546	10-90	4.13%	Keep, but investigate co-morbidity
6260	Tinnitus	348,055	10% only	4.27%	Eliminate
7005	Arteriosclerotic heart disease	98,835	10, 30, 60, or 100%	1.21%	Eliminate 10-30%
7101	Hypertensive vascular disease (essential arterial hypertension)	262,238	10, 20, 40, or 60%	3.22%	Eliminate 10%
7336	Hemorrhoids, external or internal	133,757	0, 10, or 20%	1.64%	Eliminate 10% and investigate co-morbidity
7800	Scars, disfiguring, head, face or neck	99,763	10, 30, 50, or 80%	1.22%	Keep
7804	Scars, superficial, tender and painful	91,351	10%	1.12%	Eliminate 10% (disagrees with single-SCD analysis)
7805	Scars, other	254,486		3.12%	Eliminate 10%
7806, 7817, 7820-7827	Eczema; dermatitis exfoliativa; infections of the skin; skin condition; papulosquamous disorders; vitiligo Diseases of keratinization; urticaria; vasculitis, primary cutaneous; erythema multiforme; toxic epidermal necrolysis	88,972	10, 30, or 60%	1.09%	Keep, but investigate components.

**Table VII-17. The 20 Most Prevalent SCD Diagnostic Codes that are Candidates for Adjustment Based Upon Analysis of Cells with an Average of Two Service-Connected Disabilities (continued)**

Diagnostic Code	Description	Number of Conditions	Currently Ratable	Percent of all cases	Action
7807-7809, 7811, 7815, 7828-7833, 7899	Leishmaniasis, americana (mucocutaneous); leishmaniasis, old world (cutaneous, oriental sore); lupus erythematosus, discoid; tuberculosis luposa (lupus vulgaris); pemphigus; acne; chloracne; scarring alopecia; alopecia areata; hyperhidrosis; malignant melanoma; generalized, the skin	86,093		1.13%	Keep, but investigate components.
7913	Diabetes mellitus	240,539	10, 20, 40, 60, and 100%	2.95%	Eliminate 10-20%
9400	Generalized anxiety disorder	76,985	10, 30, 50, 70, and 100%	0.94%	Keep (reduce 20 and 30% rating by 10%)
9411	Post-traumatic stress disorder	260,881	10, 30, 50, 70, and 100%	3.20%	Keep as is (disagrees with single-SCD analysis)

Source: EconSys Study Team analysis of December 2005 C&P Master Record data and 2006 earnings data provided by SSA

<sup>i</sup> Rate on limitation of function of affected part.

### Evaluative Criteria for Rating Adjustment Decisions

In order to advance beyond making adjustment decisions based on only single disabilities or two combined disabilities, greater judgment necessarily has to enter the picture given the current limitations in the data and analysis that we face. Making an adjustment decision on the rating schedule is not so straightforward as we might like it to be. We have assembled a significant amount of data to inform the decision-making process, but in many cases the decision still requires a certain amount of judgment. To better explain this and how judgment could be reasonably applied, we present a few examples.

#### *Sleep Apnea (6847)*

In judging what—if any—adjustment should be made at the individual diagnostic level, we can examine earnings ratios and employment rates by rating level and by number of disabilities. As an example, the table below shows the earnings ratios and employment rates for diagnostic code 6874, which is sleep apnea. The top part of the table separates the numbers by CDD and by number of disabilities simultaneously while the lower part shows results by number of disabilities only.

Earnings ratios within a percentage point or two of 100 percent or greater suggest there is no need for VA disability compensation. Since we have two comparison groups (non-SCD and CDD 10%), we show an average earnings ratio in the table as well. In the table we see that the earnings ratio averages about 100 percent if sleep apnea is the only disability and 91 percent for all disabilities combined. The 100 percent earnings ratio where sleep apnea is the only disability occurs only at the 30% and the 50% rating levels. This suggests that sleep apnea by itself does not result in earnings losses sufficient to justify receipt of VA disability compensation at any rating level.

**Table VII-18. Analysis of Earnings Patterns for Veterans with a Primary Diagnosis of Sleep Apnea**

CDD	No. of Disabilities	Number	Non-SCD Earnings Ratio	CDD 10 Earnings Ratio	Average Earnings Ratio	Benchmark Based on VA Compensation	2006 Employment Rate
30%	1	116	105%	91%	98.1%	84.5%	94%
40%	2	318	101%	86%	93.3%	77.7%	92%
	3	10	125%	107%	116.1%	77.7%	90%
50%	1	204	105%	100%	102.3%	68.6%	90%
	2	782	96%	85%	90.4%	68.6%	90%
60%	2	11	98%	96%	97.3%	60.4%	100%
	3	3,294	100%	87%	93.2%	60.4%	90%
	4	45	121%	95%	107.8%	60.4%	84%
70%	4	149	89%	106%	97.8%	51.0%	81%
	5	2,079	95%	86%	90.1%	51.0%	87%
80%	5	111	80%	107%	93.9%	43.6%	77%
	6	1,627	90%	86%	88.2%	43.6%	84%
90%	6	545	86%	88%	86.8%	37.3%	81%
	100%	83	52%	93%	72.8%	0%	49%
100%	6	35	66%	106%	85.9%	0%	51%
	Total	1	320	105%	96%	100.5%	92%
	2	1,111	97%	85%	91.3%	90%	
	3	3,304	100%	87%	93.2%	90%	
	4	194	97%	103%	100.1%	81%	
	5	2,273	93%	86%	89.5%	85%	
	6	2,207	89%	87%	87.8%	83%	
<b>Total Sleep Apnea</b>		<b>9,409</b>	<b>95%</b>	<b>87%</b>	<b>91.1%</b>		<b>87%</b>

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

The earnings ratios show no clear pattern of declining as the CDD rating level increases or as the number of disabilities increase from two to six or more. The high degree of fluctuation can be attributed, in part, to small numbers of veterans in some of the categories. The fluctuation may also be due to a lack of consistency in the rating process or the specific combinations of different disabilities (which we cannot see given the limitations of the currently available data).

The employment rate data in the table gives us another piece of evidence to gauge whether sleep apnea should be a ratable condition. The employment rate for SCD veterans with sleep apnea as the only disability is 92 percent, which is decidedly higher than 80 percent for the non-SCD comparison group or 85 percent for the CDD 10% comparison group. The employment rate is 87 percent overall for all of the SCD veterans with sleep apnea, which is still higher than the employment rate for either comparison group.

Weighing all of the evidence together we can reasonably make the assessment that sleep apnea should not be a ratable condition as a primary diagnosis but could still be considered as a non-primary diagnosis.

### *Post-Traumatic Stress Disorder (9411)*

Unlike sleep apnea, PTSD ratings show patterns of earnings loss, making reference to VA compensation rates useful. We can examine VA compensation either in absolute dollar amounts—which lacks multiyear comparability—or we can use the 100 percent amount of VA compensation as an indicator of full employment earnings with each 10% rating level measured against that top number. Using average compensation paid in 2006, Table VII-19 shows expected earnings parity ratios at each disability level. At the 10% CDD level, for example, VA compensation assumes a 4.5 percent earnings loss (100 – 95.5 percent). At the 30% CDD level, VA compensation assumes an earnings ratio of 84.5 percent and so on down to 37.3 percent and 0 percent at the 90% and 100% CDD levels, respectively.

**Table VII-19. Expected Earnings Ratios Based on 2006 VA Compensation**

CDD	VA Compensation Expected Earnings Ratio
10%	95.5%
20%	91.2%
30%	84.5%
40%	77.7%
50%	68.6%
60%	60.4%
70%	51.0%
80%	43.6%
90%	37.3%
100%	0.0%

*Source: EconSys Study Team analysis.*

As in the case of sleep apnea, we examine the earnings ratios and employment rates by rating level and by number of disabilities to determine whether there appear to be patterns of earnings and employment losses. Shown in Table VII-20, at the 10% CDD level with one SCD, there is a clear indication of earnings losses for PTSD. The average earnings ratio (average of predicted earnings ratio based on non-SCD veterans and on veterans rated at 10% used as statistical comparison groups) is 90 percent. Referring back to Table VII-19, at the 10% CDD rating, VA compensation rates presume an earnings ratio of 95.5 percent. The observed ratio for PTSD at 10% CDD is below that. In fact, the observed earnings ratio for veterans with a 10% CDD rating for PTSD is between the ratios we expect to see for a CDD rating between 20% and 30%.

**Table VII-20. Analysis of Earnings Patterns for Veterans with a Primary Diagnosis of PTSD**

CDD	No. of Disabilities	Number	Non-SCD Earnings Ratio	CDD 10% Earnings Ratio	Average Earnings Ratio	Benchmark Based on VA Compensation	2006 Employment Rate
10%	1	745	88%	92%	90%	95.5%	81.9%
20%	2	157	94%	96%	95%	91.2%	82.2%
30%	1	1,679	77%	80%	79%	84.5%	77.9%
	2	15	113%	142%	127%	84.5%	86.7%
40%	2	2,019	85%	89%	87%	77.7%	78.5%
	3	116	86%	80%	83%	77.7%	68.1%
50%	1	11	37%	33%	35%	68.6%	63.6%
	2	1,367	61%	62%	62%	68.6%	70.2%
	3	930	83%	83%	83%	68.6%	66.9%
60%	3	2,182	74%	77%	75%	60.4%	69.5%
	4	577	76%	71%	74%	60.4%	65.5%
70%	2	83	49%	55%	52%	51.0%	45.8%
	3	825	59%	59%	59%	51.0%	67.9%
	4	976	82%	81%	81%	51.0%	66.9%
	5	33	131%	215%	173%	51.0%	66.7%
80%	4	584	61%	63%	62%	43.6%	67.0%
	5	652	85%	87%	86%	43.6%	66.7%
	6	10	25%	16%	21%	43.6%	70.0%
90%	5	167	66%	68%	67%	37.3%	67.1%
	6	250	91%	90%	91%	37.3%	71.2%
100%	2	1,582	7%	7%	7%	0%	15.9%
	3	1,725	9%	10%	9%	0%	11.8%
	4	123	12%	11%	11%	0%	16.3%
Total	1	2,435	81%	83%	82%		79.1%
	2	5,223	52%	53%	53%		57.0%
	3	5,778	55%	57%	56%		51.6%
	4	2,260	70%	69%	69%		63.8%
	5	852	82%	85%	83%		66.8%
	6	260	86%	82%	84%		71.2%
<b>Total PTSD</b>		<b>16,808</b>	<b>61%</b>	<b>63%</b>	<b>62%</b>		<b>60%</b>

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

Based on the observations for the 10% rating, our first reaction would be that the CDD 10% rating is too low for PTSD. A rating of 20% would achieve more equitable VA compensation. We should note, however, that PTSD currently can be rated only at 10, 30, 50, 70, and 100% levels. If we have to stay within those boundaries, then a rating of 30% appears to be a more equitable rating based on the observed earnings ratio, since it is between the 20% and 30% benchmarks we obtain from VA compensation.

Looking next at the 20% CDD rating level, there were no veterans in the 2006 data with veterans rated at 20% for PTSD having just 1 disability—this is expected, since PTSD is not ratable at the 20% level. Therefore, the average 95% earnings ratio we observe here results from a combination of one PTSD disability rated at 10% and a non-PTSD

condition rated at 10%. This would tend to put the needed rating for correcting earnings losses just below the 10 percent level (95.5 percent from Table VII-19).

This would indicate that—given that these are two service-connected disabilities and we do not know the nature of the non-PTSD disability—a 10% rating for the single PTSD code appears to be appropriate. If we combine this with information from the solitary 10% rating in the preceding table row, we might consider withdrawing the suggestion that 30% is more appropriate. However, given the much higher number of cases (N=745) associated with the 10% CDD row, we would tend to give more weight to the finding from the first row than from the second (N=157) and conclude that the appropriate action in this case would be to begin allowing rating at the 20% level so that raters could have additional flexibility for achieving effective compensation equity.

Looking next to the 30% CDD rating and one SCD, the observed ratio is 80 percent, which is between the earnings ratios we expect to see for CDD ratings of 30% and 40% (based on VA compensation rates of 84.5 and 77.7 percent, respectively). Because a 40% rating is not currently an option, our decision here would be to keep the 30% rating where it is.

At 30% with two service-connected disabilities, the number of cases is very small (N=15) and based on a single cell observation. Hence, it is not advisable to let the observed ratios play a major role in the decision-making in this particular instance.

Because PTSD is not ratable at the 20% level, the rating we see for 40% with two service-connected disabilities has to be a combination of PTSD rated at 30% and another disability rated at 10%. Hence, the 40%/two ratios should be similar to what we see at the 30%/one level, unless the second disabilities on average contribute to additional earnings losses. The observed average ratio of 87 percent is in fact higher than the observed 30%/one ratio of 80 percent and is more consistent with earnings losses we would expect to find (from the VA rates) for a CDD of 30%.

The assembled information we get at the 40% CDD level for PTSD suggests that the manner in which multiple disability ratings are added together is contributing to ratings inflation. The PTSD diagnosis itself is not incorrectly rated. The combination of a 30% PTSD and one other diagnosis, however, should not be elevated to 40% based on the empirical analysis.

In the 50%/one SCD row, there was only one cell, which was too small to play a role in the analysis, although the observed average 35 percent earnings ratio suggests that this particular veteran groups' PTSD diagnosis should be rated at a higher level in order to achieve compensation equity. We can use the 70%/two SCD row, however, to gain additional insights about the 50% rating for PTSD alone. A 70%/two CDD rating for PTSD mathematically can only come from one 50% PTSD diagnosis in combination with a 30% or 40% diagnosis of non-PTSD condition (which in combination with a 50% PTSD would yield pre-rounding CDDs of 65% or 70%, respectively). Hence, the 52 percent average earnings rate we see in this row comes largely from a single 50% PTSD rating. This is very close to the expected 51 percent ratio predicted by VA compensation.



Therefore, even though this particular veteran group is in the appropriate CDD rating group, the fact that its placement there relies upon the flawed combination system suggests that an adjustment is needed. Overall, the system for combining multiple ratings results in ratings inflation. So, if that system is fixed, then the 50% rating for PTSD needs to be fixed as well to maintain compensation equity. We can now put together information from this row and the 50%/one SCD row to suggest that PTSD ratings of 50% appear to be underestimating the effects on earnings, on average, and that a rating of 70% would usually be more appropriate. Based on the empirical analysis, we would tend to conclude that the criteria for achieving a rating of 70% for PTSD appears to be too stringent.

Moving up the SCD ladder at the 70% level, the numbers of possible permutations increases geometrically, making the underlying PTSD ratings more difficult to determine. However, the observed ratios do strengthen the position that the underlying system for combining ratings is flawed. In the 70%/three SCD row, the observed 59 percent ratio is consistent with the 60% compensation level—indicating rating inflation resulting from the way multiple ratings are combined. The observed ratios for the four and five SCD rows strengthen the position further.

At the 80% CDD level, we see only four, five, and six SCD cases. The number of possible permutations makes determining the underlying PTSD ratings impossible (indeed, what we see here is the combination of a number of different PTSD ratings for the 1,246 veterans in the 80% group). For this exercise, however, the four and five SCD earnings ratio observations of 62% and 86% respectively add more support for the need to revise the system for combining multiple ratings. The six SCD row is based on a single cell containing 10 veterans, and while the 21% observed earnings ratio suggests that the CDD rating is close to where it should be, it is nonetheless an outlier.

At the 90% level, there are only five and six SCD combinations. The observed earnings ratios of 67% and 91% respectively continue to support the need for reforming the combination system. However, we can glean nothing about the rating of PTSD itself from this.

At the 100% level, the ratings we see again could have come from a variety of different permutations. Even so, the CDD ratings we see are consistent with the compensation level for 100% CDD disability ratings.

Weighing all of the evidence, our examination of PTSD suggests that the rating criteria should be made less stringent so that the 30% and 50% ratings are not so difficult to obtain. Particularly if the combining method is revised, this would improve compensation equity overall.

#### *Brain Disease Due to Trauma (8045)*

Diagnostic code 8045 is the principle condition that constitutes what is referred to as Traumatic Brain Disease (commonly known as Traumatic Brain Injury or TBI). The other VASRD code that may be used for TBI is 5296 (loss of part of the skull), but it has a much

smaller number of cases. TBI that results in disability of any body system is rated under a disability code in that body system. For example, severe TBI resulting in functional loss of use of the lower extremities would be rated under disability code 5110 for that loss.

Like PTSD, brain disease due to trauma shows patterns of earnings loss. Table VII-21 shows expected earnings parity ratios at each disability level by number of disabilities. At the 10% CDD level with one service-connected disability, there is a clear indication of earnings losses for brain disease due to trauma. The average earnings ratio for the 1,116 veterans rated for TBI using the disability code 8045 at 10% is 88 percent. VA compensation rates presume an earnings ratio of 95.5 percent at the 10% level. Hence, veterans at the 10% rating should be rated higher at either 20% or 30%.

**Table VII-21. Analysis of Earnings Patterns for Veterans with a Primary Diagnosis of Brain Disease due to Trauma (Disability Code 8045)**

CDD	No. of Disabilities	Number	Non-SCD Earnings Ratio	CDD 10% Earnings Ratio	Average Earnings Ratio	Benchmark Based on VA Compensation	Revised CDD
10%	1	1,116	89%	87%	88.0%	95.5%	20 or 30%
20%	2	378	87%	85%	85.9%	91.2%	30%
30%	2	202	90%	87%	88.4%	84.5%	30%
	3	106	100%	98%	99.1%	84.5%	20%
40%	3	202	77%	74%	75.8%	77.7%	40%
50%	3	80	79%	82%	80.7%	68.6%	40%
	4	34	79%	71%	75.3%	68.6%	40%
60%	3	50	62%	56%	59.0%	60.4%	60%
	4	68	67%	62%	64.6%	60.4%	50%
70%	4	64	68%	65%	66.2%	51.0%	50%
	5	24	81%	87%	83.6%	51.0%	40%
80%	5	56	73%	78%	75.9%	43.6%	40%
90%	5	13	50%	48%	49.1%	37.3%	80%
100%	2	63	0%	0%	0.0%	0.0%	100%
	3	172	14%	13%	13.4%	0.0%	100%
Total	1	1,116	89%	87%	88.0%		20%
	2	643	80%	78%	79.2%		30%
	3	610	61%	59%	60.3%		60%
	4	166	70%	65%	67.5%		50%
	5	93	71%	74%	72.2%		50%
<b>Brain Trauma Total</b>		<b>2,628</b>	<b>79%</b>	<b>76%</b>	<b>77.5%</b>		

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

Similarly, the average earnings ratio for the 378 veterans rated at 20% is 86 percent. VA compensation rates presume an earnings ratio of 91.2 percent at the 20% CDD rating level. Hence, the veterans at the 20% rating should be rated higher at 30%. By making similar comparisons, we would keep 30% with two disabilities at 30%, but adjust 30% with three disabilities to 20%.

As the rating level increases beyond 30%, the number of veterans in a respective category declines, and the number of disabilities increases, both of which reduces our ability to make definitive judgments and leads to greater disconnect between the average earnings ratio and the benchmark. The smaller number of cases (N) reduces the statistical confidence of the results, while a possible consequence of the greater number of disabilities is rating inflation. If we were able to ascertain the specific combinations of different disabilities with their respective rating levels, we would be in a better position to make more informed adjustments with respect to equity.

### Combining Multiple Disabilities to Create One Rating

As discussed previously, our analysis demonstrates the difficulties associated with determining the most effective and accurate way to combine multiple disabilities to create a single rating. It is clear that the current method can result in rating inflation by treating the disabilities as basically additive with respect to earnings losses. In analyzing veterans with multiple disability ratings, we discovered that a positive correlation occurs between the number of service-connected disabilities and earnings.

Our multivariate analysis of the relationship between earnings and the number of service-connected disabilities revealed the results shown in Table VII-22. Controlling for CDD rating, age, education (at time of entry into the military), former officer status, and length of military service, on average veterans with two service-connected disabilities have earnings that are \$1,368 per year *higher* than veterans with a single service-connected disability. Veterans with three rated service-connected disabilities average \$2,609 more per year. Veterans with four and five rated service-connected disabilities—controlling for CDD rating—earn \$3,873 and \$6,374 more per year, respectively, than veterans with a single rated SCD. When moving from five to six, there is still an increase but not nearly so much—rising to \$6,558.

**Table VII-22. Apparent Earnings Increase Associated with Multiple Disabilities**

Number of Rated Diagnoses	Increase in Earnings
Two	\$1,368
Three	\$2,609
Four	\$3,873
Five	\$6,374
Six	\$6,558

*Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.*

This can be further demonstrated when we look at a table of average earnings in 2006 by CDD and then by number of service-connected disabilities. At any given CDD level, earnings tend to increase, moving from left to right in Table VII-23.

**Table VII-23. Average 2006 Earnings by CDD and by Number of Service-Connected Disabilities<sup>i</sup>**

Combined Degree of Disability	Number of Rated Service-Connected Disabilities					
	1	2	3	4	5	6
<b>10%</b>	\$36,194					
<b>20%</b>	\$34,547	\$35,912				
<b>30%</b>	\$30,105	\$33,878	\$37,393	X <sup>ii</sup>		
<b>40%</b>	\$29,132	\$30,649	\$33,539	\$39,142		
<b>50%</b>	\$15,400	\$25,336	\$27,618	\$33,244	\$38,912	\$40,357
<b>60%</b>	\$23,623	\$28,747	\$30,015	\$28,891	\$34,934	\$37,451
<b>70%</b>	\$10,626	\$16,130	\$20,297	\$26,480	\$33,905	\$35,480
<b>80%</b>		\$30,008	\$24,989	\$21,186	\$28,216	\$35,660
<b>90%</b>				\$21,568	\$26,774	\$31,391
<b>100%</b>	\$1,573	\$6,676	\$5,480	\$6,223	\$12,287	\$12,240

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

<sup>i</sup> Data based on 2006 earnings provided by SSA in cells of 10 or more. Earnings averages include all cell members (including non-earners), and exclude veterans rated with IU or receiving SMC. Including non-earners and excluding IU/SMC veterans does not affect the observed patterns.

<sup>ii</sup> While it possible for a veteran to have four disabilities rated at 10% each and have a CDD of 30%, we found no empirical observations for this table cell.

This finding does not really mean that there is an earnings bonus for multiple service-connected disabilities. Instead, this suggests that—all other things being equal—multiple rated disabilities cause the calculated combined degree of disability to increase while not having a demonstrated corresponding effect on earnings losses. This then creates the mathematical illusion that there are earnings bonuses associated with increased numbers of service-connected disabilities when all that is really happening—mathematically—is that veterans are being systematically misclassified in terms of earnings impairment.

When a veteran has two 10% rated service-connected disabilities, the ratings are combined in tabular fashion to produce a single rating of 19%, which is rounded up to 20%. The empirical evidence shows definitively, however, that 10% + 9% does not usually correspond to the 20% level of earnings losses. Instead, it is much closer to 10%. This may appear counter-intuitive, but it is borne out by the data. Leaving the system as-is prevents it from correctly compensating for earnings losses. It would be far more inequitable to leave the rating combination system unchanged.

Table VII-24 shows expected earnings losses by CDD and the number of service-connected disabilities. Values shown for each cell were calculated using a multivariate technique. The VA Compensation (VA Comp) column shows average annual VA compensation paid in 2006 at each CDD level. We use this column as a reference point for the mathematically “correct” disability rating corresponding to the calculated earnings losses shown. The adjustment needed to align each CDD level is determined by matching the value in each CDD/SCD cell with the closest number in the VA Comp

column. The 10% CDD VA compensation value is shown only for reference, since there are no multiple diagnoses cases with two rated conditions at the 10% CDD level.

**Table VII-24. Expected Earnings Losses by CDD and by Number of Service-Connected Disabilities for Veterans with Multiple Diagnoses**

CDD	Number of Service Connected Disabilities					
	VA Comp	2	3	4	5	6
10%	\$1,559					
20%	\$3,034	\$1,175				
30%	\$5,323	\$3,335	\$2,095	X <sup>i</sup>		
40%	\$7,666	\$5,756	\$4,516	\$3,251	\$751	
50%	\$10,781	\$10,341	\$9,100	\$7,836	\$5,336	\$5,151
60%	\$13,596	\$11,879	\$10,639	\$9,374	\$6,874	\$6,689
70%	\$16,834	\$15,313	\$14,073	\$12,808	\$10,308	\$10,123
80%	\$19,372	\$17,258	\$16,017	\$14,753	\$12,252	\$12,068
90%	\$21,544	\$18,764	\$17,524	\$16,259	\$13,759	\$13,574
100%	\$34,336	\$39,334	\$38,094	\$36,830	\$34,329	\$34,145

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

<sup>i</sup> While it is possible for a veteran to have four disabilities rated at 10% each and have a CDD of 30%, we found no empirical observations for this table cell.

At the 20% level, for example, this table indicates that average \$1,175 earnings losses correspond most closely to the 10% level of VA compensation (\$1,559). Hence, the adjustment would be to reduce 20% CDD to 10% when the veteran has two service-connected disabilities. The \$13,759 value shown at the cell junction of the 90% CDD and five SCDs is closest to \$13,596 at the 60% VA compensation amount. Hence, its adjustment would be -30% (that is, the 90% CDD amount would be reduced by 30 percent to the 60% VA compensation amount when the veteran has five service-connected disabilities). Using this matching technique, the appropriate adjustments for all of the cells were determined, and the results are shown in Table VII-25.

**Table VII-25. CDD Adjustment Needed based on Number of Service-Connected Disabilities**

CDD	Number of Service Connected Disabilities					
	Two	Three	Four	Five	Six	
20%	-10%	X	X	X	X	
30%	-10%	-10%	X	X	X	
40%	-10%	-10%	-20%	-30%	X	
50%	-10%	-10%	-10%	-20%	-20%	
60%	-10%	-10%	-10%	-20%	-20%	
70%	-10%	-10%	-10%	-20%	-20%	
80%	-10%	-10%	-20%	-30%	-30%	
90%	-10%	-10%	-10%	-30%	-30%	
100%	None	None	None	None	None	

Source: EconSys Study Team analysis of December 2005 C&P Master Record and 2006 earnings data provided by SSA.

### *Alternative Approach for Combining Disabilities*

We hasten to add that this kind of adjustment system is an interim measure to correct the systematic misclassification created by the design of the current VASRD table for combining disabilities. Ultimately, what is needed is a diagnosis-level analysis. This requires the careful analysis of specific combinations of co-morbidities. The advantage of the multivariate analysis that we used to develop the interim adjustment method is that it gives us a complete picture at one glance. The disadvantage, however, is that it hides the details that are needed to do more than correct larger systematic problems and to fine-tune the system so that it does precisely what it is supposed to do—accurately match VA disability compensation levels to earnings loss levels. The result of the needed disaggregated analysis would not be a single CDD table, but most likely a series of CDD tables designed to handle specific conditions and combinations of conditions. In the meantime, the CDD adjustment described here is just a first step in the process.

As suggested by Table VII-25, a revised rating system for combining multiple disabilities would not necessarily treat multiple disabilities separately in an additive manner. Instead, earnings loss could be compensated for the most frequent combinations of disabilities, especially when multiple disabilities are related to each other. Instead of rating each disability separately and then combining the ratings, an alternative approach would be to have a single rating for a given combination of disabilities. This recognizes that certain conditions co-occur, often referred to by medical practitioners as co-morbidities. When conditions co-occur they produce an effect that is different from unrelated conditions.

### **Lessons from QOL Studies on Effect of Multiple Disabilities**

There is a paucity of literature of the effect of multiple disabilities on loss of earnings. On the other hand, there is more literature on the relation of co-morbidities to loss of quality of life. The study team reviewed several studies that focused on the impact of multiple diseases/conditions on QOL. Collectively, these studies found the presence of co-morbid conditions is not additive in terms of impact on QOL and disability; however, combinations of diseases and the body systems affected influenced how co-morbidities were reflected in QOL. Given that 48 percent of Americans with chronic diseases have at least one co-morbidity and the percentage of individuals with disability increases as the number of co-existing conditions increases,<sup>115</sup> these studies are important to understanding the effects of co-morbidities in veterans.

In one study, Fortin and colleagues (2007)<sup>116</sup> sought to examine which most impaired body systems impacted QOL in patients with more than one co-morbid condition. The researchers used multiple body systems as part of their study including cardiac,

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<sup>115</sup> Bayliss, Elizabeth A., Bayliss, Martha S., and others. (2004). Predicting declines in physical function in persons with multiple chronic medical conditions: what can we learn from the medical problem list. *Health and Quality of Life Outcomes*. 2:(47).

<sup>116</sup> Fortin, Martin, Dubois, Marie-France and others. (2007). Multimorbidity and quality of life: a closer look. *Health and Quality of Life Outcomes*, s. 5:(52).

vascular, hematological, respiratory, ophthalmological, upper gastrointestinal, lower gastrointestinal, hepatic/pancreatic, renal, genitourinary, musculoskeletal/tegmental, neurological, endocrine/metabolic/breast, and psychiatric. Rather than simply counting the numbers of chronic diseases present in the population, the researchers used a Cumulative Illness Rating Scale, as this was a better predictor of QOL. They also used the summary scores from the Standard Form (SF-36) Physical Component Score (PCS) and Mental Component Score (MCS) for their analysis.

Bayliss and colleagues (2004)<sup>117</sup> examined the effect that six chronic conditions had on physical well-being over a period of 4 years. Using hypertension as the anchor or reference group (n=281), Bayliss and colleagues studied SF-36 PCS scores over time for individuals with diabetes, coronary artery disease, congestive heart failure, chronic respiratory disease, musculoskeletal disease, and depression.

With respect to disease states, Bayliss and colleagues found individuals with congestive heart failure, diabetes, or respiratory disease had increased odds of a clinically significant decline in PCS over 4 years. When individuals had four or more of the six chronic conditions, individuals had increased odds ( $p \leq .05$ ) of PCS decline over 4 years. The researchers also found coronary artery disease, musculoskeletal disease, or depression did not predict a decline in physical functioning over time.

### Summary Remarks

The data made available and prepared for analysis in the time frame of this study did not allow us to fully analyze the relationship between earnings loss and the combinations of disability conditions in a manner similar to the QOL studies cited. Our analytical data file identifies the primary diagnostic code and the number of service-connected disabilities (up to 6 or more), but the nature of our data—cells of 10 or more veterans to accommodate privacy requirements by SSA, the source of earnings data—did not provide us with specific combinations. Instead, we know the primary diagnosis, but the secondary, tertiary, etc. disabilities vary within each analytical earnings cell. Such analysis, though, would be important to answer, for example, which conditions have the most direct effect, whether the effects of multiple disabilities are independent of each other or interactive, and what the overall impact is on loss of earnings.

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<sup>117</sup> Bayliss, Elizabeth A., Bayliss, Martha S., and others. (2004). Predicting declines in physical function in persons with multiple chronic medical conditions: what can we learn from the medical problem list. *Health and Quality of Life Outcomes*, 2:(47).