



Research Report

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Review of Reserve Component Activation Data Quality



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About This Report

To correctly provide benefits to reserve component (RC) members, activations must be reported accurately. A joint U.S. Department of Defense (DoD) and U.S. Department of Veterans Affairs (VA) working group identified multiple errors in the RC activation data that could cause VA disability benefits to be incorrectly calculated, but the prevalence and causes of these errors are only partially understood.

The Office of Military Personnel Policy in the Office of the Under Secretary of Defense for Personnel and Readiness asked the RAND National Defense Research Institute to provide a review and assessment of the factors that contribute to data quality issues with respect to RC activations. In this report, we quantify the frequency of data errors identified by the DoD/VA working group and estimate the potential impact of these errors on RC member benefits, including VA disability compensation, qualification for the Post-9/11 GI Bill, and eligibility for TRICARE. Through data analysis and information obtained via subject-matter expert discussions, we discuss the potential sources of each error and provide recommendations for ways to mitigate these errors in the future.

The research reported here was completed in November 2022 and underwent security review with the sponsor and the Defense Office of Prepublication and Security Review before public release.

RAND National Security Research Division

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Summary

To correctly provide benefits to reserve component (RC) members, activations must be reported accurately. In this report, we examine the prevalence of errors in RC activation data and how those errors affect U.S. Department of Veterans Affairs (VA) disability compensation, eligibility for the Post-9/11 GI Bill (PGIB), and eligibility for TRICARE. The impetus for this study was a U.S. Department of Defense (DoD) and VA working group on information-sharing that identified multiple data errors associated with activation timing and duration, resulting in potential errors in the delivery of benefits to veterans, including underpayments and overpayments of VA disability benefits. Our data analysis shows that about 11 percent of RC members with activations beginning on January 1, 2015, or later are disabled, with a median disability rating of 40 percent, entitling them to a minimum of \$673.28 per month in VA disability compensation.

The Office of the Secretary of Defense asked the RAND National Defense Research Institute to provide a review and assessment of the factors that contribute to RC activation data quality issues. This report documents that review and assessment. We used a mixed methods approach that draws information from administrative personnel data and discussions with subject-matter experts (SMEs) to understand the frequency and causes of RC activation data errors.

Each RC is required to make daily submissions of an active service transaction file that reports RC member active duty service to the Defense Manpower Data Center (DMDC), as outlined in Enclosure 8 of DoD Manual 7730.54, Volume 1.¹ Each transaction in the file represents a single, continuous period of active duty service under a given authorization, called a *segment*. Once the transaction file is accepted by DMDC, the information is incorporated into the Guard and Reserve Active Service (GRAS) file, which is a cumulative table recording the most up-to-date activation segments across all RCs. Following feedback from the Office of the Secretary of Defense, we restricted our analysis to segments beginning on or after January 1, 2015, and our data were current as of June 30, 2021. We used sequential snapshots of GRAS data along with other personnel data to estimate the frequency of RC activation data errors and to calculate how errors affect RC member benefits. We focused on three benefits that are contingent on active duty service: VA disability benefits, qualification for the PGIB, and eligibility for TRICARE. Finally, we provide recommendations for ways to mitigate RC activation errors.

¹ DoD Manual 7730.54, Vol. 1, *Reserve Components Common Personnel Data System (RCCPDS): Reporting Procedures*, U.S. Department of Defense, May 25, 2011, change 2, January 28, 2019.

Assessment of Overall Data Quality Shows Differences Across Components

To assess the overall quality of the GRAS data, we compared active service days reported in the GRAS file with imputed days paid in the Reserve Pay File. The pay file is more likely to be correct because service members see their pay and have an incentive to correct errors in disbursement. If both files recorded the same number of days of active service, then we could be reasonably confident that those totals are correct. Even if the files agreed on the total days served, there could be GRAS errors in the exact dates or multiple errors that cancel out, such as one segment that is too short and one that is too long. But general agreement between the two files would be consistent with accurate record-keeping.

Our analysis showed that the median difference across all components was zero, suggesting that the two files generally match. However, two components stood out for having a nonzero median difference, meaning that discrepancies are exceedingly common. First is the Army National Guard, which underreported days served for the majority of members. The median member had 15 days paid that were not reported in the GRAS file; the average was 18 days. Discussions with SMEs from the Army National Guard revealed that it does not report most annual training segments or other short segments, and the 15-day discrepancy was evidence of this omission. The second component was the Coast Guard Reserve, which overreported active service for most members, by about 12 days on average. Overreporting can occur when GRAS segments are not closed on time, so the service member appears to remain activated when they are not, and the pay file does not reflect those “extra” days because they were not paid out. As discussed in the report, the Coast Guard Reserve has the highest proportion of *stale* segments that have been left open even after they probably should have ended.

Except for Misreported Segments, Known Data Errors Are Rare

The DoD/VA working group identified the following five kinds of RC activation data errors, which are the focus of this report:

1. **Overlapping segments.** This error occurs when an activation segment begins before the most recent prior segment ends. The most recent prior segment may be open or closed.
2. **Unterminated segments.** This error occurs when a segment of active service that has ended has not been terminated in the GRAS file.
3. **Terminated personnel files (PNLs).** A PNL provides information on a service member’s service branch and component. A terminated PNL error occurs when a service member’s PNL has closed but the GRAS segment is still open.

4. **Cancellations and corrections.** This error occurs when a component needs to update or correct a segment but, instead of sending an update, cancels the segment and submits a new one, sometimes with multiple days between the cancellation and resubmission.
5. **Misreported project code.** This error occurs when a segment uses an incorrect project code. It is difficult to assess the magnitude of this type of error, because it is difficult to determine what project code a segment *should* have. However, there are certain project codes that we know should show up with some frequency. Specifically, annual training (AT) should be reported at least once per year, and initial active duty for training (IADT) should be reported once for each reservist who enters the RC without prior service.

Table S.1 shows the estimated frequency of each kind of GRAS data error. In total, there were just over 7 million segments beginning on or after January 1, 2015. Our analysis revealed that there were very few overlapping segments, unterminated segments, terminated PNL errors, and cancellations and corrections. In contrast, our estimates indicate that there were about 2.1 million misreported (i.e., missing or misclassified) AT or IADT segments. For all five errors, the majority were attributable to activations in the Army National Guard.

In addition, our analyses uncovered certain types of errors that were not assessed by the DoD/VA working group. Although this issue is rare, some activation segments appear to have a negative length because the end date predates the start date. More often, activations for Active Guard and Reserve (AGR) duty were interrupted by deployments, which occur while on AGR orders but which DMDC stipulates must be recorded as separate activations. Once the AGRs return from deployment, their deployment segments are closed out, but new AGR segments are not created, resulting in the appearance that they are no longer on active duty. Finally, we learned that DMDC systems prevent GRAS segments from being recorded for reserve members who are tracked as part of active component end strength. Although we do not believe this practice would affect benefits, it does affect DoD's ability to track reserve utilization.

Data Errors Affect Benefits

To understand how RC activation data errors affect RC members, we focused on three benefits programs: VA disability compensation, the PGIB, and TRICARE. As mentioned earlier, active duty days need to be counted correctly so that VA disability compensation is adjusted accurately for disabled RC members. We found that a small share of segments with errors (2.8–9.5 percent, depending on the specific error) were for activations of disabled RC members. RC members who are eligible to receive disability compensation from VA are restricted by 10 U.S.C. § 12316 and 38 U.S.C. § 5304(c) from receiving disability benefits and military

TABLE S.1
Summary of GRAS Data Errors, as of June 2021

Component	Total Number of Segments	Overlapping Segments (Error 1)	Unterminated Segments (Error 2)	Terminated PNLs (Error 3)	Cancellations and Corrections ^a (Error 4)	Misreported AT or IADT Segments ^b (Error 5)
Army National Guard	598,384	12,544	11,343	1,924	8,983–20,023	1,148,534
Air National Guard	1,977,927	95	415	113	3,539–7,105	177,131
Army Reserve	1,799,705	631	931	273	2,106–4,538	383,580
Air Force Reserve	1,826,141	617	791	110	1,332–2,661	66,722
Marine Corps Reserve	538,077	298	207	37	190–796	75,102
Navy Reserve	270,263	291	311	60	475–1,148	245,518
Coast Guard Reserve	52,423	165	311	216	49–114	11,618
Total	7,062,920	14,641	14,309	2,733	16,674–36,385	2,108,205

SOURCE: Authors' calculations using DMDC data.

NOTE: All calculations use only segments beginning on or after January 1, 2015.

^a This column reports the estimated number of errors per month rather than the total number of errors as of June 2021.

^b This column reports calculations for two duty statuses for which we can approximate the expected amount of service. The numbers indicate the sum of the number of drilling reservists who have no activation for AT during a calendar year and the number of trainees who do not have an activation for IADT, from 2015 through 2020.

pay at the same time.² Estimates of the impact on improper VA disability compensation payments suggest that RC activation data errors caused a net total of about half a million active duty days to be underreported each year, resulting in a minimum of \$11.2 million in benefits overpaid each year since 2015. Overpayment leads to recoupment by reducing the size of benefit payments in subsequent months and increases the paperwork burden for VA and the service member.

RC members are eligible for PGIB if they have at least 90 days of qualifying service. We found that a large share of certain errors (specifically, unterminated segments and terminated PNLs) had the potential to affect PGIB eligibility, and we estimate that 150,000 reservists could have had their minimum PGIB eligibility affected because of unreported IADT. However, some reservists with data errors may already have qualified for PGIB if they entered the reserves with prior service, and reservists will continue to accrue qualifying service during their RC career. Therefore, it is not possible to determine the ultimate effect of data errors by the time reservists would want to use PGIB benefits.

Eligibility for TRICARE requires active duty service orders of more than 30 days. All overlapping segments and a large share of unterminated segments and terminated PNLs had the potential to affect TRICARE eligibility. Our analysis provides a lower-bound estimate for the potential effect of data errors on TRICARE eligibility because we were only able to estimate the effects of three out of five types of data errors. We could not conclude whether the other two types of errors affect TRICARE eligibility because we do not know whether the corrected data would affect periods of more than 30 days of active service.

Recommendations and Actions to Consider

We developed recommendations and actions to consider to improve the quality of GRAS data and mitigate the adverse effects of data errors on RC member benefits (summarized in Tables S.2 and S.3). The recommendations are changes that we believe are both feasible and would yield meaningful improvements in data quality, whereas the actions to consider might not be as straightforward to implement or might not yield the biggest improvements in data quality. These items also include potential ways to address other errors uncovered in our analysis. These recommendations and actions to consider provide ways to reduce the data errors described in this report during a time when the services are transitioning to new personnel management systems and when DMDC is planning to transition its Person Data Repository, which links information about individuals across datasets, and other data to a centralized analytics platform. We note that additional analysis of RC activation data may be needed once the new systems are in place to understand whether the prevalence of errors changes or new errors are introduced.

² Military pay includes active duty pay and military training pay (VA Office of the Inspector General, Office of Audits and Evaluations, *Veterans Received Inaccurate Disability Benefit Payments After Reserve or National Guard Drill Pay Adjustments*, Report No. 18-05738-56, February 11, 2020).

TABLE S.2**Recommendations to Address GRAS Data Errors**

Recommendation	Errors Addressed
1. Components should adjust their reporting procedures to report all active duty segments, in compliance with DoD Manual 7730.54. This step would eliminate the problem of missing data, which is the most-common error documented in this report.	Unreported AT and IADT (Error 5)
2. DoD and components should improve or standardize data validation checks to reduce errors and data quality differences across components.	Overlapping segments (Error 1), cancellations and corrections (Error 4), unreported AT and IADT (Error 5)
3. DMDC should ensure that data systems are synced in the proper order to reduce PNL errors.	Terminated PNLs (Error 3)
4. Components should ensure proper use of edit transaction codes. This step would reduce errors caused by cancellations and corrections and eliminate delays in corrections being incorporated into the GRAS file.	Cancellations and corrections (Error 4)

TABLE S.3**Actions to Consider to Address GRAS Data Errors**

Action to Consider	Errors Addressed
1. DoD could consider implementing a standardized policy on placeholder end dates and the automatic termination of segments as of the projected end date for certain project codes. This action would ensure that open-ended activations are treated equally across components.	Unterminated segments (Error 2)
2. DMDC and components could establish data-sharing agreements to increase the components' ability to identify and resolve PNL errors before delivering data to DMDC.	Terminated PNLs (Error 3)
3. Components could build validation checks for segment length to eliminate negative length segments (i.e., the segment end date predates the segment begin date).	Other errors
4. Components could more effectively track deployed AGRs and reinstate AGR segments after deployment ends. This action would eliminate delays in reinstating AGRs' benefits after deployments end.	Other errors

Contents

About This Report iii

Summary v

Figures and Tables xiii

CHAPTER 1

Introduction 1

CHAPTER 2

Overview of Guard and Reserve Active Service, Associated Benefits, and Known Errors in Reporting 3

Active Service Reporting Procedures and Contingent Benefits 3

Errors in Active Service Reporting 12

CHAPTER 3

Overview of the Guard and Reserve Active Service File 17

Guard and Reserve Active Service Monthly Edit File 17

Subject-Matter Expert Discussions 18

Distinguishing Normal GRAS Edits from Possible Errors 21

CHAPTER 4

Assessing the Extent of Errors in Active Service Reporting 27

Data Sources 27

Overall Data Quality: Active Service Days Reported and Days Paid 28

Analyses of Data Errors 30

Errors Other Than Those Reported by DoD/VA Working Group 51

Summary 53

CHAPTER 5

The Effect of Data Errors on Benefit Administration 57

VA Disability Compensation 57

Qualification for the Post-9/11 GI Bill 61

Eligibility for TRICARE 64

Summary 66

CHAPTER 6

Recommendations and Conclusion 69

Recommendations and Actions to Consider 69

Additional Considerations for Guard and Reserve Service Data 73

Conclusion 73

APPENDIXES

A. GRAS File Project Codes.....75

B. Supplemental Analyses of Data Errors 77

Abbreviations 83

References 85

Figures and Tables

Figures

2.1.	Notional Example of VA Adjustment to Disability Compensation.....	9
2.2.	Example of How GRAS Errors Lead to Incorrect Benefits Eligibility.....	13
3.1.	Example of Four Types of Data Errors.....	25
4.1.	Taxonomy of Overlapping Segments.....	33
4.2.	Steps for Identifying Cancellations and Corrections	44

Tables

S.1.	Summary of GRAS Data Errors, as of June 2021	viii
S.2.	Recommendations to Address GRAS Data Errors	x
S.3.	Actions to Consider to Address GRAS Data Errors.....	x
2.1.	Active Duty and FTNGD Utilization Authorities and Corresponding Project Codes	4
2.2.	Qualifying Duty Types for Post-9/11 G.I. Bill	11
2.3.	Five Types of Data Errors Found by DoD/VA Working Group	14
3.1.	GRAS File Segments and Unique Activated Members from January 1, 2015, to June 30, 2021, by Component	18
3.2.	Taxonomy of GRAS Segments Based on Month-to-Month Changes, January–April 2021.....	23
4.1.	Summary Statistics of Reported Days of Active Service Versus Approximate Paid Days	30
4.2.	Number of Overlapping Segments, by Component.....	31
4.3.	Number of Stale Unterminated Segment Errors, by Component, as of June 30, 2021	36
4.4.	Stale Unterminated Segments, by Component and Months Past Projected End Date	37
4.5.	Segments That May Have Placeholder Projected End Dates, by Component	38
4.6.	Likely Terminated PNL Errors, by Component	41
4.7.	Likely Early PNL Errors, by Component	42
4.8.	Potential Scope of Data Error 4, by Type of Cancellation or Correction.....	46
4.9.	Misreporting of Annual Training and Initial Active Duty for Training, by Component.....	49
4.10.	Summary of GRAS Data Errors, as of June 2021	53
4.11.	Possible Effects of Data Errors on Benefits.....	54
5.1.	Disability Statistics for Reserve Component Members with Active Duty Segments Beginning January 1, 2015 or Later	58
5.2.	Summary Statistics of the Difference in Paid Versus Reported Days for Disabled Reserve Component Members.....	59

5.3.	Percentage of Data Errors Attributed to Disabled Reserve Component Members	60
5.4.	Number and Percentage of Segments for Reservists Who Have Fewer Than 90 Days of Qualifying PGIB Service, by Error Type.....	63
5.5.	Unterminated Segments and Terminated PNL Errors Affecting TRICARE-Eligible Segments	67
6.1.	Recommendations for Addressing GRAS Data Errors	69
6.2.	Actions to Consider for Addressing GRAS Data Errors.....	70
A.1.	Project Codes Referenced in This Report	76
B.1.	Sources of Overlapping Segments, by Component.....	77
B.2.	Project Codes Involved in Overlapping Segment Errors.....	78
B.3.	Most-Common Project Codes Among Open Segments More Than One Month Past Projected End Date	79
B.4.	Most-Common Project Codes for Likely Terminated PNL Errors.....	80
B.5.	Most-Common Project Codes for Each Type of Cancellation or Correction	81
B.6.	Mean Disability Rating Among Reservists with Errors.....	82

Introduction

To correctly provide benefits to reserve component (RC) members, activations must be reported accurately. In this report, we examine the prevalence of errors in RC activation data and how those errors affect U.S. Department of Veterans Affairs (VA) disability compensation, eligibility for the Post-9/11 GI Bill (PGIB), and eligibility for TRICARE.¹ This study was motivated by a U.S. Department of Defense (DoD) and VA working group on information-sharing that identified multiple data errors associated with activation timing and duration, resulting in potential errors in the delivery of benefits to veterans, including underpayments and overpayments of VA disability benefits.²

In a July 2020 report, the DoD/VA working group on information-sharing identified multiple errors in RC activation data.³ The errors were associated with activation timing and duration, resulting in potential errors in the delivery of benefits to veterans, including underpayments and overpayments of VA disability benefits. There was no consensus among the DoD and service stakeholders on the causes and solutions for the data quality issues. In particular, it was unknown how widespread the data quality issues were, whether the issues arose because of deficiencies in DoD policies or procedures for reporting the data, whether the problems related to compliance by the services with these policies and procedures or in their data management systems, whether issues arose when the data were processed by the Defense Manpower Data Center (DMDC), or whether they arose when the data were shared with VA. Although the working group focused on VA disability compensation, other benefits programs are also contingent on active duty service, so data errors that arise prior to sharing with VA could affect eligibility for those benefits as well. Our data analysis shows that about 11 percent of RC members with activations beginning on January 1, 2015, or later are disabled, with a median disability rating of 40 percent, entitling them to a minimum of \$673.28 per month in VA disability compensation.

¹ The Office of the Secretary of Defense chose these three benefits for us to analyze in this report. We note that RC activation data errors may affect other benefits that are not included in our analysis.

² As discussed in further detail in Chapter 2, eligibility for VA disability compensation does not necessarily disqualify a person from continuing to serve in the RC. Instead, it is the underlying condition, not the disability rating, that determines whether someone is medically cleared to serve.

³ Military Personnel Data Working Group, untitled slide deck provided to the authors, July 30, 2020, Not available to the general public.

The Office of the Secretary of Defense asked the RAND National Defense Research Institute to provide a review and assessment of the factors that contribute to data quality issues with respect to RC activations. This report documents that review and assessment. For this study, we focused on five data errors identified by the DoD/VA working group that cause VA to incorrectly count active duty days for reserve members: (1) overlapping segments, (2) unterminated segments, (3) mismatches between personnel files (PNLs) and Guard and Reserve Active Service (GRAS) files (called *terminated PNL errors*), (4) cancellations and corrections, and (5) misreported project codes. We used administrative personnel and activation data to understand the frequency of each error and how these errors vary across the RCs. We provided an assessment of the factors that contribute to RC activation data quality issues using a mixed methods approach that included quantitative analysis of the personnel data, semistructured discussions with subject-matter experts (SMEs), and a review of policy documents that describe the way activation information should be entered and processed in personnel systems. We then estimated and described how each type of error affects eligibility for three types of benefits that are contingent on active duty service: VA disability compensation, the PGIB, and TRICARE.

The remainder of this report is organized as follows. In Chapter 2, we provide an overview of how active service is reported for members in the RCs, the benefits affected by active service reporting, and the five errors identified by the DoD/VA working group. In Chapter 3, we describe the personnel data used in the analysis and summarize the edits to activation data that are made in a typical month. In Chapter 4, we describe our methodology and present our assessment of the frequency of each of the five data errors in active service reporting. In Chapter 5, we examine the effect of data errors on VA disability benefits, qualification for PGIB, and eligibility for TRICARE. In Chapter 6, we provide recommendations on how to reduce the frequency of data errors.

Overview of Guard and Reserve Active Service, Associated Benefits, and Known Errors in Reporting

In this chapter, we describe the types of active service that RC members can perform, the policies and procedures for reporting that service in personnel records, the available benefits contingent on that service, and the ways in which reporting errors could affect those benefits. We conclude the chapter by discussing how active service is reported in practice, based on discussions with representatives from each component.

Active Service Reporting Procedures and Contingent Benefits

RC members can perform service under various utilization authorities, described in DoD Instruction 1215.06.¹ The various authorities are grouped into three primary duty types: active duty, inactive duty, and full-time National Guard duty (FTNGD).² This report focuses on active duty and FTNGD, also called *active service*. These duty types are broadly described by four utilization categories: training, support, mobilization, or other. In each utilization category, various statutory authorities determine the type of duty that a reserve member may perform.

Table 2.1 displays the duty types and legal authorities for each utilization category. The table also lists the statute and project codes that are used to record these pieces of information in personnel data files. The table shows that some duty types are authorized under multiple statutes, and some statutes apply only to the National Guard, the reserves, or both.

¹ DoD Instruction 1215.06, *Uniform Reserve, Training, and Retirement Categories for the Reserve Components*, U.S. Department of Defense, March 11, 2014, change 2, July 12, 2022.

² A key distinction between active duty and FTNGD for the National Guard is that FTNGD activations keep guard members under state control but with federal pay and benefits. Guard members can also be activated under state control with state-level benefits (which can vary by state); this is known as *state active duty* and is not included in this report. See Lawrence Kapp, “Defense Primer: Reserve Forces,” Congressional Research Service, IF10540, updated December 21, 2021. In this report, we refer to FTNGD as active duty for convenience, unless the distinction is relevant.

TABLE 2.1

Active Duty and FTNGD Utilization Authorities and Corresponding Project Codes

Utilization Category	Purpose of Duty	Applicable Component	Legal Authority	Statute Code	Project Code
Training	Initial Active Duty for Training (IADT)	Guard and reserve	10 USC § 12301(d)	C	A20
	Annual Training (AT)	Reserve	10 USC § 10147	O ^a	A21
	Annual Training	Guard and reserve	10 USC § 12301(b)	M	A21
	Additional/Other Training Duty	Guard and reserve	10 USC § 12301(d)	C	A22
	Annual Training	Guard	32 USC § 502(a)	P	B21
	Additional Training Duty	Guard	32 USC § 502(f)(1)(A)	Q	B27
	Additional/Other Training Duty	Guard	32 USC § 502(f)(1)(B)	N	B22
Support	AGR/OS/Additional Duty	Guard and reserve	10 USC § 12301(d)	C	A25, A26
	Preplanned Combatant Commander Support	Guard and reserve	10 USC § 12304b	2	A27
	AGR/OS/Additional Duty	Guard	32 USC § 502(f)(1)(B)	N	B25, B26
	Other Duty	Guard	32 USC § 502(f)(1)(A)	Q	B27
Mobilization	Full Mobilization	Guard and reserve	10 USC § 12301(a)	B	9GF ^b
	15-Day Mobilization	Guard and reserve	10 USC § 12301(b)	M	A27
	Partial Mobilization	Guard and reserve	10 USC § 12302	D	3HS, 9GF ^b
	Presidential Reserve Call-Up	Guard and reserve	10 USC § 12304	E	3HQ, 3JT, 9FF, 9FV ^b
	Emergencies and Natural Disasters	Reserve	10 USC § 12304a	1	A27, HSM, TSH, TSI, Y10, Y11, Y12, Y13 ^b
	Emergencies and Natural Disasters	U.S. Coast Guard Reserve	14 USC § 712 or 14 USC § 3713	L	HSM, TSH, TSI, Y30 ^b
Other	Medical Care	Guard and reserve	10 USC § 12301(h)	K	A28
	Medical Evaluation and Treatment	Guard and reserve	10 USC § 12322	R	A28

Table 2.1—Continued

Utilization Category	Purpose of Duty	Applicable Component	Legal Authority	Statute Code	Project Code
	Pending LOD for Response to Sexual Assault	Guard and reserve	10 USC § 12323	3 [†]	A28
	Retiree Recall	Reserve	10 USC § 688	A	A27
	Disciplinary	Guard and reserve	10 USC § 802(d)	Y	A27
	Unsatisfactory Participation (up to 45 days)	Guard and reserve	10 USC § 10148	T ^a	A27
	Captive Status	Guard and reserve	10 USC § 12301(g)	S	A27
	Unsatisfactory Participation (up to 24 months)	Guard and reserve	10 USC § 12303	U	A27
	Duty at National Guard Bureau	Guard	10 USC § 12402	X ^a	A28, B27
	Federal Aid for State Governments	Guard	10 USC § 251	5 ^a	—
	Use of Militia to Enforce Federal Authority	Guard	10 USC § 252	V ^a	—
	Insurrection	Guard	10 USC § 12406	I	—

SOURCES: Features information from DoD Instruction 1215.06, 2022; and DoD Manual 7730.54, Vol. 1, *Reserve Components Common Personnel Data System (RCCPDS): Reporting Procedures*, U.S. Department of Defense, May 25, 2011, change 2, January 28, 2019.

NOTE: AGR = Active Guard and Reserve; LOD = line of duty determination; OS = operational support. “—” indicates that no project code corresponds to the statute code as of the January 28, 2019, version of the DoD Manual.

^a Statute code not used for any GRAS file segment as of June 30, 2021.

^b Multiple project codes may apply, but the table only lists codes that make up more than 1 percent of all instances.

Active Service Reporting Requirements Are Defined in DoD Manuals

When a service member performs active duty or FTNGD supported by federal funds, the service must be reported by the service branch to DoD, as outlined in Enclosure 8 of DoD Manual 7730.54, Volume 1 (hereafter, *Enclosure 8*).³ The manual specifies that each RC must submit an active service transaction file to DMDC every day. Each transaction in the file contains information related to a single, continuous period of active duty service under a given authorization, called a *segment*. Enclosure 8 provides instructions on what informa-

³ DoD Manual 7730.54, Vol. 1, 2019, pp. 63–70. National Guard members can also perform FTNGD authorized by a state or territory governor. Such service is not reported to DoD as described here and is not considered in this report.

tion must be included in the file and the coding schemes that should be used to record that information.⁴

Each transaction is one of the following five possible types:

1. the beginning of a segment (*begin transaction*)
2. the end of a previously reported segment (*end transaction*)
3. a completed segment that had not been previously reported or a completed segment that had incorrect data other than the start date (*historical event transaction*)
4. a correction to the *statute code*
5. a cancellation of a previously submitted transaction that had an incorrect start date.⁵

Enclosure 8 further requires that the RCs check the file for “validity and consistency” and that DMDC check the file for “accuracy of the transactions.”⁶ In practice, these phrases leave much to interpretation; as discussed further in the next chapter, the seven RCs differ in the ways they implement this requirement.

Once a transaction is accepted by DMDC, the information is incorporated into the GRAS file, which is an aggregated table of the most up-to-date Enclosure 8 information across all RCs. Per the rules of Enclosure 8, each segment in the GRAS file includes

- the service member’s identification number
- the service and component submitting the transaction
- the activation authority (statute code)
- a unique code used to identify the type of active service (called a *project code*: for example, AT, other training duty [OTD], contingency operation, border patrol, and so forth)
- the activation begin date
- the projected end date (if it is not yet terminated)
- the actual end date (if applicable)
- other information.⁷

The GRAS file is cumulative, meaning that, on a given day, the table represents the most up-to-date information about all segments reported up to that time. Each observation records information about a single activation for a given individual under a given activation authority. When a segment is edited or canceled, the GRAS file data change or the segment disappears altogether. The primary formatting difference between the Enclosure 8 file submitted by each component and the GRAS file maintained by DMDC is that the former uses transaction codes but the latter does not. For example, a begin transaction code will result in a new

⁴ State active duty for guard members is not recorded in this file or reported to DMDC.

⁵ DoD Manual 7730.54, Vol. 1, 2019, pp. 64–65.

⁶ DoD Manual 7730.54, Vol. 1, 2019, p. 64.

⁷ DoD Manual 7730.54, Vol. 1, 2019, pp. 67–70.

observation being appended to the GRAS file, whereas a change to statute code transaction will result in an existing record being updated.

The GRAS file is part of DMDC's Person Data Repository (PDR), which links information about individuals across many datasets. Within the PDR, each GRAS record is linked to the corresponding service member's PNL at the time of activation. PNLs correspond to a person's service within a particular service branch and component. If the service member transitions to another component, their PNL will close, and a new PNL will be opened. If they separate, their PNL will be closed altogether. Importantly, only DMDC (and not the individual RCs) can check the status of a service member's PNL; although, as we discuss in Chapter 6, this arrangement could be changed. The current lack of access to PNLs can cause some problems with validating Enclosure 8 data, as described in the next chapter.

VA must access information in the GRAS file to prorate VA disability compensation, as described in the next section. The VA/DoD Identity Repository (VADIR) provides VA access to the GRAS file.⁸

Certain Benefits Are Contingent on Active Service

The GRAS file serves as the primary source of information for the administration of various benefits that are conditional on time spent in active duty. In this report, we consider three benefits for which we have empirical evidence in terms of the effects of errors: VA disability compensation, the PGIB, and TRICARE. In this section, we review how these benefits are implemented and how eligibility depends on active duty service. There are other benefits that depend on active service: notably, the financial benefits and protections available in the Servicemember Civil Relief Act.⁹ Correcting errors in active service data would also have positive effects on Servicemember Civil Relief Act implementation and any other benefits programs that depend on active service.

VA Disability Compensation

Veterans may receive VA disability compensation if they received an injury leading to a disability during active duty or training. Eligibility is determined through an evaluation that establishes a veteran's disability rating based on "all service-connected disabilities and the totality of the changes in the service member's condition that occurred during military

⁸ Defense Manpower Data Center and Department of Veterans Affairs, *Computer Matching Agreement Between Defense Manpower Data Center, Department of Defense and the Department of Veterans Affairs for Verification of Disability Compensation and Pension*, U.S. Department of Defense and U.S. Department of Veterans Affairs, CMA No. 87, undated.

⁹ U.S. Code, Title 50, Section 50, Servicemembers Civil Relief.

service.”¹⁰ A person’s compensation rate varies by VA disability rating and the number of dependents.¹¹

Eligibility for VA disability compensation does not necessarily disqualify a person from continuing to serve and train in the RC. Rather, the underlying condition (not the disability rating) determines whether someone is medically cleared to serve, perhaps after receiving a medical waiver. Therefore, there are reservists who perform active service and who have a VA disability rating greater than zero. It is likely that, for many such RC members, the service-connected injury is attributable to active component service, occurring before the transition to the reserves.¹² We note that a 2014 DoD Inspector General report documents that individual medical readiness in the RC was negatively associated with the inclusion of service members with medical limitations who transferred to the RC from the active component.¹³ A 2020 RAND report documents ways to improve medical readiness, including requiring service members to meet retention standards and standardizing the types of information used to determine whether standards are met.¹⁴

To accurately disburse disability compensation, VA must account for active service performed because, under 38 USC § 5304(c), RC members are prohibited from receiving VA disability compensation while receiving military pay.¹⁵ Per VA regulations, military pay is “pay received for active duty, active duty for training or inactive duty training.”¹⁶ For most active duty statuses, VA compensation is suspended during the period when active duty pay is received.¹⁷ VA relies on the GRAS data received through VADIR der to identify periods for

¹⁰ VA, “Understanding the VA and DoD Disability Benefit System,” fact sheet, March 2008, p. 2. Note that DoD disability compensation is separate from VA disability compensation. DoD disability ratings may differ from VA disability ratings because DoD’s evaluation system, called the Line of Duty Determination, only considers conditions related to fitness for service.

¹¹ See VA, “2022 VA Compensation Rates,” webpage, December 16, 2021.

¹² Because members of the active component are on active duty continuously, most health problems that arise during service can be the basis for a disability claim. In contrast, RC members can only receive compensation for disabilities that can be attributed to active duty or training. RC members are also less likely than active component members to be referred to the Disability Evaluation System (Susan D. Hosek, “Healthcare Coverage and Disability Evaluation for Reserve Component Personnel,” in U.S. Department of Defense, *Report of the Eleventh Quadrennial Review of Military Compensation: Supporting Research Papers*, June 2012).

¹³ U.S. Department of Defense Inspector General, *Assessment of DoD-Provided Healthcare for Members of the United States Armed Forces Reserve Components*, DODIG-2015-002, October 8, 2014.

¹⁴ Heather Krull, Christina Panis, Katherine Anania, and Philip Armour, *Characteristics and Duty Limitations of Service Members Transferring Between the Active and Reserve Components*, RAND Corporation, RR-3100-OSD, 2020.

¹⁵ U.S. Code, Title 38, Section 5304, Prohibition Against Duplication of Benefits.

¹⁶ Code of Federal Regulations, Title 38, Pensions, Bonuses, and Veterans’ Relief; Chapter I, Department of Veterans Affairs; Part 3, Adjudication; Subpart A, Pension, Compensation, and Dependency and Indemnity Compensation; Section 3.654, Active Service Pay.

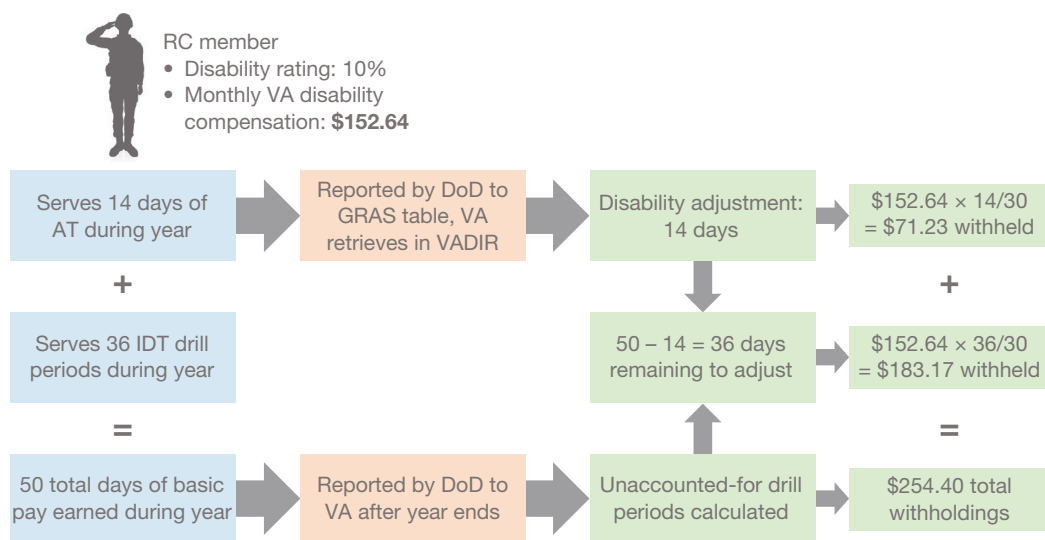
¹⁷ Code of Federal Regulations, Title 38, Section 3.654.

which VA disability payments should be adjusted. The exception is active duty for training (ADT), during which RC members may choose to receive either their military pay or their VA compensation; most choose military pay because it is generally the larger amount.¹⁸

VA must also adjust for inactive duty pay. Because inactive duty drill periods are not recorded in the GRAS file or in any analogous table, once per year, DoD sends VA a list of members who received military pay and were receiving VA disability benefits. VA then adjusts disability payments depending on the total number of military *training* days (both ADT days and inactive duty training [IDT] drills). VA calls this a “drill pay adjustment.”¹⁹ As the phrase implies, this adjustment should, in theory, only take into account IDT drills because pay was already adjusted for active duty days served.

Figure 2.1 provides a notional example of how VA disability adjustments work, assuming service is reported properly. The example assumes an RC member has a 10 percent disability rating and earns a VA disability compensation of \$152.64 per month (the corresponding rate

FIGURE 2.1
Notional Example of VA Adjustment to Disability Compensation



SOURCES: Explanation of the process is detailed in VA Office of the Inspector General, Office of Audits and Evaluations, 2020. Compensation rates are for 2022 and drawn from VA, 2021.

¹⁸ VA Office of the Inspector General, Office of Audits and Evaluations, *Veterans Received Inaccurate Disability Benefit Payments After Reserve or National Guard Drill Pay*, Report No. 18-05738-56, February 11, 2020; VA, “Adjusting Department of Veterans Affairs (VA) Benefits Based on a Veteran’s Receipt of Drill Pay,” in VA Manual M21-1, *Adjudication Procedures Manual*, U.S. Department of Veterans Affairs, August 4, 2022.

¹⁹ VA Office of the Inspector General, Office of Audits and Evaluations, 2020, p. ii.

in 2022).²⁰ The hypothetical RC member served 14 days of AT and 36 drill periods of IDT. Their disability compensation for AT would be reduced by 14/30 of the monthly total, or \$71.23. The reduction presumably occurs in the month after AT was reported in the GRAS file.

At the end of the year, DoD would inform VA that this person performed 50 “military days,” in which one drill period counts as one day. Because VA had already adjusted by 14 days, it would assume there were 36 remaining military days (drill periods) that needed adjustment. VA would then reduce compensation by 36/30 of the monthly total, or \$183.17. That money will be clawed back from future VA disability benefits payments, yielding a total of \$254.40 in disability compensation withholdings for that year.

However, an audit by the VA Office of the Inspector General found that, as of 2016, the adjustment process does not always work correctly because VA does not always subtract the correct number of active duty days.²¹ The errors made by VA can be compounded by the errors studied in this report; more details are provided in Chapter 5.

The Post-9/11 GI Bill

The PGIB refers to educational benefits for veterans established by Congress in 2008. The benefits typically cover tuition at approved programs, plus a living stipend and a stipend for other educational costs.²² Benefits depend on aggregate time spent in active duty and how the member was discharged. Serving an aggregate 90 days of active duty, excluding entry-level and skill training, confers the minimum benefit. Full benefits are afforded to those with an honorable discharge who fulfill one of the following conditions:

- served an aggregate 36 months on qualifying active duty after September 10, 2001
- was discharged or released for a service-connected disability after serving 30 continuous days on qualifying active duty after September 10, 2001
- was awarded the Purple Heart for service occurring after September 10, 2001.²³

Reservists with prior active component service would likely already meet the minimum benefit, if not the maximum PGIB eligibility threshold of 36 months’ service. Reservists with no prior active component experience must qualify by accruing qualifying active service experience. Table 2.2 shows the qualifying duty types.²⁴ Notably, qualifying active duty does

²⁰ VA, 2021.

²¹ VA Office of the Inspector General, Office of Audits and Evaluations, 2020.

²² U.S. Code, Title 38, Section 3313, Educational Assistance: Amount; Payment.

²³ U.S. Code, Title 38, Section 3311(b), Educational Assistance for Service in the Armed Forces Commencing on or After September 11, 2001: Entitlement; U.S. Code, Title 38, Section 3313(c)(1). Children of members can also be eligible under certain circumstances, but those criteria are not relevant for this report.

²⁴ U.S. Code, Title 38, Section 3301, Definitions. The definition of *qualifying active service* has been amended multiple times since the original version of the law. We consider only the current definition and

TABLE 2.2**Qualifying Duty Types for Post-9/11 G.I. Bill**

Legal Authority	Duty Type	Notes
10 USC § 12301(d)	IADT	Does not count toward eligibility if member does not serve at least 18 months in other duty types, unless discharged for a service-connected disability
10 USC § 688	Retiree Recall	
10 USC § 12301(a)	Full Mobilization	
10 USC § 12301(d)	OTD, AGR, OS	
10 USC § 12301(g)	Captive Status	
10 USC § 12301(h)	Medical Care	
10 USC § 12302	Partial Mobilization	
10 USC § 12304	Presidential Reserve Call-Up	
10 USC § 12304a	Emergencies and Disasters	
10 USC § 12304b	Combatant Command Support	
14 USC § 712	Emergencies and Disasters	Statute applies to U.S. Coast Guard Reserve only
32 USC § 502(f)	FTNGD—AGR,OS,OTD	Statute applies to National Guard only

SOURCES: Features information from U.S. Code, Title 38, Sections 3301(1) and 3311(b). See Table 2.1 for additional information about each legal authority.

not include AT and only includes entry-level and skill training (e.g., IADT) if the member accrues at least 24 months of aggregate active duty service.²⁵

TRICARE

Members of the guard and reserve who serve on active duty for more than 30 consecutive days are eligible for active duty health and dental benefits under TRICARE.²⁶ Each activation order must be greater than 30 days for TRICARE eligibility, and shorter activations cannot be appended together to achieve TRICARE eligibility.²⁷ Members with certain activation orders can be covered in advance under the Early Eligibility program, starting the day orders are issued or 180 days before reporting to active duty. Dependents can also be covered by

do not adjust for whether a given GRAS segment counted toward eligibility at the time it was performed. For more information on eligibility and its legislative history, see Cassandra Dortch, *The Post-9/11 GI Bill: A Primer*, Congressional Research Service, R42755, September 23, 2021.

²⁵ U.S. Code, Title 38, Section 3311(b).

²⁶ Defense Health Agency, *TRICARE Choices for National Guard and Reserve*, U.S. Department of Defense, October 2021.

²⁷ U.S. Code, Title 10, Section 101(d)(2), Definitions, defines the term *active duty for a period of more than 30 days* as active duty under a call or order that does not specify a period of 30 days or less.

TRICARE during the same period.²⁸ Members and their dependents are eligible for an additional 180 days of TRICARE coverage after the activation ends if the reservist was activated for a preplanned mission, in support of a contingency operation, or in support of the government coronavirus disease 2019 (COVID-19) response. Members activated for other reasons may qualify to purchase health care coverage after their activations end.²⁹

TRICARE benefits are used by thousands of RC members. In fiscal year 2018, 166,000 activated RC members were participating in TRICARE, and an additional 16,000 were enrolled in the Early Eligibility program.³⁰ Even more members may have been eligible but chose not to enroll. For example, a member might already be covered under private insurance and might not wish to transition their coverage for a short period.

We note that service members may not need or intend to use TRICARE when activated. RC members who are activated are automatically covered for medical care provided at military treatment facilities per 10 U.S.C. § 1074. Moreover, certain service members may not need medical care during their activation, or certain service members and their dependents may have no intention to use TRICARE while activated. Errors in active service reporting that affect TRICARE eligibility would have no practical impact for these members.

Errors in Active Service Reporting

The accuracy and completeness of the GRAS file is important “to establish eligibility for any benefits and entitlements predicated upon participation.”³¹ Although the individual RCs and DMDC are required to check daily transaction files before incorporating into the GRAS file, some errors are not or cannot be detected; still other errors arise after the data are delivered to DMDC. Thus, some errors exist in the final GRAS file; these remaining errors are the subject of this report because they may affect benefits eligibility.

GRAS Errors Can Result in Miscalculating Eligibility for Benefits

Errors in the GRAS file can work in two directions: (1) They can make it appear that an RC member is eligible for a benefit when they should not be eligible, or (2) they can make it appear that an RC member is not eligible when they should be. This is perhaps most vividly illustrated by VA disability compensation: Even a single misreported day of active service

²⁸ The GRAS table is used to determine TRICARE eligibility during active duty, but a separate table called the RC Benefits Transaction File is used to determine early eligibility, as well as eligibility for newly commissioned officers awaiting IADT. The requirements for the RC Benefits Transaction File are outlined in DoD Manual 7730.54, Vol. 1, 2019, Enclosure 9.

²⁹ Defense Health Agency, “TRICARE: When Deactivated,” webpage, undated.

³⁰ Sarah K. John, James M. Bishop, Nathaniel T. Cleaves, Jamie M. Lindly, and W. Patrick Luan, *Improving Reserve Component Medical Readiness*, Institute for Defense Analyses, October 2021.

³¹ DoD Manual 7730.54, Vol. 1, 2019, p. 63.

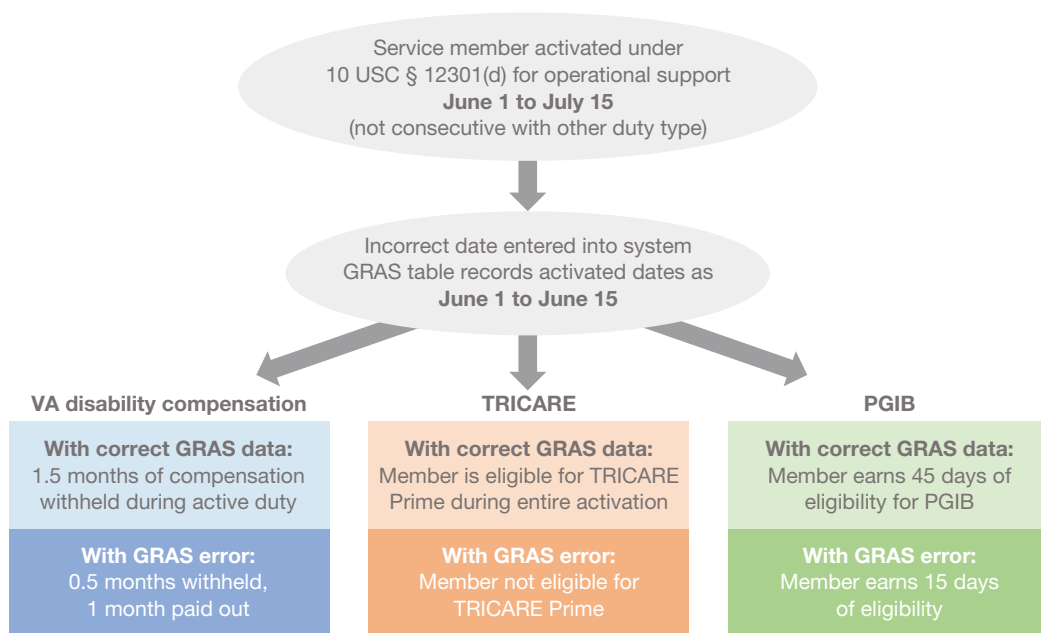
will lead to overpayment or underpayment of VA disability compensation. However, errors can affect TRICARE and PGIB benefits as well. Figure 2.2 shows how a misreported segment results in incorrect benefits payments or eligibility.

In the example, an RC member serves 45 days of OS for the entire month of June and half of July. For simplicity, we assume these days were not served consecutively with any other active duty. The member should qualify for TRICARE Prime during this time, and VA disability compensation should be withheld for the entire month of June plus 15 days in July. They should also earn 45 days of eligibility toward the PGIB. However, the segment end date was entered improperly, with a typo of June 15 instead of July 15. The segment appears to be only 15 days long in the GRAS file. This error means that, according to the official records, the member would get just half a month of VA disability withheld, resulting in overpayment of an entire month. Moreover, the member appears to be completely ineligible for TRICARE Prime and earns just 15 days of eligibility for PGIB instead of 45 days.

It is possible that this error would never be caught. If the member does not earn VA disability compensation and did not want to use TRICARE anyway, then there would be no red flag in the short term to indicate something is wrong with the person's GRAS records. And, in the long run, a difference of 30 days in PGIB eligibility may not matter if the member has served or will serve enough additional active duty days that they earn full eligibility anyway. But this is not true of all errors, nor can it be known in advance what errors will or will not affect benefits. As discussed below, some errors will lead to overpayment of certain benefits, which can result in recoupment—a frustrating prospect for the member who received the

FIGURE 2.2

Example of How GRAS Errors Lead to Incorrect Benefits Eligibility



benefits. Others may lead to underpayment or inability to access health care benefits to which the member was entitled—a similarly frustrating prospect that creates additional paperwork for both the member and the RC.

DoD/VA Working Group Identified Five Common Types of Errors

In July 2020, a joint DoD/VA working group identified five errors in active service reporting under Enclosure 8 that could affect benefit eligibility. The findings of the working group were provided to us by the Office of the Secretary of Defense and are summarized in Table 2.3. The five errors documented by the working group are as follows:

1. **Overlapping segments.** This error occurs when a segment of active service begins before the most recent prior segment of active service ends. The most recent prior segment may be open or closed. The working group identified thousands of overlap cases, about 100 of which affected service members who were eligible for VA disability benefits. Overlapping segments make it difficult to calculate the true number of

TABLE 2.3
Five Types of Data Errors Found by DoD/VA Working Group

Type of Error	Description	Working Group Conclusions	Relevance to Reserve Member Benefits
1. Overlapping segments	A GRAS segment begins before a previously opened segment was closed (earlier segment may still be open)	- Thousands of overlap cases overall - About 100 cases among members eligible for VA benefits	Causes dual compensation problems and complicates the calculation of the true number of days of active service
2. Untermiated segments	GRAS segment was projected to have ended already, but segment is not officially closed	- About 15,500 cases overall - About 2,300 cases among members earning VA benefits	Benefit eligibility will be calculated incorrectly if member is no longer on active duty but appears to be
3. Terminated PNLs	PNL is closed due to separation or transition, but a GRAS segment remains open	- About 3,400 cases - Affects about 1,300 members earning VA benefits	Benefit eligibility will be calculated incorrectly if member is no longer on active duty but appears to be
4. Cancellations and corrections	GRAS segment is canceled because of a change or error, but the new or correct segment is not entered immediately	- Nearly 600,000 cases overall - Affects about 224,000 members earning VA benefits	Cancellations generate false events that can turn “on” or “off” benefits because a member does not appear to be on active duty
5. Misreported project codes	GRAS segment is coded with incorrect project code indicating wrong duty status or is unreported altogether	One case of systematic miscoding: Marine Corps Reserve used code for OTD instead of AT	Creates miscalculation of entitlement for PGIB if either project code is not eligible but other code is eligible

SOURCE: Features information from Military Personnel Data Working Group, untitled slide deck provided to the authors, July 30, 2020, Not available to the general public.

days of active service, potentially causing dual compensation issues for disability benefits, errors in TRICARE eligibility, and errors in the number of days of active service counted for PGIB eligibility.

2. **Unterminated segments.** This error occurs when a segment of active service that has ended has not been terminated in the GRAS file. The working group identified approximately 15,500 cases overall, approximately 2,300 of which affected service members who were eligible for VA disability benefits. Unterminated segment errors create similar issues to those caused by overlapping segment errors: They make it difficult to correctly calculate benefit eligibility because the service member will appear to be on active duty until the segment is officially terminated.
3. **Terminated PNLs.** This error occurs when a service member's PNL has closed but the segment is shown as open in GRAS. This error is a subset of unterminated segment errors. The working group identified approximately 4,600 cases, with similar consequences to those for other unterminated segments.
4. **Cancellations and corrections.** This error occurs when a component needs to update or correct a segment but, instead of sending an update, cancels the segment and submits a new one. The working group identified nearly 600,000 cases, approximately 133,000 of which affect qualifications for VA benefits. This error is especially problematic for service members: If there is a delay between the cancellation and the new segment, benefits such as TRICARE may turn on or off temporarily because the service member does not appear to be on active duty. Although such problems can be corrected retroactively, they create unnecessary burdens and can be stressful for service members who need to use the benefits.
5. **Misreported project code errors.** This error occurs when a segment uses an incorrect project code. It is difficult to assess the magnitude of this type of error because it is difficult to determine what project code a segment *should* have. It is also possible that the segment is not reported at all and therefore is missing from the GRAS file—which is also difficult to determine, since it cannot be observed. However, the working group identified some cases for which there is systematic miscoding of project codes; for instance, between 2011 and 2015, the Marine Corps Reserve systematically used the project code for OTD when a segment was really AT. Misreported project codes can create a miscalculation of service members' entitlement for PGIB. Incorrect project codes can also affect eligibility for TRICARE after the activation ends. In other cases, incorrect project codes do not affect benefits, but DoD prioritized the identification and correction of such errors because project codes are one of the only ways in which DoD can track reserve utilization. In the case of the working group findings, it is important to track who is performing AT because it is a requirement of drilling reservists.³² Our analysis focuses on likely missing project codes, rather than

³² As another example, U.S. Code, Title 10, Section 12302, Ready Reserve, is used as a utilization authority under two Executive Orders: for overseas contingency operations and for COVID-19 response. Only the

codes that were reported incorrectly, complementing and not replicating the working group's analysis.

These five types of errors were the focus of our analysis. In addition to reexamining the extent of the errors, our goal was to understand the sources of the errors and how changes to the data management pipeline could avoid these errors in the future. In the course of our investigation, we discovered additional errors and data management constraints and included them in our findings. Our methods and findings are discussed in the rest of this report.

project code can distinguish the two (see Table 2.1), so it is the only way to count how many members have been deployed under each order.

Overview of the Guard and Reserve Active Service File

In this chapter, we describe the GRAS file and how it is used and edited in practice. We provide a description of the table and highlight how errors can be identified among the edits that are routinely made to the table. We also summarize SME discussions conducted with data users and the procedures and practices used by the components and by DMDC to produce the data.

Guard and Reserve Active Service Monthly Edit File

The GRAS file is cumulative, meaning that the most recent file always contains all historical segments of active service that have been reported and that were not canceled. It is also updated on a daily basis, so the table should be considered a “snapshot” of the most current information available. For each reported activation segment, the file records the information required by Enclosure 8: in particular, the begin date, the projected end date (if unterminated) or actual end date (if terminated), the project code, the statute code, and the RC that submitted the segment. The file also includes the member’s Reserve Component Category and Training and Retirement Category (RCC/TRC) code, which is not required but is useful for diagnosing some errors.

DMDC provided us with the end-of-month snapshots of the GRAS file from January 2015 through June 2021. These particular snapshots are referred to as the *GRAS monthly edit file*.¹ By comparing snapshots from month to month, we can identify changes to the file: segments that are added, deleted, or edited.

At the request of the Office of the Secretary of Defense, we limited our analysis to segments beginning on or after January 1, 2015.² Table 3.1 shows that, as of June 30, 2021, there were approximately 7 million unique segments reported for almost 960,000 unique reservists

¹ The GRAS monthly edit file is also known as the Contingency Tracking System Activation File.

² As a justification for this cutoff, the GRAS file was not always used systematically in earlier years, and data quality has improved since the file was created. Only the more-recent errors provide guidance on data management issues and the extent to which they compromise data quality.

TABLE 3.1**GRAS File Segments and Unique Activated Members from January 1, 2015, to June 30, 2021, by Component**

Component	Number of Unique Segments	Share of Total Segments	Number of Unique Activated Members	Share of Activated Members
Army National Guard	598,384	8.5%	331,759	34.6%
Air National Guard	1,977,927	28.0%	144,983	15.1%
Army Reserve	1,799,705	25.5%	214,984	22.4%
Air Force Reserve	1,826,141	25.9%	107,576	11.2%
Marine Corps Reserve	538,077	7.6%	74,364	7.8%
Navy Reserve	270,263	3.8%	74,827	7.8%
Coast Guard Reserve	52,423	0.7%	10,050	1.1%
Total	7,062,920		958,543	

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015. Percentages may not sum to 100 due to rounding.

since 2015. The component-wise shares of segments and of unique members are not perfectly correlated. The largest share of unique service members is from the Army National Guard, with 34.6 percent of all activated service members, but that component has just 8.5 percent of all segments. The largest share of segments is from the Air National Guard, at 28 percent, but that component has just 15.1 percent of all activated members. These differences are partly due to differential activation rates but also are due to component-specific policies in processing and reporting segments, which will be discussed in the next chapter.

Subject-Matter Expert Discussions

To understand how the GRAS file is generated in practice, we held several discussions with SMEs from each RC and from DMDC. For each of the seven RCs, we spoke with representatives from the teams responsible for processing Enclosure 8 data, which often included the component's liaison to DMDC. We also conducted discussions with DMDC personnel with expertise on the RCs' Enclosure 8 data, the DMDC's PDR, and the data made available in VADIR.

Each RC discussion focused on data processing and reporting procedures, patterns we observed in the RC's reported GRAS segments, and known sources of errors. Our discussions with the DMDC teams focused on data processing procedures, known sources of errors, and differences across the components in error rates and reporting procedures. These discussions helped us to understand how GRAS data are managed in practice, the data management pipeline from the "ground" to the final GRAS file, data validation procedures, the extent to which

SMEs are aware of errors in the data, and any constraints that make it difficult to comply with the requirements of Enclosure 8.

The following general findings from the SME discussions provide relevant context for the empirical analyses described in later sections.

Components Obtain Activation Data Directly from Orders

First, Enclosure 8 data are compiled in a similar way across all components. SMEs from every component cited the text of Enclosure 8 in DoD Manual 7730.54 as the authoritative guidance. Moreover, every component uses an automated system to extract information directly from activation orders. The information from orders is converted into a transaction file as specified by the DoD Manual, with transaction codes indicating new activations, terminations, edits, or cancellations. Although each component sends an updated transaction file to DMDC on a daily basis, orders can take a day or two to process (especially over weekends or holidays). Therefore, new segments may appear in DMDC's records some days after the activation actually begins.³

Component-Level Differences in Data Handling Result in Differences in Data Quality

Despite the broad similarities described above, components differ in the details of how Enclosure 8 data are handled and formatted. An important difference is in how components implement Enclosure 8's requirement to check "validity and consistency."⁴ Most of the components' SMEs told us that they compare the statute code with the project code. Project codes indicate duty status but are not written into activation orders, so they must be determined using a combination of other data fields. But each duty status can only be authorized under a well-defined set of statute codes; therefore, only some statute and project code pairs can be considered valid. Apart from project codes, however, some components do not check any additional information. Additional differences between components will be discussed in the next chapter in the context of related data errors.

There are other differences across components in terms of data management and data reporting practices that affect data quality and completeness. Components make different decisions about how to handle unterminated segments and about how or whether to report all project codes (despite technically being required to report all activation segments). These differences will be discussed in more detail in the context of specific data errors. The upshot

³ Most components reported that when orders are written in advance (particularly for deployments), the data enter the GRAS table in advance, and DMDC holds the information until the actual day the activation begins. However, this is not possible in every case, since active service may happen on short notice (for example, tacking on OTD to AT).

⁴ DoD Manual 7730.54, Vol. 1, 2019, p. 64.

is that the GRAS file has component-specific data patterns that must be interpreted in the context of each component's idiosyncratic data management practices.

DMDC performs its own validations on the GRAS transactions sent by each component. When DMDC finds an error, it sends the segment back to the submitting component. SMEs from every component told us that errors must be adjudicated manually, a process that can take a few days. Component SMEs told us that DMDC kicks back errors regularly: at least several times per week and, for some components, every day. SMEs from DMDC said that some components' Enclosure 8 transactions have just a handful of errors in most weeks, while others have hundreds, reflecting the differences in components' data validation and data handling procedures.

DMDC also validates transactions against each person's PNL. If the component submitting a transaction does not match the component associated with the PNL, DMDC kicks back the transaction as an error. This step ensures that the component submitting a transaction is the same as the component in which the member is currently listed in the PDR. Notably, SMEs from nearly all components made clear that PNL-related errors are observable only to DMDC and that such errors also are common reasons for kicking back a segment. This is because components do not have access to DMDC's PDR and therefore cannot check the PNL themselves. The teams handling Enclosure 8 data also do not tend to receive transfer or separation paperwork, so they cannot know on their end whether a member has transitioned or separated. For example, one component related an instance in which a member had recently transitioned from another RC's Individual Ready Reserve; the person's GRAS segment was flagged by DMDC because it overlapped a previous, unterminated segment from the person's previous component. Correcting the error required assistance from the previous component, which had to close the open segment on its end; the new component could not have known about the existence of that segment when it submitted the new segment to DMDC.

Errors Affect Benefits and Sometimes Are Discovered When Benefits Are Used

SMEs also informed us that errors affect benefits, indicating that the impetus for this report is not merely hypothetical. Most often, SMEs pointed to TRICARE as the greatest concern because it is a benefit that would be used while a member is activated; hence, it is critical to establish eligibility correctly and in a timely manner. SMEs noted that because it can take a few days to correct errors in the data, there have been instances in which the delay interrupts or delays a member's access to TRICARE. This is frustrating and costly for the service member; in these cases, however, it is also the service member who discovers the error and initiates the process to correct it. An example cited by several SMEs is that a member tries to use TRICARE, is told they are not eligible, and then discovers that the dates of their activation were recorded incorrectly.

Errors Can Arise at Several Points in the Data Pipeline

As mentioned earlier, SMEs from the components told us that DMDC kicks back errors regularly. SMEs from DMDC said that some components' GRAS transactions have just a handful of errors in most weeks, whereas others have hundreds. We learned from our discussions that these errors can arise at several points in the data management pipeline and that the components and DMDC are aware of some common sources of errors. Generally speaking, errors can arise at the unit level when processing orders, at the component level when extracting Enclosure 8 data from orders, or at DMDC when incorporating Enclosure 8 data into the GRAS file. The following are examples of each type of error:

1. Errors generated at the unit level
 - a. The unit processes activation orders with a typo or other data error.
 - b. The unit fails to input an extension or termination of an activation order in the order-processing system.
2. Errors generated at the component level
 - a. The component's computer system assigns the wrong project code to a given statute code when extracting Enclosure 8 data from the order system.
 - b. The component does not keep track of DMDC requirements for closing and reopening segments during deployment.⁵
 - c. The component does not report all segments to DMDC.
3. Errors generated at the DMDC level
 - a. DMDC creates PNL errors by syncing the GRAS file prior to syncing the Reserve Components Common Personnel Data System (RCCPDS).

These examples, among others, will be discussed further in the next chapter. As the list demonstrates, GRAS errors arise at several points and for several reasons. Creating solutions for errors will therefore require adjustments to processes and procedures at multiple points in the data management pipeline.

Distinguishing Normal GRAS Edits from Possible Errors

Because the GRAS file is cumulative, it expands over time as new activations occur and is edited as previous activations end. Therefore, edits are to be expected and are not necessarily indicative of errors. In addition, closed segments will remain in the file and, if they do not contain errors that are eventually corrected, will never be edited again. Because a wide variety of edits are made to the table on a regular basis, we sought to understand whether errors could be identified from edits alone, as well as the extent of potentially erroneous segments.

⁵ See Chapter 4 for additional details on this example.

Our analysis illustrates the relative frequency of various changes to the GRAS file over the course of a month.

GRAS File Edits Can Be Sorted into Mutually Exclusive Groups

To conduct the analysis, we compared consecutive pairs of GRAS monthly edit files. We developed a taxonomy of GRAS segments based on how the segment changed from one month to the next, so that the taxonomy categories were mutually exclusive and exhaustive. Categories are defined based on what type of edit occurred, whether an edit was *expected* to occur, and whether the start and end dates of the segment match the months in which the edit occurred. The categories are described in Table 3.2, color-coded by whether they indicate a data error.

To give a specific example, suppose Month 1 is January 2021 and Month 2 is February 2021. A segment is still open in the January file, with a projected end date of February 4, 2021. In the February file, the segment is closed. This would be considered an *on-time closure*.

Several categories (highlighted in green) present no red flags and would be expected to occur in a perfectly functioning, error-free GRAS file. These include the accrual of old, closed segments that record historical activations; open segments that do not change between two consecutive months; new closed segments that open and close in the second month; new segments that open in the second month; and the on-time closing of segments that were open in the first month. Such segments do not show signs of data errors. It should be noted, however, that such segments could still have errors; however, such errors cannot necessarily be inferred simply from how the segments change (or do not change) over time. For example, an old, closed segment recording a deployment from several years ago could have an error in the end date. But unless that error is caught and corrected by the service member because of an associated problem with benefits, that segment might never be edited in the table, so the error would never be apparent.

Some categories (highlighted in yellow) suggest possible errors but are not definitive. These include open segments with edits, backdated closures, and new backdated segments. These segments may just be a result of delayed order processing (which, depending on the length of the delay, is a procedural problem but not a data error per se) or other legitimate reason. Or they could be corrections to earlier segments that contained incorrect data. In the next chapter, we try to distinguish which are corrections using comparisons to other segments.

Finally, some categories (highlighted in red) indicate errors. These include segments that do not close on time and segments that disappear altogether. If a segment does not close, it could be that the activation was extended, but that extension needs to be reported. It could also be that the segment should have been closed but was not. Either way, the result is an unterminated segment error. If the segment remains unterminated for long enough, it could result in an overlap error with a new segment or a PNL error when the member transitions or separates. Segments that disappear were closed and, if they did not have an error, would not have been touched again. Therefore, such disappearances indicate a definite data error that

TABLE 3.2

Taxonomy of GRAS Segments Based on Month-to-Month Changes, January–April 2021

Type of Segment	Description	Example	Indicative of Data Error?	Possible Type of Error	Average Number per Month
Already closed, no edit	Segment already closed in Month 1	Deployment from 2018	No	N/A	6,507,900
Open segment, no edit	Same open segment in Months 1 and 2	AGR duty projected to end after Month 2	No	N/A	166,900
New closed segment	Segment started and ended in Month 2	AT	No	N/A	61,100
New open segment	Segment started in Month 2 and was not projected to close until later	New deployment	No	N/A	42,900
On-time closure	Segment was projected to close during or after Month 2 and closed in Month 2	Deployment ending	No	N/A	27,200
Open segment with edits	Open segment in Month 1 with an edit in Month 2	Correction to project code or start date; AGR duty being extended causes change to projected end date	Maybe	Cancellation and correction	9,800
Backdated closure	Segment closed in Month 2 but with end date prior to Month 2	Late processing of orders or correction to canceled segment	Maybe	Cancellation and correction	2,300
New backdated segment	Segment first appears in Month 2 but with start date prior to Month 2	Late processing of orders or correction to canceled segment	Maybe	Cancellation and correction	6,500
Lack of closure	Segment was projected to close in Month 2 but did not	AGR duty being extended but not reported	Yes	Unterminated error (possibly eventually resulting in overlap or PNL error); cancellation and correction	16,600
Disappearing or changed closed segment	Segment is a closed segment in file in Month 1 but not present or has a change in Month 2	Cancellation due to data error	Yes	Cancellation and correction	6,500

SOURCE: Authors' calculations using January–April 2021 GRAS monthly edit file from DMDC.

was caught; the question is whether an apparently new segment is a correction to that deleted segment or whether a correction was not made. In the next chapter, we assess the extent of corrections versus outright cancellations.

Approximately 173,000 Changes Occur Each Month

The last column of Table 3.1 shows the average number of segments in each taxonomy category from January to April 2021. About 173,000 net additions, deletions, and edits were made to the table each month. Note that these amount to less than 3 percent of *all* segments during this time. The vast majority, more than 6.5 million, were closed in the past and did not get touched again. The table shows that about 90,600 closed segments were added to this total each month. Approximately 61,100 of those were new segments that closed in the same month they opened, and 29,500 were open segments that got closed in the second month. These openings and closures will continue in the future, and the table will expand in size.

One subset of historical closed segments did get edited: About 6,500 segments that were closed in one month disappeared or were changed in the next month. These must be cancellations and corrections caused by initial data errors. Another 2,300 were closed out at least one month after they were projected to have closed, raising the possibility of an error.

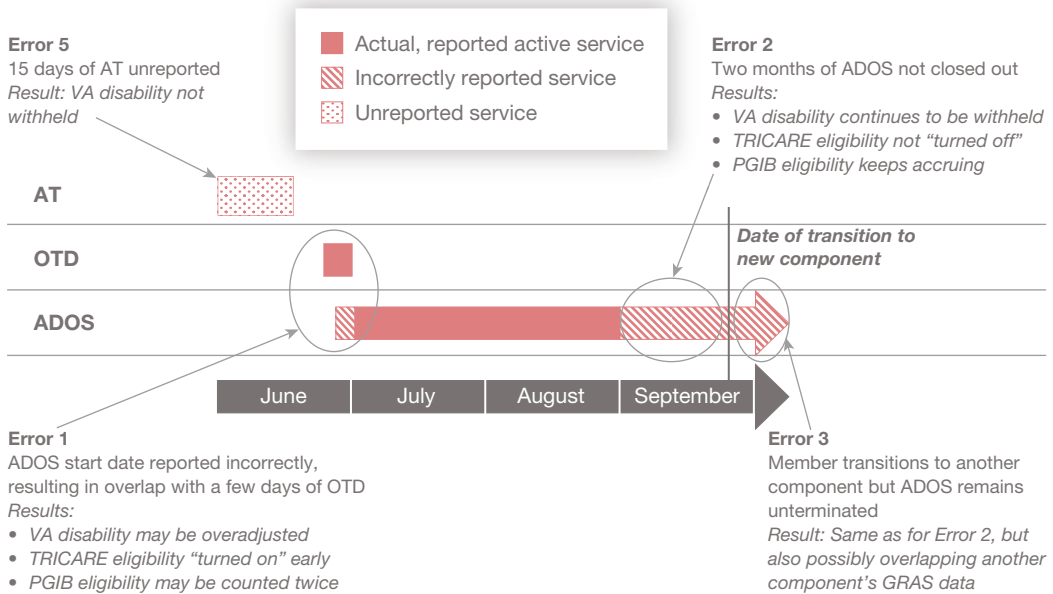
Open segments accounted for the remaining changes to the GRAS file. Although most open segments remain open with no apparent conflict in the projected end date (167,000 each month), about 9,800 remain open but are edited, suggesting an error. Another 6,500 are opened but at least one month after the segment started, raising the possibility that they, too, are related to errors. And, most telling, over 16,600 open segments fail to be closed despite the projected end date having passed. These are definitively unterminated errors.

Some Errors May Not Be Observable Based on GRAS Edits Alone

Table 3.1 shows that there could be thousands of errors each month, but this number is dwarfed by the tens of thousands of other segments edited or created each month that do not appear to have errors, as well as millions that remain untouched altogether. These relative magnitudes provide useful context but should be considered as suggestive and not definitive. Errors could exist among other categories of segments. Some errors, such as overlapping segments, are not explicitly categorized in the taxonomy but are easy to observe. Others, such as PNL errors, can sometimes be found by analyzing the GRAS file in conjunction with other datasets. Perhaps most importantly for our analysis, unreported segments are not in the GRAS data (and therefore are not included in Figure 3.1) and must be inferred from institutional details, such as reserve member utilization policies. We show in the next chapter that missing data is a substantial problem and outnumbers all other errors.

In the next chapter, we summarize our findings for each type of error documented in Table 2.3. To illustrate how these errors might manifest in the GRAS file, Figure 3.1 provides a visual example. The figure shows active service for a hypothetical reserve member over four months, illustrating four of the five errors.

FIGURE 3.1
Example of Four Types of Data Errors



NOTE: ADOS = active duty for operational support. Figure shows a hypothetical example of how data errors might occur in the GRAS file. The error numbers correspond to Table 2.3. Data error 4 (cancellations and corrections, not shown here) might occur if one of these segments was edited and would only be observable by comparing GRAS file data before and after the edit was made.

The active service illustrated in Figure 3.1 consists of 15 days of AT, performed in June, followed by a few days of OTD later in June that is consecutive with two months of ADOS through July and August. In late September, the member transitions to a different component.

However, the AT is not reported to the GRAS file (as indicated by the dotted pattern). This falls under Error 5 in Table 2.3, where we understand “misreported” to mean “not reported” rather than “reported with an incorrect project code.” Because the segment is unreported, VA cannot adjust disability compensation to account for those 15 days, so disability will be overpaid. But a 15-day segment does not qualify for TRICARE Prime anyway, and AT does not contribute to PGIB eligibility.

Later that month, the ADOS segment is reported to the GRAS file with the incorrect start date. This action creates overlap with the OTD segment, which falls under Error 1 in Table 2.3. If individual GRAS segments are counted to establish benefits eligibility (rather than counting calendar days on which the member was performing active duty), then the overlap days will be counted twice. This overlap will result in underpayment of VA disability benefits and overcounted eligibility for PGIB. In addition, because the ADOS stint is more than 30 days long, the member is eligible for TRICARE Prime, but the incorrect start date will turn on that eligibility too early.

Then, at the end of the ADOS activation, the member's component does not terminate the segment in the GRAS file. This leaves an unterminated segment, making it look like the member is on ADOS in perpetuity. This is Error 2 in Table 2.3 and results in all benefits staying on or off: VA disability payments will be withheld entirely during the activation, TRICARE coverage will remain available, and the member will continue to accrue eligibility for PGIB.

Finally, when the member transitions at the end of September, the PNL associated with that component will close, and a new PNL will be opened that is associated with the new component. But because the ADOS segment remains unterminated, this results in a PNL error (Error 3 in Table 2.3). The effects on benefits are the same as for any unterminated segment but with the additional possibility that problems will arise when the new component submits an activation for the member.

The other type of error discussed by the working group (cancellations and corrections) is not visible in a snapshot of the data. Using Figure 3.1, one example of such an error would be that a correction to the ADOS segment might result in the proper start date, eliminating the overlap with OTD. But, as with the missing AT segment, a correction cannot be observed directly: It can only be imputed by comparing segments over time or by identifying an anomalous characteristic relative to what would be expected. In the next chapter, we explain in more detail how we conducted such assessments.

Assessing the Extent of Errors in Active Service Reporting

In this chapter, we describe the methods used to assess the extent of errors in active service reporting. We then provide evidence of the number of, potential sources of, and potential solutions for known errors.

Data Sources

To understand the prevalence of data errors in active duty segment reporting, we use data from DMDC and VA in addition to the GRAS monthly edit file. In this section, we describe each additional data file used in our analysis.

Active Duty and Reserve Master Files

The GRAS file alone could not be used to identify every error: particularly, segments that are entirely missing or for which certain information is inaccurate. We triangulated among the GRAS and two other types of files: master files and pay files. The Active Duty Master File (ADMF) and Reserve Master File (formally known as the RCCPDS) contain individual-level information about military careers. We used information that indicated an individual's status in the military: service branch, component, and RCC/TRC codes. By comparing GRAS segments from a particular month with the master file data from the same month, we could observe whether misalignment of service component might be causing certain errors. Accordingly, we used the January 2015 to June 2021 monthly snapshots of the Active Duty and Reserve Master Files.

Reserve Pay File

The Reserve Pay File is a monthly pay file that provides monthly information about compensation paid to individual members in the RCs. The file reports the total number of days of ADT and ADOT paid each month, as well as the total amount of basic pay for active duty. This file allowed us to assess whether GRAS records were complete. If active service is unreported in the GRAS file, it should still be recorded in the pay file, since the reservist presum-

ably is still paid for that service. We used pay file data for the same period of observation as the GRAS file: January 2015 to June 2021.

VA Compensation and Pension File

The VA Compensation and Pension File contains information on VA disability awards and disability ratings. It records information delivered to DMDC by VA. Documentation and information about the VA Compensation and Pension File are sparse. Our understanding is that the file contains transactions, meaning that each observation represents a new disability award or an update to an existing disability award. Each award has an associated disability rating, which ranges from 10 percent to 100 percent: A higher value indicates a more severe disability. In the transaction data, we observed changes to disability ratings and the effective dates of those changes. Historical data are periodically erased from the file, although the frequency of the data purges is unclear.

DMDC provided us with an extract of the VA Compensation and Pension File, consisting of disability award transactions for all guard and reserve service members with a GRAS file segment that began on or after January 1, 2015. The earliest disability date occurred in 2002, and almost all awards are for 2016 or later, suggesting that historical transactions are purged from the file and that more-recent transactions are retained (e.g., annual inflation adjustments).

We use the VA data only to assess the degree to which GRAS errors affect VA disability compensation; we do not use these data to tabulate the GRAS errors themselves. We infer a reservist's disability status during activations by labeling them as disabled if the earliest disability date occurred prior to the start date of an activation, a process described in more detail in Chapter 5.

Overall Data Quality: Active Service Days Reported and Days Paid

Before evaluating each type of error individually, it is helpful to understand the extent to which the GRAS file and Reserve Pay File agree.¹ The pay file is more likely to be correct, since service members see their pay and have an incentive to correct errors in disbursement; they do not necessarily access their GRAS records unless there is an issue with benefits. If both files record the same number of days of active service, then we can be reasonably confident that those totals are correct. Even when the files agree on the total days served, there could be GRAS errors in the exact dates or multiple errors that cancel out, such as one seg-

¹ We did not use the ADMF in the days comparison, so our analysis may miss full-time RC members who are tracked in the ADMF.

ment that is too short and one that is too long. But general agreement between the two files is consistent with accurate record-keeping.

The pay file records the month in which pay was disbursed, which may not be the same as the month in which the corresponding service occurred. Therefore, we summed over the course of a calendar year for each reserve member. We counted the total number of active duty days reported across all GRAS segments and the total number of active duty days paid according to the pay file. The goal was to determine the extent to which errors create disagreement between the two files, so our counts of reported days in the GRAS file did not correct for errors. For example, overlapping segments were counted as separate segments, which is similar to how days of service would be calculated when considering only certain duty statuses or project codes (as would be done when calculating PGIB eligibility, for example) and not adjusting for whether those segments overlapped with others.

Days paid were calculated by dividing the total amount of basic pay for active duty by the member's daily basic pay rate. The pay file does not list the daily rate or the total number of days of active duty served, but it does list the total number of periods of inactive duty performed. We inferred the daily rate from IDT information: The daily rate equals monthly basic pay for IDT divided by the number of drills performed in that month. In months in which no drill was performed, we used the daily rate from the most recent month if the pay grade and calendar year were the same. If the pay grade or calendar year changed, the daily rate was imputed using the average daily rate in that month for individuals in the same pay grade.²

We then calculated the difference in days paid versus reported (pay file days minus GRAS file days) per member per year, averaged over the years 2015 through 2020. Because calendar years introduce artificial cutoffs (for example, service performed in December may not be paid until January), days may not align exactly each year even if the files are completely accurate. But averaging over all years should cancel out most differences.

Table 4.1 reports the findings, showing the average and median discrepancy per person per year. Positive numbers mean more days were paid than reported in the GRAS file, and negative numbers mean the opposite. In general, the median discrepancy is zero days, as would be expected if the GRAS file and pay file agree.

Two components stand out because of a nonzero median difference, suggesting discrepancies are exceedingly common. First is the Army National Guard, which underreports days for the majority of members. The median member has 15 days paid that are not reported in the GRAS monthly edit file; the average is 18 days. In fact, as detailed later in this chapter, this component does not report most AT segments or other short segments, and the 15-day discrepancy is evidence of this omission.

² We needed to calculate active duty days paid because they are not listed in the pay file. The pay file does have fields recording ADT and ADOT days paid, but those were missing in most cases. Our method of estimating some days paid based on the daily rate for others in the same pay grade introduces some approximations because basic pay rates also depend on years of service, which we do not know.

TABLE 4.1

Summary Statistics of Reported Days of Active Service Versus Approximate Paid Days

Component	Difference in Paid vs Reported Days (Days Paid – Days Reported) per Person per Year, 2015–2020	
	Median	Mean
Army National Guard	15	18
Air National Guard	0	0
Army Reserve	0	5
Air Force Reserve	0	–2
Coast Guard Reserve	–12	–12
Marine Corps Reserve	0	–7
Navy Reserve	0	4
All components combined	0	7

SOURCES: Authors' calculations using the RCCPDS and Reserve Pay File and June 2021 GRAS Monthly Edit File from DMDC.

NOTE: Population consists of all reserve members in the RCCPDS from 2015 through 2020. Days paid are calculated using monthly basic pay for active duty, reported in the Reserve Pay File, divided by the reserve component member's daily rate of pay, added up over the calendar year. Daily rate of pay is calculated from inactive duty data: basic pay for IDT divided by the number of drill periods paid in that month from the Reserve Pay File. In months with no inactive duty pay, the daily rate from the most recent month is used if the pay grade and calendar year are the same. In months in which the pay grade or calendar year changed, the daily rate is imputed using the average daily rate in that month for individuals in the same pay grade. Estimated days paid are rounded to the nearest integer.

The second component is the Coast Guard Reserve, which overreports active service for most members, by about 12 days on average. Overreporting can occur when GRAS segments are not closed on time, so the service member appears to remain activated when they are not, and the pay file does not reflect those “extra” days because they were not paid out. As discussed later in this chapter, the Coast Guard Reserve has the highest proportion of *stale* segments that have been left open even after they probably should have ended.

Analyses of Data Errors

In this section, we discuss our findings regarding each of the five GRAS errors described in Table 2.3. For each error, we describe how we assessed the error, tabulate the extent of the error in the GRAS file, and discuss the likely sources of the errors and how they might be fixed.

Data Error 1: Overlapping Segments

Identification of Overlapping Segments

To assess overlapping segments, we focused on *pairs of overlapping segments submitted by the same component*. Overlapping segments submitted by different components are counted under Error 3 (terminated PNLs). We identified overlap as follows:

1. For each service member and component pair, we sorted GRAS segments by begin date, then end date, then projected end date. This sorting yielded a series of segments in chronological order.
2. We then counted segments for which the begin date is earlier than the end date of the prior segment.

For example, suppose a reservist's first segment began March 13, 2018, and ended April 8, 2018, and their second segment began April 6, 2018, and ended April 9, 2018. These segments overlap, since the records suggest that the reservist was on two different active duty segments from April 6 through April 8.

Extent of Overlapping Segments

Table 4.2 tabulates the number of overlapping segments, by component (additional component-level tabulations are provided in Appendix B). We found 14,641 pairs of overlapping segments with begin dates from January 1, 2015, to June 30, 2021. This count is of a similar magnitude to the number documented by the DoD/VA working group. The bulk of cases (12,544, or 87 percent) were submitted by the Army National Guard, which also had the high-

TABLE 4.2
Number of Overlapping Segments, by Component

Component	Instances of Overlap	Overlap Instances as Percentage of Component's Total Segments	Component's Share of All Overlap Instances ^a
Army National Guard	12,544	2.1%	86.7%
Air National Guard	95	0.00%	0.7%
Army Reserve	631	0.04%	4.4%
Air Force Reserve	617	0.03%	4.3%
Marine Corps Reserve	298	0.06%	2.1%
Navy Reserve	291	0.11%	2.0%
Coast Guard Reserve	165	0.31%	1.1%
All components combined	14,641	0.2%	

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

^a Percentages may not sum to 100 due to rounding.

est rate of overlap among any component's segments: 2.1 percent of all Army National Guard segments had some overlap with an earlier segment. For the other six components, overlapping segments numbered in the dozens to the hundreds, accounting for less than 1 percent of all segments reported by each component.

Potential Sources of and Solutions for Overlapping Segments

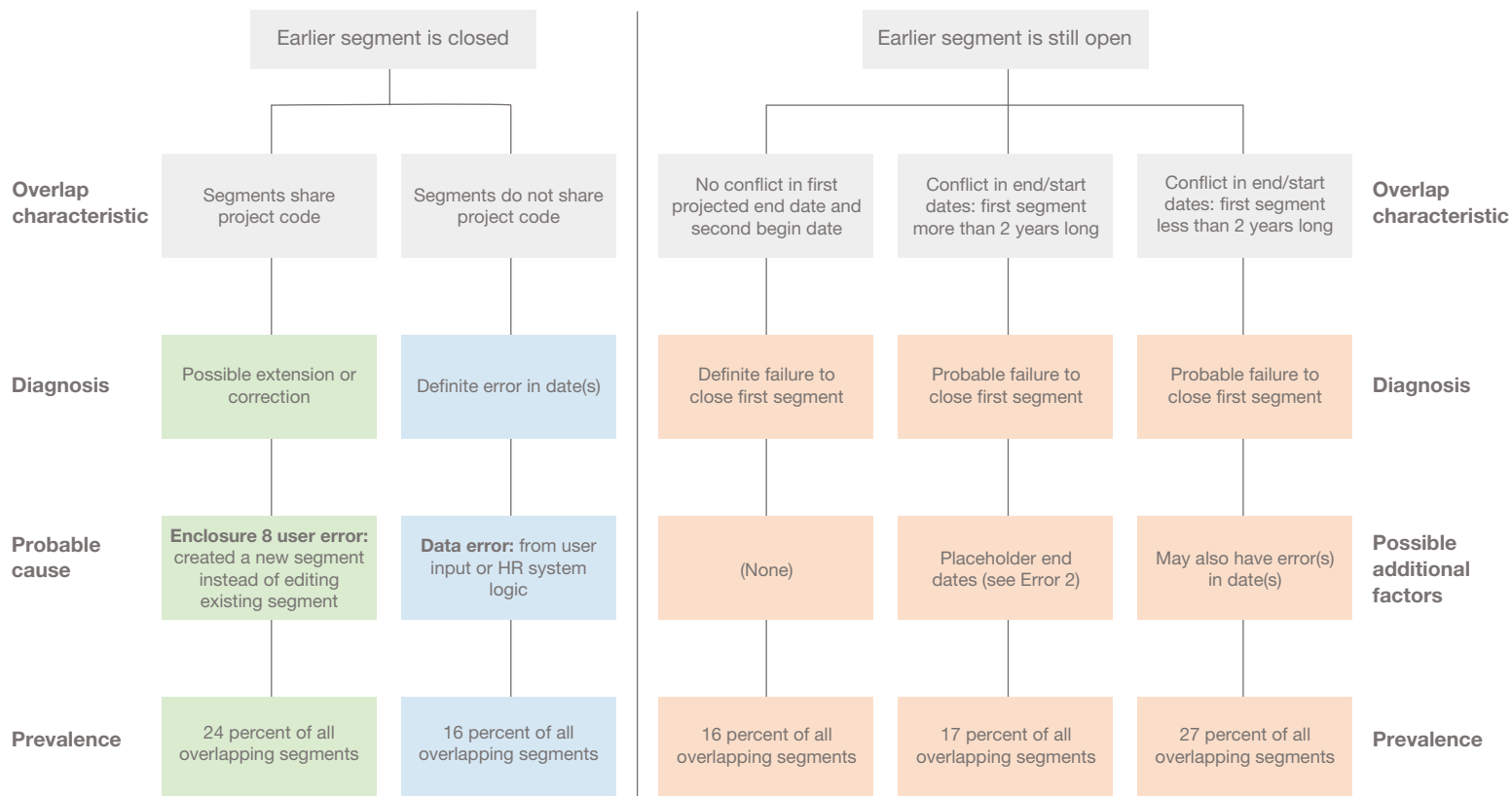
In theory, overlapping segments could be identified by the RCs and DMDC by comparing them with other segments that have been submitted. To that end, we asked each SME team about overlapping segments and whether they check for overlap as part of Enclosure 8's requirement to check validity and consistency. We learned that some check for conflicts with prior segments and some do not. DMDC does compare new segments against existing segments for overlap; when it finds an overlap error, it sends the segment back to the submitting component. The segment is not incorporated into the GRAS file until the error has been addressed. This practice is relatively recent; however, there are overlap errors in GRAS segments that began less than two years prior, suggesting that this solution does not fix all errors. Furthermore, this solution does not fix historical errors.

To be clear, all overlap errors could theoretically be caught before submitting transactions to DMDC by comparing with previously submitted segments. However, merely catching the error does not necessarily indicate the underlying reason the error exists. To help understand the original sources of the errors, we created a taxonomy of overlapping segments, categorizing them based on various characteristics, as described in Figure 4.1. We first divide instances of overlap into two broad subsets based on whether the first segment is open or closed. Among pairs for which the earlier segment is closed (40 percent of all instances of overlap), the overlap cannot be due to an unterminated segment error. Among instances for which the earlier segment is open (60 percent of all instances), we know that overlap is associated with an unterminated segment error, so these instances will also be counted in the next section.

In the first group, for which the earlier segment is closed, the overlap itself can create issues with benefits, but the overlap is finite and not ongoing. If overlapping days are counted twice, then that could affect eligibility for benefits. For example, the person could have two days counted toward PGIB when there should be just one or could have two days' offset for disability when there should be just one.

In such cases (for which the earlier segment is closed), at least one segment has an incorrect date. We further divide this group into pairs in which the segments do and do not share a project code. If the pairs of segments do not share a project code (16 percent of all instances) the two segments represent distinct duty statuses, so either the earlier segment has an incorrect end date or the later segment has an incorrect begin date. This subset of errors suggests that orders are being submitted with incorrect information. Assuming the data management systems are pulling the information as written in activation orders, the conflict in dates must be attributable to data errors in the orders themselves. It may not be possible or efficient for units to compare every order with prior orders to double-check accuracy; but, if the com-

FIGURE 4.1
Taxonomy of Overlapping Segments



SOURCE: Author analysis of the June 2021 GRAS monthly edit file from DMDC.

ponents catch an overlap error, they could kick the order back to the unit to adjudicate the problem.

If the pairs of segments share a project code (24 percent of all instances), it is possible that these could instead be two separate activations for the same purpose, with incorrect end or begin dates, similar to the errors just discussed. But it is also possible that the second segment was meant to be an extension to or correction of the earlier segment, which would point to potential user error in editing transactions. Specifically, a new transaction (with correct dates) may have been submitted, but the original transaction (with incorrect dates) was not canceled, resulting in apparent overlap. This relates to a broader issue noted in our discussions with DMDC representatives: Components sometimes use transaction codes incorrectly. Therefore, in addition to errors in the orders being submitted by units, some of these errors may be created by the Enclosure 8 teams.

Next, consider overlap with an unterminated segment. In these cases, the unterminated segment is itself a problem, compounding the problem of overlap described above. The unterminated segment creates errors in benefits like any other unterminated segment. But when overlap is involved, there are additional compounding factors. We categorize these cases into three subgroups based on whether the overlap error would have occurred in the absence of the unterminated segment error and by the projected length of the earlier segment.

The first subgroup comprises pairs of segments for which, had the first segment been terminated as of the projected end date, there would also be no overlap error. That is, there is no conflict in the *projected* end date of the first segment and the begin date of the second segment. This group accounts for 16 percent of all instances of overlap.

The other two subgroups likely include both an unterminated segment error and an error in one or more begin or end dates. In other words, had the earlier segment been terminated as of the projected end date, there would still be overlap: either the earlier segment ended earlier than projected (but was not terminated) or the later segment has an incorrect begin date. These two subgroups are distinguished based on the length of the earlier segment. One subgroup consists of segments for which the first segment is projected to be longer than two years (17 percent of all overlap instances). According to feedback from SME discussions, the long projected length of the earlier segment may indicate that the component did not know the planned length of the segment when it began and instead used a placeholder end date: that is, the component submitted the segment as having some predefined length but did not actually believe that date to be accurate. A placeholder is reasonable, since projected end dates are technically required when submitting segments (although not every component actually fills in this field). Yet placeholders can create additional issues and data errors (see the next subsection, on unterminated segment errors, for more details). Therefore, this subgroup of errors is connected to multiple practices that may compromise data quality.

The other subgroup includes cases in which the earlier segment is projected to be shorter than two years (27 percent of all overlap instances). Placeholder end dates are less common for segments of shorter length, so they are less likely to be implicated as part of the problem.

Instead, either the earlier segment ended earlier than projected or the later segment had an error in the begin date.³

All unterminated overlap errors imply a failure to properly close out the unterminated segment. In fact, unterminated segments themselves may not be errors, as discussed further in the next subsection. However, when a new segment begins, it is clear that the unterminated segment should have been closed. Some components have a policy of closing out segments as of the projected end date, regardless of whether they have received the paperwork from the relevant unit. This policy would reduce the number of overlap errors, but it can create other errors. We discuss the auto-termination policy in the next subsection in the context of unterminated errors.

Data Error 2: Unterminated Segments

Identification of Unterminated Segments

Open or unterminated segments in the GRAS file are straightforward to identify. Any segment that is open is listed with an end date of December 31, 9999. However, not all open segments are errors because open segments include all segments that have not been closed by the components, including both (1) activations that are still in progress and (2) activations that have been completed but have not yet had the activation closed out in the GRAS file. Only the segments in the second group are errors.

We cannot distinguish segments in the first group from those in the second group. However, certain open segments are more likely to be open erroneously: Those for which the projected end date has passed but that have not yet been officially closed. We refer to these as *stale* segments.

Extent of Unterminated Segments

In the June 2021 GRAS monthly edit file (the most recent data we analyzed), stale unterminated segments were those with a projected end date on or before June 30, 2021. In total, as of June 2021, 14,309 segments were stale out of 226,978 that were open at all. Our count of stale segments is in line with that of the DoD/VA working group. Table 4.3 summarizes unterminated segments by component. As with overlapping segments, the Army National Guard accounted for the bulk of stale segments, with 79 percent. However, in proportion to its size, the Coast Guard Reserve had the highest rate of stale open segments, with 22 percent of open Coast Guard Reserve segments being stale.

Our SME discussions suggest that it may take 30 days or more to process the end of an activation, so it might not make sense to classify an open segment as erroneous until it is at least 30 days past its projected end date. To that end, Table 4.4 categorizes stale segments

³ We used a two-year threshold as a proxy for placeholder end dates based on SME discussions. Many activations with a well-defined end date (such as deployments) are at least one year, but few are planned to last for two years. We believe a two-year threshold is therefore somewhat conservative; some projected end dates that are less than two years from the start date might also be placeholders.

TABLE 4.3

Number of Stale Underminated Segment Errors, by Component, as of June 30, 2021

Component	Total Number of Open Segments	Number of Stale Open Segments (Past Projected End Date)	Percentage of Component's Open Segments That Are Stale	Component's Share of All Stale Segments
Army National Guard	110,629	11,343	10.3%	79.3%
Air National Guard	43,875	415	0.9%	2.9%
Army Reserve	34,526	931	2.7%	6.5%
Air Force Reserve	16,846	791	4.7%	5.5%
Marine Corps Reserve	7,825	207	2.6%	1.4%
Navy Reserve	11,829	311	2.6%	2.2%
Coast Guard Reserve	1,422	311	21.9%	2.2%
Total	226,978	14,309	6.3%	100.0%

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file.

NOTE: Calculations are based on segments beginning on or after January 1, 2015.

based on months since their projected end date. The table shows that, in some components (notably, the Air National Guard and Marine Corps Reserve), the bulk of underminated segments that were past their projected end date were less than 30 days old, within the grace period suggested by our SME discussions. However, in other components (especially the Air Force Reserve and Coast Guard Reserve), the bulk of stale open segments were at least one month past their projected end date. Across the components, only about one-third of stale segments were within the 30-day grace period. This means that two-thirds of stale segments *should have been closed out* if components did indeed need 30 days to process necessary paperwork. In fact, we found that a slim majority (50.5 percent) of stale segments were at least four months past their projected end date, far longer than the reasonable grace period suggested by SMEs. This finding suggests either extreme delays in processing orders or another source of the problem.

In components such as the Coast Guard Reserve, the majority of stale segments are extremely stale (more than 12 months past their projected end date). It is possible that these are historical errors but that the component has managed to largely eliminate the problem more recently. If so, that is good news. But underminated segments, however outdated, pose ongoing problems because the service member appears to be on continuous active duty into the present day.

Two practices regarding end dates are relevant for this analysis. One is the practice of using a placeholder end date in cases for which the component is unsure of the likely end date at the time the segment is submitted. Our SME discussions suggest that this practice came about because of a rule at DMDC that disallows the submission of segments with missing

TABLE 4.4**Stale Underminated Segments, by Component and Months Past Projected End Date**

Component	Less Than 1 Month Past Projected End Date ^a	1–3 Months Past Projected End Date ^b	4–12 Months Past Projected End Date ^c	More than 12 Months Past Projected End Date ^d	Total Number of Segments More Than 1 Month Past Projected End Date
Army National Guard	30.4%	19.5%	35.7%	14.4%	7,893
Air National Guard	94.7%	1.0%	1.2%	3.1%	22
Army Reserve	42.9%	6.4%	29.5%	21.2%	532
Air Force Reserve	16.6%	1.9%	78.0%	3.5%	660
Marine Corps Reserve	73.9%	4.8%	9.7%	11.6%	54
Navy Reserve	47.0%	22.2%	25.4%	5.5%	165
Coast Guard Reserve	11.9%	1.3%	5.5%	81.4%	274
All components combined	32.9%	16.6%	35.4%	15.1%	9,600

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file.

NOTE: Rows may not sum to 100 due to rounding. All calculations are based on segments beginning on or after January 1, 2015.

^a Projected end dates on or after June 1, 2021.

^b Projected end dates from April 1, 2021, to May 31, 2021.

^c Projected end dates from July 1, 2020, to March 31, 2021.

^d Projected end dates on or before June 30, 2020.

projected end dates. Placeholder end dates are often several years in the future and are often used for duty statuses such as AGR, for which there may not be a preset end date to the activation. Some component SMEs stated that the placeholder end date for certain types of duty could be as far as 20 years in the future, since they could be almost certain the member would be retired by then, but DMDC currently requires them to make a more realistic guess for the placeholder, so end dates that far in the future are not allowed.

The second practice is the automatic termination of segments once the projected end date is past. Some component SMEs reported that they terminate segments on the projected end date if they have not already received orders from the unit closing out the segment. They felt that this practice was preferable to waiting for orders to come from the units; in the end, it was deemed to produce fewer data errors than leaving segments underminated.

Both of these practices make it difficult to assess the true extent of underminated segment errors. It is possible that some underminated segments have ended, but the projected end date is so far in the future that we do not yet consider it to be a stale segment. If end dates are suf-

ficiently far in the future that they are unrealistic, even components that auto-terminate segments could leave segments open too long. For this reason, we could be undercounting the number of stale segments.

Yet the practice of auto-terminating segments could create the opposite problem: Segments that are actually still open could be incorrectly terminated in the GRAS file. This creates a category of error not identified by the DoD/VA working group: incorrectly closed segments that are actually too short, rather than too long.

Table 4.5 shows our counts of segments with projected end dates that we believe are most likely inaccurate. First, we counted segments with projected end dates at least one year in the future, our proxy for a placeholder end date. Next, we counted segments with missing projected end dates, which provide no guidance on whether a segment should have been terminated. As expected because of the DMDC rule proscribing missing end dates, missing projected end dates are very rare, with less than 1 percent of open segments having a missing end date in all components except the Navy Reserve. But distant projected end dates are common, accounting for 29 percent of all open segments. The percentage is especially large in the Navy Reserve and Air National Guard but is very low in the Coast Guard Reserve. The differences across components are at least partly explained by the different ways that components use their members: for example, different usage of AGRs.

Potential Sources of and Solutions for Unterminated Segment Errors

The source of unterminated segment errors is simple: a failure to close activation segments in a timely manner. However, it is unclear whether the ultimate responsibility to close out segments in the GRAS file should fall at the unit level or the component level. Each approach has

TABLE 4.5

Segments That May Have Placeholder Projected End Dates, by Component

Component	Likely Placeholders: Open Segments in June 2021 with Projected End Date More Than 12 Months in the Future^a	Open-Ended Segments: Open Segments in June 2021 with Projected End Date Missing
Army National Guard	26.0%	0.02%
Air National Guard	37.7%	0.14%
Army Reserve	25.7%	0.03%
Air Force Reserve	26.9%	0.52%
Marine Corps Reserve	18.1%	0.59%
Navy Reserve	43.1%	2.27%
Coast Guard Reserve	0.6%	0.45%
All components combined	29.0%	0.23%

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

^a Projected end date on or after June 30, 2022.

pros and cons, as outlined by our SME discussions, and it is not clear what policy would be best for reducing unterminated segment errors.

In most components, the ultimate responsibility for updating and closing out orders is at the unit level, where orders are processed. The prevalence of open segments that are long past their projected end date suggests that this is a common issue that would need to be addressed at the unit level. Units would either need to close out the activation or submit paperwork that extends the activation to update the projected end date.

Our SME discussions made clear that the teams at the component level who are responsible for handling data are aware of the problem. Indeed, this is why some components close out segments on the projected end date if there is no order written to modify the segment. However, this could adversely affect benefits by closing the segment when it should be open, leading to overpayment of VA disability compensation that will later need to be recouped. In fact, tours do not always end on the exact day they were projected to end, so even if the projected end date is off by just a few days, it could create errors in VA disability compensation payments. SMEs acknowledged as much but believed that automatically closing out segments created fewer errors than leaving those segments open.

We believe that automatically closing out segments might be most useful for certain types of activations, particularly for short tours, such as AT or OTD, for which the length is generally fixed and the projected end date is more likely to be correct (or, at least, to be incorrect by no more than a day or two). The practice is less likely to be useful for longer activations, such as deployments or AGR duty.

Instead, components might track unterminated segments and, after a certain grace period has expired, ask units for verification that stale segments can be terminated. This creates additional burdens for both the Enclosure 8 teams and the units, but it is a similar burden as when DMDC kicks back an error for the components to resolve. And, except for the Army National Guard, the number of unterminated errors is small and amounts to just a few per week, at most.

Data Error 3: Terminated PNLs

Identification of Terminated PNL Errors

As described in Chapter 2, the GRAS file is stored as part of DMDC's PDR, with records linked to a service member's personnel record (PNL). A PNL is opened when a person becomes a member of a particular service branch and component and closes when the service member either separates or transitions to a different service or component. Activation segments sent to DMDC are not accepted onto the GRAS file unless there is already an active PNL for that member in the same service and component. But open activation segments are not automatically closed when the PNL terminates. For example, a reservist on AGR duty could retire and their PNL would be closed. But, if the component does not submit an update to the GRAS file to close the AGR segment, it will remain open in perpetuity.

We cannot directly observe PNLs, but we can observe months in which a PNL should have been opened or closed. To do this, we use the ADMF and RCCPDS to create a longitudinal file indicating the service and component to which each member belongs in each month since January 2015 (in some months, they may not be in the military at all, e.g., due to separation). We merge this longitudinal file with activation segments in the June 2021 GRAS monthly edit file in two ways:

1. merge the person's ADMF/RCCPDS record based on the month in which the segment ended
2. merge the person's ADMF/RCCPDS record based on the month the segment ended, or June 2021 if the segment is still open.

Each GRAS segment is submitted by a particular RC. If that component does not match the ADMF/RCCPDS component in the month the segment begins or ends, then we take that as evidence of a terminated PNL.

To identify terminated PNL errors, we looked at the merged information as of the segment end date (or June 2021 for unterminated segments): As of that date, if ADMF/RCCPDS and the GRAS file show different components, then the person transitioned or separated before the segment was closed out. When the component that originally submitted the segment closed it out (if the component closed it at all), the component presumably received a PNL error from DMDC: The segment is associated with an already closed PNL. We can further distinguish from the data whether the PNL would have closed due to a transition or separation. It is important to note that our method identifies only a subset of all PNL termination errors: If both the PNL and the segment are closed on different days within the same month, then the error will not appear in the monthly edit file. Our SMEs told us that PNL errors are relatively common, so we believe that our tabulations are an undercount.

Extent of Terminated PNL Errors

Table 4.6 reports our counts of terminated PNL errors in the June 2021 GRAS monthly edit file. We found a total of 2,733 likely terminated PNL errors across all components, 2,180 of which were associated with service members who had separated and 553 of which were associated with service members who had transferred components (most of which were transfers between the Army National Guard and the Army Reserve or between the Air National Guard and the Air Force Reserve). The Army National Guard had the majority of all instances (70.4 percent), followed by the Army Reserve (10 percent) and Coast Guard Reserve (7.9 percent).

Our overall count is roughly 60 percent the size of the DoD/VA working group's count. We do not know whether the working group used the same method as we did or whether the group had access to the PDR and could observe PNL errors directly. It is also possible that some errors were identified and resolved after the working group conducted its investigation but before we commenced ours.

TABLE 4.6
Likely Terminated PNL Errors, by Component

Component in GRAS	Unterminated Segments for Separated Service Members	Unterminated Segments for Transferred Service Members	Total Likely Terminated PNL Errors ^a	Component's Share of Likely Terminated PNL Errors ^b
Army National Guard	1,683	241	1,924	70.4%
Air National Guard	27	86	113	4.1%
Army Reserve	159	114	273	10.0%
Air Force Reserve	58	52	110	4.0%
Marine Corps Reserve	19	18	37	1.4%
Navy Reserve	27	33	60	2.2%
Coast Guard Reserve	207	9	216	7.9%
All components combined	2,180	553	2,733	

SOURCES: Authors' calculations using the June 2021 GRAS monthly edit file, the RCCPDS, and the ADMF from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

^a Some segments fall into both categories.

^b May not sum to 100 due to rounding.

Additional PNL Errors Identified by Subject-Matter Experts

Our discussions with RC SMEs identified another PNL-related error: segments submitted prior to PNLs being initiated. In contrast to the terminated PNL errors just discussed, we call these *early PNL errors*. This error typically occurs when a service member enters the RC (either via direct accession or transfer) and is activated immediately or soon after entering the RC. For example, a new recruit who goes directly into IADT would have an activation that begins the same day as their PNL. This error is distinct from the PNL error discussed by the DoD/VA working group, but SMEs reported that this error is one of the most-common errors that they deal with.

To identify this error in the data, we look at the month in which GRAS segments begin. If the service member does not have a record in RCCPDS/ADMF (called “record not found” in Table 4.7) or if their record indicates that they are a member of a different component during that month (called “component mismatch”), we take that as evidence that the beginning of the activation segment was submitted prior to the initiation of the service member’s PNL. Again, because we have monthly data, we are undercounting this error and catching only the most severe instances.

Table 4.7 reports our counts of early PNL errors by component. We found a total of 18,987 likely early PNL errors, including 9,131 in which the service member was not yet found in RCCPDS/ADMF and 9,856 in which they were found in a different component. The majority

TABLE 4.7**Likely Early PNL Errors, by Component**

Component	Record Not Found	Component Mismatch	Total	Component's Share of GRAS Total
Army National Guard	733	74	807	4.3%
Air National Guard	1,518	4,967	6,485	34.2%
Army Reserve	3,101	1,674	4,775	25.1%
Air Force Reserve	719	1,630	2,349	12.4%
Marine Corps Reserve	2,120	300	2,420	12.7%
Navy Reserve	801	906	1,707	9.0%
Coast Guard Reserve	139	305	444	2.3%
Total	9,131	9,856	18,987	100.0%

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file, the RCCPDS, and the ADMF from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

were found in two components: the Air National Guard (34.2 percent of all instances) and the Army Reserve (25.1 percent).

Early PNL errors are likely to resolve themselves once the PNL is created, so they pose more of a temporary problem than the terminated PNL errors in Table 4.6. However, they may be apparent in the file even after they are resolved, given that there will continue to be misalignment between the beginning of RCCPDS records and the activation start date. Therefore, the tabulations in Table 4.7 might reflect accrued historical errors that are resolved by the time of the analysis.

Potential Sources of and Solutions for PNL Errors

Our discussions with SMEs at the RCs revealed that they cannot identify terminated PNL errors on their own. This is because the teams responsible for transmitting Enclosure 8 data do not receive copies of transfer or separation paperwork, and they typically do not have the ability to check either RCCPDS or DMDC's GRAS file on their own. Therefore, if a service member separates or transfers at about the same time that an activation ends, and the transition paperwork is processed before the activation order is closed out, the Enclosure 8 team will not know; DMDC will notify the component of the terminated PNL error.

A similar situation can generate early PNL errors. When a service member starts an activation soon after transitioning from another component, a delay in transfer paperwork could delay the initiation of the PNL record and cause the Enclosure 8 segment to be rejected. A compounding issue is the order in which DMDC syncs files: GRAS is sometimes synced before RCCPDS. If a new RCCPDS record is submitted at the same time as a new activation segment in GRAS, syncing GRAS first will create an error because the PNL does not yet exist in RCCPDS. Our SME discussions revealed that this is a known issue and is associated with new IADT segments, which begin immediately after new members enter the RC.

We learned from our SME discussions that DMDC has implemented a fix for early PNL errors: holding GRAS transactions for seven days after first being rejected due to a PNL error and attempting to resync several times in the hope that the PNL has since been initiated. This policy helps resolve early PNL errors in an automated way, but components are still notified of the error, so they may spend redundant time trying to resolve it in the meantime. This seven-day window also corrects only shorter-term errors and will not catch errors that occur due to longer delays in transfer paperwork.

A few changes to data management processes could resolve both early and terminated PNL errors. First, DMDC could ensure that it always syncs RCCPDS before syncing the GRAS file. Components could enable information-sharing between their Enclosure 8 and RCCPDS data management teams so that transfer and separation paperwork is made available in order to check Enclosure 8 segments against PNLs prior to sending the segment to DMDC. This could also enable Enclosure 8 teams to terminate active segments as of the date that a member transfers or separates, in case the activation order has not yet been processed. Finally, DMDC could allow components to check Enclosure 8 segments against existing GRAS and RCCPDS data before sending to DMDC; then, the components could identify errors on their own and resolve such errors prior to submission.

Data Error 4: Cancellations and Corrections

Identification of Cancellations and Corrections

Disappearances in our snapshot file indicate that a segment was canceled or corrected, since one or more data fields must have been changed from one month to the next. To find the corrected segment, we look for new segments that appeared in the next month that are similar to canceled segments except for a specific data field. We categorize corrections according to the information that was corrected. Because our data were a monthly snapshot of the GRAS file, we could not observe daily changes, and we do not observe the original transaction data that were submitted by the RCs. As a result, our tabulations will not include errors that were created but then resolved within the same month.

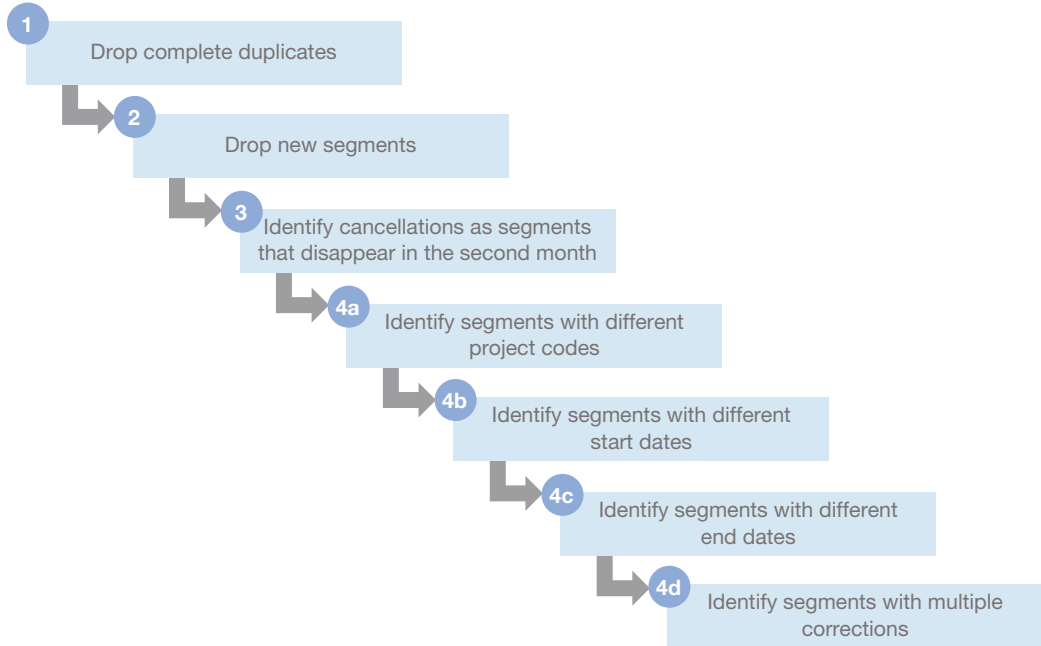
We compare the following data fields between consecutive monthly GRAS segments to identify cancellations and corrections: Social Security number, service, project code, start date, and end date.⁴ We first identified canceled segments (i.e., segments that disappear from one month to the next), then looked for segments that could be corrections. Our overall method relied on a pairwise comparison of consecutive monthly GRAS file snapshots, as illustrated in Figure 4.2.

The flowchart shows how we compared the GRAS segments from one month to the next using the following steps:

⁴ *End date* for the purposes of the cancellations and corrections analysis refers to the earlier value of the end date and projected end date.

FIGURE 4.2

Steps for Identifying Cancellations and Corrections



1. We **dropped exact duplicate observations** that do not change from one month to the next. Because the GRAS file is cumulative, the majority of segments remain in the file unchanged over time.
2. We **dropped new segments that started in the second month or later**, since these are new activations and do not suggest a conflict with historical data.
3. We identified **segments in the first month's file that disappeared in the second month**, which we label **cancellations**. These cancellations are segments for which the unique combination of Social Security number and service is present in the first month's file but not in the second month's file.
4. Finally, the remaining segments in the second month that match to a Social Security number and service pair in the first month are corrections. We categorize these corrections according to the data field or fields that change in the second month, as follows:
 - a. **A change in project code.** A new segment in the second monthly snapshot had a different project code with the same start and end date as a segment in the first month.
 - b. **A change in start date** of less than one month. A new segment in the second monthly snapshot had a start date that differs by fewer than 30 days, with the same end date and project code. We ignore changes in start date of more than

one month because the larger the difference in dates, the harder it is to justify the connection between two segments.⁵

- c. **A change in end date** or projected end date. A new segment in the second monthly snapshot had an end date or projected end date that differs from a previously canceled segment, with the same start date and project code. In this case, we excluded cases in which the segment is properly closed out and there is no error (i.e., the segments that ended on time).
- d. **Multiple corrections.** Segments that had changes to more than one attribute: project code, start date, and end date. Remaining segments that are not flagged as corrections in steps 4a to 4c had changes to multiple attributes. Because new segments with start dates in the second monthly snapshot are excluded in step 2, these remaining segments are considered corrections to segments present in the first monthly snapshot.

The first three types of corrections described in step 4 are not the only possible corrections: Any data field could, in theory, be corrected from one month to the next. But these three affect the benefits that we are interested in.

We followed these steps to tabulate month-to-month changes from January 2021 through April 2021. We learned from our sponsor that some components had large-scale corrections to systematic data errors in May and June, so these months could not be considered typical and were ignored for our analysis.

We then conducted a second tabulation, repeating the process only for segments that were closed before being canceled or edited. The second tabulation removes some edits that we believe may have been legitimate. For example, changes to the end date or projected end date of open segments could arise from extensions or adjustments to an activation rather than from an initial data error. Our two tabulations therefore provide a range of estimates. We consider the lower estimate, based on closed segments only, as *likely data errors*, and we consider the higher estimate as *potential data errors*.

Extent of Cancellations and Corrections

Table 4.8 provides our ranges of estimates for each type of correction, by component. By far, the most-common type of change was to the end date, even when considering only closed segments. End date changes accounted for 12,000 to 30,000 corrections per month, or about 75 percent to 83 percent of all edits. Outright cancellations, project code corrections, and multiple corrections were roughly equally common, occurring between 1,000 and 2,000 times each month. Changes to start dates were substantially less common, occurring a couple hundred times each month, at most. Note that our estimates of cancellation and correction errors are much lower than those estimated by the DoD/VA working group. This difference

⁵ To the extent that start dates change by more than one month, this approach will undercount the number of corrections.

TABLE 4.8**Potential Scope of Data Error 4, by Type of Cancellation or Correction**

Component	Cancellations	End Date Change	Project Code Change	Start Date Change	Multiple Errors	Total
Army National Guard	9–67	7,838–18,314	638–782	3–12	495–848	8,983–20,023
Air National Guard	97–140	2,269–5,404	879–1,129	38–48	255–385	3,539–7,105
Army Reserve	865–1,559	794–2,362	230–231	34–38	184–348	2,106–4,538
Air Force Reserve	134–164	882–2,118	3–3	87–99	226–277	1,332–2,661
Marine Corps Reserve	5–8	173–774	3–3	3–3	6–8	190–796
Navy Reserve	0–1	459–1,092	3–12	0–4	13–38	475–1,148
Coast Guard Reserve	1–1	42–105	6–6	1–1	0–1	49–114
Total	1,111–1,940	12,457–30,169	1,762–2,166	166–205	1,179–1,905	16,674–36,385

SOURCE: Authors' calculations using the January through April 2021 GRAS monthly edit files from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015. Cells reflect the average number of month-to-month changes of each type, averaged across January–February 2021, February–March 2021, and March–April 2021. Lower limits include edits only to closed segments, whereas upper limits include open segments as well.

is likely because our estimates are an average monthly rate, whereas the working group presented counts of total cases.

Potential Sources of and Solutions for Cancellations and Corrections

Edits to GRAS segments are inevitable; what is important is to ensure that the edits are not the result of initial errors and that they are submitted using the proper procedures. To that end, it is important that relevant staff are trained to use edit transaction codes rather than completely canceling a segment and resubmitting a new one; this step will minimize the likelihood that additional errors or delays are introduced in the GRAS data. Components should also verify that any automated human resources (HR) processes also submit edits using the correct procedure.

Errors in a segment's data fields could arise from several sources. First, a unit could incorrectly enter the data from an activation order into the computer system. Second, components' computer algorithms could incorrectly process information or have automation errors that read dates incorrectly or infer project codes incorrectly. Some of these errors could be eliminated through improved training and monitoring of the personnel who input orders at the unit levels and through additional validation checks of Enclosure 8 data prior to delivery to DMDC. However, it is unrealistic to expect that every order can be written without any errors whatsoever, so the data fed into HR systems will inevitably have some mistakes. Therefore,

components should invest in data verification and validation procedures that will catch as many errors as possible in a systematic way. Components may not be able to independently verify the start and end date of every order, but (as noted previously) they could more thoroughly compare project codes and statute codes.

Data Error 5: Misreported Project Codes

Identification of Misreported Project Codes

The last type of data error discussed by the DoD/VA working group relates to incorrect project codes. We refer to these as *misreported* rather than using the working group's term *misclassified* because we believe most of these segments were not reported, but we leave open the possibility that some were being reported under the wrong code. This type of error is difficult to assess. When project codes are reported incorrectly, even the SMEs responsible for managing Enclosure 8 data cannot catch every case. To do so, they would need to verify that every order was submitted with the correct statute code, which is a process that can only be implemented at the unit level.

Instead of providing comprehensive tabulations of misreported project codes, we look for evidence that specific types of project codes are not being used correctly. Because project codes are inferred by Enclosure 8 teams and are not part of the orders submitted by units, errors in calculating or reporting project codes should be systematic and not caused by idiosyncratic differences across units in how they process orders. Therefore, when the occurrence of a project code is very different in one component from the rest, that is cause for further investigation.

We focus on two project codes for which we know either the typical length of a segment or the typical number that should occur each year: the project codes for AT (A21 or B21) and the project code for IADT (A20).

Every drilling reservist is supposed to serve AT in each calendar year.⁶ For each component, we used RCCPDS merged to the June 2021 GRAS monthly snapshot and counted the number of drilling reservists who had at least one AT segment in each full calendar year since 2015. We ignored the length of AT segments, because length is not necessarily informative, for multiple reasons.⁷ We would not expect the average to be 100 percent, since some reservists will not serve AT: For example, they could be deployed all year, they could join the component late in that year, or they could be excused from AT for another reason.

⁶ Drilling reservists are members with RCC/TRC code "SA" and include drilling unit reservists and military technicians assigned to a unit. Other reservists may also serve in an annual training duty status but are not necessarily required to do so. See DoD Instruction 1215.06, 2022.

⁷ The typical required length is 14 days, although this time does not have to be served consecutively, and some people may serve more or less than the minimum, for numerous reasons. We also learned from SMEs that some components submit consecutive 14-day activations as two segments of seven days each so that pay for the first week can be received sooner.

Next, we looked for missing reports of IADT. Every trainee, or non-prior-service reservist who has just entered the reserves, should have one activation for IADT. We counted trainees in RCCPDS who did *not* have any IADT reported in the GRAS file.⁸

Note that these analyses are not directly comparable to those of the DoD/VA working group because the working group did not evaluate unreported segments. The working group did find that the Marine Corps used the code for OTD instead of AT, but those mistakes were corrected by the time we looked at the data. So, our analyses supplement the working group's but do not serve as a comparison.

Extent of Misreported Project Codes

Table 4.9 tabulates our findings. Column 1 reports the average percentage of drilling reservists listed in the RCCPDS who did *not* have an activation in GRAS for AT in a given calendar year. It is clear that AT is almost *never* reported in some components, and this is clearly wrong. Our tabulations show, in particular, that the Army National Guard virtually never reports activations for AT, with 99.9 percent of drilling reservists lacking an AT segment from calendar years 2015 to 2020. The Navy Reserve lacks a report of AT for 96 percent of reservists each year. In the other components, the percentage of reservists without an activation for AT is between 18 percent and 42 percent. We cannot verify these percentages as correct, but they do not suggest systematic reporting issues.

Column 2 of Table 4.9 reports the number of likely misreported AT segments, under the assumption that all drilling reservists should perform AT. This should be considered an upper bound; however, even if just 60 percent of drilling reservists served AT every year, that still amounts to hundreds of thousands of misreported segments for the Army National Guard and tens of thousands of missing segments for the Navy Reserve. Assuming each AT stint is 14 days long, the total number of misreported days would amount to 4.6 million per year for the Army National Guard and 560,000 per year for the Navy Reserve, explaining the majority of the underreported days in Table 4.1.

In fact, although we cannot say for certain that every misreported AT segment is completely missing from the GRAS file, we were told by Army National Guard representatives that they do not report segments shorter than 30 days. And the comparison with the Reserve Pay File (see Table 4.1) corroborates the conclusion that most (if not all) misreported AT segments are missing completely.

Column 3 of Table 4.9 reports the average fraction of trainees with no IADT in calendar years 2015 through 2020. As was true of AT, some components appear to systematically underreport IADT. We found that 80 percent of trainees in the Army Reserve do not have a reported activation for IADT; in other components, the percentage ranges from 4 percent (in the Marine Corps Reserve) to a high of 37 percent (in the Air National Guard).

Column 4 reports the number of likely misreported IADT segments, under the assumption that every trainee must perform IADT. Because the Army National Guard is the largest

⁸ Trainees are members with RCC code "U." See DoD Instruction 1215.06, 2022.

TABLE 4.9

Misreporting of Annual Training and Initial Active Duty for Training, by Component

Component	Drilling Reservists with No AT in a Calendar Year, 2015–2020 ^a		Trainees with No IADT, 2015–2020 ^b		Total Number of Likely Missing or Misreported AT and IADT Segments, 2015-2020
	1. Percentage of Drilling Reservists in RCCPDS	2. Number of “Missing” AT Segments	3. Percentage of Trainees in RCCPDS	4. Number of Missing IADT Segments	
Army National Guard	99.9%	1,081,391	30.0%	67,143	1,148,534
Air National Guard	32.9%	164,993	37.0%	12,138	177,131
Army Reserve	40.2%	325,387	81.6%	58,193	383,580
Air Force Reserve	18.7%	61,555	26.8%	5,167	66,722
Marine Corps Reserve	41.4%	73,721	4.3%	1,381	75,102
Navy Reserve	96.0%	241,485	27.6%	4,033	245,518
Coast Guard Reserve	29.7%	11,515	9.4%	103	11,618
All components combined	61.4%	1,960,047	37.5%	148,158	2,108,205

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015. Missing AT segments are calculated based on the assumption that all drilling reservists should perform AT every year; missing IADT segments are calculated based on the assumption that all trainees should perform IADT. Missing segments may be unreported completely or could have been reported under another project code. See the text for a discussion of how these are upper-bound estimates to give a sense of the order of magnitude.

^a Drilling reservists have RCC/TRC code “SA.”

^b Trainees have RCC code “U.”

component, it has the largest number of likely misreported IADT segments, although only 30 percent of Army National Guard trainees have no reported IADT. Again, these should be considered overestimates, since some trainees may not have been required to perform IADT; even still, the difference in percentage between the Army Reserve and the other components suggests the Army Reserve is underreporting tens of thousands of IADT segments.

Unlike with AT, we are not easily able to conclude that misreported IADT segments are truly missing from the GRAS file. It is possible that some IADT segments are misreported. For example, among trainees with no IADT reported, we found some segments of about 100 days, roughly the same length of time as we expect IADT to be performed, but with the project code for OS duty. It seems unlikely that a trainee would be on OS duty for that long, especially without also being on IADT. These could be project code errors, but we cannot be certain.⁹

Potential Sources of and Solutions for Misreported Project Codes

During our SME discussions, we found three sources of misreported project codes.

First, we learned that some segments do not get submitted to DMDC at all and therefore are never recorded in the GRAS file. In one component, segments that are not part of a consecutive period of at least 30 days of active duty service are systematically omitted from reporting because those segments do not affect TRICARE eligibility. This means that most AT will be excluded, along with other types of ADT and some types of ADOT. Although it is true that such segments do not affect TRICARE eligibility, they are relevant for VA disability compensation and, possibly, for PGIB. This type of misreporting is remedied by ensuring that all RCs adjust their reporting policy to align with the requirements of DoD Manual 7730.54. The requirements state that all segments of active service must be reported, regardless of segment length.

The second source of misreported project codes is incorrect data entry when processing orders. As with the other errors already discussed, units need to enter data correctly if the information is going to be reflected correctly in the component's Enclosure 8 submissions. In this case, additional validation checks could be implemented, both by the components and by DMDC, to flag possible errors related to combinations of project codes, RCC/TRC codes, component, length of activation, or other factors.

However, the systematic errors identified in Table 4.9 imply that the data processing procedures used by the components are a third source of errors. Although the SMEs we spoke with generally pointed to the individual units as sources of errors, systematic misuse of project codes cannot be attributed to the unit-level staff who process orders. Components expressed confidence in their automated systems, but some noted that they have found logic errors in their code, and they admit that there may be other errors that have not yet been detected.

⁹ We could also find segments of exactly 14 or 15 days among reservists with no annual training reported, which had the project code for something besides AT. But, given our discussions with Army National Guard representatives, we know that misclassified project codes are the exception and not the rule for AT.

We suggest that components conduct a thorough audit of their HR systems to ensure that all relevant information is being used to determine appropriate projects codes (in particular, the statute code, the length of an activation, and the member's RCC/TRC code). In terms of benefits, incorrect project codes can affect PGIB eligibility, since only certain project codes are counted toward PGIB and can affect post-activation eligibility for TRICARE.

In fact, the analyses we performed to analyze project code errors could be adapted by the units. For instance, components could check that individuals with RCC/TRC codes of "U" (indicating trainees) are not activated for any reason other than IADT. The components could further check that a project code for AT is not associated with a suspiciously long segment, perhaps any period longer than 20 days. The components and DMDC could also implement annual audits to look for members who did or did not perform certain types of duty that they would be expected to perform: for instance, trainees without an activation for IADT and drilling reservists without an activation for AT.

Errors Other Than Those Reported by DoD/VA Working Group

In the course of assessing the five errors discussed by the DoD/VA working group, we discovered additional errors in GRAS data. Some of these errors were evident from the GRAS monthly snapshots, and others were disclosed to us by SMEs.

End Dates Earlier Than Begin Dates

We counted 173 segments in GRAS for which the end date is earlier than the begin date, resulting in segments that cannot be used to determine benefits eligibility.¹⁰ Such errors are rare and may be due to incorrect data entry. Despite their rarity, it should be easy to check for such errors by calculating segment length: Any period shorter than one day should be kicked back to the component or the unit to fix. To our knowledge, neither the components nor DMDC currently conduct such checks.

Interrupted AGR Duty During Deployment

We learned from SMEs that DMDC requirements for personnel tempo (PERSTEMPO) tracking can interfere with GRAS records for long-term activations, especially AGR duty. DMDC requires that all deployed members be tracked in GRAS using a contingency project code. For AGRs who are deploying with their regular component units, the component must terminate the AGR segment and open a new segment for the deployment. But this does not align with the underlying orders: From the component's point of view, the member is on AGR duty even

¹⁰ Thirty-five percent of segments with end dates earlier than begin dates were for activations beginning in 2021, 47 percent were for activations beginning in 2020, and the rest were for activations beginning in 2019 or earlier.

during the deployment. Once the deployment is over, the contingency segment is terminated, but a new AGR segment is not opened because there are no new orders to initiate it. HR personnel must manually track these AGRs and override the automated system to ensure that the member's active service is reported correctly. If the manual override does not happen, AGRs who return from deployment may not be tracked in GRAS; as SMEs reported, AGRs sometimes lose TRICARE benefits until the GRAS reporting is corrected. Such errors could be prevented by building an automated system to track deployed AGRs (and anyone else who might be affected by the PERSTEMPO reporting requirements) and automatically reinstate predeployment activation segments after deployments end.

Reporting Activations for Reservists Counted Toward Active End Strength

Finally, SMEs told us that components sometimes submit Enclosure 8 segments for reservists who count toward active end strength. This occurs when a member of the RC is tracked by the ADMF rather than RCCPDS under a particular active strength accounting code, per DoD programming and accounting guidance.¹¹ For example, some members on extended OS duty (at least 1,095 of the previous 1,460 days or, equivalently, three of the past four years) must be counted toward active component end strength, depending on the source of funding.¹² There are also certain categories of individuals outside of active component force structure who count toward active component end strength, such as some students, cadets, or trainees.

As of October 2022, there were more than 4,000 reserve members with an active strength accounting code.¹³ These members are on active duty under specific orders, like any other activated reserve member. But if their component submits a GRAS segment associated with those orders, DMDC sends the segment back to the component and does not incorporate it into the GRAS file. To our knowledge, this type of error should not affect benefits administration because the member should be compensated as though they are full-time active duty. But the system does create inconsistencies in terms of tracking reserve utilization: The GRAS file cannot be considered a comprehensive account of all activated reserve members. In addition, kicking back segments for such members takes time and effort to adjudicate. A potential solution would be to adjust DMDC's definitions of PNLs to allow for GRAS segments to be reported for reserve members tracked in the ADMF.

¹¹ DoD Instruction 1120.11 details the programming and accounting guidance (DoD Instruction 1120.11, Programming and Accounting for Active Component (AC) Military Manpower, U.S. Department of Defense, March 17, 2015). DoD Manual 1336.05 lists the strength accounting codes (DoD Manual 1336.05, *Defense Manpower Data Center Domain Values for Military Personnel Data Extracts*, U.S. Department of Defense, July 28, 2009, change 2, May 17, 2019).

¹² Tabulations provided by the Office of the Secretary of Defense.

¹³ Tabulations provided by the Office of the Secretary of Defense.

Summary

In this chapter, we analyzed each of the five error types identified by the DoD/VA working group on information-sharing. We tabulated the frequency of each error type by component and discussed why these errors might exist based on the data analysis and discussions with SMEs. These discussions inform our recommendations for ways to reduce errors in RC activation data (described in Chapter 6). We also described errors uncovered as part of our analysis, including end dates that begin prior to start dates, interrupted AGR duty during deployments, and reporting activations for reservists counted toward active end strength.

Table 4.10 provides a summary of our tabulations by error type. Errors related to overlapping segments, unterminated segments, terminated PNL errors, and cancellations and corrections represent a very small number of overall segments, with each error amounting to no more than 0.5 percent of total segments. In contrast, we estimate that there are more than 2.1 million missing or misreported AT or IADT segments. Although most of these errors affect a small number of segments, the effect of these errors on RC members may be significant. In the next chapter, we investigate how these errors affect certain RC benefits, including VA disability compensation, qualification for PGIB, and eligibility for TRICARE.

TABLE 4.10
Summary of GRAS Data Errors, as of June 2021

Component	Total Number of Segments	Overlapping Segments	Unterminated Segments	Terminated PNLs	Cancellations and Corrections ^a	Misreported AT or IADT Segments ^b
Army National Guard	598,384	12,544	11,343	1,924	8,983–20,023	1,148,534
Air National Guard	1,977,927	95	415	113	3,539–7,105	177,131
Army Reserve	1,799,705	631	931	273	2,106–4,538	383,580
Air Force Reserve	1,826,141	617	791	110	1,332–2,661	66,722
Marine Corps Reserve	538,077	298	207	37	190–796	75,102
Navy Reserve	270,263	291	311	60	475–1,148	245,518
Coast Guard Reserve	52,423	165	311	216	49–114	11,618
Total	7,062,920	14,641	14,309	2,733	16,674–36,385	2,108,205

SOURCE: Authors' calculations using DMDC data.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

^a This column reports the potential number of errors per month rather than the total number of errors overall.

^b *Misreported* indicates segments are either missing (unreported) or reported under the wrong project code. This column reports calculations for two duty statuses for which we can approximate the expected amount of service. The numbers indicate the sum of the number of drilling reservists who have no activation for AT during a calendar year and the number of trainees who do not have an activation for IADT, from 2015 through 2020.

Before we assess the extent to which errors affect benefits, we summarize in Table 4.11 the ways in which each major type of error could theoretically affect benefits and why it is important to correct the errors.

TABLE 4.11
Possible Effects of Data Errors on Benefits

Type of Error	Description	Possible Benefits Affected
Errors Analyzed by DoD/VA Working Group		
Overlapping segments	GRAS segment begins before a previously opened segment was closed (the earlier segment may still be open)	• VA disability: May be underpaid if overlap is double counted • PGIB: Overcalculation of eligibility if overlap is double counted • TRICARE: May be incorrectly eligible because overlap causes an overcount of days
Unterminated segments	GRAS segment was projected to have ended already, but segment is not officially closed	• VA disability: Underpaid because lack of termination turns off benefits until segment is closed • PGIB: Overcalculation of eligibility; member continues to accrue eligibility until segment is closed • TRICARE: Eligibility mistakenly turned on until segment is closed
Terminated PNLs	PNL is closed due to separation or transition, but a GRAS segment remains open	• VA disability: Underpaid because lack of termination turns off benefits until segment is closed • PGIB: Overcalculation of eligibility; member continues to accrue eligibility until segment is closed • TRICARE: Eligibility mistakenly turned on until segment is closed
Cancellations and corrections	GRAS segment is canceled due to a change or error, but new or corrected segment is not entered immediately	• VA disability: Delay in correction may cause temporary miscalculation of benefits, resulting in recoupment later • PGIB: No long-term effect • TRICARE: Delay in correction may cause temporary problems establishing eligibility and accessing health care
Misreported project codes	GRAS segment is coded with incorrect project code indicating wrong duty status or is unreported altogether	• VA disability: Unreported segments cause overpayment because VA cannot offset disability compensation properly. Incorrect project codes have no effect. • PGIB: Unreported segments cause undercalculation of eligibility if they would otherwise be eligible for PGIB. Misclassified project codes cause incorrect calculation of eligibility if one project code is eligible for PGIB but the other is not. • TRICARE: Unreported segments prevent member from accessing TRICARE if the segment lasts more than 30 days. Incorrect project codes can affect post-activation eligibility for TRICARE.

Table 4.11—Continued

Type of Error	Description	Possible Benefits Affected
Other Errors		
Interrupted AGR duty	AGR segment terminated during deployment was not reinitiated after deployment	• VA disability: Overpayment of benefits because member no longer appears to be on active duty • PGIB: Undercalculation of eligibility because member no longer appears to be on active duty • TRICARE: Lack of access to TRICARE Prime because member does not appear to be on active duty for at least 30 days
“Negative length” segment	Segment end date predates segment begin date	• VA disability: Overpayment of benefits because VA cannot correctly offset benefits to account for this service • PGIB: Undercalculation of eligibility because the number of days of service cannot be calculated • TRICARE: Lack of access to TRICARE Prime if segment was supposed to last more than 30 days
Member not tracked in RCCPDS	Reserve member is tracked in ADMF rather than RCCPDS, so segment is not accepted as part of GRAS file	• No known effects on benefits

The Effect of Data Errors on Benefit Administration

The tabulations in Chapter 4 show the extent of various errors in the GRAS file. Yet some errors affect benefits, and some do not. In this chapter, we connect the errors to benefits eligibility to understand how these data errors affect reserve members by assessing the extent to which each type of error actually affects VA disability compensation, PGIB eligibility, and TRICARE eligibility.

VA Disability Compensation

Identifying Activations That Affect VA Disability Compensation

To understand the potential overpayment or underpayment of VA disability benefits resulting from each of the data errors, we use information about disability rating from the VA Compensation and Pension File. We counted a reserve member as disabled if they had a disability award prior to an active duty segment by comparing the earliest disability award in the VA Compensation and Pension File with each active duty segment's start date. The corresponding disability rating would be the rating from that disability award. For example, suppose a reservist's first recorded disability award was dated January 1, 2018, with a rating of 10 percent. We would then assume they were eligible for VA disability compensation during any activation on or after that date (with a rating of 10 percent) and not eligible during activations that started prior to that date. To match unreported segments to possible VA disability eligibility, we assumed that members with misreported AT or IADT segments (as tabulated in Table 4.9) would be eligible for VA disability compensation if they had a disability award date prior to the year with the unreported segment.

Disability Ratings Among Activated Reserve Component Members

Table 5.1 provides summary statistics on the disability ratings of RC members who had a disability award prior to at least one active duty segment beginning on or after January 1, 2015, or who were identified as having a misreported AT or IADT segment. There were 105,000 RC members activated since 2015 who had a disability rating, or about 11 percent of all activated

TABLE 5.1**Disability Statistics for Reserve Component Members with Active Duty Segments Beginning January 1, 2015 or Later**

Component	Mean Rating (if >0)	Median Rating (if >0)	Number of Disabled Reservists	Percentage of Disabled Reservists
Army National Guard	37	30	20,503	6%
Air National Guard	35	30	11,940	8%
Army Reserve	47	40	39,470	18%
Air Force Reserve	37	30	15,014	14%
Marine Corps Reserve	43	40	6,262	8%
Navy Reserve	40	40	10,853	14%
Coast Guard Reserve	42	40	1,269	13%
All components combined	41	40	105,311	11%

SOURCE: Authors' calculations using the VA Compensation and Pension file from DMDC, among individuals who appeared in the June 2021 GRAS monthly edit file with a segment start date of January 1, 2015, or later or who are identified as having a misreported AT or IADT segment.

NOTE: A reservist is disabled during an activation if the earliest disability award in the VA Compensation and Pension File was dated prior to when the segment begins.

reservists during that time.¹ Across the services, the percentage of reservists with a disability rating ranged from 6 percent in the Army National Guard up to 18 percent in the Army Reserve. In all components combined, the mean and median disabled RC member has a disability rating of 41 percent and 40 percent, respectively. Across the components, the mean disability rating varies from 35 percent to 47 percent; the median disability rating varies from 30 percent to 40 percent.

Discrepancy Between Reported Active Duty Days and Paid Active Duty Days Among Disabled Reserve Component Members

First, we examined the average overall discrepancy between days paid and days reported in the GRAS file, for each year from 2015 through 2020. The results are shown in Table 5.2, which can be compared with the full sample results in Table 4.1. The per-person differences are similar among disabled members as in the full sample. Again, the median difference is zero among most components. The exceptions are the Army National Guard, which under-reports 26 active duty days on average, and the Coast Guard Reserve, which has an average overreporting of 12 days.

¹ There are fewer than 100 reservists with a disability award who have a 0 percent disability rating.

TABLE 5.2**Summary Statistics of the Difference in Paid Versus Reported Days for Disabled Reserve Component Members**

Component	Difference in Paid vs. Reported Days (Days Paid – Days Reported) per Disabled Member per Year, 2015–2020	
	Median	Mean
Army National Guard	18	26
Air National Guard	0	2
Army Reserve	0	0
Air Force Reserve	0	–1
Coast Guard Reserve	–12	–12
Marine Corps Reserve	0	–10
Navy Reserve	0	11
All components combined	0	5

SOURCES: Authors' calculations using the RCCPDS, Reserve Pay File, June 2021 GRAS monthly edit file, and VA Compensation File from DMDC.

NOTE: See notes to Table 4.1 for details on calculations.

The aggregated discrepancies in Table 5.2 are informative because they combine the effects of several errors that would affect VA disability compensation: specifically, untermi-nated segments, canceled segments, and unreported segments. (Overlap and PNL errors do not necessarily cause errors in the number of reported days unless they are associated with an untermi-nated segment.) We disaggregate the effect of each in the next section.

Extent of Data Errors Among Disabled Reserve Component Members

To determine the degree to which data errors occur among disabled reservists, we retabulated GRAS errors among those segments using the same methods as in Chapter 4 to determine the percentage of segments with errors attributed to disabled reservists. Table 5.3 shows the percentage of segments with errors that are attributed to service members who were eligible for VA disability payments.² The first column of the table shows the total percentage of all segments (not just those with data errors) that are served by reserve members with a disability rating: 11.8 percent of segments in all components combined. Across the services, the total percentage is the lowest for the Army National Guard, at 6.2 percent, and highest for the

² VA excludes AT from its return to active duty disability compensation analysis. We include AT in Table 5.3 to report the full effects of data errors on disability compensation.

TABLE 5.3

Percentage of Data Errors Attributed to Disabled Reserve Component Members

Component	All Segments Beginning Since January 1, 2015 ^a	Overlapping Segments	Unterminated Segments	Terminated PNLs	Canceled or Corrected Segments ^b	Misreported AT ^c	Misreported IADT ^c
Army National Guard	6.2%	8.2%	7.1%	4.0%	8.2%	7.3%	5.1%
Air National Guard	6.8%	4.2%	7.0%	8.0%	7.3%	5.9%	2.3%
Army Reserve	17.8%	22.2%	16.2%	7.0%	10.7%	15.6%	0.7%
Air Force Reserve	13.0%	15.9%	13.0%	6.4%	11.7%	10.3%	0.8%
Marine Corps Reserve	10.3%	15.4%	11.6%	0.0%	7.6%	6.8%	0.6%
Navy Reserve	15.4%	17.9%	15.1%	0.0%	10.1%	14.2%	0%
Coast Guard Reserve	11.0%	11.5%	3.9%	0.9%	16.2%	8.7%	1.0%
All components combined	11.8%	9.5%	8.2%	4.1%	8.7%	9.5%	2.8%

SOURCE: Authors' calculations using DMDC data.

NOTE: All calculations are based on segments beginning on or after January 1, 2015. A reservist is disabled during an activation if the earliest disability award in the VA Compensation and Pension File was dated prior to when the segment begins.

^a These percentages do not account for reservists with misreported AT and IADT.

^b Percentages are based on the upper bound provided in Table 4.8 and are interpreted as the percentage of cancellations or corrections each month. Results are similar when using the lower bound.

^c The percentages of unreported segments are based on totals in Table 4.9 and are interpreted as percentages of all unreported segments each year.

Army Reserve, at 17.8 percent.³ These differences reflect the differences in the overall percentage of members who had a disability rating (Table 5.1).

The other columns show analogous percentages among segments with data errors. For each type of error, a minority of segments are associated with disabled members, ranging from as low as 2.8 percent of misreported IADT and as high as 9.5 percent of overlapping segments and misreported AT.

Approximate Effect of Data Errors on VA Disability Benefits

To calculate the effect of errors on actual benefits earned, we benchmark against 2022 disability compensation rates. The 2022 minimum VA disability compensation rate for someone with a 40 percent disability rating, which is approximately the mean disability rating reported in Table 5.1, is \$673.28 per month, or \$22.44 per day, which would be a lower bound on the overpayment or underpayment for one misreported day of active service. Assuming the annual discrepancies in Table 5.2 remain accurate today, there are an estimated aggregate 500,000 days underreported in the GRAS each year, resulting in a minimum of \$11.2 million in VA disability compensation being paid to reserve members that should have been withheld.

However, as noted in Chapter 2, VA makes two disability compensation adjustments: once based on the GRAS file for active duty days and once based on annual DoD reports for drill pay. We cannot determine how, if at all, GRAS errors affect final pay adjustments because we do not know the basis for delivering data and adjudicating service member disagreements. For example, if DoD delivers an annual report to the Veterans Benefits Administration (VBA) with active duty days based on the GRAS file, then those data may contain the same errors as the data VBA would have obtained from VADIR. If instead DoD reports days based on the Reserve Pay File, the totals may not align. After calculating drill pay adjustments, VBA notifies reserve members of the proposed adjustment, and the member can provide evidence that VBA's total is incorrect. Again, the final adjustment may depend on whether the evidence comes from orders, from pay data, or from GRAS records.

Qualification for the Post-9/11 GI Bill

As described in Chapter 2, receipt of benefits under PGIB requires at least 90 days of qualifying active service; whether active service qualifies depends on the statute under which the activation occurred. Minimum eligibility of prior service reservists should be near-universal because of their time spent in the active component. Non-prior-service reservists, however, may not be eligible if they do not serve in a duty status other than IADT or AT (see Table 2.1 for a list of qualifying activation authorities).

³ These percentages do not account for reservists with misreported AT and IADT.

Because the level of eligibility is determined by the length of time served under specific statutes, establishing more than a minimum level of qualification for PGIB could be affected by data errors. In particular, overlapping segments, unterminated segments, and PNL errors affect the length of time reservists are reported to serve on active duty. Eligibility can also be affected by incorrect statute codes, which could misclassify qualifying active service as non-qualifying active service, or vice versa.

Effects of Overlapping Segments, Unterminated Segments, and Terminated PNL Errors

To estimate the extent to which the first three types of data errors affect PGIB eligibility, we identify which errors occur for members with fewer than 90 days of PGIB-eligible service after excluding the segment with the error.⁴ In other words, we count the number of members for whom a segment with an error is critical in reaching the 90-day threshold. These tabulations tell us how many segments could cause reservists to incorrectly qualify for PGIB by leading to an overcount of PGIB eligible days.

Some of these members will already have established eligibility, since we do not observe activations prior to 2015, and we do not observe prior service in the regular component in the extract obtained from DMDC. Many of these members will also go on to establish eligibility later, if they are activated sufficiently often in the future. Therefore, our results overestimate the relevance of errors and provide a worst-case scenario for the number of service members whose PGIB eligibility will be affected by data errors.

Table 5.4 shows the results. Although a minority of overlapping segments are for reserve members who might have their PGIB eligibility affected by the error, more than half of unterminated segment errors and almost three-quarters of likely terminated PNL error segments are for reserve members with fewer than 90 days of qualifying PGIB service. Regarding overlapping segments, we estimate that 15.8 percent of overlapping segments, or about 2,300 overlapping segments, are for reserve members who might have their PGIB eligibility affected by the error. This percentage varies across the components, from as low as 3.7 percent for the Air Force Reserve to as high as 29.2 percent for the Marine Corps Reserve. Just over half of unterminated segments (or about 7,350) are for reserve members who have fewer than 90 days of qualifying PGIB service. Across the services, the percentage varies from 27.7 percent for the Air National Guard to 69.8 percent for the Coast Guard Reserve. The largest number of segments for members whose PGIB eligibility might be affected by unterminated segments are in the Army National Guard, with about 6,200 segments. For likely terminated PNL errors, we estimate that 73.9 of these segments are for reserve members whose PGIB eligibility might be affected by this error. Across the services, the percentage ranges from 30.9 percent for the

⁴ To conservatively estimate PGIB eligible service, we also exclude AT and IADT from the count of PGIB eligible service days, since AT and IADT are not counted for members who serve fewer than 18 months in other duty types unless they are discharged for a service-connected disability, as described in Table 2.2.

TABLE 5.4

Number and Percentage of Segments for Reservists Who Have Fewer Than 90 Days of Qualifying PGIB Service, by Error Type

Component	Overlapping Segments (Error 1)		Unterminated Segments (Error 2)		Terminated PNLs (Error 3)	
	Number of Segments	Percentage of Error 1 Segments	Number of Segments	Percentage of Error 2 Segments	Number of Segments	Percentage of Error 3 Segments
Army National Guard	2,070	16.5%	6,172	54.4%	1,587	82.5%
Air National Guard	8	8.4%	116	28.0%	41	36.3%
Army Reserve	47	7.4%	296	31.2%	126	46.2%
Air Force Reserve	12	1.9%	176	22.3%	29	26.4%
Marine Corps Reserve	85	28.5%	106	51.2%	25	67.6%
Navy Reserve	21	7.2%	156	51.2%	31	51.7%
Coast Guard Reserve	21	12.7%	208	66.9%	170	78.7%
Total	2,264	15.5%	7,230	50.5%	2,009	73.5%

SOURCE: Authors' calculations using June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

Air Force Reserve up to 82.6 percent for the Army National Guard. Again, the largest number of segments for reservists who have fewer than 90 days of qualifying PGIB service (1,589) are in the Army National Guard.

Effects of Misreported Project Codes

As noted in Chapter 4, we are easily able to identify only underreporting of certain project codes, such as those for AT and IADT, which should have a certain amount of reporting in every year. AT does not qualify for PGIB, anyway, but IADT does. The length of IADT can vary, but non-prior-service reservists could qualify for PGIB based on IADT alone if it is at least 90 days in length. Nonreporting of IADT will therefore lead to errors in which a reservist is erroneously classified as ineligible for PGIB, rather than the situations tabulated in Table 5.4, in which errors mistakenly classify a member as eligible. The estimates of reservists with misreported IADT in Table 4.9 (column 4) provide an upper-bound estimate of the number of reservists whose PGIB eligibility could be affected. At most, 148,158 reservists (or about 38 percent of trainees) could be ineligible for PGIB because of misreported IADT service, most of whom come from the Army National Guard (67,143 reservists) and the Army Reserve (58,193).

Eligibility for TRICARE

As described in Chapter 2, reservists and their dependents qualify for TRICARE during any period in which the reservist is on active duty for more than 30 continuous days. TRICARE eligibility could therefore be affected by any error that changes the reported length of an activation. Errors can affect both the intensive and extensive margin of eligibility. For example, an error that reports a 180-day segment as 150 days would reduce eligibility by 30 days (the intensive margin). An error that reports a 31-day segment as 29 days would eliminate eligibility altogether (the extensive margin).

We analyze overlapping segments (error 1), unterminated segments (error 2), and PNL errors (error 3) to assess how they affect eligibility. Although misreported segments (error 5) can also affect TRICARE eligibility, we omit them from the analysis because we cannot determine how, if at all, they affect eligibility. Although we can guess how many segments are completely unreported, we do not know the dates, so we cannot assess whether they affect TRICARE. Most AT segments, for example, would be shorter than 30 days on their own. Segments with incorrect project codes can also affect TRICARE eligibility after the activation ends because, as noted in Chapter 2, members and dependents are eligible for 180 days of TRICARE coverage after the activation ends if the reservist was activated for a preplanned

mission, in support of a contingency operation, or in support of the government COVID-19 response (Tricare.mil, undated).⁵

We also omit cancellations and corrections (error 4) from the TRICARE eligibility analysis. Corrections can affect eligibility if the begin or end dates are being adjusted and may affect TRICARE in the short term (because of an improper submission of a cancellation) if a reservist attempts to access TRICARE in between the cancellation of an erroneous segment and the submission of the corrected segment. We heard from SMEs that some of these GRAS errors are actually caught by members after trying to use TRICARE benefits and being told they were not eligible. The component would then correct the activation records. We ignore these cases in our analysis, since we cannot assess as-yet-uncorrected records, and records that have been corrected are no longer in error.

As noted in Chapter 2, RC members may not have a need for medical care or may not have any intention to use TRICARE while activated. In these instances, data errors that affect TRICARE eligibility would have no impact on these members.

Effects of Overlapping Segments

All overlapping segments have the potential to affect TRICARE eligibility by causing an overcount of active duty days. According to the analysis presented in Table 4.2, there are almost 15,000 overlapping segments that could cause TRICARE to be kept on too long.

Effects of Unterminated Segments and Terminated PNL Errors

Unterminated segments and PNL errors affect TRICARE eligibility by making it appear that a reservist is on active duty for longer than they actually were. However, unterminated segments only become obvious errors once the projected end date has passed. TRICARE eligibility must be established *before* a segment begins for the member to have access to the benefits during activation. The Defense Health Agency can determine the planned length of a segment using the projected end date in order to determine whether a reservist should be receiving TRICARE benefits. Unterminated errors and PNL therefore make it likely that TRICARE benefits would not necessarily be terminated on time, rather than not being turned on in the first place.

Table 5.5 shows the proportion of unterminated segment errors and likely PNL errors that were projected to be more than 30 days. Virtually all instances of these errors are for segments that were projected to be more than 30 days, suggesting that, in these cases, TRICARE might be left on too long rather than not being turned on at all.

For the small percentage of erroneous segments that were projected to last fewer than 31 days, it is an open question whether TRICARE eligibility was opened after the segment appeared to have been open longer than intended—or whether the reserve member even

⁵ Defense Health Agency, undated.

expected to be able to access the benefits. It is possible that some segments represent extensions that were never formally edited in the GRAS file, in which case the reserve member may have been formally eligible for TRICARE. It is also possible that some segments that are shorter than 30 days would be part of a consecutive 30-day period of service; however, given the small number of erroneous segments with short lengths, this would not have a great effect on our conclusions.

Summary

In this chapter, we discussed how RC activation data errors affect VA disability benefits, qualification for PGIB, and eligibility for TRICARE. Our analysis shows that small percentages of active duty segments beginning on January 1, 2015, or later that have errors are for disabled RC members, with the percentage attributed to disabled reservists ranging from 2.8 percent to 9.5 percent, depending on the error. We estimated the difference between days paid and days reported in the GRAS among disabled reservists to analyze the approximate effect of data errors overall on VA disability benefits. Our estimates suggest that a total of 500,000 days were underreported in the GRAS, totaling a minimum of \$11.2 million in overpaid VA disability compensation.

Reservists need at least 90 days of qualifying active service to qualify for PGIB benefits. It is important to emphasize that reservists with data errors may have already qualified for PGIB if they entered into the reserves with prior service, and reservists will continue to accrue service that counts toward PGIB eligibility. Our empirical analysis shows that although a small percentage of overlapping segments potentially affect PGIB eligibility, we estimate that more than half of unterminated segments and likely terminated PNL errors could affect PGIB eligibility. However, the number of segments with these errors that are associated with reservists with fewer than 90 days of qualifying service is small (as low as about 2,000 for likely terminated PNL errors and as high as 7,230 for unterminated segments). In terms of misreporting IADT, we estimate that, at most, 150,000 reservists could have their PGIB eligibility affected by misreported IADT.

Our analysis of the impact of RC activation data errors on TRICARE eligibility shows that all overlapping segments and almost all unterminated segments and terminated PNL errors have the potential to affect eligibility. Our analysis underestimates the impact of data errors on TRICARE eligibility because we are unable to quantify the extent to which cancellations and corrections or misreported service affect TRICARE eligibility.

TABLE 5.5

Underminated Segments and Terminated PNL Errors Affecting TRICARE-Eligible Segments

Component	Underminated Segment Errors			Terminated PNL Errors		
	Total Segments with Errors	TRICARE Eligible Segments (Planned >30 Days)	Percentage of Segments Planned to Be TRICARE Eligible	Total Segments with Errors	TRICARE Eligible Segments (Planned >30 Days)	Percentage of Segments Planned to Be TRICARE Eligible
Army National Guard	11,343	11,299	99.6%	1,924	1,923	100.0%
Air National Guard	415	411	99.0%	113	93	82.3%
Army Reserve	931	898	99.5%	273	268	98.2%
Air Force Reserve	791	778	98.4%	110	101	91.8%
Marine Corps Reserve	207	204	98.6%	37	36	97.3%
Navy Reserve	311	310	99.7%	60	58	96.7%
Coast Guard Reserve	311	311	100.0%	216	213	98.6%
Total	14,309	14,211	99.3%	2,733	2,692	98.5%

SOURCE: Authors' calculations using June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations are based on segments beginning on or after January 1, 2015.

Recommendations and Conclusion

The analyses in the previous chapters show that there are GRAS errors in every component’s data, resulting in substantial aggregate differences between the GRAS file and the Reserve Pay File. In some cases, the errors are systematic and have known sources. However, the extent of an error is not the only determinant of its effect on benefits; the effect on benefits also depends on whether the error affects benefit-relevant information about a segment, as well as the proportion of reserve members who earn that benefit in the first place.

Recommendations and Actions to Consider

Given our findings, the next question is how GRAS data quality can be improved. We have four recommendations that we believe will yield the biggest improvements in data quality, taking into consideration the feasibility and downstream effects on actual benefit programs, as detailed in Table 6.1. We also have four actions to consider for addressing GRAS data errors (as listed in Table 6.2), which could also reduce errors but may not be as easy or straightforward to implement. These actions also include potential ways to address other errors uncovered in our analysis. We briefly discuss each of these recommendations and actions to consider in turn.

TABLE 6.1
Recommendations for Addressing GRAS Data Errors

Recommendation	Errors Addressed
1. Components should adjust their reporting procedures to report all active duty segments, in compliance with DoD Manual 7730.54.	Unreported AT and IADT (Error 5)
2. DoD or components should improve or standardize data validation checks on various data fields.	Overlapping errors (Error 1), cancellations and corrections (Error 4), unreported AT and IADT (Error 5)
3. DMDC should ensure that RCCPDS is synced before the GRAS file each day.	Terminated PNLs (Error 3)
4. Components should ensure proper use of edit transaction codes.	Cancellations and corrections (Error 4)

TABLE 6.2**Actions to Consider for Addressing GRAS Data Errors**

Action to Consider	Errors Addressed
1. DoD could consider implementing a standardized policy on placeholder end dates and the automatic termination of segments as of the projected end date for certain project codes.	Unterminated segments (Error 2)
2. DMDC or components could establish additional transparency to minimize PNL errors.	Terminated PNLs (Error 3)
3. Components could build validation checks for segment length to avoid nonsensical negative length segments.	Other errors
4. Components could more effectively track deployed AGRs and reinstate AGR segments after deployment ends.	Other errors

Components Should Report All Segments to the GRAS File

This recommendation directly addresses the misreporting of project codes. Unreported segments not only create reporting problems for benefits but also violate the requirements of DoD Manual 7730.54. Moreover, by our count, unreported segments are the single most numerous error in the GRAS table, creating a discrepancy with the Reserve Pay File of millions of days per year. SMEs from Army National Guard told us that it would be difficult to adjust computer programs and reporting procedures in such a way as to incorporate all short segments into the daily Enclosure 8 file. However, other components have systems that report all activations; it is not clear from our discussions how or why the various systems differed in their complexity. Ultimately, if short activations are not reported, then VBA cannot make proper adjustments, and reserve members may face increased difficulty in proving their active service history.

DoD or Components Should Improve or Standardize Data Validation Procedures

DoD should consider incorporating specific data validation procedures as part of DoD Manual 7730.54 to mitigate errors related to overlapping segments, cancellations and corrections, and the misreporting of project codes. For example, DoD could require each component to check for overlap or provide a comprehensive list of project codes that may and may not be used with specific statute codes.

Components could also improve their data validation procedures, without DoD oversight. One example is the validation of project codes. Both the DoD/VA working group and our analysis showed that project codes are either systematically miscoded or missing but also provided a precedent for using other information to assess those codes and identify likely errors. Components could adapt those analyses to incorporate additional information—for example, segment length and RCC/TRC code—to double-check project codes or flag potentially incorrect statute codes. Components could also train staff to use edit transaction codes instead of

canceling and resubmitting new segments to minimize errors. As described earlier, incorrect project codes can affect PGIB eligibility and post-activation TRICARE eligibility.

DMDC Should Ensure That RCCPDS Is Synced Before the GRAS File Each Day

Some PNL errors are due to the GRAS file being synced before the RCCPDS and the person appearing to not yet have a PNL; however, had the RCCPDS been synced first, the person's PNL would have been created. Although these errors are fixed within a few days, the solution appears to be straightforward and would avoid the unnecessary effort of adjudicating errors or waiting for the PNL problem to resolve itself.

Components Should Ensure Proper Use of Edit Transaction Codes

In our analysis, we were unable to observe the transaction codes used to submit Enclosure 8 data. But we identified new segments that appear to have been corrections to a cancellation from at least one month earlier, suggesting that the segment was not edited directly. Instead, the segment was canceled altogether, and a new one was created. The DoD/VA working group also found that components sometimes cancel segments rather than editing them, even when the correction is made for a legitimate reason, such as a change to the activation orders. Delaying the submission of a new segment can create unnecessary problems with benefits.

Components should ensure that all personnel working with Enclosure 8 data understand the transaction codes specified in DoD Manual 7730.54 to mitigate errors related to cancellations and corrections. The manual notes that code "BA" should be used for most types of edits, with a separate code for correcting a statute code ("NB"). The only time a segment should be canceled outright and re-created is if the start date is incorrect.

DoD Could Implement Standardized Policies Regarding Placeholder End Dates and Automatic Segment Termination for Certain Project Codes

Components differ in their use of placeholder end dates and the automatic termination of segments. Some practices may introduce errors at higher rates than others and make it more difficult to find errors or conduct data audits. SMEs told us that DMDC exercises some influence over how components use placeholders (including requiring them in the first place). But there is no single standard that can serve as a reference for data management teams, nor is there any formal justification for the current practices.

To directly address unterminated segment errors, DoD could implement a standardized policy regarding both placeholders and automatic termination, making the practices consistent across all components. The policy could be based on the available evidence to ensure that it is both feasible and would mitigate data errors. DoD could determine the best approach in

consultation with the RCs, but we believe the following points should be considered, according to our findings.

First, placeholder end dates may not make sense for every type of activation. Using an end date of “99991231” can be informative because it clearly sets such segments apart from others. It is possible that, for some duty types, an open-ended end date is useful because it prevents the segment from being automatically terminated. If DoD determines placeholders should be used in some or all circumstances, they might be marked as such: for example, by creating a separate data field to record placeholders apart from typical projected end dates.

Second, automatic termination also may not make sense for every segment. Automatic termination is useful only when it is more likely that the order was not closed out than it is that the activation is still ongoing. This seems most likely for short activations that typically have well-defined lengths, such as AT or OTD. For activations such as AGR duty, automatic termination may be based on a placeholder end date that was incorrect.

DMDC or Components Could Establish Additional Transparency to Minimize PNL Errors

Components cannot identify and correct PNL errors on their own because they do not have access to the PDR or the GRAS file. SMEs in one component told us that they used to get DMDC GRAS extracts and are in the process of regaining access to these extracts, which would allow them to correct several types of errors prior to sending their Enclosure 8 data each day. DMDC could consider establishing some sort of access or data environment to all components so that components could identify and correct PNL errors on their own.

On their end, components could determine whether it might be feasible for Enclosure 8 data teams to be able to access data on transitions and separations through the component’s HR systems. If so, then all open segments could immediately be closed out as of the day that a reserve member transitions or separates. This action could also eliminate most, if not all, PNL errors.

Components Could Check for Negative Length Segments

Our analysis noted that it is rare for a segment to have an end date prior to a start date. But these occurrences are clearly errors and should be easy to identify. Before sending Enclosure 8 data to DMDC, components could check end dates against begin dates and fix any segments with an apparently negative length.

Components Could More Effectively Track Deployed AGRs

When AGRs are deployed with their active component units, DMDC PERSTEMPO requirements necessitate a component manually overriding AGR segments and creating new mobilization segments in the GRAS file. This is a standard practice, and it is expected that, once the deployment is complete, the AGR segment will need to be reinitiated. Components could more effectively track their deployed AGRs to reduce the number of AGR segments that do

not get reinitiated. Ideally, components could incorporate logic in the computer systems to automatically keep track of such AGRs. This would require a good deal of effort but would reduce paperwork and errors in the future.

Additional Considerations for Guard and Reserve Service Data

If reserve members are tracked in the ADMF rather than RCCPDS, DMDC could update its definitions of PNLs to allow for these members' active service segments to be incorporated into the GRAS file. This would ensure that the GRAS file is a comprehensive list of all active service performed by members of the RCs, not just those members whose services choose to count on reserve end strength. We recognize that such a change is likely easier said than done, but it would also provide benefits to DoD in terms of tracking reserve utilization and would eliminate some instances of segments that get kicked back to the submitting component.

Another consideration is IDT, which is relevant for VA benefits but is not recorded in a dedicated administrative table that is analogous to the GRAS file. DoD or Congress could consider whether doing so would be worthwhile. If VBA could access such a table, it could adjust disability compensation more often than every fiscal year. Data users could also directly compare IDT and active duty service, possibly reducing the number of errors in VBA adjustments. It is also possible that a table that is specifically for inactive duty statuses could benefit DoD and reserve members by making it easier to calculate retirement points, the statutory authority under which service was performed, and whether the service was performed for pay.

As an example, Funeral Honors Duty can be performed for pay or without pay. Either way, it earns retirement points. If paid, the compensation can be earned under U.S. Code, Title 37, Sections 206 or 495. Compensation under Section 206 could entitle the member to additional benefits, such as special and incentive pays that are prorated based on the number of drill periods served.

Conclusion

This analysis was conducted at an important juncture for many components and for DMDC. Some components are transitioning to new personnel management systems, and DMDC is planning to transition the PDR and other data to a centralized analytics platform. The recommendations in this chapter should be taken into consideration as these transitions occur. Additional analysis of activation data may be necessary once the new systems are in place to determine whether new errors are introduced or whether the prevalence of existing errors is reduced. Army National Guard SMEs informed us that segments shorter than 30 days are not reported in the GRAS, and most data errors were attributed to missing AT segments from the Army National Guard. Consequently, the recommendation for components to report all segments to the GRAS file would fix most of the data errors found in this report.

GRAS File Project Codes

Table A.1 lists the duty type corresponding to each project code discussed in this report. The full list can be found in DoD Manual 7730.54, Volume 1, Enclosure 8, Table 9.

TABLE A.1
Project Codes Referenced in This Report

Project Code	Description
3AX	Southern Border Security
3AZ	COVID-19 Contingency
3HQ	United Assistance
3HS	Freedom's Sentinel
3JT	Unified Response
9FF	Joint Forge
9FV	Joint Guardian
9GF	Overseas Contingency Operation
HSM	Hurricane Maria
TSH	Hurricane Harvey
TSI	Hurricane Irma
Y11	Navy Reserve Disaster or Emergency Event
A20	IADT
A21	AT
A22	OTD
A25	ADOS
A26	AGR
A27	Active Duty—Involuntary
B21	FTNGD—AT
B22	FTNGD—OTD
B25	FTNGD—OS
B26	FTNGD—AGR
B27	FTNGD—Involuntary
A28	Active Duty—Other
X10	COVID-19

SOURCES: Features information from DoD Manual 7730.54, Vol. 1, 2019, Table 9, pp. 67–70. Descriptions of project codes not listed in that manual were provided by the Office of the Secretary of Defense.

Supplemental Analyses of Data Errors

This appendix provides additional tabulations of error segments, focusing on the common project codes that co-occur with errors.

Data Error 1: Overlapping Segments

Table B.1 provides a breakdown of the three main sources of overlap errors by component. Each cell represents the percentage of overlap errors from a particular component that fall into each of the three categories listed in the flowchart of Figure 4.1.

TABLE B.1
Sources of Overlapping Segments, by Component

Component	Enclosure 8 User Error	Definite Error in Dates	Unterminated Segment Error			Number of Overlapping Pairs
			No Conflict If First Segment Closed	First Segment >2 Years	First Segment <2 Years	
Army National Guard	24%	17%	13%	18%	29%	12,544
Air National Guard	25%	18%	9%	42%	5%	95
Army Reserve	19%	20%	22%	9%	30%	631
Air Force Reserve	4%	0%	85%	9%	1%	617
Marine Corps Reserve	57%	9%	3%	18%	12%	298
Navy Reserve	25%	20%	3%	19%	33%	291
Coast Guard Reserve	43%	16%	27%	2%	12%	165
Total	24%	16%	16%	17%	27%	14,641

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file from DMDC.

NOTE: Rows may not sum to 100 due to rounding. All calculations are based on the set of segments beginning on or after January 1, 2015.

Table B.2 lists the project codes associated with overlap errors in each component. Each cell lists project codes that make up at least 10 percent of all instances corresponding to the cell. Table A.1 provides an explanation for the project codes.

Data Error 2: Unterminated Segments

Table B.3 lists the project codes associated with stale unterminated segments that are more than one month past their end dates (i.e., segments that we believe are most likely to be errors). Each cell lists project codes that make up at least 10 percent of all instances corresponding to the cell. Table A.1 provides an explanation for the project codes.

TABLE B.2
Project Codes Involved in Overlapping Segment Errors

Component	Total Number of Overlapping Segment Errors	Project Code of Earlier Segment	Project Code of Later Segment
Army National Guard	12,544	X10 (2,844 segments), B25 (2,437 segments), A20 (1,946 segments), 9GF (1,470 segments)	X10 (3,177 segments), B25 (2,431 segments), B26 (1,330 segments)
Air National Guard	95	No project code with more than 25 segments	B21 (26 segments)
Army Reserve	631	3AZ (140 segments), A21 (80 segments), A28 (65 segments)	3AZ (117 segments), A21 (125 segments), 9GF (91 segments), A28 (75 segments)
Air Force Reserve	617	A25 (311 segments), A21 (88 segments), 3HS (75 segments), A22 (71 segments)	A25 (248 segments)
Marine Corps Reserve	298	A20 (70 segments), A26 (48 segments), A25 (46 segments), A28 (40 segments)	A20 (69 segments), A27 (59 segments), 9GF (51 segments), A28 (40 segments)
Navy Reserve	291	3AZ (121 segments), A22 (54 segments), A26 (44 segments)	A22 (87 segments), 3AZ (64 segments), A26 (56 segments), 9GF (52 segments)
Coast Guard Reserve	165	A25 (53 segments), A21 (36 segments), 3AZ (25 segments)	A21 (56 segments), A25 (32 segments), 3AZ (29 segments)
Total	14,641	X10 (2,846 segments), B25 (2,443 segments), A20 (2,101 segments), 9GF (1,666 segments),	X10 (3,178 segments), B25 (2,440 segments)

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file from DMDC.

NOTE: All calculations use only segments beginning on or after January 1, 2015. Project codes are only reported in the table if there are at least 25 segments making up at least 10 percent of errors within the cell.

TABLE B.3

Most-Common Project Codes Among Open Segments More Than One Month Past Projected End Date

Component	Total Number of Segments More Than 1 Month Past Projected End Date	1–3 Months Past Projected End Date ^a	4–12 Months Past Projected End Date ^b	More Than 12 Months Past Projected End Date ^c	All Segments More Than 1 Month Past Projected End Date
Army National Guard	7,893	X10 (405 segments), 9GF (356 segments), A20 (358 segments), B25 (232 segments)	A20 (1,082 segments), X10 (968 segments), B25 (639 segments)	A20 (900 segments), X10 (432 segments)	A20 (2,340 segments), X10 (1,805 segments), B25 (968 segments)
Air National Guard	22	—	—	—	—
Army Reserve	532	No project code with more than 25 segments	A21 (72 segments), 3AZ (64 segments), 9GF (53 segments), A22 (31 segments), A20 (28 segments)	A21 (55 segments), A20 (42 segments), 3AZ (32 segments), 9GF (26 segments)	A21 (147 segments), 3AZ (96 segments), 9GF (82 segments), A20 (78 segments), A22 (61 segments)
Air Force Reserve	660	—	A25 (303 segments), 3HS (84 segments), A21 (76 segments), A22 (68 segments)	—	A25 (319 segments), A21 (92 segments), 3HS (85 segments), A22 (70 segments)
Marine Corps Reserve	54	—	—	—	No project code with more than 25 segments
Navy Reserve	165	A25 (27 segments)	3AZ (36 segments)	—	A25 (47 segments), 3AZ (44 segments), A26 (25 segments)
Coast Guard Reserve	274	—	—	A25 (234 segments)	A25 (240 segments)
Total	9,600	X10 (406 segments), 9GF (374 segments), A20 (374 segments)	A20 (1,145 segments), X10 (968 segments), B25 (639 segments)	A20 (952 segments), A25 (272 segments), X10 (432 segments)	A20 (2,471 segments), X10 (1,806 segments), B25 (970 segments)

SOURCE: Authors' calculations using the June 2021 GRAS monthly edit file.

NOTE: The table reports project codes accounting for at least 25 segments and making up at least 10 percent of errors within the cell. "—" indicates that segments totaled less than 5 percent of untruncated segment errors for the component or fewer than 30 instances at all. See Table A.1 for a list of project codes.

^a Projected end dates from April 1, 2021, to May 31, 2021.^b Projected end dates from July 1, 2020, to March 31, 2021.^c Projected end dates on or before June 30, 2020.

Data Error 3: Terminated PNLs

Table B.4 lists the project codes associated with terminated PNL errors. Each cell lists project codes that make up at least 10 percent of all instances corresponding to the cell. Table A.1 provides an explanation for the project codes.

Data Error 4: Cancellations and Corrections

Table B.5 presents the most-common project codes for each type of cancellation or correction. Cancellations and corrections most often appear in activations for training or OS. End date extensions also commonly appeared for activations related to COVID-19 in the two guard components.

TABLE B.4
Most-Common Project Codes for Likely Terminated PNL Errors

Component	Unterminated Segments for Separated Service Members	Unterminated Segments for Transferred Service Members	Total Likely Terminated PNL Errors ^a
Army National Guard	A20 (1,140 segments), B26 (196 segments)	9GF (65 segments), X10 (51 segments), A20 (40 segments), B25 (37 segments), B26 (30 segments)	A20 (1,160 segments), B26 (223 segments)
Air National Guard	—	B22 (31 segments)	B22 (35 segments), B26 (25 segments)
Army Reserve	A21 (69 segments), A20 (35 segments)	A28 (65 segments), 9GF (30 segments)	A28 (80 segments), A21 (69 segments), A20 (40 segments), 9GF (36 segments)
Air Force Reserve	—	A21 (32 segments)	A21 (50 segments)
Marine Corps Reserve	—	—	—
Navy Reserve	—	—	—
Coast Guard Reserve	A25 (202 segments)	A25 (200 segments)	A25 (209 segments)
Total	A20 (1,189 segments), A25 (232 segments)	A25 (236 segments), 9GF (105 segments)	A20 (1,229 segments)

SOURCES: Authors' calculations using the June 2021 GRAS monthly edit file, the January 2015 to June 2021 snapshots of the Reserve Component Master File, and the January 2015 to June 2021 snapshots of the ADMF from DMDC.

NOTE: "—" indicates that segments totaled less than 10 percent of unterminated segment errors for the component or fewer than 25 instances at all. See Table A.1 for a list of project codes.

^a Some segments fall into both categories.

TABLE B.5**Most-Common Project Codes for Each Type of Cancellation or Correction**

Component	Cancellation, No Correction Found	End Date Change	End Date Extension	Project Code Change ^a	Start Date Change	Multiple Errors
Army National Guard	—	A20, X10	X10	A25	N/R	B25
Air National Guard	B21, B22	A20, B22	X10	—	—	B21, B22
Army Reserve	A20, A21, A22	9GF, A22	A20, A26	A21, A22	—	A20, A21, A22
Air Force Reserve	A25	A20, A22	A22, A26	—	A25	A21
Marine Corps Reserve	—	A20	3AZ, A20	—	—	—
Navy Reserve	—	9GF, A20, A26	9GF, A20	—	—	—
Coast Guard Reserve	—	—	N/R	—	—	—
Total	A20, A21, A22	A20	A20, X10	A25	A21, A25	N/R

SOURCE: Authors' calculations using the January–April 2021 GRAS monthly edit files from DMDC.

NOTE: N/R = not reported. Project codes are included if, in every month-to-month comparison, there are at least 25 canceled or corrected segments with that project code and those segments make up at least 10 percent of cancellations or corrections within the given category and component.

^a Project code listed here is the project code in the second month.

VA Disability Compensation Analysis

Table B.6 presents the mean disability rating among reservists with errors by type of error. The overall mean disability rating across components ranges from 38 to 42, depending on the error.

TABLE B.6
Mean Disability Rating Among Reservists with Errors

Component	Data Error 1: Overlapping Segments	Data Error 2: Unterminated Segments	Data Error 3: Terminated PNLs	Data Error 4: Improper Cancellations and Corrections ^a	Data Error 5: Misreported AT ^b	Data Error 5: Misreported IADT ^b
Army National Guard	37	38	41	38	37	35
Air National Guard	N/A	27	N/A	34	35	28
Army Reserve	48	43	40	45	47	37
Air Force Reserve	32	33	N/A	37	38	28
Marine Corps Reserve	49	34	N/A	43	40	N/A
Navy Reserve	34	34	N/A	40	39	N/A
Coast Guard Reserve	44	37	N/A	50	41	N/A
Overall	38	38	42	39	41	42

SOURCES: Authors' calculations using the January 2015 to June 2021 GRAS monthly edit file, the January 2015 to June 2021 ADMF, the Reserve Component Master File, and the VA Compensation file.

NOTE: All calculations use only segments beginning on or after January 1, 2015. RC members are disabled if their earliest award date in the VA Compensation and Pension file is before the start date of the segment. Disability rating is the rating reported on the earliest award. Cells with fewer than 10 individuals are suppressed (indicated by "N/A").

^a This column is an average of potential data errors across the three months examined in Chapter 4, using the upper bound provided in Table 4.8. Improper cancellations and corrections are procedural errors in the way that corrections are submitted rather than data errors themselves, which means they cannot be directly observed in our data.

^b Misreported segment tabulations are based only on a select number of duty statuses for which we can approximate the expected amount of service and are per-year from 2015 to 2020.

Abbreviations

ADT	active duty for training
ADMF	Active Duty Master File
ADOS	active duty for operational support
ADOT	active duty other than training
AGR	Active Guard and Reserve
AT	annual training
COVID-19	coronavirus disease 2019
DMDC	Defense Manpower Data Center
DoD	U.S. Department of Defense
FTNGD	full-time National Guard duty
GRAS	Guard and Reserve Active Service
HR	human resources
IADT	initial active duty for training
IDT	inactive duty training
OS	operational support
OTD	other training duty
PDR	Person Data Repository
PERSTEMPO	personnel tempo
PGIB	Post-9/11 GI Bill
PNL	personnel file
RC	reserve component
RCC/TRC	Reserve Component Category and Training and Retirement Category
RCCPDS	Reserve Components Common Personnel Data System
SME	subject-matter expert
VA	U.S. Department of Veterans Affairs
VADIR	VA/DoD Identity Repository
VBA	Veterans Benefits Administration

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To correctly provide benefits to reserve component (RC) members, activations must be reported accurately. In this report, the authors quantify the frequency of errors in RC activation data and estimate the potential impact of these errors on RC member benefits, including U.S. Department of Veterans Affairs (VA) disability compensation, qualification for the Post-9/11 GI Bill, and eligibility for TRICARE.

The impetus for this study was a U.S. Department of Defense and VA working group on information-sharing that identified multiple data errors associated with activation timing and duration, resulting in potential errors in the delivery of benefits to veterans, including underpayments and overpayments of VA disability benefits. Through data analysis and information obtained via subject-matter expert discussions, the authors discuss the potential sources of each type of error and provide recommendations to mitigate these errors in the future.

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