CNA

Report on the Calculation of the Basic Allowance for Housing, Basic Allowance for Subsistence, and Cost-of-Living Allowances

Adam M. Clemens, Daniel M. Leeds, Jaclyn Rosenquist, Robert P. Trost, and Samuel A. Yellin

with contributions by Robert W. Shuford

Abstract

This report for the 14th Quadrennial Review of Military Compensation (QRMC) focuses on allowances: the Basic Allowance for Housing (BAH), Basic Allowance for Subsistence (BAS), and Cost-of-Living Allowances (COLAs). A companion report focuses exclusively on BAH, responding to congressional questions posed about it in the Fiscal Year 2023 National Defense Authorization Act. We found that BAH is, on average, higher than what civilians of comparable income spend on rent and utilities. However, BAH is also volatile: in any given year, more than half of military housing areas (MHAs) have a greater than 10 percentage point spread across the year-over-year BAH changes for different paygrades in that MHA. This volatility is the result of the Department of Defense estimating the cost of six different housing profiles in each of the about 300 MHAs every year. We recommend three possible courses of action to reform BAH, each of which use other government-generated data and would make BAH more predictable. We also found that the statutory definition of BAS is unclear and has led to it drifting upward over time relative to the price of food in a way that Congress probably did not intend, and we recommend tying its level to the US Department of Agriculture's estimate of the cost of a liberal food plan for an adult man. Finally, COLAs—both in the contiguous United States and overseas—are in part driven by the Living Pattern Survey, which is infrequent, is not verified, and can lead to counterintuitive outcomes. Commissaries and exchanges keep records of the volume of sales to active duty servicemembers, which could directly verify how much access to on-base savings affects the local cost of living for servicemembers.
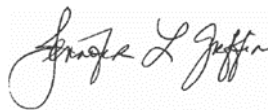
Cover image: Air Force 1st Lt. Russell Bowman embraces his family at Joint Base Charleston, South Carolina, October 3, 2022, upon returning home from deployment. Photo by Airman 1st Class Christian Silvera.

Approved by: **February 2025**

Jennifer Griffin, Research Program Director
Marine Corps and Defense Workforce Program
Resources and Force Readiness Division

Executive Summary

This report for the 14th Quadrennial Review of Military Compensation (QRMC) focuses on three allowances: the Basic Allowance for Housing (BAH), Basic Allowance for Subsistence (BAS), and Cost-of-Living Allowances (COLAs). A companion report focuses exclusively on BAH, responding to congressional questions posed about it in the Fiscal Year 2023 National Defense Authorization Act. This report summarizes key findings from that report, analyzes the data and methodologies used to calculate BAS and COLAs, and recommends possible courses of action (COAs) for reforming BAH.

What we were asked to do

The QRMC director asked CNA to review the statutory requirements and methodologies used to calculate BAH, BAS, and COLAs to ensure military members can procure suitable housing and food. We answered six questions about BAS:

1. How is BAS currently computed?
2. What purchasing power should BAS provide?
3. How often should BAS be calculated?
4. Should BAS vary by geographic area?
5. How do other measures of food prices compare with the US Department of Agriculture's (USDA) liberal food plan?
6. How much would it cost to extend BAS to servicemembers' dependents?

The QRMC director also asked us to examine the data and methodology used to calculate both contiguous United States (CONUS) COLA and overseas COLA (OCOLA). This request included tracking the history of COLA rates in some locations, determining the drivers of changes in the rates over time, and considering ways to stabilize COLA rates.

Finally, the QRMC director asked us to develop recommendations to reform BAH based on our analyses, including implementation and messaging plans.

What we did

We compared BAS values against the cost of the USDA's liberal food plan. To address whether annual BAS updates can sufficiently capture short-term variation in food prices, we used quarterly data from October 1999 through October 2023 on the cost of the USDA's liberal food plan for men aged 19 to 50. We then looked at possible methods to update BAS more frequently or incorporate forecasts of the cost of food. To address regional food costs, we used a county-level measure from Feeding America, a not-for-profit organization that links food banks and other food programs across the United States.

Given recent concerns about the food security of military families, we estimated the cost to extend BAS to dependents using data on household size by paygrade. Unfortunately, these data do not include the ages of dependents, so we made assumptions about dependents' ages (and assumed a 50/50 gender mix) based on the members' paygrades.

We reviewed the Office of the Under Secretary of Defense (OUSD) for Personnel and Readiness' (P&R's) data and processes to determine both CONUS COLA and OCOLA payments. We examined changes in these values over time and compared data internal to these processes against other data sources. Specifically, we compared Living Pattern Survey (LPS) reports of how much servicemembers shop on base versus off base against commissary sales to active-duty personnel, and we compared CONUS COLA indices to Bureau of Labor Statistics data on the non-housing cost of living in specific metropolitan areas.

What we found

How is BAS computed: BAS was initially set between the monthly cost of the moderate food plan (a healthy diet for the second-highest income quartile) and the cost of the liberal food plan (a healthy diet for the highest income quartile) for an adult man. However, over time, BAS has risen faster than the cost of these food plans and is now on par with the cost of the liberal food plan. This rise in BAS occurred because the statutory rule for updating BAS implicitly assumes that food costs always rise, and the Department of Defense (DOD) has codified this assumption by leaving BAS constant when the cost of the liberal food plan falls and by raising BAS by the same percentage when the cost of the food plan rises.

How often should BAS be calculated: Because BAS is updated annually and food costs rise more often than they fall, BAS has a lag that results in it undershooting the cost of the food plan on average. If it were always updated to the cost of the liberal food plan (with the exception that it cannot fall), between 2001 and 2023 it would have been an average of $11 per month below the liberal food plan ($6 per month if we exclude the post-COVID-19 period of high inflation). There are options to build in a forecast of future food cost growth based on growth over the

previous year, and which option performs best on historical data depends on how we prioritize different objectives.

Should BAS vary by geographic area: Food costs vary significantly by geographic area. Of the 50 largest military housing areas (MHAs), the one with the highest food costs is 50 percent more expensive than the one with the lowest. Even omitting the 10 highest and the 10 lowest out of these 50, the 11th highest is 14 percent more expensive than the 40th highest. However, we based these data on the USDA thrifty market basket, which is intended for those in the lowest income quartile.

Cost to extend BAS to dependents: We estimate that extending BAS to dependents would add either $5 billion or $6.2 billion to the program's cost depending on whether it is tied to the moderate or the liberal food plan, which would almost double the program's cost.

Although data collection and processing for CONUS COLA are extensive and well documented, the results are surprising, not well explained, and difficult to interpret. For example, the estimated national average cost rose 24 percent between 2023 and 2024 without a clearly documented explanation. This rise appears to largely have been driven by some implausibly low costs in the 2023 estimate, so it is likely the process is improving. Also, the LPS at different locations shows significant differences in the percentage of goods purchased at on-base commissaries. Because these figures are self-reported and can have a strong effect on the COLA, OUSD (P&R) could verify the LPS results by looking at commissary sales per servicemember. CONUS COLA indices *are* correlated with local consumer price index less shelter indices, indicating that they have some validity, and this correlation is likely to increase if the CONUS COLA process becomes more stable.

Some overseas locations in the same country that are not very far apart have large OCOLA differences. OUSD (P&R) notes that the primary reason for these differences in OCOLA payments is that the LPS at these locations can show large differences in the percentage of goods purchased at on-base commissaries and exchanges. For example, a June 27, 2023, memo for Germany shows substantial differences in some market basket categories between Kaiserslautern and Wiesbaden [1]. These two sites are only about 60 miles apart, but the Meat and Dairy Category is 29 COLA points higher in Wiesbaden than in Kaiserslautern, and the Household Furnishings category is 43 COLA points higher in Wiesbaden than in Kaiserslautern. OUSD (P&R) could verify the LPS results by determining whether the commissary sales per servicemember at Wiesbaden and Kaiserslautern are consistent with the LPS results.

OCOLA payments can vary substantially year to year. Some commands do not understand the OCOLA process and provide bad advice to their servicemembers [2]. For example, the monthly OCOLA payment for servicemembers living in Yokota, Japan, went from $421 in 2021 to $0 in 2024, in part because of US inflation. OUSD (P&R) could develop a process to stabilize OCOLAs. One method could be to follow a BAH-like procedure, meaning that the OCOLA payment cannot

decline below the amount the servicemember receives when they first arrive at their OCONUS (outside the contiguous United States) new duty station but can increase.

Finally, we wish to highlight two planned OCOLA reforms that we support. First, CNA concurs with OUSD (P&R)'s decision to eliminate the "miscellaneous" category that accounted for the purchase of an automobile in the OCOLA market basket of goods and services. Second, after a short-lived congressional intervention that interfered with the OUSD exchange rate accumulator, which adjusts the OCOLA rates in the military biweekly pay periods to account for 5 percent or larger swings in exchange rates, OUSD (P&R) intends to return to using it. We would not currently recommend lowering the threshold for receiving OCOLA below the planned level of 107; DOD should update OCOLA's computational methodology and should study the effects of planned reforms before considering further changes to the threshold.

What we recommend

What purchasing power should BAS provide: We recommend revising the law to define BAS such that its values are recentered on the cost of the USDA liberal food plan for an adult man, clearly defining the target. Doing so would not change BAS's value in the short term but would prevent further unintended drift.

We recommend BAH reform to reduce volatility and improve transparency. To do so, we developed three COAs: tweak BAH, consolidate BAH, or overhaul BAH.

The tweak COA keeps the existing six housing profiles that OUSD (P&R) uses to estimate housing costs, but rather than re-estimating the cost of each profile in each of 300 MHAs each year, it would do so only for a quarter of MHAs each year. Each MHA would receive a BAH update tied to the Department of Housing and Urban Development's (HUD's) estimate of changes in local median rents in three of every four years and be re-baselined in the fourth.

The consolidate COA would, as in the tweak COA, use HUD estimates to update BAH in three out of four years for a given MHA, but it also would consolidate the current six BAH housing profiles into four to improve the available sample size and avoid imposing assumptions about the relative market value of one property type versus another. Servicemembers in some paygrades would see a BAH increase on average from this approach, and other servicemembers would see a decrease. For those who would see an expected decrease on average, we recommend phased implementation to mitigate this decrease when the servicemembers next rotate.

The overhaul COA does away with housing profiles entirely and ties BAH directly to its statutory requirement, which is to enable servicemembers to afford housing comparable to that rented by civilians of comparable income. To achieve this overhaul, OUSD (P&R) would need to partner with the US Census Bureau to generate accurate estimates of what civilians

comparable to each paygrade spend on rent and utilities in each MHA. BAH is currently higher on average than what civilians spend on housing, and we assumed it would remain so by applying a consistent multiplier greater than one. By focusing directly on money rather than profiles, this COA would emphasize to members that they are receiving *more* than their civilian peers spend on housing and that they can choose how to spend the money.

In this report, we provide analytic support to help implement these COAs, but DOD must ultimately select one over the others based on how much political will it has for reform. Any of these BAH reforms would draw attention and require careful messaging to servicemembers and to other stakeholders, and we provide OUSD (P&R) with sample messaging materials for each in a separate enclosure.

This page intentionally left blank.

Contents

Introduction

QRMC background

In accordance with Section 1008 of Title 37, United States Code, the President must direct an independent review of the principles and concepts of the military compensation system every 4 years [3].

The director of the 14th Quadrennial Review of Military Compensation (QRMC) asked CNA to review the statutory requirements and methodologies used to calculate the Basic Allowance for Housing (BAH), Basic Allowance for Subsistence (BAS), and Cost-of-Living Allowances (COLAs) to ensure military members can procure suitable housing and food. Other federally funded research and development centers were simultaneously asked to support the QRMC with studies of basic pay, food security of military families, spousal income, and entitlements for deployed members.

BAH, BAS, and COLA definitions

As explained in the BAH primer published by the Office of the Secretary of Defense, BAH is a form of compensation designed to help members rent adequate housing near their duty stations when government housing is not available [4]. The BAH rate a member receives depends on their rank, their number of dependents, and the military housing area (MHA) of their duty station (with some exceptions if the dependents do not relocate). By law, the rate must be based on the cost of adequate housing for civilians of comparable incomes in the same area [5]. The Department of Defense (DOD) interprets this cost as the local median rental cost for a given housing unit type, or "housing profile," in a suitable neighborhood, plus the average cost of utilities in that area [4]. Rank and dependent status determine which housing profile DOD uses.

DOD collects data on six housing profiles:

1. One-bedroom apartment
2. Two-bedroom apartment
3. Two-bedroom townhouse/duplex

4. Three-bedroom townhouse/duplex

5. Three-bedroom single family dwelling

6. Four-bedroom single family dwelling

Most paygrades are tied to one of these or to a percentage difference between one of these housing profiles (also referred to as "anchor points") and the next. Until passage of the Fiscal Year (FY) 2024 National Defense Authorization Act (NDAA), law required that BAH for members in the grades of E-1 through E-4 with dependents be tied to the average of the cost of a two-bedroom apartment and a two-bedroom townhouse. The law still requires that E-1 through E-4 servicemembers receive the same BAH rate, but now it does not specify the profile [6].

To provide some stability in household budgets and reduce the probability that members need to move during a tour at a duty station, the BAH rate a member receives can adjust up mid-tour, but it can adjust down only when the member has a permanent change of station (PCS) move, has a rank reduction, or no longer has dependents [4].

Members may buy a home and use their BAH to make mortgage payments, but DOD policy specifies that BAH values are tied to the rental market and not to ownership costs. Servicemembers are free to spend more or less than their BAH payment on housing as they see fit; any BAH payment not spent on housing is free to be spent on other goods or services.

BAS is a tax-free allowance meant to offset costs for a uniformed member's meals. This allowance is based on the military's history of providing room and board (or rations) as part of an enlistee's pay and is not intended to offset the costs of meals for family members. Because BAS is intended to offset the meal costs, its level is linked to the price of food as reported in the US Department of Agriculture's (USDA's) food plans for men aged 19 to 50 [7].

Contiguous United States (CONUS) COLA is a taxable supplemental allowance that helps offset expenses for servicemembers assigned to expensive CONUS areas. The rate varies by geographic location and by "spendable income," which is a function of rank, years of service, and number of dependents. It is updated annually and applies only to members in MHAs with a COLA index (i.e., ratio of local cost to national average) above a set threshold.

Overseas COLA (OCOLA) is a nontaxable allowance designed to ensure servicemembers assigned to a permanent duty station outside the contiguous United States (OCONUS) (i.e., foreign countries, US territories, Alaska, and Hawai'i) maintain a level of purchasing power equivalent to servicemembers stationed in CONUS. It can be updated more frequently than annually to reflect currency exchange rate changes and has no minimum threshold.

Companion report on BAH

This report is a companion to the CNA report *Evaluation of Basic Allowance for Housing,* which addresses 11 congressional questions in the FY 2023 NDAA [8-9]. We summarize its findings in this report to provide motivation and context for the possible BAH reforms we discuss later.

We are delivering this report in two volumes for two reasons: timing and structure. CNA provided *Evaluation of Basic Allowance for Housing* to the sponsor halfway through the study because the FY 2023 NDAA required that DOD report to Congress on those questions at that time. We based the analysis in that report on 2023 BAH rates and on the most recent US Census Bureau data available. We delivered it as a finished product, and we are keeping it separate rather than attempting to update it.

We also structured *Evaluation of Basic Allowance for Housing* to exactly match the order of the questions Congress posed. Keeping the two volumes separate preserves that structure. This report goes beyond the NDAA requirement by considering BAH reforms that Congress did not directly inquire about and by analyzing the other allowances (BAS, CONUS COLA, and OCOLA).

Organization of this report

The next chapter highlights our BAH findings from the companion report. The following three chapters describe our analyses of BAS, CONUS COLA, and OCOLA. The final chapter describes three possible courses of action (COAs) for BAH reform. Appendix A expands on our analysis of possible approaches for building food cost forecasts into BAS to address the inherent lag. Appendix B describes the exchange rate accumulator used to adjust OCOLA to account for currency exchange rate fluctuations. Along with this report, we have provided separate enclosures containing fliers to explain the BAH reform COAs (if DOD were to implement one) and crosswalks mapping MHAs to other geospatial units used by other government agencies.

Basic Allowance for Housing Findings

The 2023 NDAA called for an analysis of the accuracy, efficiency, and responsiveness of BAH; the suitability of the housing profiles associated with it; and the availability of suitable housing in MHAs. Here we review highlights from our report addressing these questions.

Accuracy: nationwide average

We interpret BAH accuracy as sufficiency to meet the statutory requirement: enabling members to afford housing comparable to that of civilians of comparable income. For most BAH recipients, BAH is *higher* than median spending on rent and utilities by comparable civilians, chiefly because DOD views some low-rent living arrangements (e.g., living with roommates or in high-crime neighborhoods) as unsuitable for servicemembers and does not include them when calculating BAH. This is especially true for servicemembers with dependents—particularly junior enlisted personnel because Congress has set a BAH floor for junior enlisted personnel (a common standard for paygrades E-1 through E-4).

To evaluate the sufficiency of current BAH rates, we compared them to rental data from the American Community Survey (ACS). Conducted by the US Census Bureau, the ACS is the largest ongoing US community survey and is sent to about 3.5 million households each year [10]. The US Census Bureau provides access to a large subset of ACS survey data, aggregated by public use microdata areas (PUMAs). ACS estimates are provided in 5-year increments.[1] Unlike housing cost indices, which can provide useful information about rates of change but not appropriate BAH levels, the ACS allows us to evaluate BAH levels because it has information about both housing expenditures and incomes. To evaluate the sufficiency of BAH, we used ACS data on household rents, incomes, housing type, bedrooms, household size, and age for the most recent 5-year estimates.

BAH, with its associated absorption rates, is intended to equalize the non-housing income of servicemembers across the country. Servicemembers who rent the standard BAH unit for their paygrades are supposed to have equal amounts of remaining income regardless of where they are stationed in the US. On the whole, servicemembers earn more than civilian renters on average and therefore have higher housing standards; however, because we are interested in

---

[1] At the time we delivered our BAH report, the most recent available 5-year increment was 2017 through 2021, and we display in this review the results from that report. Data from 2018 through 2022 are now available, and we use them later in this report when describing proposed reforms to the BAH interpolation table.

BAH sufficiency, we want to compare servicemembers to civilians *who have similar amounts of non-housing income*. A servicemember's regular military compensation (RMC) minus their BAH should match the civilian's household income minus their expenditures on rent and utilities.[2] To this end, we divided the ACS data into ventiles,[3] each containing about 5 percent of the sample used. Instead of grouping these ventiles by income, we grouped them by income-less-housing and utility expenses. We excluded civilians who live in mobile or group homes, and we used the Consumer Price Index (CPI)[4] to inflate the median values to January 2023 so that we could appropriately compare them to the 2023 BAH rates that took effect at that time.

Finally, BAH is supposed to estimate the cost of vacant rental units, whereas the ACS estimates the costs of vacant and occupied units. We compared the rents paid by new movers—defined as tenants who have moved in within the last 12 months—and found that they were on average 7.9 percent higher, so we adjusted all median rents accordingly for this new renter premium.

The income-less-housing approach facilitates assessing the sufficiency of BAH rates across the country. BAH is a major component of military compensation. For an E-5 with dependents and 10 years of service, BAH can vary from 26 percent to 121 percent of basic pay, with the average being 55 percent [11-12]. Such a large variation makes comparisons with pure income ventiles difficult because the appropriate income comparison varies so greatly from location to location. However, comparing servicemembers to civilians with similar non-housing incomes (measured as income less rent or RMC less BAH) provides a much more stable comparison. As we illustrate in Figure 1, servicemembers are able to spend more on housing than civilians of equivalent non-housing income.

---

[2] Although we compare members' RMC to civilians' total household income, we realize that members may have additional sources of income such as bonuses and special pays, spouses' wages and salaries, and investment income. A member whose total household income is significantly higher than their RMC may accordingly choose to spend more on housing than a civilian with household income equal to the member's RMC. This more expensive housing choice would be partially funded through sources other than BAH, such as spousal income.

[3] Ventiles are 5 percentile increments. The full sample, therefore, comprises 20 ventiles.

[4] The ACS uses the general CPI to adjust the results between its annual surveys. We are consistent.

Figure 1.   Comparing BAH to housing expenditure of comparable civilian

Source: CNA.

Table 1 shows how average BAH for each paygrade in 2023 compares with what comparable civilians spend on rent and utilities, if their incomes and housing expenditures are inflated to January 2023 dollars and if we assume they have just moved into a new home in the last year (as BAH recipients are likely to have done). We make the comparison both for the average BAH rate that members actually receive and for the average cost that the Office of the Under Secretary of Defense (OUSD) for Personnel and Readiness (P&R) estimates for their housing profile, considering that current policy is for members to pay a small share of this cost out of pocket (an average of 5 percent).

Table 1.   Sufficiency of BAH at the national average level, by paygrade

Grade	% difference from civilian, with dependents	"5% out of pocket" added back in	% difference from civilian, without dependents	"5% out of pocket" added back in
E-2	60%	68%	23%	29%
E-3	57%	65%	26%	32%
E-4	41%	49%	15%	21%
E-5	45%	53%	27%	34%
E-6	53%	61%	27%	34%
E-7	38%	46%	17%	23%
E-8	46%	53%	19%	25%
E-9	26%	32%	10%	16%
W-1	25%	32%	-15%	-11%
W-2	39%	46%	18%	24%
W-3	37%	44%	24%	30%
W-4	26%	32%	13%	19%
W-5	17%	23%	17%	23%
O-1E	57%	65%	37%	44%

Grade	% difference from civilian, with dependents	"5% out of pocket" added back in	% difference from civilian, without dependents	"5% out of pocket" added back in
O-2E	47%	55%	30%	36%
O-3E	46%	54%	31%	38%
O-1	27%	33%	15%	21%
O-2	39%	46%	23%	29%
O-3	35%	42%	23%	30%
O-4	38%	46%	23%	30%
O-5	51%	59%	28%	35%

Source: CNA.
Note: E-2s, E-3s, and E-4s have different results even though their BAH standards are the same because they have different RMCs, and BAH is intended to provide housing quality comparable to civilians with similar incomes. The DOD RMC calculator does not always provide estimates for E-1s, so we were unable to include the E-1 BAH amounts in our assessments.

For example, reading from left to right across the row for the E-5 paygrade, we find that the average BAH paid to E-5s with dependents in 2023 is 45 percent higher than what civilian households with the same income-less-housing would spend on rent and utilities, and that it would be 53 percent higher if BAH did not notionally require an out-of-pocket contribution. Continuing along the row, we find that the average BAH paid to E-5s without dependents is 27 percent higher than expenditures of comparable civilians and would be 34 percent higher without the notional out-of-pocket contribution. For all paygrades except W-1 without dependents, and particularly for members with dependents, BAH is on average more than sufficient despite the notional "5 percent out-of-pocket" contribution.[5]

Accuracy: across MHAs

Filtering the publicly available portion of the ACS data by several attributes in specific PUMAs does not produce large enough sample sizes to determine what comparable civilians spend on a particular housing type in a particular MHA. This is because PUMAs are smaller than MHAs and do not uniquely map to them, and public use microdata does not contain the full sample. Therefore, we cannot directly measure how civilian spending compares to BAH for each paygrade-MHA combination. Instead, we sorted MHAs by BAH and PUMAs by the median rent

[5] Average compensation (including tax advantage) for servicemembers varies with family size, so to determine the comparable civilian for members with dependents, we used the average RMC of members with the median number of dependents (among members with dependents) for their paygrade.

and compared BAH in each cost bin of MHAs to rent by comparable civilians in a slightly higher cost bin of PUMAs. In this way, for all but the most expensive 13 percent of MHAs, we can establish an upper bound and be confident that BAH is sufficient if it exceeds that upper bound.

For members with dependents, we can establish that BAH is sufficient in anywhere from 80 percent (for O-2s) to 100 percent (for several paygrades) of MHAs that have a relevant upper bound. By design, BAH is less generous for members without dependents. We can establish that for these members, is it sufficient in anywhere from 38 percent (for W-4s) to 84 percent (for O-1Es or for O-1s with prior enlisted service) of MHAs that have a relevant upper bound.

Although this approach does not allow us to prove the sufficiency of BAH in high-cost MHAs such as San Diego or Hawai'i, these members are the *most* likely to have BAH that exceeds civilian housing expenditures. Members in those high-cost MHAs receive BAH tied to a nationwide housing standard despite the fact that civilians tend to consume less housing in more expensive areas. However, because servicemembers are assigned to a geographic area rather than able to choose where to live, DOD has attempted to maintain these consistent housing standards even in high-cost areas that are generally seen as more desirable. As a result, servicemembers in these areas likely receive more BAH than comparable civilians spend on housing.

Efficiency

BAH efficiency can be interpreted in multiple ways. An ongoing CNA study will survey BAH recipients about their household finances and housing choices, and the results will provide insights into some definitions of the efficiency of BAH. One interpretation, which we can address with the data we have, is technical. An efficient estimator is characterized as having the smallest possible variance, indicating that a small deviation exists between the estimated value and the "true" value [13]. We interpret *efficiency* using this technical definition: *efficiency* is the "volatility" of BAH's annual changes compared to the housing market. BAH is strikingly volatile. Even within a single MHA, large differences in the increases between various anchor points and paygrades are common. This volatility contrasts with other metrics of housing prices, and it may contribute to servicemembers' frustration and dissatisfaction with BAH.

To measure this BAH volatility, we looked at the percentage increases in the different BAH rates and anchor point rates for each MHA from 2007 through 2023. We considered the MHA rates to be volatile in a specified year if year-on-year changes for different BAH rates or anchor point rates differed by more than 10 percentage points. For example, if the BAH rate for a with-dependents paygrade increased by 8 percentage points from the previous year, but the BAH

rate for another paygrade in that same MHA decreased by 3 percentage points that same year, we considered that MHA-year combination to have a volatile change in BAH.

If we define a volatile MHA year as one with a greater than 10 percentage point spread in year-on-year changes, then more than half of the MHAs had volatile BAH rates in any specific year since 2008. Even similar housing categories often showed great volatility within the same MHA and year. For example, the difference in the annual rate changes between one- and two-bedroom apartments varied by up to 55 percentage points.[6]

To put this BAH volatility into context, we compared it to the volatility of the Department of Housing and Urban Development's (HUD's) estimates of 50th percentile housing costs. HUD produces these costs each year for approximately 2,600 metropolitan statistical areas and counties. Using the same volatility metric, we found that the HUD estimates are generally much less volatile than BAH.[7] Figure 2 shows the percentage of volatile areas for each year.

Figure 2. Volatility comparison between BAH MHAs and HUD housing areas
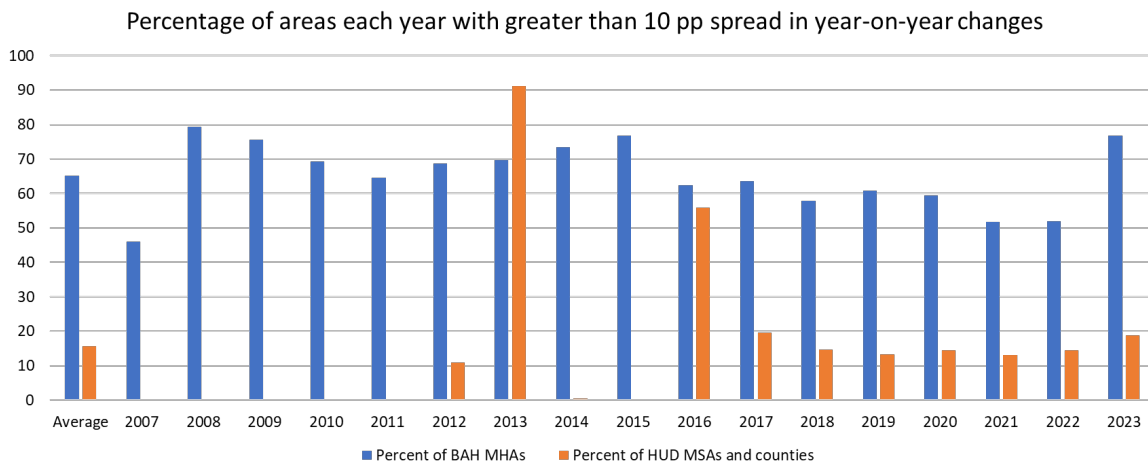
Source: CNA generated from historical BAH rates published at Basic Housing Allowance | BAH Rate Lookup | Defense Travel Management Office (dod.mil) and historical HUD estimates at 50th Percentile Rent Estimates | HUD USER.

---

[6] We drew this example from Kodiak, Alaska, where the estimated cost of a one-bedroom apartment in 2008 increased by almost 40 percent, but a two-bedroom apartment decreased by more than 15 percent.

[7] The HUD data had high volatility in two outlier years: 2013 and 2016. We enquired about those years and found that they may have been the result of a recalibration of the HUD rates.

Real estate market processes

Residential rental rates are estimated based on a combination of factors that can vary by location and over time in the real estate market. Supply and demand dynamics depend on economic conditions such as inflation, population growth, housing supply, federal interest rates, and other factors. Some of the key factors that landlords or property managers consider when estimating rental rates include the following: location (e.g., safety of the neighborhood, proximity to public services such as public transportation, school districts, employment), the property type, the size and layout of the property (e.g., number of bedrooms, bathrooms), the condition and quality of the property (e.g., age, recent remodel or renovations, amenities), operating costs (e.g., taxes, mortgage payments, utilities, maintenance costs, homeowners association fees, property management costs), historical demand and rent from comparable properties in the neighborhood, and seasonal variation [14].

The supply and demand conditions that drive the residential real estate market do not necessarily align with the assumptions underlying the six housing profiles. The BAH policy that ties profiles to paygrades implicitly assumes that a four-bedroom single family dwelling (SFD, or detached home) is more expensive than a three-bedroom SFD, which is in turn more expensive than a three-bedroom townhouse or duplex, and so forth.

In practice, BAH surveys sometimes produce cost estimates for the various anchor points that do not line up in this order for a given MHA. If left uncorrected, these "inversions" would result in some members receiving less BAH than members in a lower paygrade in the same MHA. BAH policy places all paygrades in an order such that an E-6 with dependents receives more BAH than an O-2 with dependents and less than a W-1 with dependents, and so on.[8] So, if the estimated cost of a three-bedroom townhouse is higher than that of a three-bedroom SFD in an MHA, OUSD (P&R) must adjust these estimates to ensure not only that a W-3 with dependents receives more BAH than an E-6 with dependents but also that enough separation exists between them for the seven intervening grades (W-1, E-7, O-1E, W-2, E-8, O-2E, and O-3) to each receive more BAH than the grade below.

Analysis of ACS data reveals that these inversions are not deviations from the norm but are, in fact, the norm for the private market. Average monthly rent nationwide for a three-bedroom townhouse or duplex ($1,456) is greater than for a three-bedroom detached house ($1,183).[9] In fact, in an area covered by North Dakota, South Dakota, Montana, and Wyoming, it is much

---

[8] The ordering is different for members without dependents than members with dependents, and E-1 through E-4 all receive equal BAH.

[9] These prices are from 2021.

more expensive even than a four-bedroom detached house ($1,141 versus $774). This is nearly the case in Arkansas, Mississippi, Oklahoma, and Alabama as well. The reason is that townhouses tend to be in more expensive locations that are closer to amenities and more employment opportunities.

We found that government indices, including those produced by HUD and the Bureau of Labor Statistics (BLS), have lags relative to commercial indices. These lags are due to the annual cycle of lease renewals. Since most leases last for a year, a renter's cost stays the same over the course of the year, and it will take a year to have a clearer picture of rental market changes.

Some housing cost indices apply only to apartments or only to SFDs, but the HUD 50th percentile estimate applies to all housing types and breaks them out only by number of bedrooms. Given differences across markets in the relative cost of a detached home and an attached home, an approach using four anchor points instead of six may be more suitable to define BAH profiles and calculate BAH rates.

Responsiveness over time

Over the long term, BAH is very responsive to market trends. BAH did not consistently outpace or lag HUD's 50th percentile growth from 2006 through 2023. The two measures tracked closely for one-bedroom and three-bedroom dwellings, BAH grew more quickly for two-bedroom dwellings, and HUD's estimates of rent grew more quickly for four-bedroom dwellings from 2015 to 2020 (a period in which BAH barely increased at all).

However, these changes reflect long-term trends, and BAH's short-term flexibility is another issue. BAH simply was not designed to account for rapid surges in the housing market, such as the surge in rents that occurred in 2021 and 2022. By statute, BAH rates update when basic pay updates, which occurs once per year in January [5]. As a result, from January through December of a calendar year, BAH payments are based on the prices sampled between March and July of the previous calendar year. As a result, BAH rates have a lag of at least 5 months the day they take effect and of at least 17 months by the end of the year.

Ordinarily, the effect of this lag is small relative to BAH volatility and to the other factors that drive members' housing costs. Between 2006 and 2020, the CPI of primary residence rents rose 53 percent, equivalent to an average compounded rate of about 3 percent per year. However, between 2020 and 2023, this measure grew at an average of 4.8 percent per year, and the increase was much higher in some markets. Therefore, during 2021 and 2022, the BAH lag resulted in its relative changes falling far behind in some markets in the short run. We note that private sector wages also failed to keep up with rising housing costs during those years, so military families were not the only Americans struggling with inflation.

Suitability of housing profiles to family size

We compared the current BAH housing standards for members with dependents to the 2023 family size statistics reported by OUSD (P&R) [11].[10] We considered the implications of these family sizes if each child had their own bedroom or if the number of bedrooms followed on-base housing standards, which allow children under 10 years old to share with a sibling of the same gender and children under 6 to share with a sibling of either gender [15-16].

If we assume that the first dependent is the servicemember's spouse and that it is desirable for children (assumed to be any subsequent dependents) to have separate bedrooms, then these BAH standards have bedroom numbers that are sufficient for between 69 percent and 90 percent of servicemember families for their respective paygrades (94 percent for O-7s, though officers of flag rank typically live on base).[11] There is no simple pattern in the relationship between paygrade and this adequacy metric because as members become more senior, their families tend to grow, and their housing profiles do as well.

As noted above, the military's on-base housing standards do permit children to share bedrooms, depending on age and gender. We estimate that between 82 percent and virtually 100 percent of servicemember families have sufficient bedrooms for their family size based on bedroom-sharing rules.

In the academic literature, we found that within a specific income level, civilian households with more children tend to increase their housing expenses by very little or not at all [18-19]. In examining ACS data, we found a small increase in housing expenses within income levels as household size increases. The average amount was $36 per additional person after the first two people. This increase appears small enough that it may only be due to increased utility costs. Based on these findings, the with-dependents BAH policy of providing one rate regardless of family size appears to be consistent with the civilian population.

Suitability of available housing

We examined whether servicemembers can find housing within their MHA, and we assessed the relative quality of that housing by comparing the average cost in the ZIP code in which they

---

[10] We used the annually published Selected Military Compensation Tables, or "Green Book."

[11] This assumes that the spouse is a civilian dependent and not another BAH recipient. A 2020 DOD report confirms that only 6.8 percent of active-duty servicemembers are married to another servicemember [17].

live to the average cost in other ZIP codes in their MHA. By both measures, the answer is yes, most servicemembers can find suitable housing.

We found that 92 percent of servicemember families live within their MHA while 8 percent commute from a neighboring MHA. Of those 8 percent commuting from outside the MHA, about 60 percent reside in an MHA with lower BAH rates (and presumably lower housing costs) than their assigned MHA, so their BAH should be adequate there as well. We cannot observe why some servicemembers choose to live in more expensive MHAs, but the reasons are likely tied to some combination of additional housing budget (because we cannot observe spouses' salaries) and perceived benefit (e.g., higher housing quality, proximity to formal or informal support networks, higher school quality).

The "effective market area" ZIP codes (where most BAH recipients live) typically had higher gross rents than the rest of the ZIP codes within the MHAs. This difference was true for 74 percent of the MHAs. Because rent is an indicator of housing quality and location desirability, this finding suggests that servicemembers are finding available housing in better areas within the MHAs.

This concludes our summary of the companion report on BAH. We now turn to the other allowances we were asked to analyze: BAS and COLAs.

Basic Allowance for Subsistence

Background

BAS is a tax-free allowance meant to offset costs for a uniformed member's meals; it was first set to a uniform rate in 1808 [20-21].[12] This allowance reflects the military's history of providing room and board (or rations) as part of enlistees' pay and is not intended to offset the costs of meals for family members.[13] The military has always provided some form of BAS—ideally in kind (feeding troops directly) but in cash if necessary—to US enlisted servicemembers [21]. In contrast, the military granted officers a cash allowance but required them to arrange for their own subsistence until 1870, and it did not grant officers any allowance for subsistence from 1871 through 1922; even when a version of BAS was in effect for officers, it was updated far less often than for enlistees and therefore was tied far less closely to food costs [21, 23-25]. Reflecting these historic payment patterns, BAS is unique among the RMC components in that it is more generous for enlisted servicemembers (currently $460.25 per month) than it is for officers ($316.98). As a result, BAS is a larger share of enlisted servicemembers' RMC; for an average E-5 with six years of service and a family of four, BAS provides 6.5 percent of RMC, whereas for an O-3 with six years of service and a family of four, the figure is 3 percent [26].

For much of its history, BAS was set at a fixed level; as a result, its connection to the actual price of food was tenuous and brief as food prices changed. Annual updating of BAS levels did not begin until 1951 and was not made permanent until 1953; the methods by which it was updated varied over the next 45 years, but because these methods never explicitly included food cost measures, BAS rates continued to bear little relationship to these costs [21].

The FY 1998 NDAA was the first legislation that tied BAS values to a formal measure of food costs. It established that enlisted servicemembers should be paid a monthly amount equal to the midway point between the prior October values of the USDA's moderate and liberal food plans, which meet nearly all dietary standards based on 58 food categories and expenditures

---

[12] Although the term "basic allowance for subsistence" was first introduced in the Career Compensation Act of 1949 (along with the term "basic pay"), we refer to its prior analogues as "BAS" for simplicity [22].

[13] From 1922 to 1949, officers with dependents—but not enlisted servicemembers—were offered additional allowances for subsistence; in 1949, the Pay Committee of the Armed Services Personnel Board asserted that the purpose of BAS was to provide subsistence for servicemembers and not for their dependents. This period was the only one during which BAS or analogous payments varied by family structure [21-23].

in the top and next-highest respective quartiles of food spending for men aged 20–50; BAS growth for officers was set to the same rate as for enlisted servicemembers, but they did not have their BAS payments re-leveled [7].[14] However, annual increases were capped at 1 percent until the FY 2001 NDAA established that each year's monthly BAS rate should scale the previous year's monthly BAS rate by the percentage growth between liberal food plan costs in October of the previous year and the October one year prior, using existing BAS levels as a baseline [28].[15] Since then, BAS has grown at an average of 3 percent year. In keeping with the US military's history of providing enlisted servicemembers with a cash allowance *when direct provision of meals is not possible*, single servicemembers assigned to barracks and all servicemembers assigned to ships (whether in port or at sea) have their dining hall or galley cost deducted from BAS, regardless of where they eat [29].[16]

Because basic pay tables are linked to private sector wages, which can grow or fall independently of food costs, annual BAS changes will not necessarily mirror changes in basic pay tables; similarly, annual BAS changes may not reflect BAH changes, which are based on local housing costs.

Issues and approach

To address BAS sufficiency, we answer six questions in this report (four as directed by the QRMC and two as necessary preconditions for doing so):

1. How is BAS currently computed?
2. What purchasing power should BAS provide?
3. How often should BAS be calculated?
4. Should BAS vary by geographic area?
5. How do other measures of food prices compare with the USDA's liberal food plan?

---

[14] All USDA plans exceed dietary standards for sodium; meeting this recommendation "would require changes in food-manufacturing processes" [27]. The 20–50 age bracket, which was changed to 19–50 in September 2007, covers most servicemembers. Because male dietary needs are higher than female dietary needs on average, using the average of food for men ensures that female servicemembers are compensated sufficiently for food costs. USDA values are preferred over the Bureau of Labor Statistics' CPI for food because the CPI is tied neither to specific nutritional guidelines (e.g., changes in the cost of junk food should be less relevant to the USDA than to the CPI) nor to a specific age group (e.g., the cost of baby food is irrelevant to a servicemember's own diet).

[15] That is, $BAS_{t+1} = BAS_t * (October_t / October_{t-1})$, in which BAS_t is the monthly BAS rate in year t and $October_t$ is the cost of the liberal food plan in year t.

[16] Because this directive does not apply when servicemembers are on leave, on PCS status, on temporary duty other than sea duty, or in a handful of other contexts, these servicemembers may retain some BAS payments [29].

6.   How much would it cost to extend BAS to servicemembers' dependents?

To address the first two questions, we compared BAS values against the cost of the USDA's liberal food plan. When the FY 1998 NDAA defined BAS as the midway point between the USDA's moderate and liberal food plans, this directive seemingly established a clear standard for the needs that BAS should meet. However, BAS values have since diverged from this clear standard. We argue that tethering BAS more closely to the liberal food plan value provides an appropriate, transparent, and sustainable path forward.

To address whether annual BAS updates can sufficiently capture short-term variation in food prices, we used quarterly data from October 1999 through October 2023 on the cost of the USDA's liberal food plan for men aged 19–50 [27].[17] We then looked at how computationally simple methods of quarterly and annual BAS updating would align with actual food costs over time.

To address regional food costs, we used a county-level measure from Feeding America, a not-for-profit organization that links food banks and other food programs across the United States. Its food cost measure maps NeilsenIQ data on local food sales to categories in the USDA's thrifty food plan to compute a market basket appropriate for men aged 20–50. The weekly cost of this basket is then divided into a cost per meal [31]. We then mapped these county values to the 50 MHAs with the highest servicemember populations across all services.[18] Because these measures rely on the thrifty food plan rather than the liberal food plan, they are not directly comparable to BAS values; however, we are unaware of any data sources reporting local variation in the liberal food plan's cost.

The 2022 Status of Forces Survey of Active-Duty Members included questions related to food security (i.e., the state of having reliable access to a sufficient quantity of affordable, nutritious food) as well as the number of dependents and paygrade.[19] Across all pay categories,

---

[17] In October 2007, the USDA changed its relevant age category from 20–50 to 19–50 to better align its age brackets with those used by Dietary Reference Intakes, from which Recommended Dietary Allowances of different nutrients are drawn; however, this shift in age brackets did not lead to noticeable cost differences [30]. Quarterly data reflect values for January, April, July, and October. Our report does not account for changes to the market baskets used to determine the cost of the liberal food plan, which last occurred in 2006 and 2003 [30].

[18] MHAs are created for the Basic Allowance for Housing but are also used to calculate the Cost-of-Living Allowance (COLA) and theoretically could be used to vary BAS by location as well. Five of the 50 MHAs did not correspond to a single county. For these cases, we selected a county that substantially overlapped with the MHA. These MHAs (and the selected counties) were Norfolk/Portsmouth, Virginia (Norfolk City); Hampton/Newport News, Virginia (Hampton City); Fort Riley, Kansas (Riley County); Fort Campbell, Kentucky (Christian County); and Fort Cavazos (formerly Fort Hood), Texas (Coryell County).

[19] These data are not yet publicly available and were provided to us by RAND, which is conducting a parallel study on food security for the QRMC.

servicemembers with dependents were more likely to report food insecurity issues than were those without dependents. The difference ranges from 17 percentage points among servicemembers in the E-1 through E-4 grades to 1 percentage point among those in the O-4 through O-6 grades. In light of recent concern about food insecurity among military families, OUSD (P&R) was motivated to investigate the cost to expand BAS to include dependents as well.

To this end, we used tabulated data on household size by paygrade published by OUSD (P&R's) Compensation directorate. Unfortunately, these data do not include the ages of dependents, which we would need to map to the age-appropriate USDA food plan data. Therefore, we made assumptions about dependents' ages (and assumed a 50/50 gender mix) based on the members' paygrades.[20] To expand BAS to include dependents, DOD could track the gender and the exact age of each dependent and tailor the BAS for each family accordingly (for example, USDA has a food plan for a 12- to 13-year-old girl), or it could develop BAS rates that average by gender and by six-year age bins, as we do in our calculations. Either approach would result in the same total program cost. The cost of the USDA food plans is estimated for a family of four and involves some economies of scale (i.e., they assume the cost per person is lower in larger families and higher in smaller ones), but we assume—for simplicity of calculation—that DOD would take the published numbers at face value and not adjust them for family size.[21]

Findings

How is BAS *currently* computed?

Table 2 shows monthly BAS values for enlisted servicemembers and officers since the adoption of the current BAS formula in the FY 2001 NDAA. Our first observation is that the actual BAS values differ from those that would occur under strict adherence to the formula required by law. Most noticeably, *falling food costs do not translate into reduced BAS payments*; the USDA

---

[20] We assumed that the first dependent is a spouse, and the spouse receives BAS tied to the food plan for a woman aged 19 to 50 because the member receives BAS tied to the food plan for a man aged 19–50 (in other words, we are not assuming the member is male, just that the member is getting a male food plan). We assumed that for warrant officers, for enlisted servicemembers in the grade of E-7 and above, and for officers in the grade of O-4 and above, the second dependent is in the 12 to 18 age range, and any subsequent dependents are in the 6 to 11 age range. We assumed that for E-6s and O-3s, the second dependent is in the 6 to 11 age range, and subsequent dependents are younger than 6. For personnel more junior than E-6 or O-2, we assumed that all dependents other than the spouse are under 6. These assumptions align with the age assumptions we made in our previously published BAH report.

[21] Making the adjustment would increase the program's total cost because families of four or fewer are more common than families larger than that.

liberal food plan costs decreased in 2010, 2017, and 2019, but BAS underwent no adjustments.[22] Our second observation is that using the unrounded growth in food costs tends to result in overestimates of BAS (e.g., for each year from 2002 through 2009, actual enlisted BAS was slightly lower than the strict formula predicts). As a result, BAS grew by 98 percent over the period instead of by 87 percent, as based on the value under strict adherence to the formula established in 2001. We identified a formula that better predicts BAS behavior: we round the ratio of the October liberal food plan cost to that of the previous October to three decimal places, and then we multiply the result by the previous BAS and use either this result or the previous BAS, whichever is higher.[23] Table 2 shows that compared to the strict legal formula, our modified formula comes much closer to actual BAS values (diverging by $0.27 from actual enlisted BAS values as of 2024, versus $24.75 under strict implementation of statutory requirements).

Table 2.   BAS values by calendar year

Year	Officers			Enlisted			USDA liberal food plan values for prior October
	Actual	Strict formula[a]	Modified formula[b]	Actual	Strict formula[a]	Modified formula[b]	
2024	$316.98	$299.84	$317.07	$460.25	$435.50	$460.52	N/A
2023	$311.68	$294.87	$311.77	$452.56	$428.28	$452.82	$450.70
2022	$280.29	$265.10	$280.37	$406.98	$385.04	$407.21	$405.20
2021	$266.18	$251.75	$266.25	$386.50	$365.65	$386.72	$384.80
2020	$256.68	$242.72	$256.75	$372.71	$352.54	$372.92	$371.00
2019	$254.39	$240.56	$254.46	$369.39	$349.40	$369.59	$367.70
2018	$254.39	$241.87	$254.46	$369.39	$351.31	$369.59	$369.70
2017	$253.63	$241.09	$253.70	$368.29	$350.17	$368.49	$368.50
2016	$253.63	$245.99	$253.70	$368.29	$357.29	$368.49	$376.00
2015	$253.38	$245.73	$253.45	$367.92	$356.91	$368.12	$375.60
2014	$246.24	$238.80	$246.31	$357.55	$346.84	$357.74	$365.00
2013	$242.60	$235.20	$242.67	$352.27	$341.61	$352.46	$359.50

[22] It is not clear whether this lack of adjustment is consistent with the law's intent. Section 402 of Title 37, United States Code, is worded in a way that implicitly assumes food prices increase rather than decrease.

[23] That is, as written in law, the formula for updating BAS appears to be:

$$BAS_{t+1} = BAS_t * \frac{Oct_t}{Oct_{t-1}}$$

However, in practice, it appears to be:

$$BAS_{t+1} = \max \left\{ BAS_t, \quad BAS_t * round\left(\frac{Oct_t}{Oct_{t-1}}, 3\right)\right\}$$

In which BAS_i provides the BAS level for calendar year i, Oct_j provides the value of the liberal food plan in calendar year j, and $round(x, k)$ is a function rounding real number x to k decimal places.

Year	Officers			Enlisted			USDA liberal food plan values for prior October
	Actual	Strict formula[a]	Modified formula[b]	Actual	Strict formula[a]	Modified formula[b]	
2012	$239.96	$232.65	$240.03	$348.44	$337.91	$348.62	$355.60
2011	$223.84	$216.95	$223.90	$325.04	$315.10	$325.21	$331.60
2010	$223.04	$216.16	$223.01	$323.87	$313.96	$323.91	$330.40
2009	$223.04	$223.23	$223.01	$323.87	$324.22	$323.91	$341.20
2008	$202.76	$202.88	$202.74	$294.43	$294.67	$294.47	$310.10
2007	$192.74	$192.87	$192.72	$279.88	$280.13	$279.91	$294.80
2006	$187.49	$187.57	$187.47	$272.26	$272.44	$272.29	$286.70
2005	$183.99	$184.04	$183.97	$267.18	$267.30	$267.21	$281.30
2004	$175.23	$175.21	$175.21	$254.46	$254.48	$254.48	$267.80
2003	$167.20	$167.22	$167.19	$242.81	$242.88	$242.83	$255.60
2002	$166.37	$166.37	$166.36	$241.60	$241.65	$241.62	$254.30
2001	$160.42	$160.42	$160.42	$233.00	$233.00	$233.00	$245.20

Source: [27, 32].

Because Table 2 shows that BAS values rise with the cost of the liberal food plan but do not fall when these costs do, we can reasonably speculate about the extent to which BAS's purchasing power has increased over time. We show this increase in Figure 3, which graphs enlisted BAS values as well as the previous October's moderate and liberal food plan costs. We focused on enlisted BAS rather than officer BAS and the previous October rather than current-year food prices because both are directly referenced in the BAS determination formula. We can see that BAS was always closer to the liberal food plan than to the moderate food plan, grew closer to the liberal food plan in 2010, and caught up to it by 2018.

Figure 3.   Current year's monthly enlisted BAS and previous quarter's moderate and liberal food plan costs

Current BAS vs. lagged liberal/moderate food plans
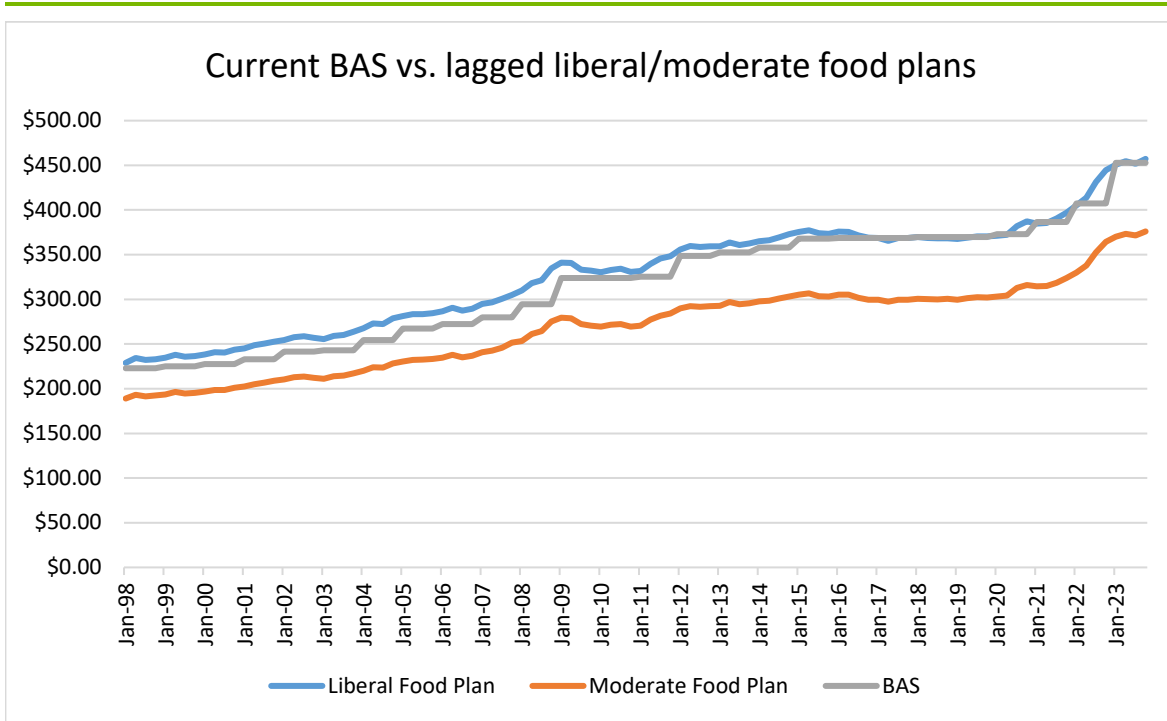
Source: CNA analysis of [27, 32].

Figure 3 shows that at the outset of every calendar year since 2017, enlisted BAS costs have exceeded the cost of the prior quarter's liberal food plan (because January BAS values are based on October food plan costs) and will likely continue growing relative to this baseline.[24] This outcome is the cumulative effect of two decades of BAS rising when food prices rise but not falling when food prices fall. As a result, BAS has become untethered from the standard Congress initially intended for it and will continue to grow in purchasing power relative to any standard.

What purchasing power should BAS provide?

Two clear arguments exist for rethinking how BAS values are set. First, as shown above, without a change in policy, BAS values will continue to rise in real terms whenever food costs

---

[24] Due to falling food costs, BAS values for all of 2018 exceeded the prior quarter's liberal food plan costs.

fall. Anchoring BAS to a fixed reference point will ensure that it can provide a consistent value into the future. Second, by setting BAS equal to the midpoint of the moderate and liberal food plans in 1998 but then having its growth mirror only that of the liberal food plan starting in 2001, Congress set up BAS in a way that prevents it from having an obvious or easily interpretable benchmark. Although actual growth patterns and unwritten policies have led BAS to converge with liberal food plan values, one can easily imagine a scenario in which flat liberal food plan values and rising moderate food plan values eventually would cause the moderate food plan's value to exceed the congressional BAS formula.[25] Although this scenario obviously has not occurred, it illustrates that the statutory text could yield a wide range of outcomes—not all of which could logically match Congress's intent.

Therefore, we recommend that BAS values be defined to explicitly recenter on liberal food plan values whenever BAS is updated. By doing so, Congress would prevent upward creep in purchasing power by referencing the values of the liberal food plan as well as its growth. The law would then provide a clear standard that servicemembers could easily understand, and servicemembers could even see the precise values used in computing BAS, increasing trust in the military compensation system.[26] And this recommendation does not reduce servicemembers' overall compensation. It should be possible to implement this recommendation while maintaining the rule that BAS values cannot fall; if liberal food plan values fall, DOD could delay BAS increases until after the cost of the liberal food plan once again exceeds BAS payments. [27]

To analyze how often DOD should calculate BAS, we must define a standard against which to compare different updating methods. Therefore, we evaluated BAS against the cost of the current year's liberal food plan, as we describe in the next section.

How often should BAS be calculated?

In this section, we examine four sets of BAS values against actual USDA liberal food plan values:

1. Actual BAS values

---

[25] In this scenario, BAS values would have remained stable to match the stability of the liberal food plan. Because moderate food plan values do not affect BAS values under the congressional formula, they could in theory converge with liberal food plan values whereas BAS values would remain unchanged.

[26] If BAS continues to be updated annually, there also would be a brief period at the end of each calendar year during which servicemembers could compute the upcoming year's BAS values.

[27] Doing so might require rewriting statute to allow BAS to remain constant in these cases, rather than mandating it increase; alternatively, it may be worth investigating whether holding BAS constant while its benchmark value falls could be considered an up-front increase for when the benchmark value eventually rises again. Or aligning BAS values with liberal food plan values *whenever BAS is updated* might accomplish this intent.

2. Quarterly updating that projects the prior quarter's growth in food plan values on top of that quarter's food plan value (i.e., January 2001 uses October 2000 as a starting point and then adds the difference between the October 2000 and July 2000 values)

3. Annual updating under a hypothetical scenario in which we can perfectly predict the average liberal food plan value over the course of each year

4. Annual updating that projects 25 percent of the previous year's October-to-October growth in the liberal food plan values on top of the previous October's food plan value (i.e., January 2001 uses October 2000 as a starting point and then adds 25 percent of the difference between the October 2000 and October 1999 values)

For formulas 2–4, we mirrored current policy by adding the restriction that BAS cannot fall; if the formula is lower than the previous year's BAS, BAS will remain at the previous year's value. Formula 3 presents a best case scenario for annual updating to both illustrate the challenges in actual BAS projection and demonstrate the degree of quarter-to-quarter error inherent in even a perfect annual projection (because liberal food plan values vary over the course of the year, but BAS would remain fixed). There are many other possible ways to update BAS values; we focus on these four as representative examples for conciseness, and we discuss several more in Appendix A: Weighting Schemes for Annual BAS Updating.

Importantly, whenever formulas 2–4 are updated, they reference the *level* of the liberal food plan, not just its growth. In this way, these formulas ensure that BAS values track food plan values and cannot continue to drift upward in purchasing power.

Evaluating BAS formulas requires weighing tradeoffs among three priorities: (1) ensuring long-term accuracy on average, (2) ensuring month-to-month accuracy, and (3) not falling below the target value (i.e., the liberal food plan).[28] Table 3 presents three illustrative scenarios to compare these three priorities. Although the scenarios themselves are unrealistic, they illustrate how pursuing each priority might conflict with the other two.

---

[28] Priority 3 may be relevant for both substantive and messaging reasons, depending on the degree of shortfall and the target chosen.

Table 3.   Examples of competing priorities for BAS forecasting

Scenario	Long-term average accuracy	Month-to-month accuracy	Meets or exceeds target
BAS overshoots liberal food plan by $100 half the time and undershoots by $100 half the time	Best (perfect on average)	Worst (off by $100)	Middle (half the time)
BAS is always $5 below liberal food plan	Middle (off by $5)	Best (off by $5)	Worst (never)
BAS is always $20 above liberal food plan	Worst (off by $20)	Middle (off by $20)	Best (always)

Source: CNA.

To evaluate these priorities, columns in Table 4 show the total net error (i.e., multiplying the month's error by 3 to obtain the quarterly error and then summing across quarters), the mean quarterly error, and the standard deviation of the quarterly error. *Net error* means that positive errors (BAS is higher than the liberal food plan) and negative errors (BAS is lower than the liberal food plan) cancel each other out, so it is theoretically possible for the total net error over the 23-year span to be zero even if there is an error each quarter. The mean quarterly error is equal to the total net error divided by 76 (the number of quarters in 2001 through 2019) or 92 (the number of quarters in 2001 through 2023). Even if the net total error and average error are both zero because of positive and negative errors canceling over time, the standard deviation will capture how much they swung back and forth. We also include the total number of "positive quarters" (i.e., in which BAS exceeded the value of the liberal food plan). This column is difficult to interpret without context. As illustrated in Table 3, the degree of overshooting or undershooting must also be considered; however, if BAS frequently undershoots its target value, then servicemembers might understandably begin to doubt how important this target value actually is. By contrast, servicemembers are likely to view equal frequency of overshooting and undershooting as a proxy for fairness—even if it does not produce optimal outcomes in other metrics.

Table 4.   Accuracy of food cost projections

	2001–2019 (76 quarters)				2001–2023 (92 quarters)			
	Total net error	Mean error	Std. dev.	Pos. qtrs	Total net error	Mean error	Std. dev.	Pos. qtrs
Historic BAS	-$3,052.62	-$40.17	$29.10	6	-$3,628.32	-$39.44	$31.00	9
Quarterly[a]	$1,089.30	$14.33	$16.38	58	$1,209.00	$13.14	$16.11	69
Perfect annual[b]	$293.10	$3.86	$12.72	46	$293.10	$3.19	$15.83	53
Actual annual[c]	$333.90	$4.39	$25.83	43	-$0.30	$0.00	$30.98	49

Source: CNA analysis of [27].

[a] For example, the predicted value for January 2001 would be $\max\{BAS_{2001}, Oct_{2001} + (Oct_{2001} - Jul_{2001})\}$.

[b] Computed as the greater of last year's BAS and the upcoming year's average value.

[c] For example, the predicted values for all of 2001 would be $\max\{BAS_{2001}, Oct_{2001} + 0.25 * (Oct_{2001} - Oct_{2000})\}$.

In Table 4, we show the results for two time periods. First, we show the results for the 2001–2023 period to take advantage of all available data. Second, we show the 2001–2019 period because the COVID-19 pandemic, rising inflation, and the subsequent price stabilization produced unusually large swings in BAS predictions for the 2021–2023 period and unusually large errors for 2022 and 2023 (restricting predictions to pre-COVID years may therefore better illustrate their accuracy going forward).

Table 4 shows, unsurprisingly, that actual BAS values have underpaid on average relative to the liberal food plan; however, both our quarterly and annual updating metrics would have overpaid in 2001–2019, and annual updating would have nearly perfectly matched liberal food plan costs in 2001–2023. We found this outcome because both options index directly to the liberal food plan and do not allow BAS rates to fall. When food costs fall, the floor on BAS values means that BAS will be unable to fall to meet the new target value and will consequently overpay; this fact introduces (positive) error when there otherwise might not have been any.

The most surprising element of Table 4 may be that perfect annual updating has a smaller amount of both overall and quarter-to-quarter error than quarterly updating (as illustrated by its smaller standard deviation). This finding chiefly reflects that under quarterly updating with a BAS floor, very few BAS values will be below their target (and those that are will be only slightly below), meaning that quarterly updates will have many positive errors and very few negative ones. Perfect annual updating instead allows for a mix of positive and negative errors and does not have to respond to every quarterly price change if any of these cancel out over the year. However, we note that the advantage in quarter-to-quarter error practically disappears when accounting for 2020–2023. When food prices rise drastically over the year, paying the average value means overpaying substantially at the beginning and underpaying at the end (or vice versa when prices fall). Figure 4 illustrates this outcome and shows that perfect annual updating is more accurate than quarterly updating when food prices are relatively

stable (such as 2015 through 2019), but they are less accurate when food prices are rapidly increasing (such as 2021 and 2022).

Therefore, annual updating *can in theory* be preferable to quarterly updating. Row four of Table 4 and the orange line of Figure 4 show that annual updating *in practice* can perform considerably better than quarterly updating at achieving priority 1 (ensuring long-term accuracy on average) but performs worse at achieving priority 2 (ensuring month-to-month accuracy) and priority 3 (not falling below the target value). Annual updating comes close to actual liberal food plan values on average, but it does so through a combination of overshooting and undershooting its target values—in particular, it tends to undershoot actual liberal food plan values during periods of sustained growth (such as 2007–2008 or 2021–2022) and then overshoot once this growth comes to an end (such as 2009–2011 or 2023).

Figure 4.   Accuracy of food cost projections
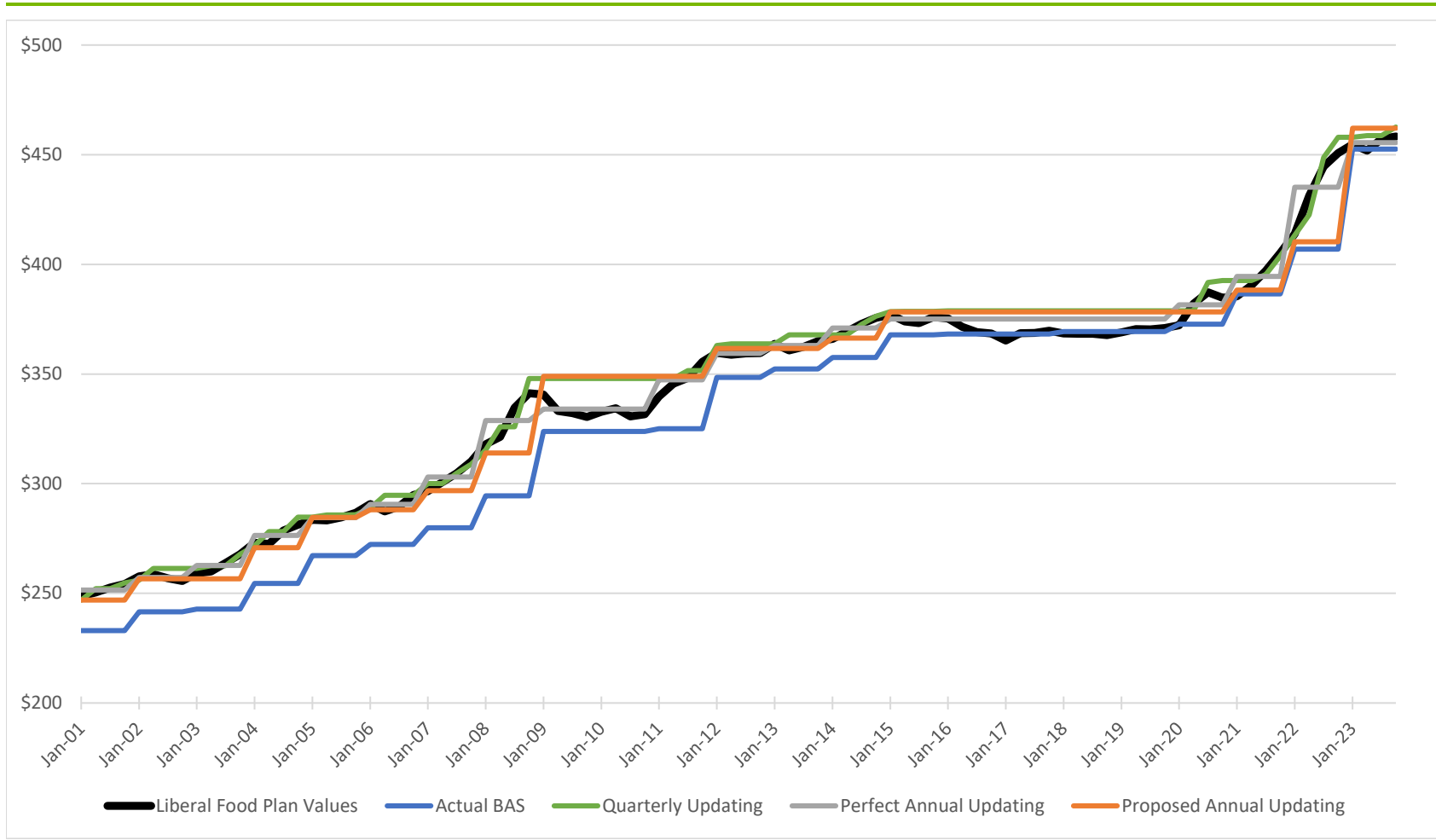
Source: CNA analysis of [27].

It is possible that other methods of annual updating may be preferable to the ones we present here. Identifying an optimal weight on the previous year's liberal food plan growth requires consensus on the relative importance of priorities 1 through 3, which is a political decision that CNA cannot make on its own; however, we discuss in Appendix A why a weight of 0.25 on the previous year's growth in liberal food plan costs could be preferable to a weight of 0, 0.50, or 1. Additional guidance on DOD or congressional objectives in setting BAS values would allow us to better determine an optimal weight. Alternatively, examining growth over multiple years or using non-linear projection might increase the accuracy of BAS relative to current food costs; however, because any gains are likely to be marginal and would come at the cost of computational simplicity and transparency, we recommend against taking these steps.

We are therefore left with the following initial findings (assuming that BAS values cannot fall):

- **In theory**, annual updating can be much more accurate than quarterly updating both in the long run and from quarter to quarter—but only if the USDA-published liberal food plan costs could be known perfectly in advance.
- In practice, **annual updating can be more accurate than quarterly updating** in the long run.
- Annual updating is considerably **less accurate from quarter to quarter**, especially during prolonged periods of increasing or decreasing food costs.
- Annual updating will **underpay more often and by larger amounts** than quarterly updating.

When evaluating quarterly versus annual BAS updating, DOD and Congress also should consider a variety of challenges associated with more frequent updates. In particular, there may be costs associated with more frequently publishing updated BAS values, updating the costs of any goods or services indexed to these values, and incorporating new BAS values into paychecks. Although servicemembers would require instruction regarding why their pay is updated more frequently (and perhaps reassurance that it will not decrease as a result of shifting to quarterly updating), some instruction would be necessary for any BAS reform.

Should BAS vary by geographic area?

Figure 5 shows county-level variation in the cost per meal for food-secure individuals across the 50 MHAs containing the most servicemembers, using data on the county to which each MHA belongs (or selecting one county if an MHA overlaps multiple counties).[29]

Figure 5 shows wide geographic variation in food costs. Food costs in the most expensive MHA (Honolulu County, Hawai'i) are 50 percent higher than those in the least expensive MHA (Fort Cavazos, Texas); even focusing on CONUS locations, food costs in the Washington, DC, Metro Area are still 50 percent higher than those at Fort Cavazos, and costs at Fort Riley (Kansas) are more than 36 percent higher. Even omitting the 10 most expensive and 10 least expensive MHAs, the 11th-most expensive MHA (Fort Meade, Maryland) has costs more than 14 percent higher than in the 40th-most expensive MHA (Fort Johnson, Louisiana). These findings demonstrate meaningful variation in food costs that cannot be fully explained away as OCONUS costs or as distortions caused by a handful of disproportionately inexpensive or expensive MHAs.

Nevertheless, we urge caution in interpreting these findings. We found variation in food costs based on the lowest cost USDA food plan (i.e., the thrifty food plan), whereas BAS values nearly approximate the highest cost plan (i.e., the liberal food plan). Although the methodologies for creating the two baskets are not perfectly comparable, the food types in each plan are quite different:

- Both plans have similar total amounts of vegetables, but the thrifty plan has more starchy, red, or orange vegetables and fewer dark green and "other" vegetables.[30]

- The liberal food plan contains nearly a pound more fruit per week than the thrifty food plan, and far more of this amount comes from whole fruits (versus fruit juices) than in the thrifty food plan.

- Almost all of the grain in the thrifty food plan comes from whole and refined staple grains (such as bread, rice, and tortillas), whereas the liberal food plan allows for more whole grain cereals and whole grain snacks.

---

[29] We selected the county to align with the *name* of the MHA or maximized spatial overlap using Google Maps. Because San Diego County contains both the San Diego MHA and Camp Pendleton, these 50 MHAs cover only 49 counties. If results were presented for 50 counties rather than 50 MHAs, the 50th county would be Lowndes County, Georgia, which contains Moody Air Force Base. Lowndes County had a 2021 food-secure cost per meal of $3.72 and weighted monthly need of $93.87.

[30] The thrifty plan contains "red and orange vegetables" and "starchy vegetables," whereas the corresponding categories in the liberal plan are "orange vegetables" and "all potato products."

- Most of the dairy in the liberal food plan is low fat, whereas the dairy in the thrifty food plan is evenly split between low-fat and high-fat milk and yogurt.
- The liberal plan has approximately twice as much red meat and a quarter as many eggs as the thrifty plan.
- The liberal food plan allows for far more soft drink consumption than the thrifty food plan.[31]

---

[31] The liberal plan allows for 3.3 pounds per week of "soft drinks, sodas, fruit drinks, and ades (including rice beverages)," whereas the thrifty plan allows for 0.42 pounds of "other foods and beverages (e.g., soft drinks, fruit drinks, ice cream, pudding, cookies, candy bars)."

Figure 5.   2021 food-secure people's costs per meal in the 50 largest MHAs
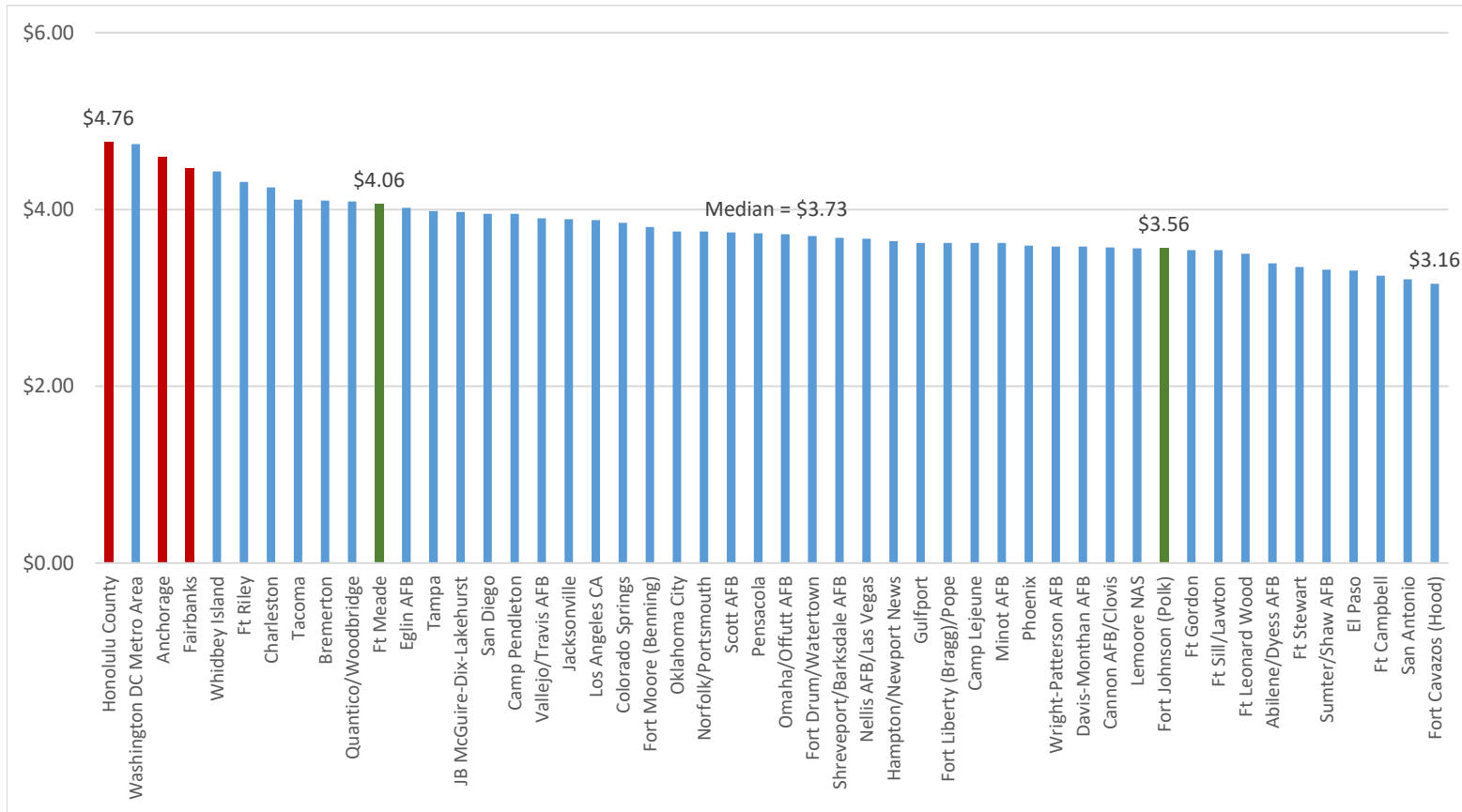
Source: CNA analysis of [31].
Note: Red values represent OCONUS MHAs. Green values represent the 11th and 40th most expensive MHAs (i.e., omitting outliers to focus on the middle 60 percent of MHAs).

Because the liberal food plan contains very different food *types* than the thrifty food plan, it is reasonable to assume that geographic variation in the liberal food plan's costs will not perfectly mirror those of the thrifty food plan. As a result, we cannot simply scale up the food quantity in the thrifty food plan or use more expensive versions of similar groceries. Although the costs of the liberal food plan surely reflect some local variation, we cannot do more than theorize about whether it is larger or smaller than the variation of the costs of the thrifty food plan without undertaking a large-scale data collection effort.

Even if the cost variation in the liberal food plan was identical to that in the thrifty food plan, it would not necessarily imply that changing BAS values would be the proper response. Servicemembers with convenient access to mess halls or wardrooms have the cost of these meals indexed to BAS, and they therefore have a degree of insulation from local food costs. Commissaries also can provide a cheaper source of groceries in more expensive areas, providing another degree of insulation from local food costs for food consumed outside of mess halls. As a result, variation in local food costs is likely to be the most relevant for servicemembers who do not have convenient access to these sorts of on-base amenities (or who are stationed at smaller bases where they may have reduced hours or offerings).

Unfortunately, because we cannot separately identify servicemembers who use on-base amenities out of convenience, those who use them out of financial necessity, those who are unable to use them, and those who choose not to use them, we cannot say exactly how many servicemembers are negatively affected by cost variation or to what extent.[32] However, although the precise scale is unclear, most servicemembers in high-population MHAs are unlikely to have to fully bear the cost of higher local food prices.

Variation in food costs *would* have to be borne by any accompanying dependents in high food cost areas. However, dependents are accounted for in CONUS COLA, which considers the overall cost of living (of which food is one component), but not in BAS. In areas with particularly high food costs, then, either COLA will be available or other costs of living (such as

---

[32] We also would need to assess whether appropriate remedies differ for each. For example, a servicemember whose schedule or job duties do not allow access to on-base amenities, a second who lives off base but can afford to shop and eat only on-base, and a third who chooses to live far off base to enroll their children in a high-quality school are all negatively affected by high local food prices. However, the degree of unavoidable and avoidable harm is different for each, and policy-makers may be differently sympathetic to each. In particular, servicemembers who *choose to pay more* for food off base do so because they wish to get access to some other amenity, such as cheaper housing, a shorter commuting distance for their spouse, or high quality public schooling; servicemembers who *have to pay more* for food off base because their job duties or duty station do not allow access to food on base do not necessarily have a specific benefit that outweighs these higher prices.

personal care or transportation) will be sufficiently low that overall costs will be below the COLA threshold.[33]

As a result, we can make the following claims:

- The minimum food cost necessary to meet nutritional requirements varies substantially by MHA. Although it is unclear how this variation translates to the food baskets that determine BAS values, some notable local variation almost certainly remains.

- Even if the food costs for a comparable civilian drastically vary across MHAs, it is unclear how much of this cost difference gets passed on to servicemembers (or whether every dollar of additional cost is equally harmful).

- To the extent that local variation in food costs affects dependents, this variation is better addressed through COLA than through BAS.

How do other measures of food prices compare with the USDA liberal food plan?

To accurately index BAS to food costs, DOD will need an appropriate measure of food costs. Although the liberal food plan is the most appropriate reference point that the USDA offers, other organizations that track food costs may compute a market basket that better matches servicemembers' nutritional needs.

We examined two potentially relevant market baskets: the Retail Price Schedule (RPS), which is used as a component in determining OCOLA, and the CPI, which is used to compute overall US inflation.[34] In practice, these two indices are the same—both were designed by BLS, collect data on the prices of the same food types, and use the same quantity of each item in computing the basket's cost.

We believe the USDA's construction to be superior to the BLS's construction used in OCOLA and in the CPI in part because the USDA's costs are tailored specifically to the 19–50 age group. Because it is not designed with a specific age group in mind, the BLS construct contains baby food and formula—which may be relevant to military families but not to servicemembers themselves. In addition, it is reasonable to assume that the composition of the market basket reflects the nutritional needs of children, adolescents, and senior citizens, all of whom have

---

[33] We discuss both the costs of expanding BAS to dependents and also the overall sufficiency of COLA and whether its threshold is set appropriately later in this report.

[34] Other countries may develop their own baskets based on what they consider an ideal or representative diet, but they do not provide a good comparison point for the US.

different total and relative needs for different food groups (e.g., within the USDA's liberal food plan, children require far less food overall than adult men, but a much larger share of their diet is recommended to be dairy products).

In addition, the BLS construct contains four categories of alcoholic beverages that are arguably necessary for computing overall food costs but that DOD may not wish to factor into servicemembers' daily lives, let alone be seen as subsidizing.[35] Finally, several food categories reflect corporate costs or convenience categories rather than a distinct nutritional need, and therefore these categories do not have an analogue in the USDA's food plans.[36] These consumption forms are either less relevant to servicemembers or may be expense types that DOD does not wish to factor into basic pay (though under different reasoning than alcohol).

How much would it cost to extend BAS to servicemembers' dependents?

The cost of extending BAS to families depends on whether the dependents receive the liberal food plan or the moderate food plan, which is still based on the second-highest quartile of household incomes. In the former case, we estimate that the annual cost of BAS for dependents would be $6.2 billion.[37] The moderate food plan for dependents would cost $5 billion.[38] To put these costs in perspective, applying the 2024 BAS rate to the reported number of servicemembers would generate a current program cost of $6.6 billion, so extending BAS to dependents would almost double BAS costs.

Based on the data available for this study, we were unable to determine the number of dual-military households in which both servicemembers receive BAS. As a result, our cost estimates of extending BAS to dependents overstate the actual cost. Our cost estimates also assume that officers' dependents would rate the same BAS as enlisted servicemembers' dependents; if officers' dependents received less, the program cost would go down.

---

[35] These categories are "distilled spirits at home," "wine at home," "alcoholic beverages away from home," and "beer, ale, and other malt beverages at home."

[36] These categories are "full service meals and snacks," "limited service meals and snacks," "food at employee sites and schools," "food from vending machines and mobile vendors," and "board, catered events, and other food away from home."

[37] We applied an average annual cost of $2,823 per child under age 6, $4,330 per child aged 6–11, $4,902 per child aged 12–18, and $4,870 per spouse to counts of dependents in each paygrade.

[38] We applied an average annual cost of $2,330 per child under age 6, $3,710 per child aged 6–11, $4,087 per child aged 12–18, and $3,818 per spouse to counts of dependents in each paygrade.

To be clear, CNA advises against expanding BAS to dependents on both philosophical and practical grounds. On a philosophical level, BAS reflects DOD's commitment to individual servicemembers rather than to their families as a whole; BAS has never been extended to enlisted servicemembers' families, and the 27 years during which it was extended to officers' families ended with an explicit statement that it was intended only for servicemembers. Expanding BAS to all servicemembers' dependents would be expanding benefits far beyond their original intent.[39] Practically speaking, both sides of Congress might balk at an additional $5–7 billion in annual military spending—especially when there may be alternatives that appeal to both sides. Expanding BAS would provide a fixed benefit to *all* servicemembers' families, regardless of need, rather than targeting those who are facing food insecurity. To the extent that some servicemembers' families do face food insecurity, it would be more effective to identify where and how this need arises and to target it directly through narrower tools, such as expanded COLAs or expanded access to on-base amenities (or through measures that apply to civilians and servicemembers alike, such as expanding the Supplemental Nutrition Assistance Program).

Having considered relevant planning factors that would inform possible BAS reforms, we now pivot to COLAs.

---

[39] In theory, providing benefits on a per-dependent basis could lead to unintended consequences among both existing servicemembers (e.g., incentivizing servicemembers to have additional children because the cost of raising a child has fallen) and prospective servicemembers (e.g., making military service more attractive to individuals with more dependents or who plan to have larger families). We were not able as part of this study to evaluate the extent to which these benefits would lead to altered behavior, let alone make a value judgement about any changes in behavior. The cost of having and raising a child is far higher than any amount BAS would pay, and non-monetary considerations mean that having children is not strictly a cost-benefit exercise. However, it is important to note that these incentives exist, if only to note that any back-of-the-envelope calculations presented here would likely represent the lower bounds of the cost of expanding BAS to cover dependents.

CONUS Cost-of-Living Allowance

Background

CONUS COLA is a taxable, supplemental allowance designed to help offset expenses for servicemembers assigned to expensive CONUS areas. The rate varies by geographic location and by "spendable income," which is a function of rank, years of service, and number of dependents.[40] The QRMC director asked us to determine whether changes to the current methodology for calculating CONUS COLA are needed.

Because the cost of living varies across the US, the military has developed allowances to help offset the inequity that servicemembers experience if they must live in more expensive locations. Although BAH is designed to compensate servicemembers for higher housing costs in expensive locations, COLA is designed to assist with higher expenses in other categories, such as food, clothing, and transportation. Unlike BAH, COLA is provided to servicemembers whose official quarters are government owned, such as barracks or ships.

DOD employs a contractor who provides cost-of-living differentials for non-housing expenditures for a given family size and income level. The contractor develops a "standard city" that represents the average expenditures for a particular market basket of goods and services for a typical civilian household. To calculate the COLA indices, the contractor also collects costs for the same market basket in at least 300 locations nationwide where servicemembers are stationed. The contractor then develops an index representing the amount of income needed to purchase the same items in each location relative to the cost for the standard city.

According to a government facility savings metric computed as part of CONUS COLA, if military commissaries or exchanges are available near a member's place of duty, that member's expenditures will be lower than those of a comparable civilian. The presence or absence of facilities has a major effect on the CONUS COLA's calculation. Even without these facilities, most locations do not qualify for CONUS COLA because the average expenses do not meet the established threshold index of 108 when compared to the baseline (national average) cost-of-living index, which is normalized to 100. That is, non-housing costs in most locations are not

---

[40] Specifically, the rate comes from a table in which the row is determined by the range in which the member's RMC falls and the column is determined by number of dependents. The spendable income in the selected cell has been calculated from BLS data indicating how much a household with a given income has left to spend after taxes, insurance, housing expenses, gifts and cash contributions, and savings. The amount is increasing in number of dependents because on average larger families are taxed less, save less, and receive more subsidies.

greater than 8 percent above the standard city for the standard market basket of goods and services. For example, an area with a COLA index of 115 would be eligible for a COLA payment of 7 percent. An area with a COLA index of 107.9 would not receive CONUS COLA. The rationale for this threshold is that servicemembers are stationed in lower cost areas at some times and higher cost areas at other times, so the costs will balance out over the course of a career, unless at some point they are stationed in an area that is a true high-cost outlier.

The FY 2024 NDAA authorized DOD to lower the CONUS COLA threshold from 108 to as low as 105, and DOD has chosen to lower it to 107. In what follows, we consider the cost implications of further reductions.

Approach

To advise on the suitability of the current methodology for setting CONUS COLA, we first needed to understand the methodology. After a thorough review of documentation sent by OUSD (P&R), CNA arranged for several meetings with OUSD (P&R) to clarify the material. We also met with the Defense Commissary Agency (DeCA) to clarify how commissary prices and commissary savings are computed.

Finally, we met with the DOD contractor who collects the RPS data for the 150-item market basket of goods and services to clarify how these prices are collected.

The triennial Living Pattern Survey (LPS) measures where servicemembers shop and the proportion of shopping that occurs on military installations (such as at commissaries and exchanges), at local community outlets, and online. CNA looked at the total sales to active-duty servicemembers and their dependents at individual commissaries to see whether those data support the LPS results with respect to the percentage of items bought at commissaries versus off-base retail stores.

We found that 300 MHAs and about 150 ZIP codes not in an MHA have a computed COLA index. We were able to uniquely match 39 MHAs with 1 of 17 core-based statistical areas (CBSAs) in CONUS for which the Federal Reserve Economic Data (FRED) publishes the CPI-less-shelter series.[41] Two other CBSAs with a published CPI-less-shelter series are OCONUS. Comparing the COLA index for these MHAs to the CPI-less-shelter ratio for the corresponding CBSAs requires a crosswalk, which we provided to OUSD (P&R).

---

[41] Some of these price index series are monthly, some are bimonthly, and some are annual. Any of the above are suitable for COLA because it is updated annually.

FRED publishes each of these series indexed to a historical baseline for that series, so they reveal the cumulative change in costs in that area since the early 1980s. Since not every area had the same costs then either, it is not obvious whether these CBSA cost indices relative to the national average CPI-less-shelter ratio would be strongly correlated with COLA indices for the corresponding MHAs. We ran a linear regression model to test whether these CBSA CPI-less-shelter indices have predictive power for COLA indices despite this caveat.

$$Y_{it} = a + d_1 D2022_t + d_2 D2023_t + d_3 D2024_t + bX_{it} + e_{it}$$

for i = 1 to 39 and t = 2021, 2022, 2023, or 2024,

in which Y_{it} is the CONUS COLA index for MHA i in time period t, X_{it} is the CPI-less-shelter ratio for the CBSA that contains MHA i in time period t, D2022 it is an indicator variable equal to 1 if t = 2022 and zero otherwise, D2023 is an indicator variable equal to 1 if t = 2023 and zero otherwise, D2024 is an indicator variable = to 1 if t is 2024 and zero otherwise, and e_{it} is a random error term. The terms a, b, d_1, d_2, and d_3 are coefficients to be estimated. If the estimate of coefficient b is positive and statistically significantly different from zero, then it strongly suggests there is a positive relationship between the CBSA CPI-less-shelter ratio and the CONUS COLA indices, providing evidence that the CONUS COLA index is valid. We also can use this regression to identify "outlier" MHAs by removing a suspected MHA-year outlier from the model and comparing the actual COLA index for that MHA in that year to what the model would have predicted it to be.

Using 2023 COLA data available from OUSD (P&R) at the time, we estimated the added cost to reduce the CONUS COLA threshold from 108 to lower levels (i.e., 107, 106, 105). We later reviewed an OUSD (P&R) analysis that calculated the increased costs using 2024 CONUS COLA data.

We found that the procedure OUSD (P&R) used was very close to the methodology we had used, and we believe that the OUSD (P&R) calculations represent a reasonable estimate of the increased costs when the CONUS COLA threshold is reduced.

The OUSD (P&R) analysis used personnel data for BAH recipients. One difference in our analyses was that we added an additional number of personnel based on an estimate of the number living in barracks who do not receive BAH. If a future cost analysis is needed, we recommend adding personnel who are not drawing BAH to the calculation's numbers.

The following information is needed to compute the cost of lowering the threshold:

1. The number of servicemembers stationed at each of the COLA-eligible locations

2. The dollar amount each servicemember receives per COLA point (e.g., the amount their COLA rate increases if their MHA's COLA index increases from 109 to 110)

A count of eligible members in an MHA would include both those who receive BAH and those in government housing. OUSD (P&R) provided us with the data on the number of servicemembers who receive BAH at each eligible location.

To estimate the number of servicemembers assigned to barracks at each eligible location, we made the following assumptions:

1. 22.9 percent of total military are E-1 to E-3 (2021 Demographic Report).
2. 71.2 percent of E-1 to E-4 are unmarried (2021 Demographic Report).
3. 85 percent of E-1 to E-3 are unmarried (assumption based on 2).

Applying the first and third assumptions, we estimate that approximately 20 percent (0.229 x 0.85) of all servicemembers are unmarried E-1 to E-3 who live in the barracks. If we assume for simplicity that the other 80 percent of servicemembers receive BAH, we can estimate the total number of servicemembers in an MHA as the number of BAH recipients x 1.25 (that is, divided by 0.8).

The dollar amount each servicemember receives per COLA point depends on their income and number of dependents. We estimated it using planning factors provided by OUSD (P&R) because the actual mix of paygrades and family size varies across MHAs. These planning factors indicate that servicemembers with dependents receive $33 to $59 per COLA point and that servicemembers without dependents receive $22 to $45 per COLA point.

Because the dollar amount per COLA point depends on paygrade, marital status, years of service, and number of dependents, we divided the population of servicemembers at each eligible location into four categories and assigned each category a dollar amount per COLA point:

1. Single enlisted: $34.00 (approximate midpoint of without-dependents range)
2. Married enlisted: $46.00 (midpoint of with-dependents range)
3. Single officer: $45.00 (top of without-dependents range)
4. Married officer: $59.00 (top of with-dependents range)

Findings

Although the current process used to collect prices and calculate the CONUS COLA index for each CONUS MHA is detailed and thoroughly documented, its output is not well understood.

Living Pattern Survey and commissary sales

The LPS at different locations shows large differences in the percentage of goods purchased at on-base commissaries. Differences may be due to commissary savings relative to local off-base prices, the size of the commissary and available selection there, and the relative accessibility of the commissary and of off-base shopping options. OUSD (P&R) could verify the LPS results by looking at commissary sales per servicemember.

We requested active-duty commissary sales data from DeCA (which specifically tracks which sales are to active-duty personnel) for four CONUS installations: two with unusually low commissary usage (less than 20 percent) reported by the LPS and two with unusually high usage (greater than 40 percent) reported by the LPS.[42]

The two CONUS installation groups are as follows:

1. Bases where groceries on base are less than 20 percent of goods purchased:
   - TX275 Corpus Christi (11 percent)
   - TX286 Fort Cavazos (19 percent)
2. Bases where groceries on base are more than 40 percent of goods purchased:
   - MO163 Fort Leonard Wood (45 percent)
   - NJ204 Joint Base (JB) McGuire-Dix-Lakehurst (41 percent)

We compared the sales per active-duty military member to approximate the amount of shopping at their local commissary to see whether the on-base shopping percentages aligned with the LPS percentages. Table 5 reports commissary sales to active-duty servicemembers and their dependents for these four CONUS miliary installations.

---

[42] We found more extreme outliers at small installations, but we focused on installations with at least 2,000 active-duty personnel.

Table 5. CONUS commissary sales to active-duty servicemembers and their dependents for four installations

Military installation	MHA	FY23 commissary sales	Active-duty personnel[a]	Sales per servicemember in FY23	LPS commissary usage[b]
NAS Corpus Christi	TX275	$1,228,816	2,301	$534	7–11%
Fort Cavazos	TX286	$17,872,757	33,522	$533	16–20%
Fort Leonard Wood	MO163	$14,240,117	9,663	$1,474	40–45%
McGuire AFB – Lakehurst NAES	NJ204	$19,120,668	7,655	$2,498	39–41%

Source: Installation personnel numbers provided by OUSD (P&R) on "eligibles" per MHA, January 2024. Commissary sales provided by DeCA. LPS defense commissary usage from OUSD (P&R).
[a] MHA "eligible" personnel numbers from OUSD (P&R).
[b] Average percentage of meat, poultry, dairy, and groceries purchased at the commissary, as reported in the LPS.

Table 5 shows that both Naval Air Station (NAS) Corpus Christi and Fort Cavazos have low sales per servicemember and low commissary usage according to the LPS. McGuire Air Force Base (AFB) – Lakehurst Maxfield Field has the highest sales per servicemember but lower commissary usage than Fort Leonard Wood according to the LPS. This finding suggests that some correlation exists between LPS-reported commissary usage and actual commissary usage, but because the correlation is not perfect and actual commissary usage is verifiable, it probably makes more sense to use the actual commissary usage.

Comparing the Retail Price Schedule with some readily available non-housing cost indices

Table 6 lists the 17 CBSAs in CONUS for which the FRED publishes the CPI-less-shelter series. We found that if the ratio of the CPI-less-shelter index for a CBSA to the CPI-less-shelter index for the nation rises by 1, the CONUS COLA index for the corresponding MHA will rise by 0.29 on average, with high statistical confidence that the true value of this coefficient is not zero. However, this CPI-less-shelter ratio explains only 19 percent of the variation in CONUS COLA indices. We also found that the COLA indices for San Diego in 2023 and Detroit in 2023 were outliers: San Diego was 2.25 COLA points lower (105.13) than the model predicted it should have been (107.38), and Detroit was 6.1 COLA points higher (109.42 versus a predicted 103.32).

Table 6. Core-based statistical areas (with published CPI-less-shelter indices)

Number	CBSA location
1	New York-Newark-Jersey City, NY-NJ-PA
2	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
3	Boston-Cambridge-Newton, MA-NH
4	Chicago-Naperville-Elgin, IL-IN-WI
5	Detroit-Warren-Dearborn, MI
6	Dallas-Fort Worth-Arlington, TX
7	Houston-The Woodlands-Sugar Land, TX
8	Atlanta-Sandy Springs-Roswell, GA
9	Miami-Fort Lauderdale-West Palm Beach, FL
10	San Francisco-Oakland-Hayward, CA
11	Seattle-Tacoma-Bellevue, WA
12	St. Louis, MO-IL
13	San Diego-Carlsbad, CA
14	Phoenix-Mesa-Scottsdale, AZ
15	Denver-Aurora-Lakewood, CO
16	Minneapolis-St. Paul-Bloomington, MN-WI
17	Tampa-St. Petersburg-Clearwater, FL

Source: FRED, St. Louis Fed.

Because the indices do not all have a common baseline, these results represent a lower bound on the potential predictive power of the CPI-less-shelter series for CONUS COLA indices. The relationship is likely to become stronger if the CONUS COLA process becomes more consistent and if OUSD (P&R) partners with the BLS or the FRED to directly compare the BLS cost estimate in a given CBSA with the BLS estimate of national average cost (rather than comparing their cumulative growth rates).[43] These CPI-less-shelter indices cannot currently replace the CONUS COLA process because they are not available for the majority of MHAs, but they provide supporting evidence.

---

[43] This would be analogous to a current arrangement between the Department of Housing and Urban Development (HUD) and the US Census Bureau, whereby HUD pays the US Census Bureau to use its proprietary data to calculate fair market rates for each local area.

Overseas Cost-of-Living Allowance

Background

OCOLA is a nontaxable allowance designed to ensure servicemembers assigned to an OCONUS permanent duty station (i.e., foreign countries, US territories, Alaska, and Hawai'i) maintain a level of purchasing power equivalent to servicemembers stationed in CONUS. It differs from CONUS COLA because the latter is taxable, OCOLA can update more frequently due to currency exchange rate changes, and OCOLA has no minimum threshold analogous to CONUS COLA.

DOD updates OCOLA rates based on assessment of three primary data points: the triennial LPS, the annual RPS, and, for foreign locations, currency exchange rate fluctuations. The triennial LPS measures where servicemembers shop and the proportion of shopping that occurs on a military installation (such as at commissaries and exchanges), at local community outlets, and online. The RPS measures the cost of a 150-item market basket of non-housing goods and services (e.g., groceries and clothing) from the outlets where servicemembers indicate they shop. The RPS does not include utilities or housing costs, which are accounted for separately through housing allowances (BAH or the Overseas Housing Allowance (OHA)). Currency fluctuations measure the relative purchasing power in the foreign currency as compared to the US dollar.

Annually, DOD compares LPS and RPS data collected overseas to similar data collected in CONUS (average CONUS baseline) to establish the OCOLA index for the OCONUS location. These price differences account for the relevant currency exchange rate, and OCOLA can be updated throughout the year to reflect exchange rate fluctuations. The OCOLA rate pays a differential to servicemembers in OCONUS locations for the increased cost of buying the same CONUS baseline non-housing goods and services at the OCONUS location. Based on changes in the underlying data, OCOLA rates may increase or decrease over time; thus, the potential for OCOLA to fluctuate should be considered in household budgeting.

One factor of the underlying data that affects the OCOLA variation for a location over time is inflation. If CONUS prices rise at a greater rate than OCONUS prices, OCOLA may decrease—which has been a primary cause of OCOLA decreases for several OCONUS installations in recent years. Conversely, OCOLA may increase if OCONUS prices rise at a greater rate than CONUS prices.

In addition, as the US dollar strengthens against a foreign currency, OCOLA may decrease to maintain purchasing power in the local currency. OCOLA may increase if the foreign currency strengthens against the US dollar.

Approach

To check the LPS's accuracy in overseas locations, we looked at per capita sales to servicemembers and their dependents at six overseas bases and compared the results to commissary use stated in the LPS. We chose German locations for the foreign examples because using multiple sites in one country allowed us to make useful comparisons between them and because a large number of US servicemembers are stationed in Germany.

Germany variability:

- Volgelweh (Kaiserslautern)
- Ramstein
- Wiesbaden

US OCONUS COLA sites:

- Pearl Harbor, Hawai'i
- Hickam, Hawai'i
- Elmendorf-Richardson, Alaska

We compared the sales per active-duty military member to see whether the on-base shopping percentages align with the LPS percentages.

We attempted to decompose the OCOLA changes over time to determine how much they were driven by local price changes, CONUS price changes, and (when applicable) exchange rate fluctuations. For this purpose, OUSD (P&R) provided us with copies of the DOD Overseas COLA Survey Analysis Summaries for Oahu in July 2021 and June 2022 as well as for Kaiserslautern in December 2021 and December 2022. We used these data to analyze OCOLA index changes for these two locations between 2021 and 2022.

DOD determines OCOLA payment to servicemembers by comparing the cost of living in military locations overseas to living in CONUS. Overseas military locations get OCOLA when their local living costs exceed those of CONUS locations. As currently structured, if the average CONUS cost of living rises faster than that of an overseas location, an OCOLA decrease is justified. Even if overseas living costs were rising, OCOLAs would be reduced because CONUS costs rose more. We examined OCOLA changes over time in a given location to understand how they may affect servicemembers.

Findings

Living Pattern Survey

Table 7 displays commissary sales to active-duty servicemembers and their dependents for four OCONUS miliary installations.

Table 7. OCONUS commissary sales to active-duty servicemembers and their dependents

Military installation	MHA	FY23 commissary sales	Active-duty personnel	FY23 sales per active-duty servicemember	LPS commissary usage[c]
Kaiserslautern	N/A	$51,325,479[a]	12,715[a]	$4,037	34–35%
Wiesbaden	N/A	$10,544,619	2,452	$4,300	27–30%
JB Pearl Harbor/ Hickam	HI408	$70,715,311[b]	41,768[b]	$1,693	45–51%
Anchorage area	AK404	$19,015,878	13,419	$1,417	15–18%

Source: Sales data from DeCA. LPS data for Kaiserslautern from OUSD (P&R). Personnel numbers for Kaiserslautern and Wiesbaden are from OUSD (P&R) "OCOLA Notice, 27 June 2023". Personnel numbers for JB Pearl Harbor/Hickam and Anchorage are from OUSD (P&R) MHA "eligibles" data.
[a] Kaiserslautern commissary sales are combined sales for the Vogelweh and Ramstein commissaries. Kaiserslautern personnel numbers are the total for that military complex.
[b] JB Pearl Harbor/Hickam commissary sales are the combined sales for Pearl Harbor and Hickam commissaries. Personnel numbers are for JB Pearl Harbor/Hickam.
[c] LPS data for meat, poultry, dairy, and groceries categories.

From Table 7, we see that the Kaiserslautern and Wiesbaden commissaries have approximately the same relatively high sales per servicemember, but we were told Wiesbaden had a much higher OCOLA index than Kaiserslautern in part because the LPS reported that servicemembers use the commissary in Wiesbaden less than the commissary in Kaiserslautern.

For example, a June 27, 2023, memo from the Assistant Secretary of Defense for Manpower and Reserve Affairs shows large differences in some market basket categories between Kaiserslautern and Wiesbaden [1]. These two sites are only about 60 miles apart, but in Table 8, we see that the 2022 OCOLA category analyses for these sites show significant differences in several market basket categories.

Table 8.   2022 OCOLA indices for Kaiserslautern and Wiesbaden

OCOLA category	Kaiserslautern	Wiesbaden	Difference
Meat and dairy	122	151	29
Groceries	99	105	6
Fruits and vegetables	111	106	-5
Personal care	118	130	12
Alcohol and tobacco[44]	100	96	-4
Household furnishings	116	159	43
Household operations	116	144	28
Clothing	123	110	-13
Medical care	94	102	8
Recreation	112	149	37
Transportation	118	133	15
Food away from home	111	114	3
Miscellaneous	100	100	0

Source: [1].

The meat and dairy category is 29 COLA points higher in Wiesbaden than it is Kaiserslautern, and the household furnishings category is 43 COLA points higher in Wiesbaden than it is in Kaiserslautern. The Alaska and Hawai'i data also provide cause for skepticism about the LPS because self-reported commissary use is three times higher in Hawai'i than in Alaska, but the actual commissary expenditures are only 20 percent higher. Using commissary and exchange sales data to estimate on-base savings would be more reliable than using the LPS.

OCOLA variation over time

We were unable to determine how much local prices changed between 2021 and 2022 in Oahu or Kaiserslautern because the market baskets changed dramatically in both locations. These changes came in the form of removing items from the 2021 market basket and adding new ones (e.g., Oahu dropped 7 of its 14 grocery items and added 19 new ones) and in the form of

---

[44] We offer three arguments for why alcohol could reasonably be included in OCOLA but not in BAS. First, one could argue that alcohol functions more as a form of recreation than as a way to meet nutritional needs—particularly when served at sporting events, concerts, restaurants, bars, or other locations outside the home (recall also that BAS is not meant to cover local differences in restaurant costs)—and that OCOLA intentionally captures differences in the cost of recreation without taking a stance on the nature of the recreation. Second, including alcohol in BAS might imply that alcohol is a daily need rather than a way people can choose to spend their budgets. Third, BAS is computed using a cost-effective basket of goods to meet nutritional needs at a given income level; because alcohol has little nutritional value beyond calories (and is far from the most cost-effective way of getting empty calories), very little alcohol would appear in this basket even if it were allowed to do so.

changing the weights across categories (e.g., the share of the Kaiserslautern basket that was not estimated and instead set to a default value of parity grew from 12.4 percent to 28 percent). Unless OUSD (P&R) can apply market baskets more consistently from year to year, it will be difficult to analyze how much local prices are actually changing from year to year.

OCOLA payments can vary substantially year to year. For example, the OCOLA payment for servicemembers living in Yokota, Japan, went from a biweekly payment of $421 in 2021 to $0 in 2024 (see Table 9). Some commands do not understand the OCOLA process and incorrectly inform their servicemembers about how their pay will change [2].

Table 9.   Monthly OCOLA payments for an E-6 with three dependents, 2019 through 2024

Location	2019	2020	2021	2022	2023	2024
Kaiserslautern	$333	$345	$491	$416	$232	$239
Yokota	$333	$311	$421	$277	$116	$0
Okinawa	$267	$276	$351	$243	$116	$40
Guam	$267	$311	$316	$312	$347	$278
Naples	$700	$656	$807	$693	$579	$636
Oahu	$300	$276	$281	$277	$309	$199

Source: Defense Travel Management Office, https://www.travel.dod.mil/Allowances/Overseas-Cost-of-Living-Allowance/Overseas-COLA-Rate-Lookup/.
Note: Assumes 10 years of service. Dollars shown are for January of each year.

In the FY 2024 NDAA, Congress implemented changes to the frequency and amount of reductions allowed for OCOLA payments. Reductions unrelated to the exchange rate may not be announced more than twice a year (they may be phased in across multiple pay periods), and each announced reduction must be a difference of 10 COLA points or fewer. These changes still allow large OCOLA payment reductions. We estimate that these revisions in OCOLA reduction procedures would not have had any effect on the examples in Table 9.

However, the FY 2024 NDAA also restored OUSD's ability to employ its exchange rate accumulator to adjust OCOLA rates in the military's biweekly pay periods to account for 5 percent or larger swings in exchange rates. We endorse this accumulator as intuitive and fair. We provide details of how the accumulator works in Appendix B.

OCOLA rate protection

One possible solution to the problem of OCOLA variation would be for OUSD (P&R) to develop a process to stabilize OCOLA payments. As one method, OUSD (P&R) could follow a procedure similar to BAH, meaning that the OCOLA payment cannot decease below the amount the servicemember receives when they first arrive at their new OCONUS duty station, but it can increase. Another possibility is launching a new messaging campaign to better manage

servicemembers' expectations of OCOLA and better assist local commands in communicating about it.

Rate protection might offer several advantages, but two benefits are particularly notable. First, it can improve servicemembers' financial planning while they are assigned to a particular duty station, allowing them to better budget for their expenses. OCOLA rate protection could shield servicemembers from fluctuations in their expected income. Ensuring that OCOLA moves in only one direction—upward—would improve servicemembers' budgeting and financial planning. Furthermore, research shows that households more acutely react to unexpected income declines, which is how servicemembers are likely to perceive OCOLA rate adjustments [33].

Second, rate protection can improve perceptions of fairness by addressing the psychological bias that may make servicemembers more sensitive to losses than to gains [34].[45] Individuals tend to evaluate outcomes relative to a reference point (their expectation), which in this instance would be their original OCOLA. Individuals assess gains and losses relative to this reference point, and because losses may be more acutely noticed, losses can lead to resentment and loss of morale, which creates potential retention concerns. Research suggests that economic shocks causing civilian pay reductions are associated with lower satisfaction and job commitment [35].[46] Thus, in addition to improving the financial health of individual servicemembers, OCOLA rate protection could provide a secondary effect of improving the long-term health of the services.

Issues associated with how to compensate employees relocated overseas and how to fairly manage volatility are not unique to DOD, and the private sector does not appear to have all the answers either. When US firms temporarily relocate their workers overseas, they may compensate their employees using a menu of options, including, but not limited to, the following: a base-pay adjustment, cost-of-living adjustments, housing allowances, and premium pay. Cost-of-living adjustments may be implemented in several ways, but historically, American firms have most commonly used a balance-sheet approach for temporary assignments (under five years) [37-38]. This method adjusts the employee's home-base salary to equalize purchasing power in the country where they work. However, like OCOLA, these adjustments are sensitive to local currency fluctuations, creating employee uncertainty and stress. A survey of expatriate employees identified currency exchange rate risks as a common

---

[45] This notion is based on what is called prospect theory, or loss aversion theory, in behavioral economics.

[46] Additional research suggests that civilian pay penalties increase employee turnover, especially of skilled or high-quality workers [36]. However, there is no way to disentangle the pay reduction effect from the penalty's punishment effect.

relocation issue; employees were particularly concerned about the financial planning and savings implications [39].

We do not have the data on current aggregate OCOLA costs needed to estimate the funds required to implement this guarantee. We have prepared a calculation process that could be used to estimate this amount (described below).

Assume:

- Overseas tours are 1, 2, or 3 years in length. If there are longer tours, then they can be added to the formula.
- OCOLA payments fall 50 percent of the time and rise 50 percent of the time. This assumption can be modified to fit experience.

Define:

- TC = annual total cost of OCOLA program
- A = percent of overseas tours that are 1 year
- B = percent of overseas tours that are 2 years
- C= percent of overseas tours that are 3 years
- D1 = typical (or worst case, as desired for planning factors) percentage drop in OCOLA payment from last year (this formula assumes the payment is lower than last year 50 percent of the time)
- D2 = typical (or worst case, as desired for planning factors) percentage drop in OCOLA payment from two years ago (this formula assumes the payment is lower than two years ago 50 percent of the time)

Formula:

Cost = annual cost of guaranteeing payment does not go lower than initial payment

- Cost = 0.5[.5*B*TC*D1 + 0.33*C*TC*D1 + 0.33*C*TC*D2]

Eliminating "miscellaneous" category

OUSD (P&R) plans to eliminate the "miscellaneous" category from the OCOLA market basket of goods and services.[47] The miscellaneous category is the second largest category and contains 17 percent of the market basket's overall weight, as indicated in the BLS Consumer Expenditure Survey (CES). Miscellaneous consists of the combination of new and used

---

[47] The staff intend for this step to take effect on May 16, 2024, but it does not yet have final approval.

automobile purchases. In the current OCOLA calculation, miscellaneous (automobile purchase) is a constant in the calculation and is set to assume that the cost of a vehicle overseas is the same as in CONUS. The reasoning behind this assumption is that servicemembers often purchase automobiles at the car lots on base at the beginning of their overseas tour and then sell them back to the lot at the end of their tours.

The Department of State's Office of Allowances, which prescribes civilian COLA for US government employees working abroad, does not include this category at all; rather, it moves that category's weight to other category items. Therefore, OUSD (P&R) decided to remove the category, redistribute that weight to the other overseas categories, and reduce the "spendable income" amount used in COLA calculations by the net annual cost of an automobile. As a result, the total effect on OCOLA payments is small (the weighted average that drives the index is higher, but the base it is multiplied by is smaller). For example, we found that if miscellaneous had been eliminated in 2022, the OCOLA index for Kaiserslautern would have been 112 instead of 110, and for Wiesbaden it would have been 128 instead of 124.

CNA concurs with OUSD's decision to eliminate the miscellaneous category that accounted for an automobile purchase in the OCOLA market basket of goods and services because doing so aligns with the practices of another government department, is more intuitive (i.e., eliminating a category is simpler to explain than leaving it in with an artificial value), and has limited effect on cost.

This completes our analyses of existing BAH, BAS, and COLA processes. We now propose possible courses of action (COAs) for reforming BAH. We did not include these in our separate BAH report because we structured that document to directly conform with the 2023 NDAA tasking, which did not include any questions about these reforms.

Courses of Action for BAH Reform

Although BAH is high relative to civilian housing expenditures, it may be lower than servicemembers' expectations. This issue is related to the statistical problem of accurately setting the rate for each MHA, which can lead to BAH being far more generous for some MHAs than others, and to significant differences in BAH changes across paygrades. BAH recipients may find that BAH relative to local civilian spending is lower in their current MHA than in their previous one, or they may learn it is lower than the MHA and paygrade combination of someone else they know. As a result, they may conclude that their BAH is insufficient.

We also note two likely causes of frustration with BAH that our COAs cannot address. First, on-base housing standards are more generous than BAH standards (a three-bedroom townhouse is the de facto minimum on base and houses larger than four bedrooms exist there). Second, some members are stationed in high-cost urban areas where they can trade a longer commute for lower rent or a larger home (e.g., stationed at the Pentagon and commuting approximately 40 miles from Stafford, Virginia), and they may be dissatisfied if they are next stationed somewhere without that trade-off option.

We propose three possible COAs to help improve BAH's predictability and perceived fairness. Because publicly available indices of housing costs do not align with MHAs or with DOD standards, they cannot simply replace the current BAH process. However, a common feature of our three COAs is that they use government-produced data on the housing market. The COAs differ in the degree to which they retain unique features of the current process. Thus, at one extreme, the tweak COA is the most similar to what is familiar and would be perceived as the least risky by stakeholders who are generally averse to change. At the other extreme, the overhaul COA would be the boldest change but would go the furthest toward smoothing BAH's relative generosity. We assume that DOD would apply any of these three approaches in a cost-neutral manner, so each of them would create winners and losers in the short run (and to a greater degree the more the COA differs from the current approach).

Tweak BAH: smooth BAH updates using HUD data

The most modest BAH reform would keep the current six housing profiles: one-bedroom apartment, two-bedroom apartment, two-bedroom townhouse or duplex, three-bedroom townhouse or duplex, three-bedroom SFD, and four-bedroom SFD. It would, however, reduce

BAH's volatility by reducing the frequency of DOD-specific BAH surveys for each MHA and by filling in the intervening years with percentage changes tied to HUD's median rent estimates.

Specifically, a contractor would conduct BAH surveys for a quarter of all MHAs annually so that each MHA received a new BAH survey once every four years. These periodic BAH surveys still would be necessary to account for the fact that housing in suitable neighborhoods for DOD may not follow the same cost trajectory as housing in the civilian market overall over time. OUSD (P&R) could arrange this four-year cycle of BAH surveys in such a way that MHAs that tend to create the most controversy or require the most adjustments to the raw data are spread across the four cohorts, thus evening out the staff effort across years. We also note that the same contractor who conducts annual BAH surveys currently conducts less frequent housing requirements market analyses for each MHA.[48] With BAH surveys on a four-year cycle, it would make sense to align these market analyses so that the contractor conducts both in a given MHA at the same time.

For the off-year adjustments, the one-bedroom profile would be updated according to the percentage change in the HUD one-bedroom median rent estimate (and so on for the other profiles). These year-on-year changes in the HUD estimate are much more consistent across the number of bedrooms than are BAH rates under the current process, as we showed previously in Figure 2.

This approach requires a crosswalk from HUD areas to MHAs, which we have provided to OUSD (P&R). Servicemembers not assigned to an MHA would, as now, have the county of their duty station tied to an MHA with similar median rents (as reported by HUD). Three out of every four years, BAH for that county would be updated with the same percentage change as the HUD median rent for that county (for the number of bedrooms that corresponds to each anchor point), and once every four years, the BAH would be reset to match an MHA with comparable median rents.

OUSD (P&R) also asked us to update the interpolation table, even though the six profiles remain the same. Our proposed interpolation tables smooth BAH as a share of RMC across paygrades, while keeping the total BAH cost within half a percent of its current value. They also align the paygrade order so that they are the same for with-dependent BAH and without-dependent BAH (though within each grade, members with dependents still receive higher BAH). Table 11 shows how we have adjusted the order, the interpolations for each grade, and the resulting expected average BAH change for members with dependents. Table 12 does the same for members without dependents.

---

[48] The purpose of these analyses is to determine whether more on-base housing is required because the private housing market off base does not provide enough suitable rentals.

Table 10. Proposed BAH interpolation table for members with dependents (tweak COA)

Current grade order	New grade order	Housing type	New interpolation	Expected BAH	Percentage change (expected BAH)
E-1	E-1	2 BR TH/APT	95% (of E-5)	$2,125	1%
E-2	E-2	2 BR TH/APT	95% (of E-5)	$2,125	1%
E-3	E-3	2 BR TH/APT	95% (of E-5)	$2,125	1%
E-4	E-4	2 BR TH/APT	95% (of E-5)	$2,125	1%
E-5	E-5	2 BR TH	Anchor	$2,237	0%
O-1	O-1	2 BR TH	8%	$2,259	0%
O-2	E-6	3 BR TH	Anchor	$2,497	0%
E-6	W-1	3 BR TH	19%	$2,543	2%
W-1	O-2	3 BR TH	25%	$2,555	3%
E-7	O-1E	3 BR TH	28%	$2,562	-1%
O-1E	E-7	3 BR TH	32%	$2,571	0%
W-2	W-2	3 BR TH	51%	$2,617	0%
E-8	E-8	3 BR TH	63%	$2,644	-1%
O-2E	O-2E	3 BR TH	67%	$2,653	-2%
O-3	O-3	3 BR TH	82%	$2,689	-1%
W-3	W-3	3 BR SFD	Anchor	$2,731	0%
E-9	E-9	3 BR SFD	22%	$2,872	1%
W-4	O-3E	3 BR SFD	25%	$2,894	0%
O-3E	W-4	3 BR SFD	44%	$3,017	5%
W-5	O-4	3 BR SFD	49%	$3,049	-2%
O-4	W-5	3 BR SFD	84%	$3,277	8%
O-5	O-5	4 BR SFD	Anchor	$3,378	0%
O-6	O-6	4 BR SFD	1% above O-5	$3,412	0%
O-7	O-7	4 BR SFD	2% above O-5	$3,446	0%

Source: CNA. Expected BAH calculated from current average BAH payments for each anchor point paygrade as reported in Selected Military Compensation Tables [26].

Table 11.   Proposed BAH interpolation table for members without dependents (tweak COA)

Current grade order	New grade order	Housing type	New interpolation	Expected BAH	Percentage change (expected BAH)
E-1	E-1	1 BR APT		$1,623	0%
E-2	E-2	1 BR APT	Same as E-4	$1,623	0%
E-3	E-3	1 BR APT		$1,623	0%
E-4	E-4	1 BR APT	Anchor	$1,623	0%
E-5	E-5	1 BR APT	86%	$1,786	2%
O-1	O-1	2 BR APT	Anchor	$1,813	0%
E-6	E-6	2 BR APT	44%	$2,033	10%
W-1	W-1	2 BR APT	78%	$2,199	12%
E-7	O-2	2 BR APT	93%	$2,275	2%
O-2	O-1E	2 BR TH	Anchor	$2,309	0%
O-1E	E-7	2 BR TH	3%	$2,317	12%
W-2	W-2	2 BR TH	22%	$2,375	0%
E-8	E-8	2 BR TH	36%	$2,417	2%
O-2E	O-2E	2 BR TH	40%	$2,427	-1%
E-9	O-3	2 BR TH	55%	$2,472	-1%
W-3	W-3	2 BR TH	70%	$2,518	2%
O-3	E-9	2 BR TH	96%	$2,593	5%
O-3E	O-3E	3 BR TH	Anchor	$2,606	0%
W-4	W-4	3 BR TH	12%	$2,671	1%
O-4	O-4	3 BR TH	15%	$2,686	-5%
W-5	W-5	3 BR TH	39%	$2,813	-1%
O-5	O-5	3 BR TH	48%	$2,859	-3%
O-6	O-6	3 BR SFD	Anchor	$3,137	0%
O-7	O-7	3 BR SFD	2% above O6	$3,200	0%

Source: CNA. Expected BAH calculated from current average BAH payments for each anchor point paygrade as reported in Selected Military Compensation Tables [26].

As we show in the tables, although several paygrades would see a *slight* BAH reduction, only O-4s without dependents would see their average BAH decline by more than 3 percentage points. Of course, the rate protection policy would remain in place, so until a servicemember has a PCS, their BAH would not fall below its value at the time they arrived at that duty station. That said, we recommend an additional protection. For the first two years of implementation of this approach, O-4s without dependents who have a PCS to a new MHA would receive a BAH

halfway between its calculated value according to the new table and the higher value it would have had under the legacy table.

Consolidate BAH: consolidate profiles to align with market reality

As we reported in our BAH findings, the current six housing profiles lead to frequent "inversions" that OUSD (P&R) must correct because the inversions would otherwise lead to a higher paygrade receiving less BAH than a lower paygrade in the same MHA. These inversions are partly due to idiosyncrasies in local markets; for example, servicemembers might be trying to find apartments in an MHA with mostly SFDs or trying to find SFDs in an MHA with mostly townhouses and apartments. But these inversions also are due to a nationwide trend: three-bedroom townhouses are more expensive on average than three-bedroom SFDs because they are in more expensive locations closer to amenities and jobs.

DOD can correct for both problems by consolidating the six current housing profiles into four: one bedroom, two bedroom, three bedroom, and four bedroom. This consolidation aligns with how HUD reports median rents, and it accepts the composition of housing types that the market provides rather than trying to impose assumptions about the relative value of an apartment, townhouse, and SFD. Table 13 shows an interpolation table compatible with these four profiles, and it shows our estimate of how the average BAH would change for each of these paygrades for members with dependents. Table 14 does the same for members without dependents.

Table 12.   Proposed BAH interpolation table for members with dependents (consolidate COA)

Current grade order	New grade order	Housing type	New interpolation	Expected BAH	Percentage change (expected BAH)
E-1	E-1	2 BR		$2,101	0%
E-2	E-2	2 BR	Same as E-4	$2,101	0%
E-3	E-3	2 BR		$2,101	0%
E-4	E-4	2 BR	Anchor	$2,101	0%
E-5	E-5	2 BR	46%	$2,283	2%
O-1	O-1	2 BR	51%	$2,301	2%
O-2	E-6	3 BR	Anchor	$2,497	0%
E-6	W-1	3 BR	9%	$2,573	3%
W-1	O-2	3 BR	11%	$2,593	4%
E-7	O-1E	3 BR	12%	$2,605	0%
O-1E	E-7	3 BR	14%	$2,620	2%

Current grade order	New grade order	Housing type	New interpolation	Expected BAH	Percentage change (expected BAH)
W-2	W-2	3 BR	22%	$2,695	3%
E-8	E-8	3 BR	28%	$2,740	3%
O-2E	O-2E	3 BR	29%	$2,756	2%
O-3	O-3	3 BR	36%	$2,816	3%
W-3	W-3	3 BR	44%	$2,885	6%
E-9	E-9	3 BR	56%	$2,992	6%
W-4	O-3E	3 BR	62%	$3,046	5%
O-3E	W-4	3 BR	69%	$3,103	8%
W-5	O-4	3 BR	71%	$3,127	1%
O-4	W-5	3 BR	86%	$3,252	7%
O-5	O-5	4 BR	Anchor	$3,378	0%
O-6	O-6	4 BR	1% above O-5	$3,412	0%
O-7	O-7	4 BR	2% above O-5	$3,446	0%

Source: CNA. Expected BAH calculated from current average BAH payments for each anchor point paygrade as reported in Selected Military Compensation Tables [26].

Table 13.   Proposed BAH interpolation table for members without dependents (consolidate COA)

Current grade order	New grade order	Housing type	New interpolation	Expected BAH	Percentage change (expected BAH)
E-1	E-1	1 BR		$1,623	0%
E-2	E-2	1 BR	Same as E-4	$1,623	0%
E-3	E-3	1 BR		$1,623	0%
E-4	E-4	1 BR	Anchor	$1,623	0%
E-5	E-5	1 BR	86%	$1,786	2%
O-1	O-1	2 BR	Anchor	$1,813	0%
E-6	E-6	2 BR	17%	$1,950	5%
W-1	W-1	2 BR	30%	$2,053	4%
E-7	O-2	2 BR	36%	$2,100	-6%
O-2	O-1E	2 BR	39%	$2,120	-8%
O-1E	E-7	2 BR	41%	$2,135	3%
W-2	W-2	2 BR	52%	$2,229	-6%
E-8	E-8	2 BR	61%	$2,297	-3%
O-2E	O-2E	2 BR	63%	$2,313	-5%
E-9	O-3	2 BR	72%	$2,387	-4%
W-3	W-3	2 BR	82%	$2,462	0%

Current grade order	New grade order	Housing type	New interpolation	Expected BAH	Percentage change (expected BAH)
O-3	E-9	2 BR	97%	$2,585	5%
O-3E	O-3E	3 BR	Anchor	$2,606	0%
W-4	W-4	3 BR	3% above W-4	$2,684	1%
O-4	O-4	3 BR	6% above W-4	$2,762	-2%
W-5	W-5	3 BR	9% above W-4	$2,840	0%
O-5	O-5	3 BR	12% above W-4	$2,919	-1%
O-6	O-6	3 BR	15% above W-4	$2,997	-4%
O-7	O-7	3 BR	18% above W-4	$3,075	-4%

Source: CNA. Expected BAH calculated from current average BAH payments for each anchor point paygrade as reported in Selected Military Compensation Tables [26].

Because we cannot foresee exactly how the sampling will work with the redefined profiles, we based our cost estimates of the new profiles on existing BAH profiles. We tied our one-bedroom average cost to the current one-bedroom apartment, our three-bedroom average cost to the current three-bedroom townhouse, and our four-bedroom average cost to the current four-bedroom SFD. For the two-bedroom profile, we applied different approaches for members with and without dependents to attempt to keep E-1 through E-4 compensation comparable to what it is now. We tied our estimate of the two-bedroom unit for with dependents to the average cost of the current midpoint between a two-bedroom apartment and a two-bedroom townhouse, whereas we tied our estimate for members without dependents to the current two-bedroom apartment profile.

These new broader profiles would contain some home types that do not match any current BAH profile but that are available for members to rent using BAH. ACS data reveal that 10 percent of one-bedroom rentals are townhouses or SFDs, 21 percent of two-bedroom rentals are SFDs, 25 percent of three-bedroom rentals are apartments, and 18 percent of four-bedroom rentals are apartments or townhouses. Therefore, the sampling approach for these new anchor points could (and perhaps should) place some weight on these home types not currently included in BAH profiles. In fact, we note that two of the current six profiles are not that common nationwide: fewer than 9 percent of two-bedroom rentals are townhouses or duplexes, and only 12 percent of three-bedroom rentals are.

Because these new profiles are more broadly defined, the contractor who conducts BAH surveys and the military housing offices at installations will have more discretion in determining which properties to sample. This approach would enable them to tailor the sample to the local market conditions, but it would also carry the risk of them not selecting the sample in accordance with the intent of OUSD (P&R). Because surveys would be conducted for only a

quarter of MHAs each year, OUSD (P&R) would be able to provide more oversight and guidance to the process, which may include mandating the apartment, townhouse, and SFD mix for a profile and MHA. If OUSD (P&R) had data from the concurrent housing requirements market analyses, it would be able to provide more informed oversight. However, we note that the apartment vs. townhouse vs. SFD distinction is just one of many features that differentiate two dwellings with the same number of bedrooms (they also differ in distance to base, school zoning, etc.), so there always has been discretion in which homes are sampled for BAH surveys.

As shown above in table 14, servicemembers without dependents in the paygrades O-2, O-1E, W-2, and O-2E would see a BAH reduction of 5 percent or more on average relative to the current process. In addition to the current rate protection policy, we recommend an additional protection. For the first two years of implementation of this approach, members of those paygrades who have a PCS to a new MHA would receive a BAH halfway between its calculated value according to the new table and the higher value it would have had under the legacy table.

As with the tweak COA, surveys would take place every four years for each MHA, and intervening annual BAH updates would be tied to the percentage change in the HUD median rent for that number of bedrooms, using the crosswalk of HUD areas to MHAs that we provided. Duty stations without an MHA also would be addressed in the same way as in the tweak COA. This COA would reduce volatility and increase predictability more than the tweak COA because the consolidated profiles would yield larger sample sizes and be more stable.

Overhaul BAH: tie directly to statutory requirement

The statutory requirement for BAH does not mention housing profiles at all, and the current approach of trying to tie BAH to the same set of profiles across all MHAs fundamentally differs from how civilians approach housing decisions. The law says that the rate must be based on the cost of adequate housing for civilians of comparable incomes in the same area, and civilians of comparable incomes consume less housing when they live in higher cost areas and vice versa. Therefore, one approach to calculate BAH would be to directly tie it to civilian incomes and housing expenditures rather than to a common set of profiles.

If DOD took this approach in a cost-neutral manner, it could cause a significant reallocation from higher cost MHAs to lower cost MHAs. For example, currently the average BAH for an E-5 with dependents across the most expensive third of MHAs is 106 percent higher than the average BAH for an E-5 with dependents across the least expensive third of MHAs. Civilians with the same income-less-housing as an E-5 with dependents spend only 87 percent more in the most expensive third of areas than in the least expensive third. By this logic, we would

expect BAH in high-cost MHAs such as San Diego or Washington, DC, to go down and BAH in low-cost MHAs such as Fort Sill and Fort Polk to increase. However, the current process has its own approach to increasing BAH relative to civilian spending in low-cost MHAs by excluding neighborhoods as unsuitable. Therefore, it is not obvious that this overhauled approach would necessarily increase BAH in lower cost areas.

We note that unlike civilians, servicemembers do not choose where to live, and they may not value the amenities or climate associated with higher cost areas as much as civilians who choose to live in those areas. For example, one driver of higher cost is civilian employment opportunities, but employment options for servicemembers' civilian spouses may be more tied to military infrastructure and not closely related to the broader civilian labor market. Also, military families may not place as much weight as civilians on some forms of urban entertainment, and they have similar on-base services available to them at any large installation regardless of the cost of living in the area.

Why, then, would DOD implement this overhaul? Because the statutory requirement for BAH is defined in terms of comparable civilians, it would make sense for it to be generous relative to civilian spending by a roughly consistent amount. Such consistency can be accomplished through periodic updates to the interpolation table, but doing away with the profiles and interpolation tables simplifies the message. BAH is cash that servicemembers are free to spend as they choose, which may or may not be on a home that fits the profile to which their grade is tied. Tying BAH directly to the requirement would focus attention on its relative generosity (a positive message), acknowledge the reality that the government is not dictating what type of home the member will choose, and smooth the degree to which it is generous relative to the standard.

To implement this COA, the US Census Bureau would identify households in each MHA that have income-less-housing in a range that corresponds to a military paygrade and determine the average amount that these households spend on rent and utilities. It would restrict the sample to exclude respondents living in group homes, mobile homes, trailers, vans, recreational vehicles, and boats. It also could exclude those sharing a rental with roommates other than relatives or an intimate partner (though unmarried servicemembers do sometimes pool their BAH and rent a home together). This average civilian spending then would be multiplied by a factor greater than 1 (and higher for members with dependents than members without dependents) to determine their BAH rates. This multiplier would be set such that the total BAH cost is the same as under the current system.

OUSD (P&R) and the US Census Bureau currently are exploring how to implement this arrangement. The US Census Bureau has confirmed its ability to create custom results tables based on MHA boundaries.

Because survey data are lagged, this COA would require OUSD (P&R) to inflate the estimated rents in a manner similar to the process HUD currently uses. HUD reports that it first calculates a CPI rent change using the CPI Rent of Primary Residence Series. Then, it calculates a rent change based on private sector data by looking at six commercial sources of rent data and averaging available sources.[49] Next, it calculates a *gross* rent change by combining the CPI rent and private rent changes with the CPI Fuels and Utilities Series. Finally, it takes a weighted average of the CPI and private gross rent changes. OUSD (P&R) could follow an approach similar to HUD's.

Two issues would require a separate solution. First, in some MHAs, civilians with incomes comparable to servicemembers may be almost nonexistent because the military is the primary driver of the local economy. For paygrade-MHA combinations with this problem, BAH could be tied to comparable civilians in another MHA with similar overall costs. Second, this approach may result in a significant revenue loss for privatized housing partners that already have built large homes in high-cost MHAs. The solution would have to involve separating compensation for privatized housing partners from BAH and directly compensating them through another mechanism, which would require offering them a new deal sufficiently attractive that all of them agree to terminate their existing contracts with the government and switch to the new system.

The current approach to privatized on-base housing is designed to meet specific requirements with the expectation that the owners can charge servicemembers rent up to a rent ceiling of BAH. This ceiling functions as a form of rent control, which limits how much landlords can increase rents for existing tenants. The overhaul COA will inevitably result in reductions to BAH generosity in certain locations, which means that BAH, or the maximum rent that may be charged, may be lower than the costs associated with building and maintaining the current on-base privatized housing stock. Although rent control policies are intended to protect tenants by ensuring access to stable, affordable housing, the economic literature has documented some harmful long-term outcomes associated with these types of policies.[50] The consequences most pertinent to on-base privatized housing include reductions in the quality and supply of rental housing. If companies are forced to reduce the rent they may charge for a unit, they may reduce their investment in and maintenance of the existing housing stock [41]. Furthermore, rent ceilings may inhibit new construction (because of lower return on investment or fear of lower return on investment if additional BAH adjustments were to occur), affecting the overall supply

---

[49] The six sources HUD currently uses are Zillow, Apartment List, CoreLogic, RealPage, REIS, and CoStar.

[50] Rent control is associated with several adverse outcomes that may not apply to the military housing stock, such as distortions in the market due to reductions in the mobility of tenants [40], racial or social inequities [41], and the conversion of rental properties into owner-occupied units [40].

of available rental housing and potentially inflating the rental costs of off-base housing because of limited supply.

Messaging the reforms

We include fliers to inform servicemembers and their families about each of these BAH reform COAs, if DOD were to select one to implement, as an enclosure to this report.

Conclusion

The statutory definition of BAS is unclear and has led to BAS drifting upward over time relative to the USDA's estimates of the cost of food. We recommend redefining it to directly tie its level, not rate of change, to the cost of the USDA liberal food plan for adult men. It may be optimal to build a forecast into BAS to address its lag because food prices rise more often than they fall. Differences in the cost of food across MHAs make more sense to address through CONUS COLA than through BAS. We estimate that extending BAS to dependents would almost double the cost of the program, and this approach would be inefficient for addressing food security concerns for military families.

Because members have access to savings on base that help offset differences in local cost of living, both CONUS COLA and OCOLA attempt to account for how much members use these savings through an LPS. However, more frequent and directly verifiable data are available about how much shopping members do on base. Some MHAs align with metropolitan areas for which the FRED publishes CPI-less-shelter indices, and these data series are correlated with the CONUS COLA indices computed by OUSD (P&R), suggesting that OUSD (P&R) can continue to check this correlation in the future to confirm its approach and can use the comparison to identify outliers that merit further exploration.

DOD can improve the transparency and predictability of BAH by tying its rate of change to publicly available data estimated by the US Census Bureau and published by HUD. Because the statutory requirement for BAH does not include the housing profiles that DOD currently uses to calculate BAH, it could go further and tie BAH directly to the requirement by partnering with the US Census Bureau to observe civilian incomes and housing expenditures in each MHA.

This page intentionally left blank.

Appendix A: Weighting Schemes for Annual BAS Updating

This appendix examines how forecasting the previous year's BAS growth helps BAS to better align with the values of the liberal food plan. In the body of this report, we projected half of the prior year's October-to-October growth to predict BAS values during the upcoming year. In theory, we could scale the prior year's growth in food costs by any number we choose (though practically speaking, this amount should be between 0 and 1), so it is worth examining how using different weights best aligns with policy-makers' potential objectives.

We focus on five possible weights on the previous year's growth: 0.00, 0.25, 0.50, 0.75, and 1.00. Table 15 includes the same outcomes for these weights as were shown in Table 4; note that the second row is identical to the final row in Table 4.

Table 14. Comparing weights on prior year growth in food costs

	2001–2019 (76 quarters)				2001–2023 (92 quarters)			
	Total net error	Mean error	Std. dev.	Pos. qtrs	Total net error	Mean error	Std. sev.	Pos. qtrs
Weight = 0.00[a]	-$422.70	-$5.56	$23.77	27	-$1,023.00	-$11.12	$29.87	28
Weight = 0.25[b]	$333.90	$4.39	$25.83	43	-$0.30	$0.00	$30.98	49
Weight = 0.50[c]	$1,172.10	$15.42	$29.09	53	$1,108.80	$12.05	$33.87	61
Weight = 0.75[d]	$2,072.10	$27.26	$32.67	63	$2,279.70	$24.78	$37.67	72
Weight = 1.00[e]	$2,990.10	$39.34	$36.81	66	$3,468.60	$37.70	$42.31	77

Source: CNA analysis of [27].
[a] For example, predicted values for all of 2002 would be $\max\{BAS_{2001}, Oct_{2001}\}$.
[b] For example, predicted values for all of 2002 would be $\max\{BAS_{2001}, Oct_{2001} + 0.25 * (Oct_{2001} - Oct_{2000})\}$.
[c] For example, predicted values for all of 2002 would be $\max\{BAS_{2001}, Oct_{2001} + 0.5 * (Oct_{2001} - Oct_{2000})\}$.
[d] For example, predicted values for all of 2002 would be $\max\{BAS_{2001}, Oct_{2001} + 0.75 * (Oct_{2001} - Oct_{2000})\}$.
[e] For example, predicted values for all of 2002 would be $\max\{BAS_{2001}, Oct_{2001} + (Oct_{2001} - Oct_{2000})\}$.

Using different weights on the prior year's October-to-October growth in food prices would effectively assume that food price trends from the prior year will persist into the current year (the larger this weight, the more persistent the growth from one year to the next). Because food prices are generally rising, putting a higher weight on the prior year's growth often will result in a higher BAS level, and because BAS is constrained not to fall, putting a greater weight on the prior year's growth will have no effect during periods of falling food prices. Taken together, higher weighting should always result in BAS values at least as high as under lower

weighting.[51] As a result, lower rows in Table 15 have more positive total errors and mean quarterly errors. However, higher weights also mean that BAS overshoots the value of the liberal food plan more frequently and by larger amounts, resulting in larger standard errors in lower rows. Both patterns—more positive total and mean errors and larger standard deviations—hold whether looking at 2001–2019 or 2001–2023. We show these results graphically in Figure 8 (omitting a weight of 0.75 to allow closer viewing of the other four).

We now can consider the competing priorities illustrated in Table 3 as applied to Table 15. A weight of 0.00, corresponding to the top-right graph in Figure 8, is the best at month-to-month accuracy—its low standard deviations mean that it typically comes closest to the actual food. However, it is the worst of the four at the other two priorities because failing to project forward the food cost ensures that BAS will frequently (though not always) pay less than the liberal food plan. By contrast, a weight of 1.00, corresponding to the bottom-right graph in Figure 8, is the best at meeting or exceeding the liberal food plan because it always sets the highest BAS value; however, it also results in long stretches during which BAS is set far above the value of the liberal food plan and must wait for food prices to catch up. We view a weight of 0.25, corresponding to the top-right graph in Figure 8, as the most attractive of these options because it does the best at balancing multiple objectives—it has the lowest total net and mean errors, it has the second-lowest standard errors, and it comes the closest to having equal numbers of quarters in which BAS overshoots and undershoots the values of the liberal food plan.

---

[51] If BAS were allowed to fall from year to year, higher weights would carry some downside risk because they would result in lower BAS projections after a year of falling prices.

Figure 6.   Comparing weights on prior year growth in food costs

Source: CNA analysis of [27].

Appendix B: The Exchange Rate Accumulator

In this appendix, we describe the exchange rate accumulator DOD uses to adjust OCOLA rates to account for large exchange rate fluctuations that occur in the time between the annual retail price data collections.

Currency fluctuations can affect both OCOLA and OHA payments. Military finance centers pay all allowances in US dollars, but many expenses for OCONUS servicemembers are in the local currency. When exchange rates fluctuate, DOD adjusts overseas allowance payments to ensure that the servicemember has the same purchasing power as before the change. When the trading exchange rate is less than the exchange rate in the pay system, servicemembers are underpaid. When the trading rate is greater than the pay system exchange rate, servicemembers are overpaid (see Figure 9).

Figure 7.   Currency trend over time—an example

The above graph tracks the Pay System Exchange Rate against the Weekly Average Exchange rate.
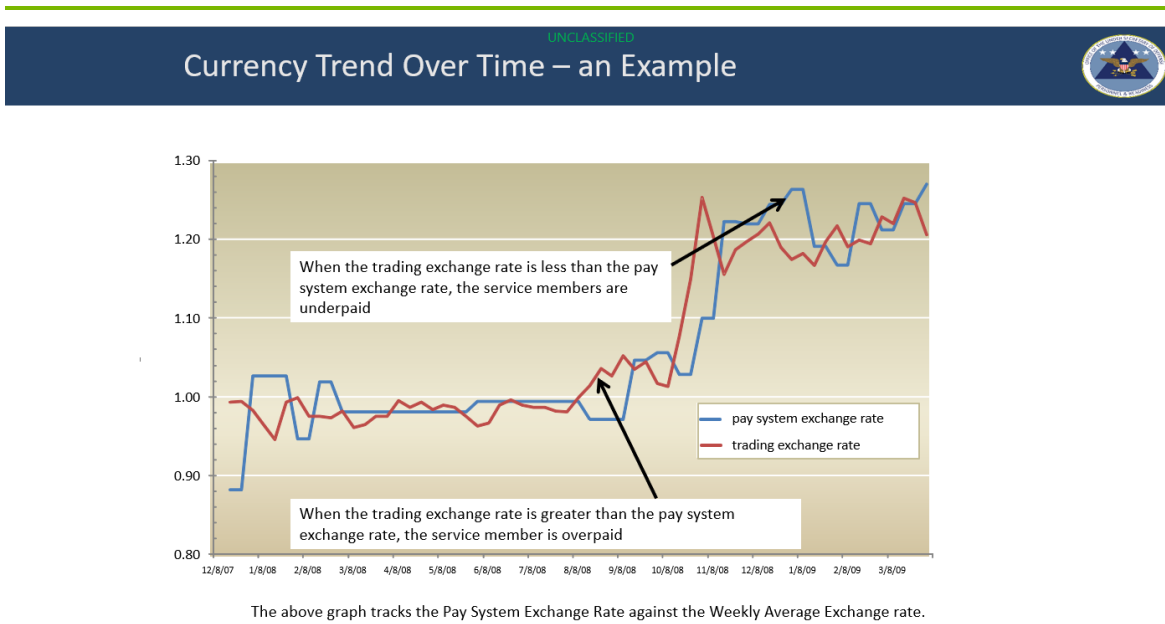
Source: PowerPoint slides by Jon Loewer of OUSD (P&R) sent on February 27, 2024.

DOD monitors and analyzes daily exchange rates using a Currency Adjustment model. The model compares the current pay system exchange rate used by military finance centers to the currency exchange rate. DOD reviews exchange rates twice a month to adjust the pay system exchange rate. This method ensures that over time, fluctuating exchange rates do not disadvantage either the servicemember or the government.

When DOD makes a currency adjustment servicemembers see the changes in their next paycheck. Currency adjustments may result in an increase, a decrease, or no change to the OCONUS COLA and OHA. Adjustments are made the same way whether the dollar is increasing or decreasing in value. The allowance changes are posted one day prior to the effective date. Because DOD makes adjustments only once per pay period based on past data, the pay system exchange rate will generally not be the same as the exchange rate at the bank window.

The 5 percent exchange rate accumulator ensures that the actual exchange rate is not more than 5 percent different than the pay system's exchange rate. Note that this is an accumulated plus-or-minus 5 percent, meaning that the algorithm is designed to buy back the difference between the exchange rate over the 8 weeks when the calculated difference is an accumulated +/- 5 percent difference. This calculation method is valuable because, for example, if an exchange rate continues to be 1.5 percent less than the pay system's exchange rate for a long period, once the accumulated difference surpasses 5 percent, the algorithm will provide the exchange rate that will buy back the difference and ensure that the servicemember is neither systematically overpaid nor underpaid relative to the exchange rate.

Figures

Tables

Abbreviations

ACS	American Community Survey
BAH	Basic Allowance for Housing
BAS	Basic Allowance for Subsistence
BLS	Bureau of Labor Statistics
CBSA	core-based statistical area
CES	Consumer Expenditure Survey
COA	course of action
COLA	Cost-of-Living Allowance
CONUS	contiguous United States
CPI	consumer price index
DeCA	Defense Commissary Agency
DOD	Department of Defense
FRED	Federal Reserve Economic Data
FY	fiscal year
HUD	Department of Housing and Urban Development
LPS	Living Pattern Survey
MHA	military housing area
NDAA	National Defense Authorization Act
OCOLA	overseas COLA
OHA	Overseas Housing Allowance
OUSD	Office of the Undersecretary of Defense
PCS	permanent change of station
PUMA	public use microdata area
P&R	Personnel and Readiness
QRMC	Quadrennial Review of Military Compensation
RMC	regular military compensation
RPS	Retail Price Schedule
SFD	single family dwelling
USDA	US Department of Agriculture

References

[1]   Office of the Assistant Secretary of Defense for Manpower and Reserve Affairs. 2023. *Overseas Cost-of-Living Allowance - Germany.*

[2]   Robson, Seth. 2023. "COLA Cuts Will Affect Some Pacific-based Marines After All, Command Says." *Stars and Stripes.* May 23, 2023.

[3]   *Presidential Recommendations Concerning Adjustments and Changes in Pay and Allowances.* Title 37, United States Code.

[4]   Office of the Secretary of Defense. 2023. *Basic Allowance for Housing: BAH Data Collection and Rate-Setting Process Overview.* Accessed Sept. 15, 2023.

[5]   *Section 403: Basic Allowance for Housing.* Title 37 United States Code.

[6]   *National Defense Authorization Act for Fiscal Year 2024. Pub. L. No. 118-31.* Dec. 22, 2023. Accessed May 10, 2024.

[7]   *National Defense Authorization Act for Fiscal Year 1998. Pub. L. No. 105-85.* Nov. 18, 1997.

[8]   Clemens, Adam M., Danielle N. Angers, Russell W. Beland, Shing L. Cheng, Daniel M. Leeds, Rikesh A. Nana, Robert W. Shuford, Susan Starcovic, and Sarah L. Wilson. 2023. *Evaluation of Basic Allowance for Housing.* CNA. DRM-2023-U-036969.

[9]   *National Defense Authorization Act for Fiscal Year 2023.* Dec. 23, 2022.

[10]   US Department of Commerce. 2017. *American Community Survey Information Guide.* Accessed Oct. 3, 2023. https://www.census.gov/content/dam/Census/programs-surveys/acs/about/ACS_Information_Guide.pdf.

[11]   Office of the Undersecretary of Defense for Personnel and Readiness Directorate of Compensation. Jan. 1, 2023. *Selected Military Compensation Tables.*

[12]   Defense Travel Management Office. Jan. 1, 2023. "Basic Allowance for Housing Rate Lookup." https://www.travel.dod.mil/Allowances/Basic-Allowance-for-Housing/BAH-Rate-Lookup/.

[13]   "Efficient Estimator." In *Encyclopedia of Mathematics.* https://encyclopediaofmath.org/wiki/Efficient_estimator.

[14]   Hatzenbihler, Eva. "How to Calculate the Rental Rate for Your Property." Rentspree. Oct. 21, 2022. https://www.rentspree.com/blog/how-to-calculate-the-rental-rate-for-your-property#:~:text=Two%20main%20factors%20determine%20rental%20rates%3A%20the%20physical,questions%20to%20help%20determine%20your%20property%27s%20rental%20rate.

[15]   Department of the Army. 2009. *DA PAM 420-1-1: Housing Management.*

[16]   Department of the Navy. 2019. *CNIC M-11103.3: Navy Owned and Leased Family Housing Eligibility, Assignment and Termination Criteria*.

[17]   2020. *2020 Demographics: Profile of the Military Community.* Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy. Accessed 17 June, 2024. https://download.militaryonesource.mil/12038/MOS/Reports/2020-demographics-report.pdf.

[18]   Forsyth, F.G. 1960. "The Relationship Between Family Size and Family Expenditure." *Journal of the Royal Statistical Society Series A: Statistics in Society* 123 (4): 367-393.

[19]   Mei, Mike. 2022. "House Size and Household Size: The Distributional Effects of the Minimum Lot Size Regulation." Working paper.

[20]   *Act of April 12, 1808, ch. 43, §6*. 1808.

[21]   Undersecretary of Defense for Personnel and Readiness. 2018. *Military Compensation Background Papers: Compensation Elements and Related Manpower Cost Items, Their Purpose and Legislative Backgrounds. Eighth Edition*.

[22]   *Public Law 81-351*. 1949.

[23]   *Public Law 67-235*. 1922.

[24]   *Act of July 15, 1870, ch. 294, §24*. 1870.

[25]   *Act of July 15, 1870, ch. 295, §§3–4*. 1870.

[26]   Office of the Under Secretary of Defense for Personnel and Readiness, Directorate of Compensation. 2024. *Selected Military Compensation Tables.*

[27]   United States Department of Agriculture. 2024. "USDA Food Plans: Monthly Cost of Food Reports." USDA Food and Nutrition Service. Jan. 25. Accessed Feb. 21, 2024. https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-monthly-reports.

[28]   *National Defense Authorization Act for Fiscal Year 2001. Pub. L. No. 106-398.* Oct. 30, 2000.

[29]   2007. *Department of Defense Directive 1418.05: Basic Allowance for Subsistence (BAS) Policy*.

[30]   Carlson, A., M. Lino, and T. Fungwe. 2007. *The Low-Cost, Moderate-Cost, and Liberal Food Plans, 2007.* United States Department of Agriculture, Center for Nutrition Policy and Promotion. CNPP-20.

[31]   Feeding America. 2023. *Map the Meal Gap 2023 Technical Brief: An Analysis of County and Congressional District Food Insecurity and County Food Cost in the United States in 2021.*

[32]   Defense Finance and Accounting Service. 2024. "Military Pay Charts - 1949 to 2021." Defense Finance and Accounting Service. Accessed Feb. 21, 2024. https://www.dfas.mil/militarymembers/payentitlements/Pay-Tables/PayTableArchives/.

[33]   Bunn, Philip, Jeanne Le Roux, Kate Reinold, and Paolo Surico. 2018. "The Consumption Response to Positive and Negative Income Shocks." *Journal of Monetary Economics* 96: 1-15.

[34]   Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47 (2): 363-391.

[35]   Wang, Wen, and Roger Seifert. 2017. "Pay Reductions and Work Attitudes: The Moderating Effect of Employee Involvement Practices." *Employee Relations* 39 (7): 935-950.

[36]   Stede, Wim A. Van der, Anne Wu, and Steve Yu-Ching Wu. 2020. "An Empirical Analysis of Employee Response to Bonuses and Penalties." *Accounting Review* 95 (6): 395-412.

[37]   Global Tax Network. 2017. "Local Plus Expatriate Policies." GTN. Dec. 17, 2017. Accessed May 6, 2024. https://www.gtn.com/resources/newsletters/local-plus-expatriate-policies#:~:text=What%20is%20a%20Local%20Plus,often%20times%2C%20home%20country%20payroll.

[38]   Solomon, Charlene. 1995. "Global Compensation: Learn the ABCs." *Personnel Journal* 74 (7): 70-76.

[39]   Suutari, Vesa, and Christelle Tornikoski. 2001. "The Challenge of Expatriate Compensation: The Sources of Satisfaction and Dissatisfaction Among Expatriates." *International Journal of Human Resource Management* 12 (3): 389-404.

[40]   Diamond, Rebecca, Tim McQuade, and Franklin Qian. 2019. "The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco." *American Economic Review* 109 (9): 3356-3394.

[41]   Kholodilin, Konstantin A. 2024. "Rent Control Effects Through the Lens of Empirical Research: An Almost Complete Review of the Literature." *Journal of Housing Economics*: 101983.

This page intentionally left blank.

This report was written by CNA's Resources and Force Readiness Division (RFR).

RFR provides analytic support grounded in data to inform resource, process, and policy decisions that affect military and force readiness. RFR's quantitative and qualitative analyses provide insights on a full range of resource allocation and investment decisions, including those pertaining to manning, maintenance, supply, and training. Drawing on years of accumulated individual and unit data, as well as primary data collections, the RFR toolbox includes predictive data analytics, statistical analysis, and simulation to answer optimization and what-if questions, allowing military leaders to make better informed decisions.

CNA is a not-for-profit research organization that serves the public interest by providing in-depth analysis and result-oriented solutions to help government leaders choose the best course of action in setting policy and managing operations.

Error! Reference source not found.

3003 Washington Boulevard, Arlington, VA 22201
www.cna.org 703-824-2000