



## OSIE Resilience Index Methodology

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### Background

On February 26, 2021, Secretary of Defense Lloyd Austin issued the Memorandum, “Immediate Actions to Counter Sexual Assault and Harassment and the Establishment of a 90-Day Independent Review Commission on Sexual Assault in the Military,” which directed immediate actions to address sexual assault and harassment. Immediate Action 2 directed the Office of the Secretary of Defense (OSD) to conduct on-site installation evaluations (OSIEs) and to provide quarterly command climate updates.



To support identification of installations for the 2021 evaluations, the Under Secretary of Defense for Personnel and Readiness (USD(P&R)) directed the completion of a force-wide Defense Organizational Climate Survey (DEOCS). The DEOCS was selected as the primary data source for the 2021 installation evaluations because it serves as the most timely and sensitive Defense-wide measure of command climate and because other relevant data were delayed due to COVID. In 2022, command climate updates employed a multi-measure approach to better capture the many facets of installation risk. Specifically, the OSIE team developed a Risk Index by leveraging several data sources, in addition to the DEOCS, across five organizational levels: Individual, Workplace, Leadership, Installation, Community.

In 2024, the Risk Index was reframed as a resilience index, and incorporated updated and additional data sources. The Resilience Index was calculated in March 2024 and August 2024. The data sources used in index versions from 2022 and 2024, and the subsequent methodology used to identify outlier installations in terms of resilience, are described in detail in the sections below.

## Data Sources

Table 1 below outlines differences between the 2022 Risk, March 2024 Resilience, and August 2024 Resilience versions of the OSIE Index. The data sources are described in more detail following the table.

Table 1: Data Source Usage in 2022 Risk and 2024 Resilience Index Versions			
Data Source	Time period used in 2022 Index	Time period used in Mar 2024 Index	Time period used in Aug 2024 Index
Defense Organizational Climate Survey (DEOCS) 5.0	Jan 2021-Jul 2022	Jan-Dec 2022	--
DEOCS 5.1	--	--	Aug 2023-Jan 2024
Workplace and Gender Relations Survey of Active-Duty Members (WGRA) - Contextual Analysis	2018	2018 & 2021	2018 & 2023
Defense Sexual Assault Incident Database (DSAID)	FY 2018	CY 2021	FY 2023
Defense Suicide Prevention Office (DSPO) Suicide Counts	2020-2022	2016-2022	2016-2024
Status of Forces Survey of Active-Duty Members - Contextual Analysis	[not used]	2020	2022
Family Advocacy Program (FAP) Domestic and Child Abuse Counts	FY 2021	FY 2022	FY 2022
U.S. County Health Rankings & Roadmaps (CHR&R)	2022	2023	2024

**Defense Organizational Climate Survey (DEOCS):** Designed by the Office of People Analytics (OPA), the DEOCS assesses 19 protective and risk factors that can impact a unit/organization’s climate and the ability to achieve their mission.

Protective factors are attitudes, beliefs, and behaviors associated with positive outcomes for organizations or units. Higher favorable scores on protective factors are linked to a higher likelihood of positive outcomes, such as improved performance or readiness and higher retention, and are also linked to a lower likelihood of negative outcomes, such as suicide, sexual harassment, and sexual assault. The DEOCS identifies 10 Protective factors. However, for this analysis, transformational leadership ratings for the unit/organization leader and the non-commissioned officer, where applicable, are treated as two separate factors. Thus, the 11 Protective factors are as follows: Cohesion, Connectedness, Engagement & Commitment, Fairness, Inclusion, Morale, Safe Storage for Lethal Means, Work-Life Balance,



Leadership Support, Transformational Leadership (Commander), and Transformational Leadership (Non-commissioned Officer).

Risk factors are attitudes, beliefs, and behaviors associated with negative outcomes for organizations or units. Higher unfavorable scores on risk factors are linked to a higher likelihood of negative outcomes, such as suicide, sexual harassment, and sexual assault, and are also linked to a lower likelihood of positive outcomes, such as higher performance, readiness, and retention. The DEOCS identifies nine Risk factors. However, for this analysis, passive leadership ratings and toxic leadership ratings for the unit/organization leader and the non-commissioned officer, where applicable, were treated as separate factors. Thus, the 11 Risk factors are as follows: Alcohol Impairing Memory, Binge Drinking, Stress Passive Leadership (Commander), Passive Leadership (Non-Commissioned Officer), Toxic Leadership (Immediate Supervisor), Toxic Leadership (Non-Commissioned Officer), Racially Harassing Behaviors, Sexually Harassing Behaviors, Sexist Behaviors, and Workplace Hostility. For more information on the DEOCS, see [Prevention | Home](#).

The 2022 OSIE Risk Index used data from DEOCS 5.0, spanning January 2021 through July 2022. The March 2024 OSIE Resilience Index used data from DEOCS 5.0, spanning January 2022 through December 2022. The August 2024 OSIE Resilience Index used data from DEOCS 5.1, spanning August 2023 through January 2024.

**Workplace and Gender Relations Survey of Active-Duty Members (WGRA) – Contextual Analysis:** OPA's 2018, 2021, and 2023 WGRA provide insights regarding the estimated prevalence and characteristics of sexual assault, sexual harassment, and gender discrimination in the Active Component; Service members' experiences with reporting these types of incidents; and perceptions of unit culture and climate. A follow-up contextual analysis using 2018 WGRA data was done by OPA to understand how rates of sexual assault and sexual harassment vary across installations and ships. For more information, see <https://www.opa.mil/research-analysis/health-well-being/gender-relations/contextual-studies-workplace-and-gender-relations-survey-of-active-duty-members/2018-contextual-risk-factors-associated-with-sexual-assault-and-sexual-harassment-in-active-duty-overview-report>.<sup>i</sup> For the 2021 and 2023 surveys, a limited contextual analysis was performed to replicate estimated prevalence rates. In addition, installation level estimates of general reporting climate and trust in the military system were produced from the 2018 survey, though these items were not produced for the 2021 or 2023 survey.

**Defense Sexual Assault Incident Database (DSAID):** DSAID is the Department's authoritative, centralized database used to collect and maintain information about sexual assault cases involving members of the U.S. Armed Forces. The Sexual Assault Prevention and Response Office (SAPRO) provided a record of every reported case of military sexual assault (restricted and unrestricted) in FY 2018, CY 2021, and FY 2023, by installation. These years were chosen to align with WGRA fielding windows. For more information on DSAID, see <https://www.sapr.mil/dsaid-overview>.

**Status of Forces Survey of Active-Duty Members (SOFA) - Contextual Analysis:** The Office of People Analytics (OPA)'s SOF enables the DoD to assess the attitudes and opinions of the DoD community, such as retention, satisfaction, stress, and readiness. The survey includes questions relating to suicide-related behaviors, such as suicide attempts and suicidal ideation. For the 2020 and 2022 SOFA, OPA performed a limited contextual analysis to assess installation level estimates of suicide attempts and ideation. For more information on the SOF, see <https://www.opa.mil/research-analysis/opa-surveys/status-of-forces-surveys>

**Defense Suicide Prevention Office (DSPO) Suicide Counts:** DSPO provided the OSIE team with a record of every military suicide from 2016 through 2024 (as of June 2024), by UIC and installation.<sup>ii</sup> DSPO is part of the Office of the Under Secretary of Defense for Personnel and Readiness and is the



authoritative source for suicide data in the Department of Defense (DoD). For more information on DSPO, see <https://www.dspo.mil/>.

**Family Advocacy Program (FAP) Domestic and Child Abuse Counts:** The Office of Military Community and Family Policy provided the OSIE team with FAP records of every substantiated incident of domestic abuse and child abuse and neglect in FY 2021 and FY 2022, by installation.<sup>iii</sup> FAP is the DoD's program designated to address domestic abuse, child abuse and neglect, and problematic sexual behavior in children and youth. For more information on FAP, see <https://www.militaryonesource.mil/family-relationships/family-life/preventing-abuse-neglect/the-family-advocacy-program/>.

**U.S. County Health Rankings & Roadmaps (CHR&R):** CHR&R is a program of the University of Wisconsin Population Health Institute that compiles local U.S. health data to help communities identify opportunities to improve their health. The CHR&R spans several health focus areas: length of life, quality of life, tobacco use, diet and exercise, alcohol and drug use, sexual activity, access to clinical care, quality of clinical care, education, employment, income, family and social support, community safety, air and water quality, housing and transit, and demographics. For more information on the CHR&R, see <https://www.countyhealthrankings.org>.

## Data Ingestion and Merging

Each data source informing the OSIE Resilience Index was ingested into Advana. Validation consisted of confirming record counts match and comparing individual values to the original file for select rows and registrations. We also verified all variables to ensure they were transferred properly and contained valid values.

We then merged each of the separate data sources into a single table using Databricks. Specifically, we merged installation names from the DEOCS, WGRA, SOFA, DSAID, DSPO, and FAP data files using a standardized list from the OSIE master database of installations and ships (n = 1,668 in the full installation list).<sup>iv</sup> This external master list allowed us to match installations with different names/aliases across data files (e.g., Eglin Air Force Base vs. Duke Field vs. Camp Bull Simons). Where applicable, we also aggregated installations from the data files to match the OSIE master database. For instance, McGuire Air Force Base, Fort Dix, and Naval Air Engineering Station Lakehurst—listed as separate bases in the WGRA data—were collapsed into the OSIE installation Joint Base McGuire-Dix-Lakehurst. Finally, we merged the CHR&R to the master database of installations by matching OSIE installations with U.S. Counties using FIPS codes.

## OSIE Resilience Index: Domain Calculations

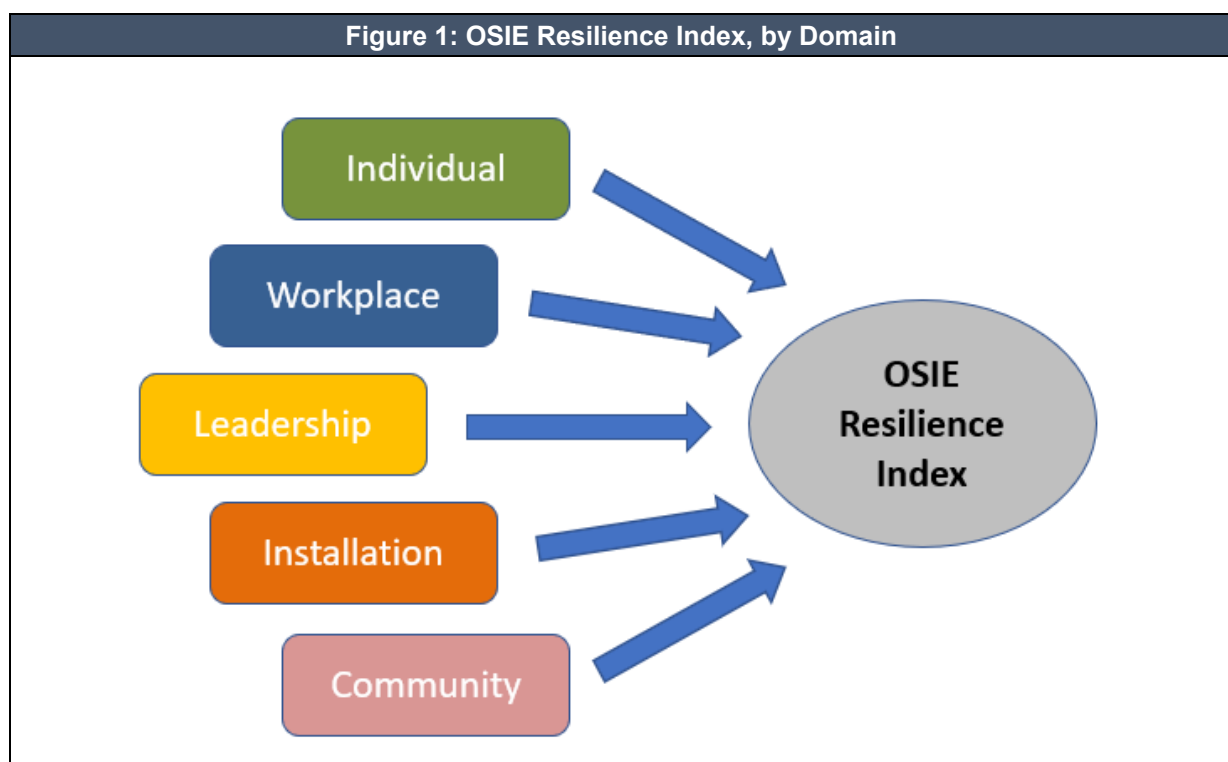
We categorized data sources and DEOCS factors into five levels or domains based on a social ecological model. A social ecological model is a public health framework used to understand the complex interaction between the individual, interpersonal, organizational, and community factors that affect a person's overall health and well-being. This framework enables scholars to better understand the causal processes behind incidents or harm or violence, including why and how individuals are at risk or protected from harm or violence. To create environments free from harm and violence, it is necessary to enhance protective factors and reduce risk factors at every level of the social ecological model.<sup>v</sup>

To produce a social ecological model appropriate for a military environment, we tailored the levels of the model to better suit an installation setting in which a Service member is embedded in an existing chain of

command or leadership structure. The social ecological model we used to produce the installation resilience index reflects risk and protective factors at five different levels (see Figure 1):

1. Individual (e.g., individual behaviors, attitudes)
2. Workplace (e.g., work peers, interpersonal teams, etc.)
3. Leadership (e.g., organizational factors controlled by the command team or supervisor)
4. Installation (e.g., installation historical prevalence or incidence rates)
5. Community (e.g., health trends in the surrounding civilian community)

These five levels constitute a robust social ecological model tailored for the military environment. We used a “best fit” approach and placed each risk and protective factor into a single level of the social ecological framework.



**Individual:** The Individual domain is comprised of six factors from the DEOCS: Connectedness, Sexually Harassing Behaviors, Racially Harassing Behaviors, Sexist Behaviors, Alcohol Impairing Memory, and Binge Drinking. For each factor, we converted installation raw scores to percentiles by comparing each installation’s factor score to the factor scores of all other installations with DEOCS data ( $n = 931$ ).<sup>vi</sup> Because percentiles are a measurement of relative resilience, we assigned percentiles for Connectedness in ascending order and for the five risk factors in descending order. (i.e., A higher value on a protective factor translates to a higher percentile, or a higher level of resilience, and vice versa.) We then averaged the six factor percentiles to create a DEOCS Individual domain composite score for each installation. Finally, depending on the weighting scheme employed (Original Weights, Data Coverage, and Domains Equally Weighted) we assigned the DEOCS Individual domain a weight of either 15% or 20% in the OSIE Resilience Index (see Table 2). Note that we detail each weighing scheme in the final section of the Methodology.

Table 2: OSIE Resilience Index, Weighting Schemes by Domain						
Domain	Items/Inputs	Data Source	Scoring Type	Original Weights	Data Coverage	Equal Domain Weights
Individual	Connectedness	DEOCS Individual	Average Factor Percentile	15%	20%	20%
	Sexually Harassing Behaviors					
	Racially Harassing Behaviors					
	Sexist Behaviors					
	Alcohol Impairing Memory					
	Binge Drinking					
Workplace	Stress	DEOCS Workplace	Average Factor Percentile	15%	20%	15%
	Work-life Balance					
	Engagement & Commitment					
	Morale					
	Fairness					
	Inclusion					
	Cohesion					
	General Reporting Climate	WGRA Climate	Average Scale Score Percentile	5%	10%	5%
Leadership	Toxic Leadership	DEOCS Immediate Supervisor	Average Factor Percentile	5%	7%	7%
	Leadership Support	DEOCS Commander	Average Factor Percentile	5%	7%	7%
	Transformational Leadership					
	Passive Leadership	DEOCS Non-Commissioned Officer	Average Factor Percentile	5%	7%	7%
	Transformational Leadership					
	Passive Leadership					
	Toxic Leadership					
Installation	Estimated Male Sexual Assault Rate	WGRA Male	Rate Per Capita (Percentile)	5%	10%	3%
	Estimated Male Sexual Harassment Rate	WGRA Female	Rate Per Capita (Percentile)	5%	--	3%
	Estimated Female Sexual Assault Rate					
	Estimated Female Sexual Harassment Rate	WGRA & DSAID	Rate Percentile	5%	--	3%
	Estimated Sexual Assault Non-Reporting Rate					
	Domestic Abuse Counts	FAP	Rate Per Capita (Percentile)	10%	--	6%
	Child Abuse Counts					
	Suicide Counts	DSPO & SOFA	Suicide Risk Group	15%	10%	5%
Community	Health Outcomes	CHR&R	Average Percentile	5%	5%	10%
	Health Factors		Average Percentile	5%	10%	10%
<b>Total</b>				<b>100%</b>	<b>100%</b>	<b>100%</b>
Notes: Percentages may not sum to 100% due to rounding. See Table 5 for full list of CHR&R measures.						

**Workplace:** The Workplace domain utilized two data sources: DEOCS and WGRA. The DEOCS component included seven factors: Stress, Work-life Balance, Engagement & Commitment, Morale, Fairness, Inclusion, and Cohesion. Like the DEOCS factors in the Individual domain, we converted an installation's raw score to a percentile by comparing each installation's factor score to the factor scores of all other installations with DEOCS data (n = 931). We assigned percentiles for the six Protective factors in ascending order and assigned percentiles for the Risk Factor Stress in descending order. (i.e., Higher





percentiles were associated with more resilience and less risk). We then averaged the seven factor percentiles to create a DEOCS Workplace domain composite score for each installation.

The second component of the Workplace domain was comprised of two survey items from the WGRA: General Reporting Climate and Trust in the Military System. For each item, we converted an installation's raw score to a percentile by comparing each installation's scale score to the scale scores of all other installations with WGRA data (n = 398). We then averaged the two percentile scores to create a WGRA climate composite score for each installation.

**Leadership:** The Leadership domain was comprised of seven DEOCS factors across three subdomains: Immediate Supervisor (Toxic Leadership and Leadership Support, n = 931), Commander (Transformational Leadership and Passive Leadership, n = 931), and Non-Commissioned Officer (Transformational Leadership, Passive Leadership, Toxic Leadership, n = 829).<sup>vii</sup> Like the DEOCS factors in the other domains, we converted each installation's raw score to a percentile by comparing their factor score to the factor scores of all other installations with DEOCS data. Again, we assigned percentiles for the Protective Factors in ascending order and for the Risk Factors in descending order. We then averaged the percentile scores in the Immediate Supervisor, Commander, and Non-Commissioned Officer subdomains and averaged across subdomains to create a DEOCS Leadership domain composite score for each installation.<sup>viii</sup>

**Installation:** The Installation domain was the most complex in terms of breadth and variety of data sources. First, the domain included the estimated male sexual assault and sexual harassment rates from the WGRA.<sup>9</sup> For both sexual assault and sexual harassment, we converted each installation's rate to a percentile by comparing their rates to the rates of all other installations with WGRA data (n = 398). Given that these rates measure negative constructs, we assigned risk percentiles for the two rates in ascending order (i.e., higher rates were coded using lower percentile scores). We then averaged the two percentiles to create a WGRA male sexual assault and harassment composite score for each installation.

Similarly, the domain includes the estimated female sexual assault and sexual harassment rates from the WGRA (n = 201).<sup>x</sup> Like male sexual assault and sexual harassment, we converted female rates for each installation into risk percentiles in ascending order. We then averaged the two percentiles to create a WGRA female sexual assault and harassment composite score for each installation.

Third, we estimated installation sexual assault reporting rate by comparing the total number of estimated sexual assaults at an installation (from the 2018, 2021, and 2023 WGRA) to the total number of *reported* sexual assaults from DSAID (FY 2018, CY 2021, and FY 2023, respectively). Specifically, we defined reporting rate as DSAID reported sexual assaults divided by WGRA total estimated sexual assaults.<sup>x</sup> We then converted each installation's sexual assault reporting rate to a percentile by comparing their reporting rate to the reporting rates of all other installations with both male and female WGRA sexual assault data and DSAID data (n = 179).

Fourth, we ranked installations according to their FAP per capita rate of domestic abuse incidents and child abuse incidents. To convert raw counts to per capita rates, we used installation size estimates derived from the total rostered individuals at an installation per the DEOCS aligned with the FAP year of interest.<sup>xi</sup> We then divided both the count of domestic abuse incidents and child abuse incidents by this estimate of installation size and multiplied by 1,000 to standardize each of these rates per 1,000 Service members. Lastly, we converted each installation's per capita rate of domestic and child abuse incidents to a percentile by comparing their rates to the rates of all other installations with FAP data (n = 181). We then averaged the two percentiles to create a FAP domestic and child abuse composite score for each installation.



Lastly, we classified installations into suicide risk groups. The data sources and methodology used in this classification differ between the Risk (2022) and Resilience (March 2024 and August 2023) versions of the index. Both are described below.

**OSIE Risk Index (2022) Suicide Risk Groups:** (n = 1,165).<sup>xii</sup> Like FAP domestic and child abuse incidents, we converted raw suicide counts into a per capita rate, by dividing suicides by the estimated active-duty population at each installation and then multiplied the rate by 1,000 Service members. However, rather than converting these rates to percentiles, we categorized installations based on a predetermined matrix (see Table 3) given that suicides are low incidence events. Essentially, we wanted to consider both the raw suicide count and per capita rate when scoring installations on this risk measure.

**Table 3: OSIE Risk Index Suicide Scoring Matrix**  
Based on data from 2020 Q1 through 2022 Q1

		Suicide Rate per 1,000					
		< 0.25	.25 - .49	.50 - .74	.75 - 99	1 - 1.49	>1.5
Suicide Count	0	0					
	1	20					
	2	20	40				60
	3	20	40	40	40	60	60
	4 - 5	20	40	40	60	80	80
	6 - 10	20	40	60	80	80	100
	>10	20	40	60	80	100	100

**OSIE Resilience Index Suicide Risk Groups:** (March 2024, n=1,055; August 2024, n = 931)  
The March 2024 version of the OSIE Resilience Index utilized both raw suicide counts spanning 2016 through 2022 and installation-level estimates of suicidal ideation from the 2020 Status of Forces Survey of Active-Duty Members (SOFA). The August 2024 Resilience Index uses suicide counts spanning 2016 through June of 2024 and 2022 SOFA estimates of suicidal ideation. Raw suicide counts were converted to a suicide score in a similar method as the 2022 methodology, incorporating both suicide counts and per capita rates. The matrix included more categories than the previous version due to the larger pool of data (making both suicide counts and rates have a wider range) and in order to introduce more variation across installations (with 11 categories rather than 6) (see Table 4).



**Table 4: OSIE Resilience Index Suicide Scoring Matrix**  
Based on data from 2016 Q1 through 2022 Q4

		Suicide Rate per 100,000										
		0	1-4	5-9	10-16	17-24	25-34	35-49	50-69	70-99	100+	
Suicide Count	0	0	0	0	0	0	0	0	0	0	0	0
	1	0	10	10	10	10	20	30	40	50	60	
	2	0	10	10	10	20	30	40	50	60	70	
	3	0	10	10	20	30	40	50	60	70	80	
	4-5	0	10	20	30	40	50	60	70	80	80	
	6-7	0	20	30	40	50	60	70	80	80	90	
	8-10	0	30	40	50	60	70	80	80	90	90	
	11-14	0	40	50	60	70	80	80	90	90	100	
	15-19	0	50	60	70	80	80	90	90	100	100	
	20-30	0	60	70	80	80	90	90	100	100	100	
	31-70	0	70	80	80	90	90	100	100	100	100	
	71+ (max 104)	0	80	80	90	90	100	100	100	100	100	

The Resilience Index method also incorporated suicidal ideation estimates at the installation level. Installations were categorized into four groups of low, medium-low, medium-high, and high levels of suicidal ideation, resulting in a score of 25, 50, 75, or 100, respectively.

To combine these two scores in the final suicide risk groups, we computed a weighted average of the scores, with the suicide count-derived score holding 80% weight and the SOFA-derived score a 20% weight. In cases where an installation had no SOFA data (n = 540), the suicide count-derived score was used alone.

**Community:** Lastly, the Community domain consisted of U.S. health data compiled and maintained by the CHR&R. The CHR&R classifies measures into Health Outcomes and Health Factors. Health Outcomes are comprised of 5 measures: years of potential life lost before age 75 per 100,000 population, the percentage of adults reporting fair or poor health, average number of physically unhealthy days, average number of mentally unhealthy days, and percentage of live births with low birthweight. Health Factors are comprised of 28 measures from four subdomains (health behaviors, clinical care, social and economic factors, and physical environment), including: the percentage of adults who are current smokers, the ratio of population to primary care physicians, and the percentage of the workforce that drives alone to work. (For the full list of factors, see Table 5.)

We converted each CHR&R measure into a county-level percentile by comparing each U.S. County with an associated installation to all U.S. Counties with installations.<sup>xiii</sup> This meant that if multiple installations were in the same county, every installation was assigned the same county percentile for each CHR&R measure. For example, both Creech and Nellis Air Force Bases are in Clark County, Nevada. Therefore, both installations were linked to the same percentile scores across all the CHR&R measures. In total, we linked 909 installations and ships to 463 unique U.S. counties. We assigned resilience percentiles for



positive measures (e.g., percentage of adults ages 25 and over with a high school diploma or equivalent) in ascending order and negative measures (e.g., percentage of adults reporting fair or poor health) in descending order.<sup>xiv</sup> Once every CHR&R measure had been converted into a percentile, we computed a weighted average of measures for each installation comprising both the Health Outcomes and Health Factors domains in accordance with CHR&R's original weighting scheme (see Table 5). We then calculated a percentile of those weighted averages to create the two County Health composite scores.



Table 5: County Health Measures and Weighting Scheme			
Domain	Measure	Data Source (Year)	Weight
Health Outcomes	Years of potential life lost before age 75 per 100,000 population (age-adjusted).	National Center for Health Statistics - Mortality Files (2018-2020)	50.0%
	Percentage of adults reporting fair or poor health (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	10.0%
	Average number of physically unhealthy days reported in past 30 days (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	10.0%
	Average number of mentally unhealthy days reported in past 30 days (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	10.0%
	Percentage of live births with low birthweight (< 2,500 grams).	National Center for Health Statistics - Natality files (2014-2020)	20.0%
<b>Total</b>			<b>100.0%</b>
Health Factors	Percentage of adults who are current smokers (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	10.5%
	Percentage of the adult population (age 18 and older) that reports a body mass index (BMI) greater than or equal to 30 kg/m2 (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	5.3%
	Index of factors that contribute to a healthy food environment, from 0 (worst) to 10 (best).*	USDA Food Environment Atlas, Map the Meal Gap from Feeding America (2019)	2.1%
	Percentage of adults age 18 and over reporting no leisure-time physical activity (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	2.1%
	Percentage of population with adequate access to locations for physical activity.*	Business Analyst, ESRI, YMCA & US Census Tigerline Files (2010 & 2021)	1.1%
	Percentage of adults reporting binge or heavy drinking (age-adjusted).	Behavioral Risk Factor Surveillance System (2019)	2.6%
	Percentage of driving deaths with alcohol involvement.	Fatality Analysis Reporting System (2016-2020)	2.6%
	Number of births per 1,000 female population ages 15-19.	National Center for Health Statistics - Natality files (2014-2020)	2.6%
	Percentage of population under age 65 without health insurance.	Small Area Health Insurance Estimates (2019)	5.3%
	Ratio of population to primary care physicians.	Area Health Resource File/American Medical Association (2019)	3.2%
	Ratio of population to dentists.	Area Health Resource File/National Provider Identification file (2020)	1.1%
	Ratio of population to mental health providers.	CMS, National Provider Identification (2021)	1.1%
	Rate of hospital stays for ambulatory-care sensitive conditions per 100,000 Medicare enrollees.*	Mapping Medicare Disparities Tool (2019)	5.3%
	Percentage of female Medicare enrollees ages 65-74 that received an annual mammography screening.*	Mapping Medicare Disparities Tool (2019)	2.6%
	Percentage of fee-for-service (FFS) Medicare enrollees that had an annual flu vaccination.*	Mapping Medicare Disparities Tool (2019)	2.6%
	Percentage of adults ages 25 and over with a high school diploma or equivalent.*	American Community Survey, 5-year estimates (2016-2020)	5.3%
	Percentage of adults ages 25-44 with some post-secondary education.*	American Community Survey, 5-year estimates (2016-2020)	5.3%
	Percentage of population ages 16 and older unemployed but seeking work.	Bureau of Labor Statistics (2020)	10.5%
	Percentage of people under age 18 in poverty.	Small Area Income and Poverty Estimates (2020)	7.9%
	Ratio of household income at the 80th percentile to income at the 20th percentile.	American Community Survey, 5-year estimates (2016-2020)	2.6%
	Percentage of children that live in a household headed by a single parent.	American Community Survey, 5-year estimates (2016-2020)	2.6%
	Number of membership associations per 10,000 population.*	County Business Patterns (2019)	2.6%
	Number of deaths due to injury per 100,000 population.	National Center for Health Statistics - Mortality Files (2016-2020)	2.6%
	Average daily density of fine particulate matter in micrograms per cubic meter (PM2.5).	Environmental Public Health Tracking Network (2018)	2.6%
	Indicator of the presence of health-related drinking water violations.	Safe Drinking Water Information System (2020)	2.6%
	Percentage of households with at least 1 of 4 housing problems: overcrowding, high housing costs, lack of kitchen facilities, or lack of plumbing facilities.	Comprehensive Housing Affordability Strategy (CHAS) data (2014-2018)	2.1%
	Percentage of the workforce that drives alone to work.	American Community Survey, 5-year estimates (2016-2020)	2.1%
	Among workers who commute in their car alone, the percentage that commute more than 30 minutes.	American Community Survey, 5-year estimates (2016-2020)	1.1%
<b>Total</b>			<b>100.0%</b>

Note: N = 463 U.S. counties; "Number of newly diagnosed chlamydia cases per 100,000 population" and "Number of reported violent crime offenses per 100,000 population" omitted from OSIE Resilience Index given these measures are not comparable across state lines. The symbol \* indicates resilience percentiles assigned in ascending order (i.e., higher levels on a measure indicate higher resilience). Source: <https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-measures>

## OSIE Resilience Index: Weighting Schemes and Stability Analysis

We employed three weighting schemes to rank installations in terms of resilience: Original Weights, Data Coverage, and Domains Equally Weighted (see Table 2). Utilizing three separate weighting schemes allowed us to be more confident in the reliability of the rankings. Importantly, for each weighting scheme, if a data source (or sources) were missing, all coefficients were removed from the weighting formula. Using this approach, installations were not penalized for having missing data. Instead, the weights of the other data sources increased proportionately to compensate for the missingness of the other data sources.

**Original Weights.** The Original Weights scheme assigned percentages to domains based largely on socio-ecological theory. Moreover, Original Weights ensured every data source contributed to the overall ranking as each subdomain was assigned a weight between 5% and 15%. In this weighting scheme, DEOCS factors comprised 45% and suicide risk group made up 15% of the OSIE Resilience Index.

**Data Coverage.** The Data Coverage scheme prioritized data sources for which more installations had data. Because there were only 386 installations with estimated female sexual assault rates, sexual harassment rates, and sexual assault reporting rates, these measures were omitted from the OSIE Resilience Index. Likewise, domestic abuse and child abuse rates were removed from the OSIE Resilience Index given that only 181 installations had FAP data. As a result, in this weighting scheme DEOCS factors comprised 60% of the OSIE Resilience Index to compensate for the absence of the omitted data sources.

**Domains Equally Weighted.** The Domains Equally Weighted scheme followed an atheoretical approach by assigning a weight of 20% to each of the five domains. Therefore, this domain-agnostic weighting scheme de-emphasized data sources in the Installation domain (e.g., estimated male sexual assault rates and sexual harassment rates comprised only 3% of the OSIE Resilience Index and suicide risk group accounted for only 5%). Conversely, greater prominence was given to the Community domain by increasing the overall weight of the CHR&R from 10% to 20%.

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**Stability Analysis, August 2024 OSIE Resilience Index.** We performed a stability analysis to examine the potential influence of the weighting schemes on the installation rankings for the August 2024 OSIE Resilience Index. First, we categorized installations into quintiles in terms of resilience and then analyzed the frequency with which installations' resilience quintile changed depending on the weighted scheme employed. This section details results of the stability analysis for the August 2024 Resilience Index. As shown at the top of Table 6, 100% of the 931 total installations exhibited no change when their resilience index quintiles were computed using Original Weights versus Data Coverage.

When resilience quintiles produced using Original Weights were compared against those using Data Coverage, a smaller but still high percentage of installations exhibited no change (94%). Similarly, 806 of the 847 total installations (87%) exhibited no change when their resilience index quintiles were computed with Domains Equally Weighted compared to using Original Weights. Across all three weighting schemes, almost 99% of installations were sorted into the same or an adjacent resilience quintile, lending credence to the consistency of the OSIE Resilience Index.

**Table 6: Stability of August 2024 OSIE Resilience Index Rankings by Weighting Schemes**

	Original Weights vs. Data Coverage	Original Weights vs. Domains Equally Weighted	Data Coverage vs. Domains Equally Weighted
All Installations			
No Change	931 (100%)	872 (94%)	806 (87%)
+/- 1 Quintile Change	-	55 (6%)	117 (13%)
+/- 2 Quintile Change	-	4 (0%)	8 (1%)
+/- 3 Quintile Change	-	-	-
Total	931 (100%)	931 (100%)	931 (100%)

Notes: Percentages may not sum to 100% due to rounding.

<sup>i</sup> If you do not currently have access to OPA.mil, there is a Request Access procedure accessible from the top-right corner of the home page. If you need help accessing the site of establishing an account, please email [ContactOPA@mail.mil](mailto:ContactOPA@mail.mil)

<sup>ii</sup> Records of suicide do not include civilian population.

<sup>iii</sup> Records of domestic abuse and child abuse and neglect do not include military population on ships.

<sup>iv</sup> We define an installation as: *A facility or municipality housing the primary quarters, correspondence, and body of military service units at the lowest echelon available such that each location be geographically unique and reasonably encompassing all its associated units.*

<sup>v</sup> The Centers for Disease Control and Prevention. (2022) "The Social-Ecological Model: A Framework for Prevention." [About Violence Prevention | Violence Prevention | CDC](#)

<sup>vi</sup> DEOCS raw factor scores were originally computed for each installation in two steps. First, we converted the proportion of responses in each category to an average unit score for each factor. Specifically, each negative category for a protective factor was assigned a value of -1 (e.g., non-cohesive organization), each neutral category was assigned a value of 0 (e.g., neutral), and each positive category was assigned a value of 1 (e.g., cohesive organization). For risk factor scores, we use the opposite coding structure: each negative category was assigned a value of 1 (e.g., frequent binge drinking), each neutral category was assigned a value of 0 (e.g., some binge drinking), and each positive category was assigned a value of -1 (e.g., no binge drinking). For factors with only two response categories, each positive category was assigned a value of 1 (e.g., no presence of racially harassing behaviors) and each negative category was assigned a value of -1 (e.g., presence of racially harassing behaviors). Second, we aggregated all unit-level individual factor scores to the installation-level according to the number of individuals rostered for each unit. This process ensures that the responses of each survey respondent in an installation (regardless of unit) were assigned equal weight in the overall factor score of the installation.

<sup>vii</sup> 101 installations were comprised only of units without non-commissioned officers, and therefore, this subdomain was omitted from their Index.

<sup>viii</sup> Two DEOCS factors were excluded from the Risk Index. Safe Storage of Lethal Means was omitted because descriptive and exploratory factor analysis revealed this factor to behave differently than all the other DEOCS factors. Additionally, Workplace Hostility was excluded given that this factor was rescored part way through DEOCS administration.

<sup>ix</sup> The number of installations with estimated female sexual assault and sexual harassment rates was significantly lower than the number with male rates (n = 228 vs. n = 461 for 2023). This is because installations with fewer than 100 Service members of a given gender were excluded from the WGRA Contextual Analysis.

<sup>x</sup> Total sexual assaults at an installation were estimated by summing the sexual assault rate for men multiplied by the total number of male service members and the sexual assault rate for women multiplied by the total number of female



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service members. Therefore, to ensure an accurate estimate of this total, sexual assault non-reporting rates were only calculated for installations where both male and female sexual assault rates were available (n = 201). In addition, any installation with a sexual assault non-reporting rate less than 0% (i.e., DSAID reported sexual assaults greater than WGRA estimated total sexual assaults) were recoded as 0%.

<sup>xi</sup> For the 2022 OSIE Risk Index, installation size estimates were derived using a different method. We estimated the active-duty population at each installation by averaging the total DEOCS roster count of non-civilians for all units mapped to that installation and the 2018 ADMF count of installation size (a variable we obtained from the 2018 WGRA Contextual Analysis).

<sup>xii</sup> Unlike the other data sources, we assumed that installations without data were the result of no suicides and not data missingness. Thus, all 1,165 installations were classified into a suicide risk group, ranging from 0 to 100.

<sup>xiii</sup> We assigned ships the U.S. County of their homeport.

<sup>xiv</sup> The CHR&R measure *presence of health-related drinking water violations* was binary. Therefore, we coded "Yes" as 50 and "No" as 100.