PROJECT AIR FORCE

Air Force Morale, Welfare, and Recreation Programs and Services

Contribution to Airman and Family Resilience and Readiness

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Preface

Morale, Recreation, and Welfare (MWR) programs and services are considered an integral part of building resilient and ready Airmen and families. However, the Air Force currently lacks an evidence-informed evaluation framework for its MWR portfolio, especially one that identifies short-term and intermediate outcomes that contribute to Airmen and family resilience and readiness. These earlier outcomes can be thought of as precursors to overall resilience and readiness. A necessary first step in determining the possible impact of the MWR portfolio is to identify, and then assess, how each individual program or service contributes to resilience and readiness.

The purpose of this report is to provide a summary of the method used to develop a model of the precursors, or building blocks, of resilience and readiness. It also presents the model itself, focusing on direct and indirect building blocks at the individual, family, peer/squadron, and community levels. Ultimately this model provides the basis for a comparison of evidence-informed resilience and readiness building blocks to the short-term and immediate outcomes targeted by programs and services within the Air Force MWR portfolio. This matching process helps the Air Force understand how its portfolio of MWR programs and services may enable and enhance a more resilient and ready force. It does not, however, identify whether MWR programs and services are actually meeting their intended objectives.

The report concludes with a discussion of the data needed—primarily, measures of effectiveness—to assess whether MWR programs and services are achieving their intended outcomes. In this section, a notional, ideal data management system is compared to Air Force current practice. Where gaps exist, recommendations are developed to address them. The report concludes with a discussion of next steps that the Air Force can take to move closer to evaluating the capabilities of the MWR portfolio with respect to enhancing Airman and family resilience and readiness.

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Summary

Morale, Welfare, and Recreation (MWR) programs and services are thought to be an integral part of building resilient and ready Airmen and families. However, the Air Force currently lacks an evidence-informed evaluation framework for MWR programs, especially one that identifies short-term and intermediate outcomes that contribute to Airman and family resilience and readiness. To understand the ways that MWR programs can contribute to resilience and readiness, the Air Force asked RAND to develop an evidence-informed framework that links program activities to such outcomes and provides guidance on collecting and managing the data needed to measure those outcomes.

To accomplish this, we developed an evidence-informed model of resilience and readiness building blocks—that is, precursors to overall resilience and readiness identified through a review of existing literature.[1] We then used this model as the basis for a comparison between the building blocks and the short-term and intermediate outcomes targeted by programs and services within the Air Force MWR portfolio. Together these two efforts allow the Air Force to examine whether and how the MWR portfolio could be used to foster resilience and readiness across the total force.

Fitness, Resilience, and Readiness: An Overview

We began by examining three related concepts: fitness, resilience, and readiness. For the first concept, fitness, we looked to the efforts of the Chairman of the Joint Chiefs of Staff, ADM Michael Mullen, who in 2010 called for the development of a Total Force Fitness (TFF) framework (Mullen, 2010). "Total fitness" was viewed as contributing to a resilient and ready force, and included eight domains: behavioral, environmental, medical, nutritional, physical, psychological, social, and spiritual fitness (Land, 2010). In 2014 the Air Force established the Comprehensive Airman Fitness (CAF) Framework (U.S. Air Force, 2014b). This framework included four pillars of fitness: mental, physical, social, and spiritual. Though somewhat different from the four CAF pillars, Meadows, Miller, and Robson (2015) demonstrated that the eight domains of TFF can be integrated into the four CAF pillars. In this framework, fitness is the immediate precursor to resilience and readiness.

[1] Research that relies on methodologies that preclude inferences about causality (e.g., cross-sectional regression), and instead utilize methods that highlight associations between variables or constructs is generally referred to as *evidence-informed*. In contrast, the term *evidence-based* typically refers to analysis that incorporates more methodologically rigorous, well-controlled methods that do allow for identification of causal relationships (e.g., randomized controlled trials). Because this study draws on research with a range of methodologies, not just those at the more rigorous end of the spectrum, we describe it as *evidence-informed* rather than *evidence-based*.

In recent years, the Department of Defense (DoD) and the service branches have been increasingly focused on the concept of resilience. Multiple definitions of resilience exist in the scientific literature; however, the consensus is that resilience indicates strength and positive outcomes despite significant risks or adversity (Cicchetti and Rogosch, 1997; Masten and Coatsworth, 1998). Individual resilience is not restricted by one's innate abilities; instead, resilience can be developed. Resilience can be thought of as the knowledge, skills, and abilities (KSAs) that are needed to address challenges and adversity. In other words, resilient Airmen and families have a well-stocked toolbox of resources available to them to build or strengthen resilience.

Readiness has also been a key focus for DoD, which defines it as "[t]he ability of military forces to fight and meet the demands of assigned missions" (U.S. Department of Defense, 2018, p. 193). Although readiness at this highest level is supported by service branch and unit readiness, readiness begins at the individual and family levels (McGonigle et al., 2005), as ready Airmen and ready families are both important to increasing the Air Force's ability to fight and meet the demands of assigned missions. Like resilience, individuals can have a toolbox of resources that contribute to readiness.

Leisure as Coping

A key goal of MWR programs is to support leisure and positive use of leisure time. A largely qualitative literature suggests that individuals use leisure activities as a type of coping strategy. Coping is a conscious effort that an individual takes to manage stress (Folkman and Moskovitz, 2004). There are various coping strategies, such as problem-focused coping and social and emotional coping (Iwasaki et al., 2002). However, an increasing body of research has explored leisure as a type of coping strategy (Iwasaki et al., 2002) by examining the connection between leisure coping, stress, and health. The consensus is that leisure "can contribute to physical, social, emotional, and cognitive health," in part through coping with stress or by acting as a buffer to stress (Caldwell, 2005, p. 15).

The leisure-as-coping literature is relevant for a discussion of how and why MWR programs may contribute to resilience. Denovan and Macaskill (2017) posit that leisure supports resilience by building other resources (e.g., coping strategies, social support, sense of purpose, positivity, mental health, and physical health), but that leisure does not build resilience directly. The literature directly connecting leisure to resilience is sparse, and there is a need for future work to test whether leisure promotes resilience, both directly and indirectly.

An Evidence-Informed Model of Resilience and Readiness Building Blocks

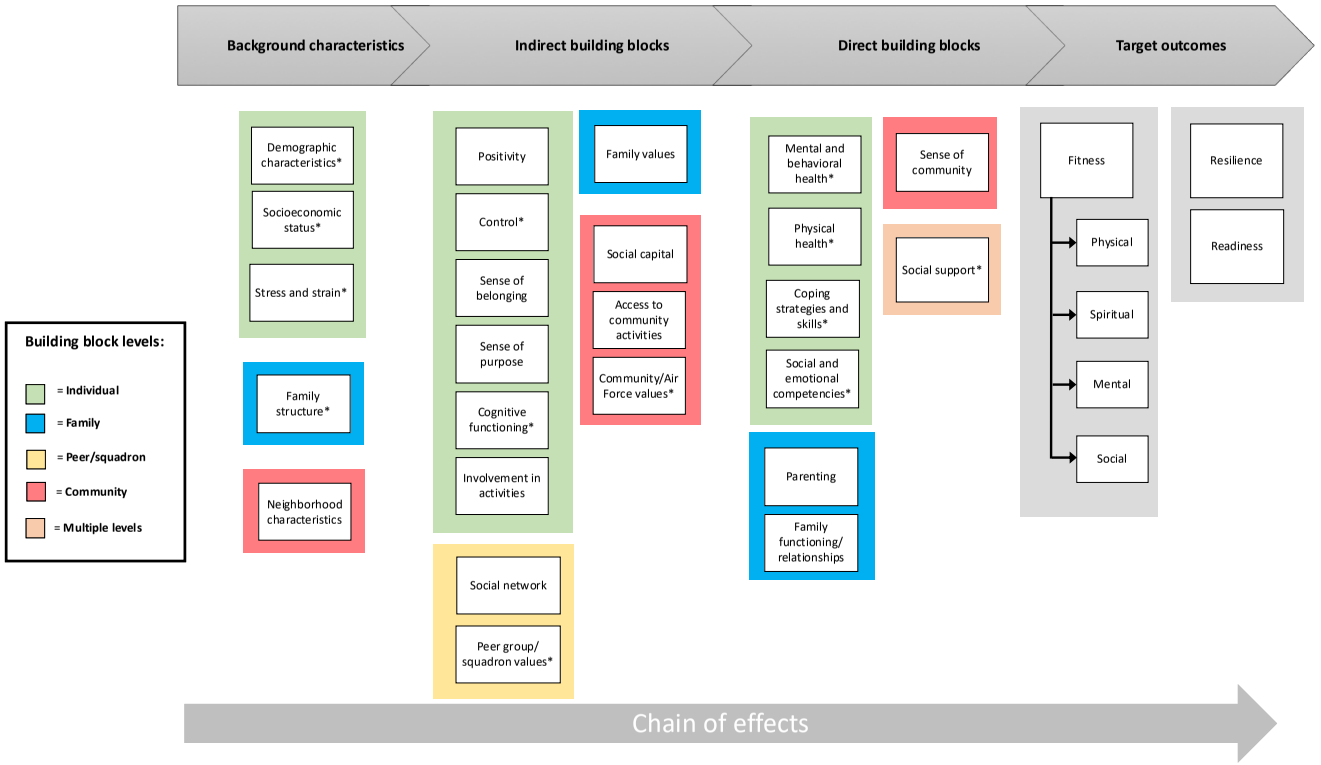
Using these operational definitions, our next step was to review the literature to develop an evidence-informed model of resilience and readiness building blocks. We conducted a

comprehensive review of the literature, with a focus on review articles, including systematic reviews, descriptive literature reviews, and meta-analyses.

We identified 162 articles in our review of the resilience literature and 15 articles in our review of the readiness literature that met our inclusion criteria. As we reviewed these articles, we identified individual factors that contribute to resilience and readiness, and then combined these factors into meaningful categories. In developing our model, the research team focused on two dimensions: system level and proximity. *System level* builds on classic ecological systems theory to define different levels of influence (Bronfenbrenner, 1979). Our model was organized across four system levels: the individual, the family, the peer/squadron, and the community. A fifth level includes background factors (e.g., educational attainment, family structure, and neighborhood characteristics) that may influence access to building blocks at each of the four system levels. *Proximity* refers to the chain of effects needed to connect a given building block to resilience and readiness. Direct building blocks are considered a primary facilitator, whereas indirect building blocks are secondary facilitators of resilience and/or readiness in that they influence direct building blocks. Not all blocks fall clearly into either the direct or indirect category, and certain building blocks may have a direct effect on resilience and readiness but also influence these outcomes indirectly via another direct building block.

Figure S.1 presents the schematic for the overall building blocks model. It is described as *evidence-informed* because all the building blocks are supported with qualitative or quantitative data in the existing resilience and/or readiness literature, although the relationships did not have to be causal. Because we consider fitness (to include the four CAF domains of physical, spiritual, mental, and social fitness) to be an immediate precursor to resilience and readiness, Figure S.1 depicts fitness as the most proximate "target outcome" of the full set of building blocks. Resilience and readiness, then, are the most distal outcomes of the set of building blocks. All building blocks were identified as related to resilience; the subset of building blocks marked with an asterisk (*) were also found in the readiness literature.

Figure S.1. Evidence-Informed Building Blocks Model of Resilience and Readiness



NOTES: All building blocks were found in the resilience literature; building blocks with an asterisk (*) were found in both the resilience and readiness literature. Building blocks are organized at four ecological levels, denoted by different color blocks: individual, family, peer/squadron, and community. Some blocks overlap levels. Working behind, and simultaneously with, blocks in these four levels are a set of background building blocks. Direct building blocks are considered a primary facilitator of fitness, resilience, and readiness. Indirect building blocks are secondary facilitators of fitness, resilience, and readiness in that they work through a direct building block. Promoting the indirect building blocks therefore increases the likelihood of a direct building block being strengthened, which in turn is expected to increase fitness, resilience, and readiness. Target outcomes include resilience and readiness. Resilience is defined as "the ability to withstand, recover, and grow in the face of stressors and changing demands" (U.S. Air Force, 2014b, p. 14). Readiness is defined as "the state of being prepared to effectively navigate the challenge of daily living experienced in the unique context of military service" (U.S. Department of Defense, 2012, p. 31). The Air Force uses four pillars of fitness: physical, spiritual, mental, and social.

A Comparison of Building Blocks to the Comprehensive Airman Fitness Framework

The Air Force defines fitness as "[t]he relationship between one's behaviors and attitudes and their positive or negative health outcomes that results in a state of complete mental, physical, social, and spiritual well-being and not merely the absence of disease or infirmity" (U.S. Air Force, 2014b, p. 13). Each of the CAF fitness domains includes a number of tenets:

- mental: awareness, adaptability, decisionmaking, and positive thinking
- physical: endurance, recovery, nutrition, and strength
- social: communication, connectedness, and social support
- spiritual: core values, perseverance, perspective, and purpose.

A crosswalk between these CAF domains and tenets with the building blocks in our model revealed substantial overlap between the building blocks and the CAF tenets discussed in Air Force Instruction 90-506 (U.S. Air Force, 2014b), such that every evidence-informed direct and indirect building block at the individual, family, peer/squadron, and community level can be tied to at least one CAF tenet, covering all four domains. Thus, the building blocks model aligned well with current Air Force goals related to building and maintaining force resilience and readiness. In this way the building blocks model can be considered an evidence-informed expansion of the CAF framework.

Developing Logic Models and Measures of Performance and Effectiveness

When evaluating programs, a common first step is to develop a logic model for a given program or service. A logic model visually depicts a program or service's operations and outcomes (Milstein and Wetterhall, 2000; Acosta et al., 2013), demonstrating the relationship between program resources and inputs, activities, and expected results. It typically includes resources/inputs, activities, outputs, and short-term and intermediate outcomes, as well as the ultimate impact of a program—that is, long-term outcomes expected at the organizational, community, or system level.

We developed a program- or service-specific logic model for each of the MWR programs and services within the scope of the study. Each logic model links program and service activities to short-term and intermediate outcomes and provides guidance on measuring those outcomes. In addition to providing the foundation for future program evaluation efforts, identifying the short-term and intermediate outcomes for each MWR program and service was a critical next step in determining how each individual program or service contributes to the resilience and readiness building blocks outlined in our model. To identify each core component of the programs and services, we reviewed Air Force documentation, including Air Force Instructions (AFIs) and program and service websites. We also consulted with relevant Air Force Manpower, Personnel and Services, Directorate of Services (AF/A1S) and Air Force Services Activity (AFSVA) staff.

Aside from clearly summarizing the expected operation and outcomes of a program or service, logic models can also be used to identify measures of performance (MOPs) and measures of effectiveness (MOEs). We developed a set of proposed MOPs and MOEs specific to each program and service. MOPs are part of a process evaluation and are used to assess program usage and implementation, such as how many people participated in activities, what activities were implemented, and whether participants were satisfied with the program or service. MOEs are part of an outcome evaluation and are designed to evaluate the effectiveness of a program—that is, whether a program is achieving its intended outcomes. MOEs are used to assess participant-level changes that result from program or service utilization, determining whether programs and services are meeting intended short-term and intermediate outcomes.

The logic models should be considered "living documents"—that is, as the programs and services change, or as documentation becomes more complete or explicit about intended outcomes, the logic models may be updated accordingly, which in turn may affect the MOPs and MOEs. However, a review of the logic models, MOPs, and MOEs across MWR programs and services reveals certain patterns. First, there is a fair amount of consistency in the MOPs across programs. Because MOPs measure implementation and usage, they tend to focus on staff qualifications, types of activities offered, utilization of a program's activities, and satisfaction. By contrast, MOEs are somewhat more variable across programs and services—particularly those measuring short-term outcomes. That said, we found that certain MOEs were common across programs and services, such as positive use of leisure time, increased family interaction, increased squadron cohesion, and increased quality of Air Force life. Regarding impacts, resilience and readiness were identified as intended impacts of each program. Other common impacts include improved morale and increased retention.

Matching Measures of Effectiveness to Building Blocks

To determine how the MOEs mapped onto the previously described resilience and readiness building blocks, we matched the MOEs developed for each MWR program or service to the 22 building blocks of resilience and readiness described in our building blocks model.[2] Of note, the match between an MOE and a building block is not always one to one, as some MOEs are linked to multiple building blocks.

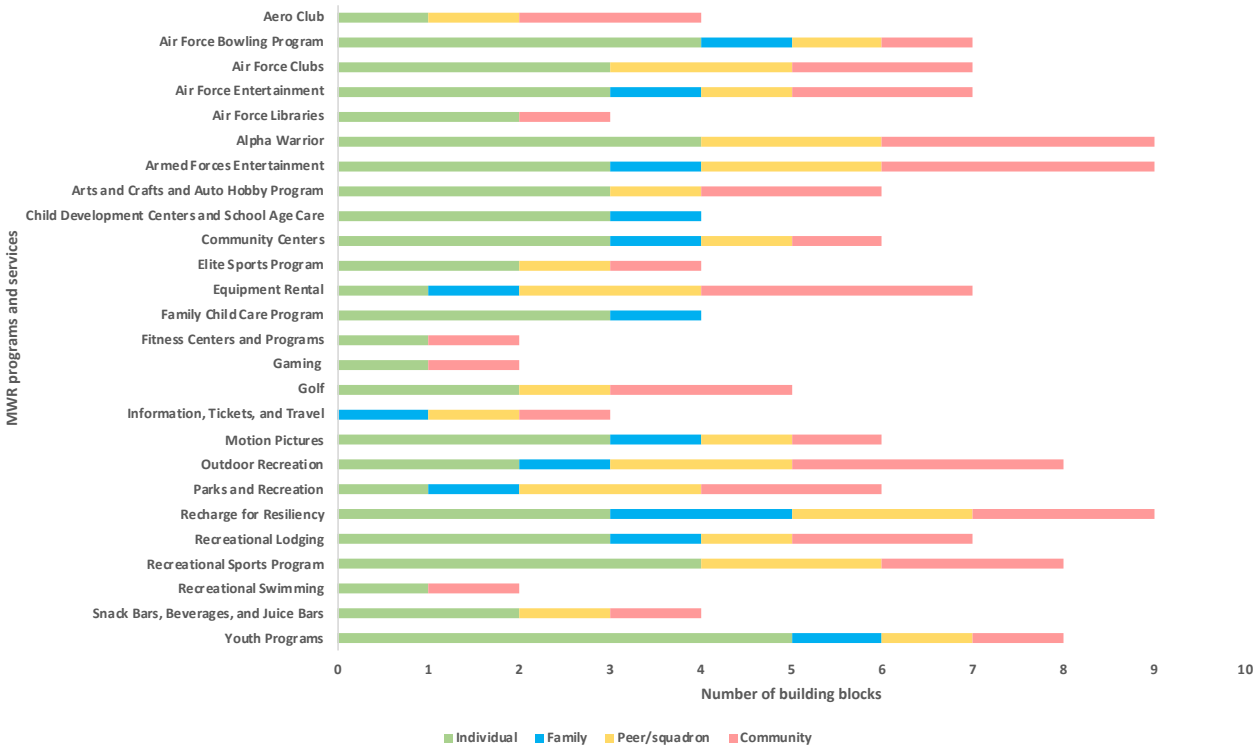
We analyzed the results of the matching process by (1) building blocks and (2) MWR programs and services. The analysis by building blocks shows that 18 of the 22 building blocks match to at least one program or service. The building blocks most frequently matched to programs and services were social network, sense of belonging, sense of community, and access to community activities. The matched building blocks span all four system levels of our model,

[2] This analysis focused on building blocks at the individual, family, peer/squadron, and community levels but did not include the background characteristics.

but the majority of the matched building blocks relate to interpersonal relations. MWR programs and services appear especially oriented toward promoting and maintaining positive relationships and sense of belonging among Airmen and their families.

On average, MWR programs and services were linked to six building blocks, with a range between two and nine (see Figure S.2). All programs and services matched with building blocks at two or more system levels, with six programs and services covering two levels, nine covering three levels, and 11 covering all four levels. Our analysis also revealed that the MWR portfolio is very dense, with many programs and services sharing the same building blocks.

Figure S.2. Number of Building Blocks Linked to MWR Programs and Services, by System Level



As a whole, MWR programs and services link to a majority of the resilience and readiness building blocks in our model, suggesting that the MWR portfolio provides programs and services that have the potential to promote multiple precursors of resilience and readiness. That said, there are considerable redundancies in coverage, as multiple MWR programs and services are linked to a small number of building blocks. Notably, these programs and services may differ in the populations they serve, such that redundancy in coverage may actually promote these building blocks in a wider set of individuals. There are also some gaps in coverage, with four building blocks not linked to any MWR programs or services; however, it may not be practical to expect all building blocks to be covered by MWR programs and services. Finally, building blocks associated with social, mental, and physical fitness are well represented among MWR programs

and services. In contrast, building blocks that are related to spiritual fitness received the least coverage by MWR programs and services.

Based on these findings, we identified a set of recommendations for MWR portfolio management. These include:

- **Consider the full range of goals that the MWR portfolio is designed to achieve.** Though resilience and readiness are key possible impacts of the MWR portfolio, MWR programs and services also promote other potential long-term impacts—for example, morale and retention. Therefore, there are other considerations that may guide decisionmaking about the MWR portfolio. Air Force leadership must decide what it wants the MWR portfolio to achieve.
- **Determine which resilience and readiness building blocks are relevant to the goals of the MWR programs and services.** The MWR portfolio may not be expected to cover all resilience and readiness building blocks. A program or service that does not contribute to any building blocks in the model should not automatically be considered for removal or closure since it may contribute to another portfolio goal (e.g., morale, retention).
- **Consider focusing on additional building blocks if the Air Force decides that promoting spiritual fitness is one of the goals of the MWR portfolio.** However, spiritual fitness is likely to be targeted by other Air Force services outside the MWR portfolio.
- **Conduct a process evaluation to understand whether overlap in coverage of building blocks is functional.** For example, process evaluations could help to determine if multiple programs targeting the same building block are serving different subpopulations.
- **Conduct an outcome evaluation to understand how MWR programs and services *actually* contribute to resilience and readiness.** Our matching analysis is based on the expected outcomes of these programs and services; an evaluation will determine whether those outcomes are actually being achieved.
- **Make the intended purposes of MWR programs and services more explicit.** Clearly communicating a program's desired objectives will make it easier to identify associated MOEs, which can then be linked to building blocks of resilience and readiness. Doing so should also facilitate rigorous program evaluation.

Data Management Practices

To formally determine whether programs and services in the MWR portfolio are being implemented as intended and ultimately achieving their expected outcomes, it will be important to conduct evaluations of these programs and services. The results of any program evaluation are only as good as the data they rely on for assessing performance and effectiveness.

It is also important to consider data management practices and capabilities when thinking about program evaluation. Data management is the process by which data are consistently collected and recorded, securely stored, and prepared for analysis to guide daily operations or in program evaluations (Krishnankutty et al., 2012; BetterEvaluation, 2014). Data management is

critical for ensuring that all data can be utilized with relative ease for an evaluation. An optimal data management system has certain key features:

- **Standardization,** which refers to establishing a set of standards and practices to which all individuals and organizations conform, including consistency in the software used for data management and consistency in the data itself (e.g., recording the same information in the same way).
- **Automation,** which refers to data collection that does not rely on manual data entry. This can include auxiliary technology or tools, such as computer-assisted technology (e.g., Common Access Card readers to register attendance).
- **Tracking,** which allows for creating a profile of an individual's use of MWR programs and services over the course of his or her Air Force career. This requires the assignment of a unique ID across data systems, which can then be used to track individuals, but also to track families.
- **Integration,** which refers to the ability to link external data sources (e.g., personnel records) with MWR data to support evaluation. This practice also relies on a unique ID that is common for the individual across data records.
- **Compliance,** which refers to ensuring that data are collected and managed in accordance with federal policy, as well as with DoD and Air Force regulations. This includes review by an Institutional Review Board, a critical first step before initiating program evaluation.

We reviewed current data systems and data collection efforts within the Air Force and DoD to understand what type of data are already being collected that could be leveraged for an evaluation and to understand what improvements could be made. In addition to reviewing MWR program and service documentation, we spoke with staff in the AF/A1S and AFSVA, as well as those working with MWR programs and services at the installation level.

We learned that MWR programs and services do not currently utilize a single data management software or integrated set of data management software across all installations. There is no centralized support or requirements for how MWR programs and services are expected to manage their data. In fact, the identification, purchase, management, and training of software falls to installation-level staff members. According to our confidential discussions, MWR programs and services commonly rely on multiple "legacy data systems," some of which are outdated in terms of technology, or use spreadsheet programs or other manual processes to capture required data. These efforts are generally managed and stored at the local (e.g., installation, program, or service) level. Though we did not see a list of specific data collected, our discussions indicated that the data that are collected mainly focus on program operations (e.g., program attendance, registration, and funding). With some modification and adaptation, these current collection practices could be leveraged to support program evaluation. However, it appears data required to assess short-term, intermediate, and long-term outcomes of the MWR programs and services are not part of current data collection by programs, installations, or headquarters.

To identify potential secondary sources of MOP or MOE data that AFSVA could leverage, we reviewed surveys currently or previously approved for use in the Air Force community (e.g., the DoD MWR Customer Satisfaction Survey). The reviewed surveys do have items that correspond to some of the program MOPs (e.g., utilization) and MOEs (e.g., unit cohesion), but there are also limitations to relying on these surveys for evaluation purposes (e.g., surveys may only capture crude measures of participation; survey data cannot be integrated with data collected by programs and services to create more nuanced pictures of utilization and resulting outcomes).

Based on our review of program and service documentation (e.g., AFIs, program and service websites) and key informant discussions, we found that there are many ways in which the current data management systems and data collection efforts fall short of the optimal features described above. Our comparison of current data management and collection practices relative to the optimal features are summarized in Table S.1.

Based on our review, we have developed six recommendations for advancing current data systems and practice.

- **Examine the data infrastructure to identify system(s) to support collection and management of high-quality data for evaluation.** This would include a review of current data systems and their capabilities, an examination of storage and computing capabilities, and the availability of infrastructure to support automation.
- **Review existing data to assess alignment between currently available data and the MOPs and MOEs recommended for evaluating MWR programs and services.** This would include an examination of the type and quality of data currently collected; how this overlaps with recommended MOPs and MOEs; and coordination with other data collection efforts.
- **Develop needed data collection processes and instruments to address gaps between current and recommended data for evaluation.** This includes ensuring everyone within the enterprise understands data collection processes.
- **Identify what resources are required to narrow the gap between existing data management and more optimal data management.** This includes creating data collection tools with well-defined measures to promote consistency in how data are collected across locations and providing centralized training for staff who will be actively engaged in data collection.
- **Ensure compliance with all federal, DoD, and Air Force regulations on research, human subjects' protection, and data management.** This includes establishing data handling procedures and ensuring all data collection tools and instruments have been approved by the necessary Air Force offices before putting new data collection and management practices into the field.
- **Create a communication plan to inform the enterprise on the purpose of new data practices.** This would include information tailored to all key stakeholders, including program providers and staff, program participants, Air Force unit commanders and leaders, senior Air Force leadership, and other collaborators.

Table S.1. Comparison of Optimal Data Management System Qualities and the Current Air Force MWR Data Management System

Quality	Description of Optimal Data Management System	Current Air Force Data Management System
Standardization	Each individual MWR program or service uses the same data management system, which is used across all installations. The system can comprise multiple, complementary computer or web-based software or rely on a single, comprehensive software that serves all operational and evaluation needs.	No single data management software or integrated set of data management software is used across all installations and MWR programs in the AFSVA portfolio. MWR programs rely on multiple legacy data systems, some more than a decade old, and the data from these systems are stored across various Air Force networks.
	A shared data lexicon ensures that all data are recorded in the same way, regardless of location, and that actual data collected are comparable across locations.	There is little evidence of standardization regarding type of data collected, format these data take, or the frequency of data collection across programs, services, or installations.
Automation	Computer-assisted technology can improve data quality, reduce error, and improve timeliness of data collection, particularly if data are complex or sensitive.	Some installations use of point-of-sale systems for MWR programs that automate data collection.
Tracking capabilities	Tracking of individuals over time provides information on patterns of behavior, allowing for use of more sophisticated analytic techniques in evaluations.	There is no tracking of users of MWR programs and services over time.
	Tracking individuals is made possible through the assignment of a unique ID to each individual; all individual-level data are connected to the appropriate unique ID.	There is no record of using a single, unique ID for each MWR program and service participant.
Integration	Use of unique IDs consistent with other Air Force organizations enables integration of external data sources (e.g., personnel records) with MWR program/service data, reducing redundancy of data collected and information requested of participants.	Lack of IDs prevents linking of MWR program and service utilization data to data systems outside MWR, at least at the individual level.
Compliance	Established procedures for collecting, managing, analyzing, and reporting data must be implemented in accordance with federal, DoD, and Air Force policies and regulations.	Reviewed surveys, approved by the Air Force Survey Office, are in compliance; however, no information was ascertained about compliance of installation-specific data collection.

Conclusion

Collectively, the MWR portfolio of programs and services is expected to improve Airman and family resilience and readiness. However, a necessary first step in determining the possible impact of the portfolio is to identify, and then assess, how each individual program contributes to precursors of resilience and readiness. The present study has aimed to develop an evidence-informed model of factors that contribute to Airman and family resilience and readiness, and then to develop an evaluation framework for MWR programs and services that identifies short-term and intermediate outcomes that contribute to Airman and family resilience and readiness.

Our recommendations provide a blueprint for steps that can be taken to ensure that the MWR portfolio of programs and services achieves its mission: fostering resilient and ready Airmen and families. They also serve as a guide for developing a data management system that will support evaluation efforts. That said, many of these recommendations are designed to be addressed over an extended period of time. Therefore, we also offer a set of recommended immediate next steps that could be implemented by the Air Force over a more immediate three- to six-month time frame. These include:

- **Finalize the logic models for each program and service, make any needed updates to the proposed MOPs and MOEs, and then formalize the MOPs and MOEs in program and service documentation.** The more explicit and detailed these documents are, the easier it will be to develop a concrete evaluation plan and determine if programs and services are achieving their goals.
- **Identify all existing data sources, to include Air Force–wide surveys, administrative data sets, and data collected for current program and service evaluations.** There may be additional surveys or data sources that are not available to review but would be valuable in conducting an evaluation.
- **Conduct a gap analysis between the data needed for evaluations (MOPs and MOEs) and data currently available.** Ultimately, this will allow the Air Force to develop plans for the collection of these data (e.g., the ways in which data will be obtained; how certain MOPs or MOEs will be measured; how data from across sources can be linked to support an evaluation).

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Abbreviations

AF/A1S	Air Force Manpower, Personnel and Services, Directorate of Services
AFI	Air Force Instruction
AFPC/SV	Air Force Personnel Center, Services Directorate
AFSVA	Air Force Services Activity
APF	appropriated funds
CAF	Comprehensive Airman Fitness
CDC	Child Development Centers
CSF	Comprehensive Soldier Fitness
CSF2	Comprehensive Soldier and Family Fitness
DEER	Defense Enrollment Eligibility Reporting System
DoD	Department of Defense
FCC	Family Child Care
FSS	Force Service Support Squadron
IRB	Institutional Review Board
ITT	Information, Tickets, and Travel
KSAs	knowledge, skills, and abilities
MCFP	Military Community and Family Policy
MRT	Master Resilience Trainer
MWR	Morale, Welfare, and Recreation
MOE	measure of effectiveness
MOP	measure of performance
NAF	nonappropriated funds
OCONUS	outside Continental United States
PAF	Project Air Force
PCS	permanent change of station
QoL	quality of life

R4R	Recharge for Resiliency
RCT	randomized control trial
SAC	School Age Care
SCN	survey control number
SOFS	Status of Forces Survey
TFF	total force fitness
WCAP	World Class Athlete Program

1. Introduction

Morale, Welfare, and Recreation (MWR) programs and services are thought to be an integral part of building resilient and ready Airmen and families. However, the Air Force currently operates without an evidence-informed evaluation framework for MWR programs and services, especially one that identifies short-term and intermediate outcomes that contribute to Airman and family resilience and readiness. To understand the ways that MWR programs can contribute to resilience and readiness, the Air Force asked RAND to develop an evidence-informed framework that links program activities to such outcomes and provides guidance on collecting and managing the data used to measure those outcomes.

These short-term and intermediate outcomes can be thought of as precursors to overall resilience and readiness. For the purposes of this study, we conceptualize these precursors as "building blocks." By cultivating and strengthening these building blocks, MWR programs can promote resilience and readiness among Airmen and their families. At the same time, if Airmen and family members lack these building blocks, it can affect their ability to navigate military life, to withstand stressors and overcome adversity, and to accomplish the Air Force's mission. For this reason, it is important to understand how MWR programs contribute to the development and maintenance of these building blocks, and ultimately to resilience and readiness.

A necessary first step in determining the possible impact of the MWR portfolio on resilience and readiness is to identify the building blocks. This study aimed to develop such an evidence-informed model of these resilience and readiness building blocks, which could then be used as the basis for a comparison between the building blocks and the short-term and intermediate outcomes targeted by programs and services within the Air Force MWR portfolio, allowing the Air Force to examine whether and how the portfolio could be used to foster readiness and resilience across the total force.[1] Before describing the building blocks model itself, as well as the matching process between the blocks and program and service outcomes, we begin by discussing several relevant and interrelated constructs: fitness, resilience, and readiness. This discussion is followed by a brief review of the leisure-as-coping literature, which is especially pertinent for the Air Force's portfolio of MWR programs and services.

[1] Research that relies on methodologies that preclude inferences about causality (e.g., cross-sectional regression), and instead utilize methods that highlight associations between variables or constructs, is generally referred to as *evidence-informed*. In contrast, the term *evidence-based* typically refers to analysis that incorporates more methodologically rigorous, well-controlled methods, which do allow for identification of causal relationships (e.g., randomized controlled trials). Because this study draws on research with a range of methodologies, not just those at the more rigorous end of the spectrum, we describe it as *evidence-informed* rather than *evidence-based*.

Fitness

The concept of fitness is closely related to building a resilient and ready force. Although the military has considered the importance of fitness for quite some time, the concept gained attention in 2009. ADM Michael Mullen, then Chairman of the Joint Chiefs of Staff, called for the development of a Total Force Fitness (TFF) framework (Mullen, 2010). In 2010 an issue of *Military Medicine* was devoted to exploring the evidence for each of the domains that contribute to fitness (i.e., behavioral, environmental, medical, nutritional, physical, psychological, social, and spiritual; Land, 2010) and developing an operational definition for each. In that volume, Mullen wrote, "A total force that has achieved total fitness is healthy, ready, and resilient; capable of meeting challenges and surviving threats" (Mullen, 2010, p. 1). The TFF framework was designed to capture these essential domains.

In 2011 the Air Force contracted with RAND to conduct a literature review exploring the ways that the TFF domains contribute to the resilience of Airmen and their families and to identify key factors within the eight larger domains (Meadows, Miller, and Robson, 2015). This led to a series of reports describing the resilience-related research within each domain (McGene, 2013; Robson, 2013, 2014; Shih, Meadows, and Martin, 2013; Yeung and Martin, 2013; Flórez, Shih, and Martin, 2014; Robson and Salcedo, 2014; Shih et al., 2015).

In 2014 the Air Force established the Comprehensive Airman Fitness (CAF) framework, which was designed to reflect a "cultural shift" in the promotion of fitness, and ultimately resilience and readiness (U.S. Air Force, 2014b). Air Force Instruction (AFI) 90-506, which describes the CAF framework, defines fitness as: "[t]he relationship between one's behaviors and attitudes and their positive or negative health outcomes that results in a state of complete mental, physical, social, and spiritual well-being and not merely the absence of disease or infirmity" (U.S. Air Force, 2014b, p. 13). This definition reflects the four CAF pillars: mental, physical, social, and spiritual fitness:

- *Mental fitness* involves "[a]pproaching life's challenges in a positive way by demonstrating self-control, stamina and good character with choices and actions; seeking help and offering help."
- *Physical fitness* involves "[p]erforming and excelling in physical activities that require aerobic fitness, endurance, strength, flexibility and body composition derived through exercise, nutrition, and training."
- *Social fitness* involves "[d]eveloping and maintaining trusted, valued friendships that are personally fulfilling and foster good communication, including exchange of ideas, views, and experiences."
- *Spiritual fitness* involves "strengthening a set of beliefs, principles or values that sustain an individual's sense of well-being and purpose." (Air Combat Command, undated)

Although somewhat different from the four CAF pillars, the eight domains of TFF can be integrated into the four CAF pillars (e.g., the physical CAF pillar is comprised of the physical, environmental, medical, and nutritional TFF domains), as demonstrated by Meadows, Miller,

and Robson (2015). These four pillars thus provide a backbone for building and maintaining fitness of Airmen and their families, and ultimately the resilience and readiness of the total force of Airmen and families.

Resilience

Following the development of the TFF construct, the Department of Defense (DoD) and the service branches began to be more explicit about defining the related concept of resilience and ways in which service members and their families could build and maintain resilience. Multiple definitions of resilience exist in the scientific literature; however, the consensus is that resilience indicates strength and positive outcomes despite significant risks or adversity (Cicchetti and Rogosch, 1997; Masten and Coatsworth, 1998). Consistent with this conceptualization, the Air Force defines individual resilience as "the ability to withstand, recover, and grow in the face of stressors and changing demands" (U.S. Air Force, 2014b, p. 14). Individual resilience is not restricted by one's innate abilities; instead, resilience can be developed. One can think of resilience as the knowledge, skills, and abilities (KSAs) that are needed to address challenges and adversity. In other words, resilient Airmen and families have a well-stocked toolbox of resources available to them to build or strengthen resilience.

Many of the resources used to build and strengthen individual resilience are also relevant at the family level, although it is important to note that family resilience is more than the simple sum of the resilience of individual family members. Meadows, Miller, and Robson (2015) conducted a literature review on family resilience and concluded that research on family resilience is in its infancy in comparison to research on individual resilience, and that multiple definitions of family resilience exist. They recommended the following definition by Simon, Murphy, and Smith (2005, p. 427): "family resilience is the ability of a family to respond positively to an adverse situation and emerge from the situation feeling strengthened, more resourceful, more confident than its prior state." This definition captures the core components of individual resilience—namely, exhibiting positive outcomes after exposure to adverse events.

The operational tempo experienced by service members and their families during the recent conflicts in the Middle East led senior military leadership, researchers, and program staff to focus on how to build and sustain a resilient force. These efforts identified ways to develop well-stocked toolboxes of resources to promote resilience. The U.S. Army was the first to engage in such endeavors, through a collaboration with the University of Pennsylvania Center for Positive Psychology. Instead of focusing on pathology or deficits, positive psychology is a study of psychological and physical health with an emphasis on strengths and potential (Cornum, Matthews, and Seligman, 2011). In 2008 the collaboration with the center led to the Comprehensive Soldier Fitness program (CSF). CSF includes four domains—physical, emotional, social, and spiritual—that overlap with those found in the TFF construct. In 2012 the program was expanded and renamed Comprehensive Soldier and Family Fitness (CSF2), to

reflect additional support for Army families and Department of the Army civilians. The purpose of CSF2 is to "increase the resilience and enhance the performance of soldiers, families, and DACs [Department of the Army civilians]" (U.S. Army, 2014, p. 6).

CSF2 enhances the resilience and performance of soldiers and families by strengthening the original four domains of fitness—physical, emotional, social, spiritual—as well as the fifth domain of family, added to the Army's fitness framework to further emphasize the importance of family fitness.[2] CSF2 includes individual assessment and training of master resilience trainers (MRTs). After graduating from master resilience training courses, MRTs are responsible for the delivery of resilience training within their unit.[3] There are four levels of MRTs with increasing expertise and responsibility. Ongoing evaluation of CSF2 is conducted by the Walter Reed Army Institute of Research. Individual assessment is done via the Global Assessment Tool, which was developed to assess CSF2's five fitness domains. Results help soldiers and their families identify deficits in the KSAs that promote resilience, and they provide recommendations on how to address existing gaps.

The Air Force adapted the CSF2 framework when developing the aforementioned CAF, which ultimately aims to sustain and enhance fitness and resilience of Airmen, their families, and Air Force civilians (U.S. Air Force, 2014b).[4] CAF is a strength-based approach to enhance fitness in four domains (mental, physical, social, and spiritual). CAF accomplishes its goal of resilient and ready Airmen and families in a number of ways. For instance, a major element of the program is the wingman concept, whereby CAF is intended to create a culture in which Airmen take care of other Airmen at the individual or squadron level. CAF also offers education, resilience-building activities, and wellness support programs, including MWR programs. Leaders at all levels are expected to adhere to the key program philosophy of providing the resources necessary for Airmen to function at the highest level.

Readiness

Readiness is a construct relevant at multiple levels, from the total force to the individual. The DoD defines readiness as "[t]he ability of military forces to fight and meet the demands of assigned missions" (U.S. Department of Defense, 2018, p. 193). Although readiness at this highest level is supported by service branch and unit readiness, readiness begins at the individual and family level (McGonigle et al., 2005), as ready Airmen and ready families are both

[2] The Army uses five domains of fitness, versus the Air Force's four.

[3] One interesting possibility for the Air Force to consider is formally including use of MWR programs and services as part of the MRT curriculum. We were unable to find any existing policies or procedures that indicate this is currently occurring; however, it is possible that individual MRTs have adapted the training in such a way.

[4] Although not discussed here, the Navy and Marine Corps also have a resilience program for servicemembers housed in the 21st Century Sailor and Marine office.

important to increasing the Air Force's ability to fight and meet the demands of assigned missions. Relevant to this context, the DoD has defined family readiness as "the state of being prepared to effectively navigate the challenge of daily living experience in the unique context of military service" (U.S. Department of Defense, 2012, p. 31). Readiness at the individual and family levels is often conceptualized as having many facets, including cognitive (Cosenzo, Fatkin, and Patton, 2007; Grier, 2012); health/physical (Hopkins-Chadwick, 2006; McLaughlin and Wittert, 2009); and mental/psychological (Thompson and McCreary, 2006).

Like resilience, individuals can have a toolbox of resources that contribute to readiness. Deficits in readiness resources may prevent Airmen and their families from optimal performance, thus jeopardizing the Air Force mission. Because readiness at the personal and family levels has such important implications for mission readiness and readiness of the total force, the service branches have developed policies and programs to promote personal and family readiness over the past several years. One example of these programs is the Airman and Family Readiness Centers, which are designed to "provide consultation to senior leadership and commanders in support of the development and execution of policies, programs and processes to enhance individual, family and community readiness, resilience and quality of life" (U.S. Air Force, 2013, p. 4).

The Relationship Between Resilience and Readiness

The existing literature does not address how readiness and resilience are related, perhaps in part because the construct of readiness in the military does not have a direct analog in the civilian world.[5] Nonetheless, there are at least two ways to explain the relationship between the two. First, one could argue that being ready can only happen if an individual is first resilient. That is, one must first possess the ability to bounce back (i.e., have a fully stocked toolbox of resources that promote resilience) when faced with stress before he or she can be ready to face that stress (e.g., deploy). This view treats resilience as a state, and suggests it can be measured cross-sectionally as whether or not an individual possesses some set of sufficient resources.[6] In this view, resilience temporally precedes readiness and can be measured in the absence of a stressful situation. Second, one could argue that readiness (i.e., being prepared to meet the demands of military life) sets the stage for an individual to successfully address a difficult or stressful situation (e.g., a permanent change of station [PCS] move) and must be in place before resilience can occur. This view treats resilience as a process and suggests it should be measured longitudinally, assessing functioning before, during, and after experiencing stress. This way, it is

[5] As we note in Chapter Two, school readiness is one area where there is an available research literature. However, we are unaware of any work that has examined the similarities (or differences) between preparation for entry into the education system and preparation for entry into the military.

[6] The existing literature is unclear on what "sufficient resources" means and how to measure it.

possible to track (1) whether an individual perceives an event to be stressful and (2) how that individual utilizes the resilience resources available to him or her. In this view, readiness, or access to a cache of resources, temporally precedes resilience—the use of those resources during a stressful period.

It is outside the scope of this study to adjudicate which of these two scenarios best fits existing data. We offer them only to point out that there is currently no consensus on whether resilience is a process, a state, or both (Luthar, Cicchetti, and Becker, 2000; Southwick et al., 2014; Bowers et al., 2017; Chmitorz et al., 2018), or whether readiness is a necessary precondition for resilience. Finally, we do not believe that a sufficient body of evidence exists to rank resilience and readiness—that is, one should not be viewed as more important than the other.

Leisure as Coping

A key goal of MWR programs is to support leisure and positive use of leisure time. A largely qualitative literature is emerging that suggests that individuals use leisure activities as a type of coping strategy. Coping is a conscious effort that an individual takes to manage stress (Folkman and Moskovitz, 2004). There are various coping strategies, such as problem-focused coping, social and emotional coping, coping through acceptance or problem reframing, and coping through disengagement (Iwasaki et al., 2002). However, an increasing body of research has explored the idea that leisure could be used as a type of coping strategy (Iwasaki et al., 2002) by examining the connection between leisure coping, stress, and health. The consensus is that leisure "can contribute to physical, social, emotional, and cognitive health," in part through coping with stress, or by acting as a buffer to stress (Caldwell, 2005, p. 15).

Iwasaki and Mannell (2000) have proposed a framework outlining three different leisure coping strategies, which may contribute to health in different ways. The first, palliative leisure, addresses symptoms of stress (e.g., a book club with friends) rather than the actual reason for stress (e.g., work-life balance; see Iwasaki and Mannell, 2000). As Iwasaki and colleagues note, "This strategy incorporates two elements: a positive diversion or 'time-out' from stress-inducing situations and thoughts, and a context for rejuvenation and renewal" (2005, p. 93; see also Iwasaki, 2006). This "reset" (or rejuvenation) may then contribute to resilience.[7] Palliative leisure has been associated with stress reduction and better mental health—and in fact, was shown to be superior to problem-focused and emotional coping strategies in one study (Iwasaki et al., 2002). It is also believed to be effective in reducing stress in situations in which individuals feel they have little control (Iwasaki, 2001).

The second leisure coping strategy is leisure companionship, defined as seeking social support by engaging in leisure activities with other people (Iwasaki and Mannell, 2000). This has

[7] This literature does not mention readiness; however, as noted earlier, this is not surprising given the lack of readiness research on the general civilian population.

been found to have a stronger association with mental health than other coping strategies (problem-focused, emotional coping; see Iwasaki et al., 2002) and to be associated with stress reduction and improved physical health (Iso-Ahola and Park, 1996, cited in Iwasaki and Mannell, 2000). There is some evidence to suggest that leisure companionship is most effective in reducing stress in high-stress populations (Caldwell, 2005).

The third coping strategy is mood-enhancing leisure, which is leisure pursued specifically to improve mood (Iwasaki and Mannell, 2000). One example may be taking a walk in the woods to alleviate stress and increase happiness. Mood-enhancing leisure has been linked with stress reduction (Iwasaki et al., 2002) but has received relatively less attention in the literature.

In addition to these specific leisure coping strategies, an individual's beliefs and perceptions of leisure may also impact the effectiveness of it as a form of coping. For example, research has examined "leisure empowerment," which is the extent to which an individual's leisure activities make him or her feel more able and energized to deal with constraints, gain confidence, and foster a sense of self (Iwasaki and Mannell, 1999). This belief is associated with better coping outcomes (Iwasaki, 2001), improved physical health for highly stressed individuals (Iwasaki et al., 2002), and better mental health and psychological well-being (Iwasaki and Mannell, 1999).

Researchers have argued that leisure coping strategies and beliefs are a more important factor in coping effectiveness than the nature of the leisure activity (Iwasaki and Mannell, 2000; Denovan and Macaskill, 2017). However, there is literature that focuses on the effects of engagement in different types of leisure activities, sometimes categorized broadly as "active" or "passive," or sometimes more specifically labeled, as in "outdoor recreation." Studies suggest that the nature of leisure activities may have different associations with physical and mental health, and that this may vary further by population. For example, some studies have cast doubt on the effectiveness of physically active leisure (i.e., fitness activities and sports) as a style of coping (Kirkcaldy and Cooper, 1993; Iwasaki et al., 2005), including one study that found that active leisure was not associated with coping effectiveness or improved physical health for police and emergency services workers (Iwasaki et al., 2005). However, a study of U.S. Army soldiers found a positive correlation between active leisure, life satisfaction, and decreased depression (Odom, 2016). More research is needed to understand the specific contexts in which physically active leisure is an effective coping strategy; for example, it is possible that the effectiveness of a particular type of leisure activity depends on the level and type of stress being experienced or the outcome examined.

Relaxing leisure (e.g., watching television, reading) has been linked with reduced stress among police and emergency workers and had the strongest association with reduced stress of the various types of leisure activities considered in one study (Iwasaki et al., 2005). Several other studies have suggested that engagement in specific types of solitary leisure, such as music appreciation or viewing scenery on television, can improve mood and decrease state anxiety (Caldwell, 2005), reduce stress as effectively as social leisure (Denovan and Macaskill, 2017), and contribute to life satisfaction (Odom, 2016). However, this type of leisure has been shown to

have a negative association with mental health among adolescents (Passmore and French, 2000, cited in Caldwell, 2005; Passmore, 2003). Other forms of nonactive leisure include cultural leisure (e.g., attending a musical or visiting an art museum) and social leisure (e.g., attending a baby shower, going on a date), and some research has found an association between social leisure and stress reduction, as well as cultural leisure and physical health (Isikawa et al., 2005). Moreover, among police officers and emergency workers, higher frequency of leisure across all categories of leisure predicted better stress reduction, mental health, and physical health, and higher ratings of enjoyment of leisure were associated with greater mental health (Iwasaki et al., 2005). However, there remains a need to better understand the effect of specific leisure activities and how their effects may differ by population.

The leisure-as-coping literature is relevant for a discussion of how and why MWR programs may contribute to resilience.[8] Denovan and Macaskill (2017) posit that leisure supports resilience by building other resources (e.g., coping strategies, social support, sense of purpose, positivity, mental health, physical health), but that leisure does not build resilience intrinsically. The literature directly connecting leisure to resilience is sparse, and there is a need for future work to test whether leisure promotes resilience, both directly and indirectly. We return to the mechanisms through which leisure activity may contribute to resilience when describing the components of the building blocks model reviewed in Chapter Two.

The Organization of This Report

The rest of this report provides more detail on the methods used to identify these building blocks of resilience and readiness and describes the building blocks model itself (Chapter Two). Chapter Two also compares the building block model to the Air Force's own fitness pillars, as outlined in the CAF framework, to assess its relevance to and comprehensiveness with current and ongoing modeling of resilience. Chapter Three describes the development of logic models, measures of performance (MOPs), and measures of effectiveness (MOEs) for each program and service. Chapter Four conducts an analysis of the match between MOEs and resilience and readiness building blocks and provides recommendations for the Air Force to consider when thinking about management of the MWR portfolio as a whole. Chapter Five describes the key characteristics of an optimal data management system and compares current Air Force practice

[8] We also explored whether there is empirical evidence to suggest participation in leisure activities might be protective against engaging in negative behaviors (e.g., alcohol and drug use, family violence). The literature we found largely applies to adolescent populations and provides mixed evidence about the effectiveness of recreational programs for behavioral control (Agnew and Peterson, 1989; Dawkins et al., 2006; Smith and Waddington, 2004). The type of activity, as well as the context (i.e., supervised or unsupervised), does appear to matter in terms of effectiveness, with supervised activities that also include explicit messaging of fighting deviance as most effective (Trulson, 1986). Ultimately, the existing literature suggests that participation in leisure activities alone is not enough to deter deviant behavior; however, more empirical work with other populations is needed to fully understand the relationship between participation in leisure activities and negative behaviors.

to these ideals; the chapter also provides recommendations for moving current data management practices closer to ideal practices in order to support evaluations. Finally, Chapter Six provides overall conclusions and recommendations for actions that the Air Force, and especially Air Force Manpower, Personnel and Services, Directorate of Services (AF/A1S), can take in the next three to six months to prepare for an actual evaluation of the programs and services in the MWR portfolio. Three appendixes are available for download at www.rand.org/t/RR2670.[9]

[9] Appendix A provides a complete list of the citations used in the building block model. Appendix B provides the goals, logic models, and MOP and MOE lists for each program and service within the scope of the study as described in Chapter Three. Appendix C provides detailed results about the MOE–building block matching analysis, as described in Chapter Four.

2. The Building Blocks Model

As the service branches have built their portfolio of programs and services designed to promote resilience and readiness, there has been increasing attention paid to these constructs in the research literature as well. For example, resilience literature previously focused largely on resilience among civilians; more recently, the focus has shifted to resilience in military communities. RAND recently published two related reviews on the topic of resilience in military service members and families. Meredith and colleagues (2011) conducted a literature review to identify evidence-informed factors associated with psychological resilience and examined the extent to which these factors are reflected in resilience-building programs for servicemembers and their families. The second review was conducted by Meadows and colleagues (2015) with a focus on family resilience. The purpose of this review was to support DoD efforts to better define and evaluate the effectiveness of programs designed to increase resilience among service members and their families.

The building blocks model defined in this chapter expands upon these and other reviews of factors that promote resilience and readiness and contributes to the existing knowledge base in two ways. First, the methodology used to build the model is a review of reviews. Instead of focusing on individual research studies, we conducted a comprehensive review of literature reviews and meta-analyses of resilience building blocks. The rapidly increasing size of the resilience literature makes it valuable to draw inferences based on existing syntheses within the literature; this strategy allows for greater confidence in the importance of building blocks that are identified. Second, whereas previous studies have focused on resilience, this study also reviews the literature on readiness. By focusing on both resilience and readiness, this study sheds light on the similarities and differences in building blocks that are associated with these two related constructs. Ultimately, the evidence-informed model described in this chapter will allow the Air Force to identify how MWR programs and services may promote and sustain resilience and readiness and through which pathways—resilience and readiness building blocks—it does so.

Method

To identify building blocks of resilience and readiness, we reviewed the scientific literature on these topics through a comprehensive search strategy.[1] We conducted a review of reviews,

[1] We do not include fitness as an outcome in our literature review because we view it as a precursor to resilience and readiness (i.e., fitness across a number of domains facilitates resilience and readiness; see the discussion in Chapter One). Thus, we assert that the CAF framework is simply another way to conceptualize resilience and readiness building blocks. A comparison of the CAF framework and the resilience and readiness building blocks identified in the literature review is discussed later in this chapter.

focusing on articles that were systematic reviews, descriptive literature reviews, or meta-analyses. We searched the following databases: Web of Science, PsycINFO, PubMed, and Scopus. For our resilience search, we required that article titles, abstracts, or keywords include a variant of the term *resilience*, as well as the terms *review* or *meta-*, and article type was restricted to reviews and meta-analyses. For readiness, we selected articles that included *readiness* in the title, abstract, or keywords, and further added a key search term for *military*; without this term, the search yielded a large number of articles about readiness in contexts that were not relevant to the current study (e.g., school readiness). After identifying articles that were appropriate for inclusion, we reviewed each article and identified factors that emerged from the literature, and then organized these factors into more comprehensive building blocks to better understand the ways in which they may impact resilience and readiness.

Resilience

Given the size of the resilience literature, restrictions on the date of publication for resilience searches were selected based on the volume and relevance of results for each database (2007–2017 for PsycINFO and PubMed; 2012–2017 for Web of Science and Scopus). The search of the resilience literature resulted in 2,228 articles. After reviewing the title and abstract of each article, removing duplicates, and removing all results published in a language other than English or non–peer reviewed literature (e.g., dissertations), we identified 305 articles for full-text review. We excluded articles that did not provide evidence for any potential resilience building blocks (e.g., articles that found no association between the factor examined and resilience), and articles that addressed resilience in nonhuman or nonbehavioral contexts (e.g., engineering, urban planning). Also excluded were studies on neurobiological or genetic aspects of resilience, as the research team deemed these as out of scope for a study of MWR programs.

After full-text review, 162 articles were found to be relevant and meet inclusion criteria. The majority of these articles focused on a vulnerable population (e.g., those suffering from a specific illness, experiencing a specific trauma, or serving in a specific stressful profession); such populations have been exposed to significant stressors, paralleling the military context and making these populations relevant to understanding resilience. Other articles focused on resilience in general (e.g., resilience interventions, general populations), supplementing our representation of the theoretical frameworks and evidence base for each of the building blocks.

We took a constant comparative approach, beginning by developing a list of the factors identified in the studies reviewed or meta-analyzed. As we proceeded to identify and collect relevant resilience factors, we identified key categories that emerged, helping us synthesize multiple related factors into a single building block. We continued to refine the building blocks as we reviewed additional articles. We complemented this bottom-up approach with a top-down approach of aligning the building blocks with established constructs and theories of change from the social science literature.

For each building block, we then utilized the review articles to identify existing evidence linking the block (and constituent factors) to resilience. We identified whether qualitative and/or quantitative evidence exists. If quantitative evidence was found, we identified the analytic method used to produce the evidence:

- *Cross-sectional* studies collect data on independent and dependent variables at the same time, which eliminates the ability to infer causality.
- *Pre/post* studies collect data from participants twice: before and after an intervention/treatment/incident of stress. Differences between pre- and post- measures provide correlational evidence of whether programs were successful.
- *Longitudinal* studies follow participants for a prolonged period and collect data multiple times to measure change over time, which are then attributed to participation in programs or services.
- *Quasi-experimental* and *experimental* designs are similar in that participants in different conditions (e.g., treatment versus control) are compared. Quasi-experimental designs identify an appropriate comparison group against which the outcomes of treatment participant can be assessed. True experimental designs randomly assign participants to treatment or control conditions. Due to random assignment, experimental designs are the only research designs that produce causal evidence. Quasi-experimental designs only allow for the inference of causality.

We also note if we identified a meta-analysis finding support for the building block. Meta-analysis is a statistical technique that utilizes findings from multiple studies to increase the power to detect a true relationship between variables. By pooling results across studies, researchers are better able to estimate the true size of the relationship, especially when individual studies may disagree or report a wide range of the strength of the relationship.

Readiness

For readiness, the searches were not restricted with respect to year, given the more limited size of the readiness literature relative to the resilience literature. The search of the readiness literature resulted in 316 articles. After reviewing the title and abstract of each article, removing duplicates, and removing all results published in a language other than English or non–peer reviewed literature (e.g., dissertations), we identified 40 articles for full-text review. After full-text review, 18 articles were found to be relevant and to meet inclusion criteria; however, three articles were not included in the final set given that they found no evidence for an association between the factors that they addressed (i.e., nutrition) and readiness (Teo et al., 2017a, 2017b, 2017c). For example, one systematic review resulted in a recommendation against the use of certain foods and beverages for enhancing cognitive performance (Teo et al., 2017a); in the other reviews, the authors concluded that there was no evidence that nutrition was associated with readiness (Teo et al., 2017b, 2017c). The final set therefore consisted of 15 readiness articles. As with the resilience literature, we abstracted the readiness factors that each article had identified based on the studies it reviewed. By combining factors into meaningful categories, this data

abstraction process revealed a set of building blocks that were consistent with a subset of the resilience building blocks, although not all resilience building blocks were also found in the readiness literature. When presenting the model (in text, tables, and figures), we indicate with an asterisk (*) where overlap between resilience and readiness factors was found in the literature. It is important to keep in mind that some building blocks may be hypothesized to influence both outcomes; however, the hypotheses may not yet have been empirically tested. In the model, we indicate only those relationships between building blocks and outcomes for which we found supportive evidence in the research literature.

Model Dimensions

Given the large existing literature on these topics, the research team developed a building blocks model that focuses on two dimensions: system level and proximity. System level builds on classic ecological systems theory to define different levels of influence (Bronfenbrenner, 1979), while proximity is related to the chain of effects proposed in the literature.

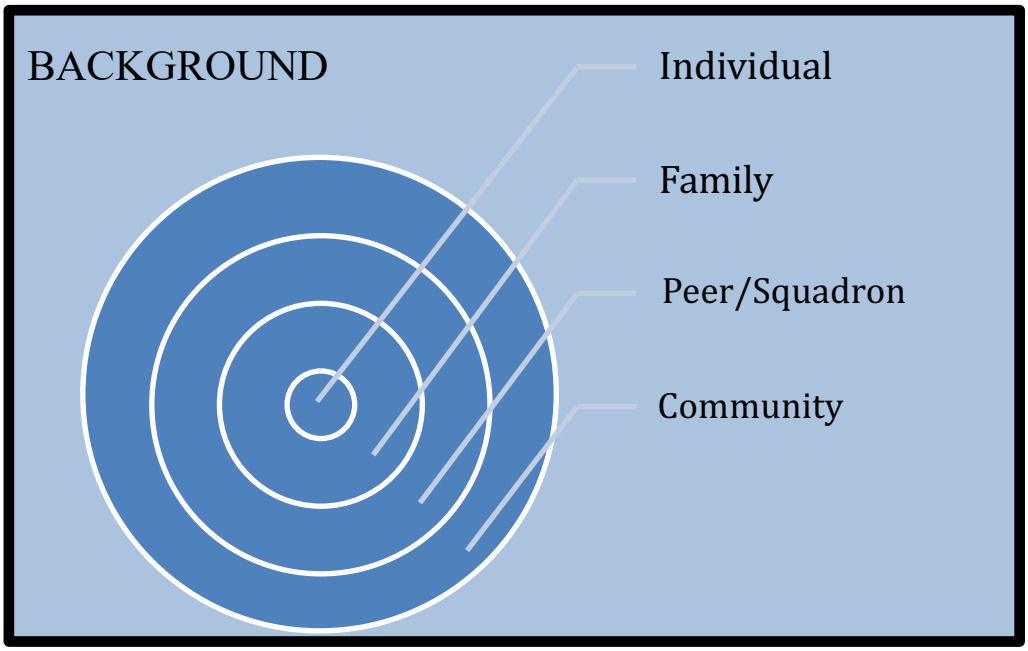
System Levels

Recent research and RAND reports on military resilience and readiness argue that resilience and readiness resources can be conceptualized at different system levels, including the individual, the family, the peer/squadron, and the community (Meredith et al., 2011; Masten, 2013; Meadows et al., 2015). As such, the building blocks of resilience and readiness were organized across these four system levels. A fifth level includes background factors (e.g., educational attainment, family structure, neighborhood characteristics) that may influence access to building blocks at each of the four system levels. These background factors can shape how individuals acquire, develop, and use building blocks at the other levels, although there is no deterministic relationship between early life experiences reflected through background factors and later-life resilience and readiness. Figure 2.1 depicts the levels of resilience and readiness building blocks. The system levels can be thought of as concentric circles, though building blocks can span multiple levels.

Proximity to Resilience and Readiness

The building blocks model developed for this study adds a further dimension: proximity to resilience and readiness. Building blocks were categorized as direct or indirect based on a theoretical model, grounded in the literature, of the chain of effects needed to connect a given building block to resilience and readiness. Direct building blocks are considered a primary facilitator of resilience and/or readiness. Indirect building blocks are secondary facilitators of resilience and/or readiness in that they work through direct building blocks. Promoting the indirect building blocks therefore increases the likelihood of a direct building block being strengthened, which in turn is expected to increase resilience and readiness. For example, having

Figure 2.1. Levels in the Resilience and Readiness Building Blocks Model



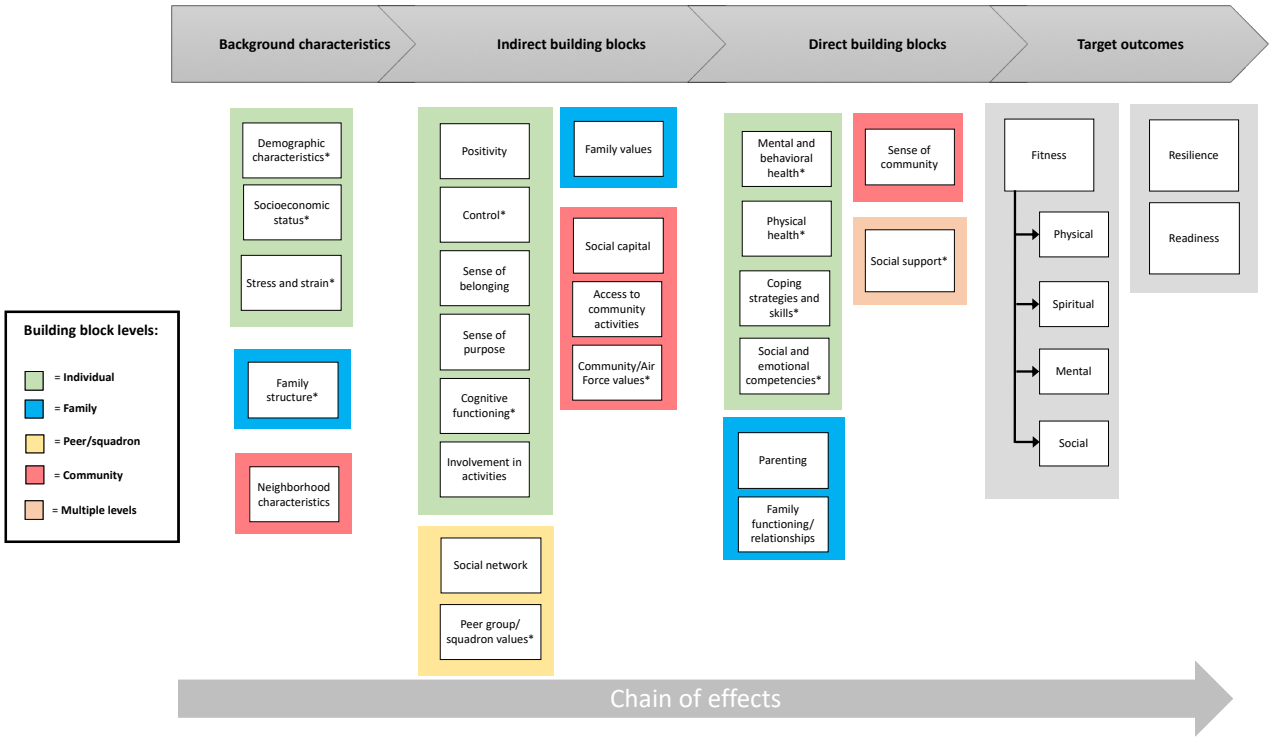
an internal locus of control is believing that you are "in charge" and have the KSAs to face adversity rather than believing that you have no ability to address a situation. Having a greater level of internal locus of control (an indirect building block) is likely to lead to a more proactive and problem-oriented coping style (a direct building block), which is positively associated with resilience and readiness. Note that directness is relative, and not all blocks fall clearly into either the direct or indirect category. Relatedly, certain building blocks may have a direct effect on resilience and readiness but also influence these outcomes indirectly via another direct building block.

The Building Blocks Model

Based on our literature review, the research team identified a set of building blocks organized by system level, and then within each system level, by proximity to resilience and readiness. Figure 2.2 presents the schematic for the overall building blocks model. It is described as *evidence-informed* because all the building blocks are supported with qualitative or quantitative data in the existing resilience and/or readiness literature, although the relationships did not have to be causal.[2] Because we consider fitness itself (to include the four CAF domains of physical,

[2] Prevention and treatment literature generally uses the term *evidence-based* to describe the strength of supporting evidence for a theory or practice (Children's Bureau, undated; Woodbury and Kuhnke, 2014). More specifically, *evidence-based* refers to models or practices that are validated by methodologically rigorous, well-controlled studies that allow for identification of causal relationships. Though there has been a substantial increase in resilience

Figure 2.2. Evidence-Informed Building Blocks Model of Resilience and Readiness



NOTES: All building blocks were found in the resilience literature; building blocks with an asterisk (*) were found in both the resilience and readiness literature. Building blocks are organized at four ecological levels, denoted by different color blocks: individual, family, peer/squadron, and community. Some blocks overlap levels. Working behind, and simultaneously with, blocks in these four levels are a set of background building blocks. Direct building blocks are considered a primary facilitator of fitness, resilience, and readiness. Indirect building blocks are secondary facilitators of fitness, resilience, and readiness in that they work through a direct building block. Promoting the indirect building blocks therefore increases the likelihood of a direct building block being strengthened, which in turn is expected to increase fitness, resilience, and readiness. Target outcomes include resilience and readiness. Resilience is defined as "the ability to withstand, recover, and grow in the face of stressors and changing demands" (U.S. Air Force, 2014b, p. 14). Readiness is defined as "the state of being prepared to effectively navigate the challenge of daily living experienced in the unique context of military service" (U.S. Department of Defense, 2012, p. 31). The Air Force uses four pillars of fitness: physical, spiritual, mental, and social.

spiritual, mental, and social fitness) to be an immediate precursor to resilience and readiness, Figure 2.2 depicts fitness as the most proximate "target outcome" of the full set of building blocks, with each CAF domain specifically noted. Resilience and readiness, then, are the most distal outcomes of the set of building blocks.

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research over the past several years, much of this research relies on methodologies that often preclude inferences about causality (e.g., cross-sectional approaches), and instead focus on associations. Because our model draws on research with a range of methodologies, not just those at the more rigorous end of the spectrum (e.g., quasi-experimental or experimental designs) we describe our model as *evidence-informed* rather than *evidence-based*. However, we have described the analytic methods used to form the evidence base for each building block to address this issue (see Tables 2.1 through 2.5). The reader can use this information to judge the strength of the evidence that supports each building block.

Tables 2.1 through 2.5 depict the resilience and readiness building blocks identified from the literature review described earlier in this chapter. These evidence tables are organized first by system level—individual, family, peer/squadron, and community—and then by whether the literature suggests that they contribute indirectly or directly to resilience or readiness. The final table, Table 2.5, includes the background building blocks.

For each building block, we offer specific example subcomponents from the literature (e.g., physical activity, exercise adherence, nutrition, and wellness are example factors for the physical health building block). It is important to keep in mind that these examples are illustrative and not intended to be exhaustive. We also offer the theoretical rationale for why each block is included. Finally, we offer a summary of the type of supportive evidence found in the literature—qualitative, quantitative, or both. If the literature was quantitative, we then provide a brief description (i.e., cross-sectional or longitudinal; pre/post, quasi-experimental, or experimental).

We did not attempt to "weigh" the strength of the evidence found in the literature review. However, the gold standard design for a research study is a randomized controlled trial (RCT) in which a group of individuals is randomly assigned to either the treatment condition (i.e., they receive a treatment of some sort) or to a control group where no treatment is received. In the simplest form of this experimental design, the treatment group is then compared to the control group on the outcome(s) of interest. Random assignment should result in two equivalent groups on important observable (e.g., age, gender) and unobservable (e.g., personality traits) characteristics.[3] This randomization process, and assumed equivalency, allows researchers to say that the treatment caused the outcome. Unfortunately, the RCT is not the study design used most frequently in the resilience and readiness literature. It is difficult, and in some cases impossible, to randomly assign individuals to many of the factors within any given building block. Thus, experimental evidence in support of any given building block is likely to be rare. In most cases, the existing literature provides less stringent evidence that allows researchers to talk about correlations between building blocks and resilience and readiness. Note that we did not impose any threshold for how many studies needed to exist for a category to be included. That is, if a single experimental study was in the literature review, then "experimental" was included in the evidence tables.

[3] As noted earlier in this chapter, quasi-experimental studies use equivalent treatment and comparison groups, but they lack the essential element of RCTs—random assignment to treatment or control conditions.

Table 2.1. Evidence: Individual-Level Building Blocks of Resilience and Readiness

Building Block	Example Subcomponents	Theoretical Framework	Evidence Base	Type of Quantitative Evidence
Direct				
Mental and behavioral health*	Positive mood; low symptomatology for depression, posttraumatic stress disorder, and anxiety; low levels of substance use (including tobacco and alcohol); adequate sleep	Supports effective coping and social and emotional competencies Also conceptualized as an outcome of resilience	Quantitative, qualitative	Cross-sectional (including meta-analysis); longitudinal; pre/post; quasi-experimental; experimental
Physical health*	Physical activity; exercise adherence; nutrition; overall wellness	Supports mental and behavioral health building block and cognitive functioning Also conceptualized as an outcome of resilience	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental
Social and emotional competencies*	Interpersonal: Social skills; interpersonal competence; trust in others; prosocial behavior; altruism; communication skills Intrapersonal: Self-regulation; hardiness; self-esteem; self-efficacy; persistence; setting goals; proactive orientation; perseverance, determination; assertiveness; sense of self-worth; personal mastery; skill recognition	Promotes access to social support Supports coping strategies through efforts to persevere and belief that one is capable of overcoming stressors Supports mental and behavioral health building block Also conceptualized as an outcome of resilience	Quantitative, qualitative	Cross-sectional (including meta-analysis); longitudinal; pre/post; quasi-experimental; experimental
Coping strategies and skills*	Problem solving; expecting the unexpected; acceptance; mindfulness; accommodation; desire to learn; adaptability; training; preparation; psychological flexibility; attribution style; positive appraisal	Supports positive appraisal and cognitive reappraisal of potential stressors and threats	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental; note that evidence is mixed across different coping strategies and outcomes

Building Block	Example Subcomponents	Theoretical Framework	Evidence Base	Type of Quantitative Evidence
Indirect				
Positivity	Optimism; hope; agreeableness; positive future orientation; gratitude	Supports effort to persevere through factors within the social and emotional competencies building block, such as confidence and determination Supports mental and behavioral health building block	Quantitative, qualitative	Cross-sectional (including meta-analysis); longitudinal; pre/post; quasi-experimental; experimental
Control*	Personal choice; perceived control; internal locus of control; agency; autonomy; self-directedness; control over schedule and tasks	Supports effort to persevere through factors within the social and emotional competencies building block, such as confidence and determination Supports social and emotional competencies such as motivation to overcome stressor and rationalization of overcoming it due to cognitive dissonance	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental
Sense of belonging	Sense of belonging; secure attachment; social identity; sense of connectedness	Supports mental and behavioral health building block	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental
Sense of purpose	Sense of purpose; sense making; spirituality; self-understanding; sense of coherence	Supports factors within the coping strategies and skills building block such as positive appraisal and cognitive reappraisal of potential stressor	Quantitative, qualitative	Cross-sectional; longitudinal; experimental
Cognitive functioning*	Cognitive flexibility; academic and cognitive ability	Supports coping strategies and skills	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental
Involvement in activities	Participation in extracurricular activities, social activities, or clubs	Promotes access to social support Supports mental and behavioral health, social and emotional competencies, and physical health building blocks	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental

NOTE: Building blocks with an asterisk (*) were found in both the resilience and readiness literature.

Table 2.2. Evidence: Family-Level Building Blocks of Resilience and Readiness

Building Block	Example Subcomponents	Theoretical Frameworks	Evidence Base	Type of Quantitative Evidence
Direct				
Social support	Parental support; spouse support; support from extended family	Serves as a protective factor and provides connections to resources	Quantitative, qualitative	Cross-sectional; longitudinal; quasi-experimental; experimental
Positive parenting	Parental monitoring; authoritative parenting (warmth, responsive, and consistent); parental modeling positive coping; parental provision of security	Provides social support and social modeling	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental
Family functioning and relationships	Family coherence and cohesion; family stress and conflict; quality family time; family involvement/collaboration; adaptability of family unit; sense of belonging to family; emotionally secure attachment to family; interconnectedness among family members; positive relationship with parents/caregivers; emotional bonding with siblings	Supports attachment; positive and secure relationships with family members provide tangible (e.g., instrumental) and nontangible (e.g., expressive) support	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental
Indirect				
Family values	Family unity/trust; honor; family optimism; family responsibility; family acceptance	Provides individuals with direction and guidance, supporting the development of individual social and emotional competencies	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; experimental

NOTE: Building blocks with an asterisk (*) were found in both the resilience and readiness literature.

Table 2.3. Evidence: Peer/Squadron-Level Building Blocks of Resilience and Readiness

Building Block	Example Subcomponents	Theoretical Framework	Evidence Base	Type of Quantitative Evidence
Direct				
Social support*	Support from friends and peers; high-quality close relationships; stable relationships; squadron cohesion[a]	Supports mental and behavioral health through emotional and instrumental assistance Promotes adjustment among youth	Quantitative, qualitative	Cross-sectional (including meta-analysis); longitudinal; pre/post; quasi-experimental; experimental
Indirect				
Social network	Large social network; strength of ties; effective professional relationships; informational support	Promotes access to social support Supports mental and behavioral health through positive identity and sense of belonging Provides social and informational resources to increase access to other building blocks	Quantitative, qualitative	Cross-sectional; longitudinal; pre/post; quasi-experimental; experimental
Peer group/Squadron values*	Communalism; traditional values; cultural values; sharing stories; collective self-esteem; commitment to Air Force	Promotes sense of belonging and provides access to social support Supports regulation of attitudes and behaviors as part of social and emotional competencies building block	Quantitative, qualitative	Cross-sectional

NOTE: Building blocks with an asterisk (*) were found in both the resilience and readiness literature.
[a] Here we use *squadron* rather than *unit* since this work was completed for the Air Force.

Table 2.4. Evidence: Community-Level Building Blocks of Resilience and Readiness

Building Block	Example Subcomponents	Theoretical Framework	Evidence Base	Type of Quantitative Evidence
Direct				
Social support	Collective/community support; collective coping; religious community support; educational community support	Members from community provide support to cope with challenges and to reduce social isolation	Quantitative, qualitative	Cross-sectional, longitudinal; experimental
Sense of community	Connected to coethnic community groups; positive community experience; social cohesion; sense of belonging; social connectedness; positive group identity	Social connection with others is related to perceived social support and access to social and cultural resources	Quantitative, qualitative	Cross-sectional; longitudinal; quasi-experimental; experimental
Indirect				
Social capital	Use of collective resources to meet individual and group needs; access to psychological resources from community	Supports sense of community and facilitates collective action	Quantitative, qualitative	Cross-sectional; pre/post; quasi-experimental
Access to community activities	Access to extracurricular activities such as clubs and sports, cultural/traditional activities, volunteering	Provides access to larger social network and more resources including social support	Quantitative, qualitative	Cross-sectional
Community/Air Force values*	Communalism; traditional values; cultural values; ethnic pride; sharing stories; collective self-esteem; commitment to Air Force	Shared values reinforce sense of community and can regulate attitudes and behavior, as part of social and emotional competencies and sense of belonging building blocks	Quantitative, qualitative	Cross-sectional; pre/post; longitudinal

NOTE: Building blocks with an asterisk (*) were found in both the resilience and readiness literature.

Table 2.5. Evidence: Background Building Blocks of Resilience and Readiness

Building Block	Example Subcomponents	Theoretical Framework	Evidence Base	Type of Quantitative Evidence
Individual Level				
Demographic characteristics*	Gender; age; race/ethnicity	Interacts with other building blocks	Quantitative, qualitative	Cross-sectional (including meta-analysis); longitudinal; pre/post; experimental
Socioeconomic status*	Educational attainment; employment status; income level, health care coverage	Promotes access to services and resources, supporting resilience building blocks at family, peer, and community levels	Quantitative, qualitative	Cross-sectional; longitudinal; quasi-experimental; experimental
Stress and strain*	Absence of stressful life events; burnout	Supports mental and behavioral health	Quantitative, qualitative	Cross-sectional (including meta-analysis); longitudinal; experimental
Family Level				
Family structure*	Two-parent household; father presence at home; contact with extended family members	Promotes a support system that enhances one's access to social support	Quantitative, qualitative	Cross-sectional; longitudinal
Community Level				
Neighborhood characteristics	Neighborhood safety; infrastructure; access to community institutions (e.g., school, religious organizations, community centers, parks); availability of support services (e.g., counseling); ethnic diversity	Neighborhoods that are safe and provide adequate infrastructure and resources to individuals as support in adapting to stress or strain	Quantitative, qualitative	Cross-sectional Longitudinal

NOTE: Building blocks with an asterisk (*) were found in both the resilience and readiness literature.

Definitions of Model Building Blocks

Below we provide definitions of each of the building blocks within the model. The building blocks are identified as direct or indirect and grouped within each system level. We also include selected citations from the reviewed articles to illustrate the evidence base for each building block. A complete list of citations and types of evidence available for each building block are in Appendix A, Table A.1. As noted above, an asterisk (*) indicates building blocks that support both resilience and readiness as based on the existing research literature.

Individual Level

Direct

- *Mental and behavioral health** refers to an individual's psychological well-being. It encompasses not only lower rates of clinically diagnosable mental and behavioral health issues (Cicchetti, 2013), but also positive mood and lower symptoms of depression, stress, and anxiety (Lee et al., 2013). Also included in this block are both positive behaviors, including sleep, as well as negative health behaviors that have the potential to adversely affect resilience (e.g., substance, alcohol, and tobacco use; see Allen et al., 2008; Verrall, 2011). Mental and behavioral health is in some cases conceptualized as an outcome of resilience (Wermelinger Ávila, Lucchetti, and Lucchetti, 2017; Gheshlagh et al., 2017; Hodder et al., 2017).
- *Physical health** refers to an individual's physical well-being, including physical activity and exercise, as well as nutrition (Yousafzai, Rasheed, and Bhutta, 2013; Holland and Schmidt, 2015). Physical health and functioning is in some cases conceptualized as an outcome of resilience (Stewart and Yuen, 2011).
- *Social and emotional competencies** refer to both interpersonal and intrapersonal factors (Payton et al., 2000; Durlak et al., 2011). Interpersonal factors can include social skills, communication skills, trust, and prosocial behavior (Cicchetti, 2013; Young et al., 2008). Intrapersonal factors can include self-regulation, self-esteem, and determination (Cicchetti, 2013; Robertson et al., 2016). Social and emotional competencies are in some cases conceptualized as an outcome of resilience (Haft, Myers, and Hoeft, 2016).
- *Coping strategies and skills** refer to practices or tendencies that help an individual to adapt to a stressor, such as preparing for challenges and reframing situations to accommodate challenges (Gheshlagh et al., 2017). Notably, not all coping strategies are equally effective in all contexts, and some can at times increase stress and other negative outcomes (Peer and Hillman, 2014; Gheshlagh et al., 2017). In some cases, coping skills may be developed through stressor-specific training and information (McFadden, Campbell, and Taylor, 2015; Pieloch, McCullough, and Marks, 2016) or previous experience with a similar stressor (although this concept of "stress inoculation" is contested, with some literature suggesting that previous exposure may intensify the stress

response; Bonanno et al., 2010). As described in Chapter One, we would also include leisure as coping in this building block.[4]

Indirect

- *Positivity* refers to an individual's tendency to have an optimistic or hopeful outlook or attitude (Hart, Brannan, and De Chesany, 2014; Pieloch, McCullough, and Marks, 2016). Positivity can protect against negative affective consequences of stressors and promote the restoration of other psychological resources (e.g., self-efficacy, self-esteem, persistence; see Lee et al., 2013; Peer and Hillman, 2014).
- *Control** refers to an individual's actual or perceived choice, influence, and autonomy with respect to circumstances in his or her life (Stewart and Yuen, 2011; Rice and Liu, 2016).
- *Sense of belonging* refers to an individual's perception of being connected to others in a secure way or identification with a social group (Baumeister and Leary, 1995). An individual's sense of belonging is not determined solely by the objective presence of family, peers, or a community, or even provision of social support; rather, it is an individual's subjective sense of being part of a group or relationship and being valued by others (Jones and Morris, 2012; Amsters et al., 2016; Fonseca Freitas, Coimbra, and Fontaine, 2017; Goubert and Trompetter, 2017).
- *Sense of purpose* refers to interpreting one's circumstances as having an underlying reason or coherence (Heine, Proulx, and Vohs, 2006; Park, 2010). Meaning making may take the form of spiritual beliefs, having a strong drive or sense of direction, or having a clear self-understanding (Stewart and Yuen, 2011; Bekhet, Johnson, and Zauszniewski, 2012; Brooks et al., 2015; Rice and Liu, 2016; Sleijpen et al., 2016).
- *Cognitive functioning** refers to being able to engage in effective mental processing, including the ability to understand, problem-solve, plan, and make decisions, as needed in different situations (Allen et al., 2008; Grier, 2012; Sousa et al., 2013).
- *Involvement in activities* refers to an individual's participation in informal or formal organized groups or pastimes that are made available in a community, such as extracurricular clubs or recreation (Zolkoski and Bullock, 2012; Chen and Kovacs, 2013; Domhardt et al., 2015; Sanderson and Brewer, 2017).

Family Level

Direct

- *Social support* at the family level refers to instrumental or emotional assistance or validation from family members such as parents, a spouse, or extended family (Thoits, 2011; Marriott, Hamilton-Giachritsis, and Harrop, 2014; Peer and Hillman, 2014; Domhardt et al., 2015; Hassett and Finan, 2016; Horn, Charney, and Feder, 2016).

[4] In fact, as it is described in the literature, leisure may combine four of the blocks in the building blocks model: involvement in activities, coping strategies and skills (in the case of palliative leisure), mental health (in the case of mood-enhancing leisure), and social support (in the case of leisure companionship). In this way, leisure may contribute to resilience by facilitating the development of other building blocks.

- *Positive parenting* refers to practices or tendencies that guide parenting and discipline (Dvorsky and Langberg, 2016). For example, an authoritative parenting approach has been found to increase resilience because authoritative parents are warm, responsive to their child, and consistent in their discipline (Afifi and MacMillan, 2011; Bhana and Bachoo, 2011; Leve et al., 2012; Park and Schepp, 2015; Dvorksy and Langberg, 2016; Traub and Boynton-Jarrett, 2017). In addition, parental modeling of positive coping strategies (Cousins et al., 2015) and consistent parental monitoring are related to strengthening resilience in children (Betancourt, Meyers-Ohki, et al., 2013; Tol, Song, and Jordans, 2013; Reuben and Shaw, 2015).
- *Family functioning* includes high current levels of family cohesion and family involvement/collaboration (Zolkoski and Bullock, 2012; Sousa et al., 2013; Gauvin-Lepage, Lefebvre, and Malo, 2015; Sleijpen et al., 2016; Wlodarczyk et al., 2017) and low current levels of family conflict and family stress (Afifi and MacMillan, 2011; Holland and Schmidt, 2015; Wlodarczyk et al., 2017).
- *Family relationships* include current positive relationships with parents or caregivers (Cousins et al., 2015; Lira and Morais, 2018), harmony in family relationships (Jones and Morris, 2012; Oré et al., 2016), sense of belonging to one's family (Domhardt et al., 2015), emotional bonding with family members (Masten and Narayan, 2012; Domhardt et al., 2015), and secure relationships with family members (Miller, 2007; Domhardt et al., 2015). Individuals feel loved and valued when they have positive relationships with family members.

Indirect

- *Family values* refer to family unity, mutual trust among family members, acceptance of family members, and family optimism (Fazel et al., 2012; Follins, Walker, and Lewis, 2014; MacDonald et al., 2013; Scott, Wallander, and Cameron, 2015). Intervention approaches that are consistent with individuals' family values are effective in strengthening resilience (Pesantes et al., 2015).

Peer/Squadron Level

Direct

- *Social support** at the peer level refers to instrumental or emotional assistance or validation from peers such as friends or colleagues (Thoits, 2011; Jacobowitz, 2013; Ttofi et al., 2014; McFadden, Campbell, and Taylor, 2015; Fonseca Freitas, Coimbra, and Fontaine, 2017). Squadron cohesion falls into this building block (Brooks et al., 2017).[5]

Indirect

- A *social network* refers to the availability of social connections to an individual, such as through a large or dense network. A social network can include both strong and weak ties. It can include friendships and professional relationships (Dvorsky and Langberg,

[5] We use the term *squadron* rather than *unit* here because of the Air Force emphasis on that level of organization.

2016; Fonseca Freitas, Coimbra, and Fontaine, 2017; Klika and Herrenkohl, 2013), which themselves may lead to provision of informational support.
- *Peer group/squadron values** refer to group beliefs and attitudes tied to a social identity that are shared by peers (McFadden, Campbell, and Taylor, 2015; Morgan et al., 2017).

Community Level

Direct

- *Social support* at the community level refers to instrumental or emotional assistance or validation from community members or organizations (McGonigle et al., 2005; Thoits, 2011; Van Kessel, 2013; Wu et al., 2013; Hassett and Finan, 2016; Rudzinski et al., 2017).
- *Sense of community* refers to strong connection with community (Afifi and MacMillan, 2011; Santos et al., 2013; MacLeod et al., 2016), feeling a sense of belonging (Bhana and Bachoo, 2011; Oré et al., 2016; Roffey, 2016), and positive group identity (Utsey, Hook, and Stanard, 2007; Follins, Walker, and Lewis, 2014; Scott, Wallander, and Cameron, 2015). Connection with community provides individuals with access to social and cultural resources (Follins, Walker, and Lewis, 2014).

Indirect

- *Social capital* refers to "social networks, norms of reciprocity, mutual assistance, and trustworthiness" (Putnam and Feldstein, 2004, p. 2). For example, members of a community could use collective resources to meet individual needs (MacDonald et al., 2013; Sousa et al., 2013; Babatunde-Sowole et al., 2016; Shishehgar et al., 2017). Collective resources are shared among community members. For example sense of community is the extent to which individuals have a sense of belonging to their community, which in turn can promote positive relationships among community members. In addition, one's relationships with other community members allows him or her to access nontangible resources (e.g., information) and tangible resources (e.g., childcare provided by a neighbor; Ungar, 2011).
- *Access to community activities*, such as social clubs, sports, cultural/traditional activities, and volunteering, has been shown to promote resilience (Domhardt et al., 2015; Oré et al., 2016; Sanderson and Brewer, 2017). Participation in these activities increases access to resources and social support (Santos et al., 2013; Lira and Morais, 2018).
- *Community/Air Force values** refer to cultural resources that are shared by community members and reinforce individual positive behaviors (McGonigle et al., 2005; Hopkins-Chadwick 2006; Pieloch, McCullough, and Marks, 2016; Shishehgar et al., 2017; Sousa et al., 2013). For example, ethnic pride (Utsey et al., 2007), collective self-esteem (McCann and Brown, 2017), and communal altruism (Follins et al., 2014; MacLeod et al., 2016) are related to readiness and resilience.

Background Characteristics

As described previously, background characteristics may affect access to other building blocks or the way that individuals engage with other building blocks, but there is not a

deterministic relationship between background factors emerging in early life and later-life resilience and readiness.

- *Demographic characteristics** include factors such as gender (Masten and Narayan, 2012), age (Holland and Schmidt, 2015), and race/ethnicity (Glonti et al., 2015; Rodriguez-Llanes, Vos, and Guha-Sapir, 2013; Marriott, Hamilton-Giachritsis, and Harrop, 2014). These characteristics can contribute to the availability of material and emotional resources, and have shown to be associated with several of the building blocks identified above (e.g., physical health, approaches to coping).
- *Socioeconomic status** refers to an individual's education (Scott, Wallander, and Cameron, 2015; Sousa et al., 2013), income level (Rodriguez-Llanes, Vos, and Guha-Sapir, 2013), and occupation (Sousa et al., 2013; Moeller-Saxone et al., 2015). It is often understood as representing social standing and as arising from access to economic and educational resources. Access to health care coverage also promotes readiness and resilience (Woodward et al., 2016).
- *Stress and strain** refers to the experience of more episodic stressful life events or persistent strain (Rodriguez-Llanes, Vos, and Guha-Sapir, 2013; Marriott, Hamilton-Giachritsis, and Harrop, 2014). Stress and strain are associated with poor mental and behavioral health, as they deplete coping and other social and emotional resources. Long-term exposure to repeated negative life events or chronic strain can result in burnout, oftentimes related to a particular role or demand (e.g., employee, parent; see Jackson-Jordan, 2013; Delgado et al., 2017).
- *Family structure** refers to the makeup of an individual's family unit. A more robust family structure can provide stability to family members. In the literature, stable family structure often implies a two-parent household (Schumm, Bell, Rice, and Perez, 1996; Zolkoski and Bullock, 2012; Domhardt et al., 2015). However, contact with extended family members is particularly important when parents/primary caregivers are not available (Miller, 2007; Park and Schepp, 2015).
- *Neighborhood characteristics* refer to different qualities of an individual's community that can determine exposure to risk and/or protective factors. For example, positive characteristics, like a well-resourced public transportation system, can provide adequate infrastructure and resources to residents (Ungar, 2011). Some key protective neighborhood characteristics are safety (Zolkoski and Bullock, 2012; Ttofi et al., 2014), presence of institutions (e.g., religious organizations, hospitals, parks, community centers; see Masten and Narayan, 2012; Pieloch, McCullough, and Marks, 2016), and availability of support services (e.g., counseling; see Van Kessel, 2013; Rudzinski et al., 2017). Conversely, neighborhood disorganization (e.g., physical dilapidation of buildings, high crime rates, poverty) may convey risk exposure (Zolkoski and Bullock, 2012).

Target Outcomes

As noted at the beginning of this chapter, the ultimate outcomes of the building blocks model are resilience and readiness. Fitness, including the four CAF domains, are modeled as more proximate outcomes, which ultimately contribute to resilience and readiness. A number of other proximate outcomes—such as retention, morale, and quality of life (QoL), all of which may be

associated with use of MWR programs and services—are of interest to the Air Force. Yet it is not clear how these outcomes are related to resilience and readiness. In our review of the literature, we sought to identify evidence of a linkage between one of these outcomes and resilience and readiness, focusing specifically on QoL.

MWR programs and services are often believed to contribute to QoL, through many of the building blocks in the model (e.g., self-esteem, social support, spirituality; see Felce and Perry, 1995; WHOQOL Group, 1995).[6] However, QoL did not itself emerge as a direct contributor to resilience or readiness in our review. Some of the studies we reviewed did measure QoL; however, these studies generally conceptualized it as an outcome of resilience rather than a precursor. For example, studies examined whether individuals who have higher levels of resilience (as measured by resilience scales) have a better QoL (Cal et al., 2015), or whether participation in a resilience training promotes QoL (Leppin et al., 2014). It is not well established whether resilience precedes QoL, or whether resilience and QoL are both longer-term outcomes that are related but conceptually distinct (Lawford and Eiser, 2001). Because QoL remains an important goal of the MWR portfolio we do include "quality of Air Force life" as an outcome for relevant MWR program and service logic models, as they are designed to capture all expected program and service outcomes (see Chapter Three).

Assessing the Building Blocks Model: Comparison to the Comprehensive Airman Fitness Framework

As noted earlier in this chapter, AFI 90-506 defines fitness as "[t]he relationship between one's behaviors and attitudes and their positive or negative health outcomes that results in a state of complete mental, physical, social, and spiritual well-being and not merely the absence of disease or infirmity" (U.S. Air Force, 2014b, p. 13). The CAF framework consists of four domains: mental, physical, social, and spiritual fitness. These domains provide a backbone for building and maintaining fitness of Airmen and their families, and ultimately the resilience and readiness of the force (Airmen, their families, and Air Force civilians).

Each domain includes a number of tenets, as outlined below:

- mental: awareness, adaptability, decisionmaking, and positive thinking
- physical: endurance, recovery, nutrition, and strength
- social: communication, connectedness, and social support
- spiritual: core values, perseverance, perspective, and purpose.

The resilience and readiness building blocks model depicted in this chapter can be overlaid on the four domains (and tenets) found in CAF. Unlike CAF, the building blocks model includes the system level (individual, family, peer/squadron, community, and background) and proximity

[6] It was outside the scope of this study to do a full literature review of the factors that contribute to quality of life.

(direct and indirect) as additional dimensions. Within these dimensions, we created a crosswalk between CAF domains and tenets and each of the building blocks in the resilience and readiness model (see Table 2.6).[7] Though they do not correspond directly to the CAF fitness domains, we also include the background building blocks in this crosswalk. This crosswalk exercise highlights both the relevance to and comprehensiveness of the building blocks model with respect to current and ongoing modeling of resilience.

There is substantial overlap between the building blocks and the CAF tenets discussed in AFI 90-506 (U.S. Air Force, 2014b). In fact, every evidence-informed direct and indirect building block at the individual, family, peer/squadron, and community levels can be tied to at least one CAF tenet, covering all four domains. Although the team made some judgment calls in this exercise, the CAF concept of fitness—and its four key pillars and associated tenets—do appear to serve as a good backbone for conceptualizing how to develop and promote resilience and readiness among Airmen and their families.

Conclusion

Together the evidence-informed building blocks described in this chapter can help Airmen and their families develop and maintain resilience and readiness, ultimately enabling them to meet the Air Force's mission. The model outlined here organizes these building blocks around their level of influence (i.e., the individual, the family, the peer group/squadron, and the community), as well as their proximity to resilience and readiness. However, we acknowledge that the Air Force already has a framework for organizing these building blocks in its CAF program. We created a crosswalk to show how the resilience and readiness building blocks model compares to the existing CAF framework.

Given the consistency between CAF and our building blocks model, we felt that the building blocks model aligned well with current Air Force goals related to building and maintaining force resilience and readiness. In this way the building blocks model described in this chapter can be considered an evidence-informed expansion of the CAF framework.

[7] The crosswalk exercise consisted of the lead primary investigator drafting a matched list of the building blocks, as defined in this chapter, to the CAF tenets, as defined in AFI 90-506. Matching at the tenet level was then aggregated to the domain level based on expert judgment. Feedback was solicited from each study team member regarding the appropriateness of the matches based on the definitions of building blocks, tenets, and domains in the existing documentation. The lead primary investigator then led a one-hour team meeting to discuss and resolve any discrepancies in matches.

Table 2.6. Crosswalk Between Comprehensive Airman Fitness Domains and Tenets and Resilience and Readiness Building Blocks

CAF Fitness Domain	CAF Tenet	Building Block(s)	Building Block Level	Building Block Proximity
Mental	Awareness	Social and emotional competencies, sense of purpose, cognitive functioning	Individual	Direct and indirect
	Adaptability	Social and emotional competencies, coping strategies and skills, cognitive functioning	Individual	Direct and indirect
	Decisionmaking	Social and emotional competencies, coping strategies and skills, cognitive functioning	Individual	Direct and indirect
	Positive thinking	Social and emotional competencies, positivity	Individual	Direct and indirect
		Mental and behavioral health	Individual	Direct
Physical	Endurance	Physical health	Individual	Direct
	Recovery	Physical health, involvement in activities, access to community activities	Individual, community	Direct and indirect
	Nutrition	Physical health	Individual	Direct
	Strength	Physical health	Individual	Direct
Social	Communication	Social and emotional competencies, cognitive functioning	Individual	Direct and indirect
	Connectedness	Involvement in activities, sense of belonging, family functioning and relationships, social network, sense of community	Individual, family, peer/squadron, community	Direct and indirect
	Social support	Social support, parenting, sense of community	Family, peer/squadron, community	Direct
	Teamwork	Social and emotional competencies, social network, social capital, sense of community	Individual, peer/squadron, community	Direct
Spiritual	Core values	Family values, peer/squadron values, sense of community, community/air force values	Family, peer/squadron, community	Direct and indirect
	Perseverance	Coping strategies and skills, social and emotional competencies, positivity, control	Individual	Direct and indirect
	Perspective	Coping skills and strategies, sense of purpose	Individual	Direct and indirect
	Purpose	Sense of purpose	Individual	Indirect
None	None	Demographic characteristics	Individual	Background
	None	Socioeconomic status	Individual	Background
	None	Stress and strain	Individual	Background
	None	Family structure	Family	Background
	None	Neighborhood characteristics	Community	Background

NOTES: CAF fitness domains and tenets found in U.S. Air Force (2014). For building blocks and building block levels, see Chapter Two.

Using this more detailed model, we next sought to assess where and how the blocks in our model align with the expected outcomes of current MWR programs and services. However, to complete this matching exercise, we first had to develop a set of logic models, identifying MOPs and MOEs, for each program and service. These MOPs, and especially MOEs, are the basis for program evaluation and identify what a program or service is supposed to achieve and how it is expected to do so. Chapter Three provides a brief overview of program evaluation, logic models, MOPs, and MOEs; Chapter Four then presents the results of our matching analysis, linking program and service MOEs to building blocks.

3. Developing Logic Models and Measures of Performance and Effectiveness

Currently the Air Force operates without an evidence-informed evaluation framework for MWR programs and services. The next stage in our process was to develop such a framework, one that links program activities to short-term and intermediate outcomes and provides guidance on measuring those outcomes. In addition to providing the foundation for future program evaluation efforts, identifying the short-term and intermediate outcomes for each MWR program and service was a critical next step in determining how each individual program or service contributes to the resilience and readiness building blocks outlined in our model. In this chapter we present a brief overview of program evaluation, and then describe the evaluation framework, including the development of logic models and the identification of MOPs and MOEs. We then describe the logic models, MOPs, and MOEs developed for the MWR programs and services.

Program Evaluation Overview

Program evaluation is a systematic process for collecting and analyzing information about a program to determine that program's quality of operation and ability meet intended purposes (i.e., effectiveness; see Rossi, Lipsey, and Freeman, 2004; Wholey, Hatry, and Newcomer, 2010).[1] The information gained from evaluation guides decisionmaking on the types of program activities to offer; informs new program activities to incorporate; allows for the identification of program components functioning above, at, or below expectation; and demonstrates the value of a program in effectively contributing to organizational priorities. Evaluations can be conducted as one-time occurrences, but the more common purpose of program evaluation is as part of continuous improvement efforts. Continuous Quality Improvement is a cycle of planned, formal, systematic, and perpetual action for improving a program to meet desired outcomes (Berwick, 1989; Deming, 1994; Hunter et al., 2015).

Evaluations can be categorized into two types: process evaluations and outcome evaluations. Process evaluations focus on what activities were implemented, the quality of that implementation, and the strengths and weaknesses of program implementation (Chinman, Imm, and Wandersman, 2003). Assessing participant satisfaction is considered process evaluation. Outcome evaluations focus on the short-term and intermediate outcomes of a program and attempt to identify whether the program created improvement—and if so, how

[1] In the context of program evaluation, "program" refers to the broad categories of programs, practices, policies, services, or activities. In this way, program evaluation applies to MWR programs and services.

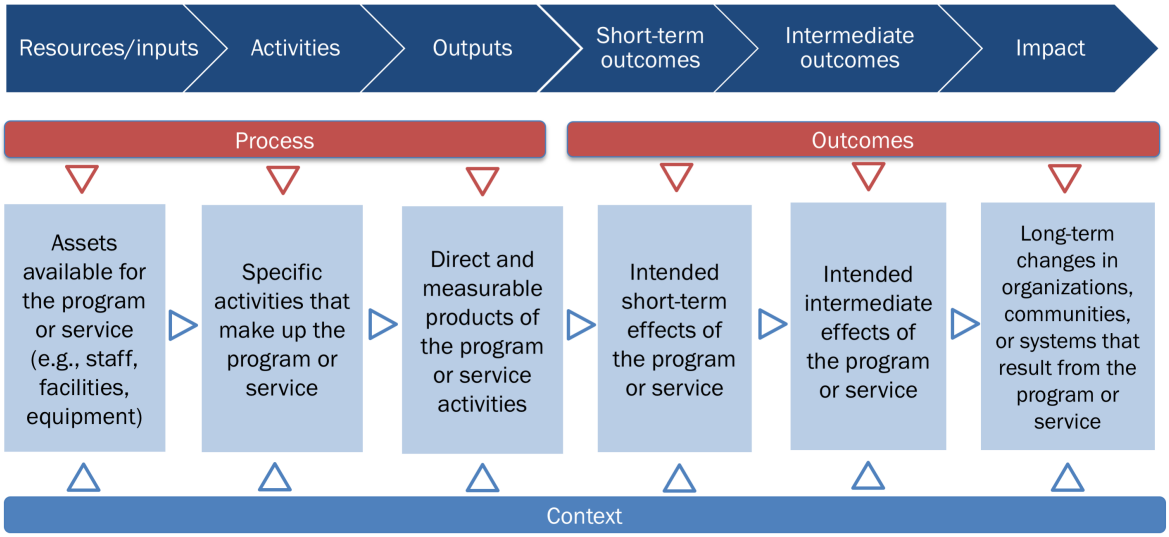
much of an improvement—in those outcomes for program participants (Chinman, Imm, and Wandersman, 2013). Notably, process evaluations can provide the context needed to understand outcome evaluations. If a program is not meeting all its intended outcomes, there may be signals from the process evaluation that suggest why. For example, programs may not be reaching the intended target audience or may not be implemented with fidelity (e.g., there are too few program sessions, or staff without the needed training), or program participants may not have identified program activities as useful.

Logic Model Overview

When developing a program evaluation framework, a common first step is to develop a logic model for a given program or service. A logic model visually depicts a program or service's operations and outcomes (Milstein and Wetterhall, 2000; Acosta et al., 2013), demonstrating the relationship between program resources and inputs, program or service activities, and the expected results. The logic model displays the connection between program goals, resources/activities, and outcomes (Acosta et al., 2013), and in this way can be a useful tool in developing an evaluation plan. A basic outline of a logic model appears in Figure 3.1. Each of these elements is described in more detail below.

- **Resources/inputs** to a program are the assets and resources needed for a program to operate. This includes human resources, such as trained and qualified staff; organizational resources, such as necessary infrastructure, facilities, and equipment; and financial resources, such as source of funding (e.g., appropriated funds [APF] and/or nonappropriated funds [NAF]).
- **Activities** refer to the specific actions, strategies, and approaches that are implemented to achieve a program or service's goals. These activities are designed to bring about the intended effects of the programs. For example, this may include providing access to facilities and equipment; organizing and operating specific activities, courses, or events; managing reservations; or making referrals.
- **Outputs** are the direct and tangible products of a program or service's activities. This may include utilization of the program or service's facilities; attendance at activities or events; and satisfaction of individuals using the program or service.
- **Outcomes** refer to the intended effects of a program. Outcomes are generally broken into short-term (i.e., outcomes observed in the year after using a program or service) and intermediate outcomes (i.e., outcomes observed one to three years after using a program or service). Outcomes are generally observed on the individual or small-group level (e.g., the family or squadron level).
- **Impact** refers to the long-term outcomes that are expected because of a program or service. These impacts are generally observed at the organizational, community, or system level—such as effects that would be observed at the total force level.

Figure 3.1. Logic Model Outline



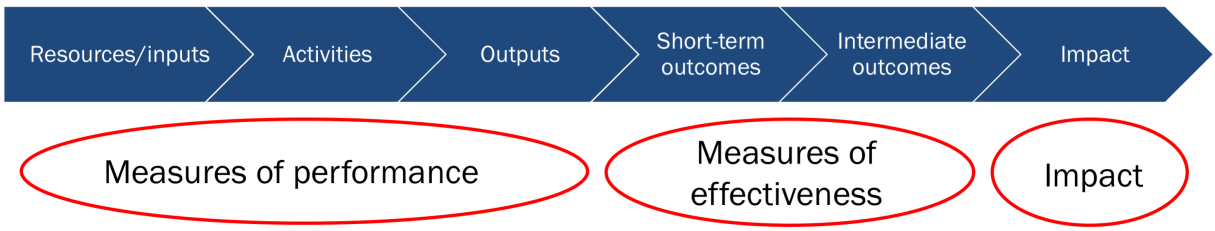
Logic models are an important tool for program evaluation because they clearly summarize the expected operation and outcomes of a program or service and can also be used to identify MOPs and MOEs.

Measures of Performance and Effectiveness

To determine whether a program or service is being implemented as expected and achieving the intended outcomes, the next step is to identify MOPs and MOEs. MOPs are part of a process evaluation and are used to assess program usage and implementation. They correspond to the resources/inputs, activities, and outputs on the logic model (see Figure 3.2). MOPs are designed to answer questions such as how many people participated in activities, what activities were implemented, and whether participants were satisfied with the program or service. They are generally measured in an immediate time frame.

MOEs are part of an outcome evaluation and are designed to evaluate the effectiveness of a program—that is, whether a program is achieving its intended effects. MOEs provide information about the changes that resulted from program or service activities at the

Figure 3.2. Connection Between Logic Model Components, MOPs, and MOEs



individual or small-group (e.g., family, squadron) level. They can be developed to measure both short-term and intermediate outcomes.

In addition to identifying MOPs and MOEs for each program, it is important to think about the way that data may be collected to assess these measures. One consideration is the use of objective versus subjective data. *Objective data* refers to information that is observable and not subject to influence by an individual's perceptions or beliefs (e.g., number of program sessions a person attended).[2] By contrast, *subjective data* capture personal opinions, beliefs, and experiences (e.g., a person's perception of unit cohesion). Both types of data can be used for evaluations. For process evaluation, objective data might include the number of people participating in a workshop, and subjective data could include ratings of satisfaction. For outcome evaluations, objective data could include scores on a knowledge test, while subjective data could be perceptions of social support or community connectedness. The selection of the most appropriate type of data will depend in part on the MOPs and MOEs identified for the evaluation.

Another consideration is the use of qualitative versus quantitative data. *Qualitative data* include descriptive information about a program and the implementation process. To collect qualitative data, evaluators may conduct individual and group interviews with key personnel (e.g., program staff and administrators, program participants), conduct focus groups, engage in observation of an activity, or ask open-ended questions on surveys (LeBlanc and Lacey, 2002; Chinman, Imm, and Wandersman, 2003; W. K. Kellogg Foundation, 2004b; World Health Organization, 2013). These kinds of qualitative data are often reviewed and analyzed to identify major themes that arise across interviews and among interviewees. Qualitative methods can provide rich information or context. For example, focus groups with program participants may be used to understand the aspects of a program that were most relevant or useful, and whether there were certain aspects of the method of delivery that made it especially useful. Observations can be used to determine whether a program with a specific curriculum has been implemented with fidelity to the curriculum. In this way qualitative data can be used to provide context for analysis of quantitative data on MOPs and MOEs. However, these methods can also be time-consuming and, therefore, resource-intensive.

Quantitative data are in a numerical format and can used for both MOPs and MOEs (World Health Organization, 2013). For example, this could include quantities, such as numbers of people served by a program or service, or responses on structured knowledge questions about a topic that produce a score on a numerical scale. These data are often

[2] Although objective data generally are not generally influenced by a program or service participant's own subjective perceptions or beliefs, interpretation may be required by those individuals who are analyzing data or results of program evaluation using such data.

collected through surveys or questionnaires or may be obtained from existing clinical or administrative data (Chinman, Imm, and Wandersman, 2003; Lalayants, 2012; World Health Organization, 2013). Quantitative data can be analyzed using traditional statistical methods that allow for comparisons between groups or assessing change over time.

In the next section we describe the development of logic models, MOPs, and MOEs for the MWR programs and services included in the scope of the current study. For these programs and services, we recommend a combination of measures that would be assessed with objective data (e.g., changes in knowledge following participation in an activity) and subjective data (e.g., satisfaction, perceptions of community connectedness). Most recommended measures rely on quantitative data, in part because it can be less burdensome to measure on a large scale (e.g., all participants of a given MWR program or service); however, these measures could be supplemented by qualitative data sources pending the interests or needs of a program or evaluator (e.g., conducting a focus group to better understand participant satisfaction and potential areas for improvement).

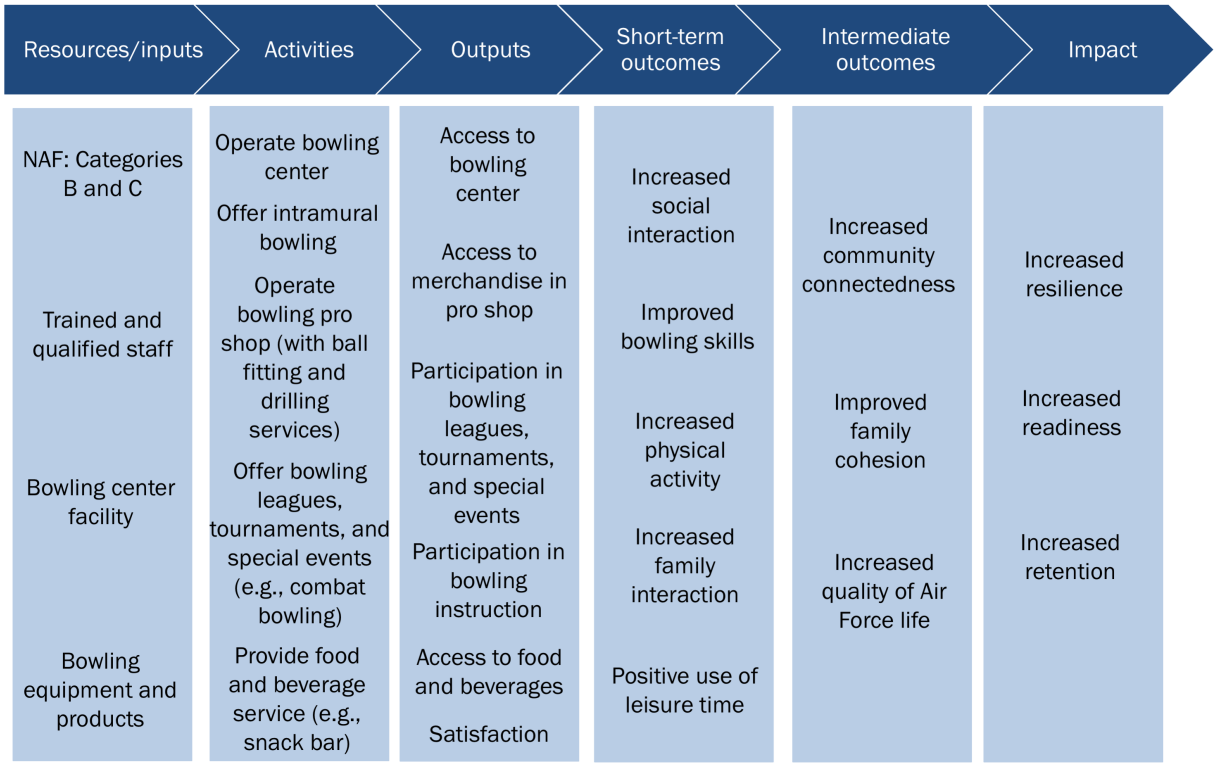
Developing Logic Models, MOPs, and MOEs for MWR Programs and Services

We developed a specific logic model for each of the MWR programs and services within the scope of this study. To identify each core component of the programs and services, we reviewed Air Force documentation, including AFIs and program/service websites. We also consulted with relevant AF/A1S and Air Force Services Activity (AFSVA) staff.[3] In some cases, there was limited information or formal documentation about a program. For example, the expected outcomes of programs were often not specified in formal documentation; therefore, when possible, we imputed expected outcomes or impacts of programs based on the knowledge and expertise of the project team. When information was missing about resources/inputs, activities, and outputs, we did not impute or infer information; instead we completed the logic models to the best of our ability based on available information and documentation. We also note that these logic models should be considered "living documents"—as the programs and services change, or as documentation becomes more complete or explicit about outcomes, the logic models may be updated accordingly. A sample logic model for the Air Force Bowling Program appears in Figure 3.3.

Using these logic models as a guide, we then developed a set of proposed MOPs and MOEs specific to each program and service (for MOP and MOE lists, see Appendix B). In each list we include the measure itself, as well as an operational definition (i.e., how the measure could be assessed). In some cases, a program or service identified a specific metric,

[3] AFSVA supports installations, major commands, and air staff through provision of technical assistance, creation of new initiatives, development of programs and procedures, and management of central support functions.

Figure 3.3. Sample Logic Model for Air Force Bowling Program



or target, for a given measure (e.g., 100 percent of staff should have appropriate certifications). In other cases, specific targets were not identified. In these instances, we have provided suggestions for measurement—for example, noting that a measure could be tracked over time and compared to some type of baseline or established threshold. In other cases, we suggest that a measure could be administered before and after participation in a program or service and the change in scores examined. For example, some programs and services are designed to promote KSAs in a certain domain. For these programs, an MOE of "improved knowledge" could be measured by giving a knowledge test before and after participation.

In most cases, the MOPs and MOEs that we have suggested require data only on the individuals who used a given program or service. However, more rigorous evaluation designs often include some type of comparison group, including RCT and quasi-experimental design evaluations. In these cases, having a comparison group enables the evaluator to determine whether effects observed are due to the program or service versus some other reason (e.g., passage of time, characteristics of the participants). Because these more rigorous evaluation designs are often more labor- and resource-intensive, and generally require more advanced

knowledge of program evaluation or research design, we are aware that it may not always be possible to identify a comparison group.[4] However, for some MOEs, we have made suggestions about a potential comparison group that could be examined, should available resources allow. For example, a number of programs and services have "increased quality of Air Force life" as an MOE. We have proposed two options for operationalizing this measure. First, a question could be posed to individuals who used a given program or service asking how much having access to that particular program or service contributes to their QoL in the military. This option would not require a comparison group. Second, we suggest that a broader QoL question could be administered: "Taking things altogether, how satisfied are you with your life in the Air Force right now?" (Tanielian et al., 2014). We note that this question could be administered to individuals who use a program or service and those who do not, and responses compared between the two groups. Sample MOPs (Table 3.1) and MOEs (Table 3.2) for the Air Force Bowling Program are presented below.

Appendix B contains the logic models developed for each of the 26 programs and services within the scope of this study, as well as the MOP and MOE lists. A review of these yields certain trends. First, there is a fair amount of consistency in the MOPs across programs and services. Because MOPs measure resources/inputs, activities, and outputs, they tend to focus on staff qualifications, types of activities offered, utilization of a program's or service's various activities, and satisfaction. By contrast, MOEs tend to be somewhat more variable across programs and services—particularly those measuring short-term outcomes. For example, as mentioned, the MOEs for several programs and services include the development of KSAs specific to the content of a particular program or service. That said, we found that certain MOEs were common across programs and services. Common short-term MOEs included positive use of leisure time, increased social interaction, and increased family interaction, while common intermediate MOEs included increased squadron cohesion, increased family cohesion, increased quality of Air Force life, and increased community connectedness. In addition, there is consistency in the intended impacts of these programs and services. Resilience and readiness are intended impacts of each of the programs and services. Other common potential impacts include improved morale and increased retention.

[4] A more comprehensive review of program evaluation design options is outside the scope of this report. However, there are many resources available to individuals interested in learning more about such design; see, for example, Cook and Campbell (1979); Shadish, Cook, and Leviton (1991); Fitzpatrick, Sanders, and Worthen (2011); and Shadish, Cook, and Campbell (2002).

Table 3.1. Sample MOPs for the Air Force Bowling Program

Measure of Performance	Definition	Metrics/Notes for Use[a]
Inputs/resources		
Open and operational bowling center	–Number of open hours, per week, month, and year –Number of bowling lanes rented per day, week, month, and quarter –Number of unique patrons by week, month, and quarter (by population type: e.g., active-duty, family members, etc.) –Number of unique patrons who use the bowling center per month/Number of eligible patrons on installation –Average number of bowlers per bowling lane	
Bowling center, pro shop, and snack bar are fully staffed with trained personnel	–Number of staff positions filled by trained personnel/Number of staff positions –Number of staff who received required training/Number of staff required to attend training	
Activities/outputs		
Core bowling promotions	–Number of core bowling promotions held per month, quarter, and year –Number of unique patrons participating in bowling promotions/Number of eligible and unique patrons who use bowling center	Must be offered consistent with schedule in AFI 34-118
Bowling leagues (by age group)	–Number of bowling leagues, by population and per quarter and year –Number of leagues sanctioned by U.S. Bowling Congress or organized as private organization/Total number of bowling leagues –Number of unique patrons in a bowling league/Number of patrons requesting to be in bowling leagues –Number of leagues participated in by a patron, by age group, per quarter or year/Number of patrons, by age group who participated in at least one league per quarter or year	This MOP can be analyzed by age group (e.g., for youth and adult) Metric for second measure is 100 percent
Satisfaction	–Percentage of unique patrons who are satisfied/very satisfied with bowling center programs and events (by type) among patrons who visit the bowling center –Percentage of eligible individuals who are satisfied/very satisfied with bowling center programs and events available	

NOTE: [a]Appropriate interpretation of program evaluation data requires some advanced knowledge (e.g., how data was collected, psychometric properties of scales, limitations).

Table 3.2. Sample MOEs for the Air Force Bowling Program

Measure of Effectiveness	Definition	Notes for Use[a]
Short-term outcomes		
Increased social interaction	Options to measure social interaction include: 1. Self-report of interaction: –Proportion of individuals using bowling centers who report that participation or presence facilitated opportunities to interact with others –Proportion of users reporting that using bowling centers led to additional interactions with or connecting to new friends/families/peers 2. UCLA Loneliness Scale, Version 3 (20 items; Russell, 1996) –As an alternative to the full scale, the relational connectedness (five items) and collective connectedness (four items) subscales could be administered (Hawkley, Browne, and Cacioppo, 2005), which are based on the Revised UCLA Loneliness Scale (Russell, Peplau, and Cutrona, 1980)	The first self-report options could be measured over time. The second option (the UCLA Loneliness Scale) could be administered before and after use of bowling centers and participation in associated activities, and/or compared to individuals who are eligible but have not used the bowling centers and programs.
Improved bowling skills	–Proportion of patrons reporting enhanced bowling skills –Instructor reports of improved bowling skills (among those participating in bowling instructional programs)	Could be measured before and after participation in bowling center activities.
Increased physical activity	–Participant ratings of how much bowling contributes to weekly/monthly physical activity	Measured over time from baseline or an existing threshold
Intermediate outcomes		
Increased quality of Air Force life	Options to measure quality of Air Force life include: 1. Among those who use the Bowling Center, how much does having access to these resources contribute to your quality of life in the military? Response options: Not at all–high impact 2. Item adapted from the Deployment Life Study (Tanielian et al., 2014): Taking things altogether, how satisfied are you with your life in the Air Force right now? Response options: Very satisfied, somewhat satisfied, neutral, somewhat dissatisfied, very dissatisfied	Measured over time on the population of individuals who use the bowling center and its programs. The second option could be compared to eligible individuals who did not use the bowling center and its programs.

NOTE: [a]Appropriate interpretation of program evaluation data requires some advanced knowledge (e.g., how data was collected, psychometric properties of scales, limitations, etc.).

Conclusion

As noted, the logic models are living documents, and the MOPs and MOEs may change as programs and services mature, procedures change, and documentation about MWR programs and services continues to be codified. That said, these logic models, MOPs, and MOEs provide the foundation for the evaluation of the MWR programs and services. In addition, identifying the MOEs associated with each program enables us to examine how the MOEs map onto the building blocks identified in Chapter Two, thereby providing us with information about how the MWR programs and services may contribute to resilience and readiness. In Chapter Four, we describe the methods and results from our matching analysis, linking program and service MOPs and MOEs to resilience and readiness building blocks.

4. Matching Measures of Effectiveness to Building Blocks

Having identified the MOEs for each MWR program and service (i.e., the intended outcomes of each program), we next sought to determine how these MOEs mapped onto the previously described resilience and readiness building blocks. In this chapter we outline the process used to match MWR program and service MOEs with the individual, family, peer/squadron, and community-level building blocks from the resilience and readiness building blocks model presented in Chapter Two.[1] Following a discussion of the method, we present the results of the matching analysis. Finally, we offer some recommendations for AF/A1S to consider when thinking about how to manage the overall MWR portfolio. More detailed results from the matching analysis can be found in Appendix C.

Method

To understand the extent to which existing MWR programs and services contribute to resilience and readiness in Airmen and families, we matched the MOEs developed for each MWR program or service to the building blocks of resilience and readiness described in our building blocks model. The model includes four system levels with a total of 22 unique building blocks across those four levels: ten individual building blocks, four family building blocks, three peer/squadron building blocks, and five community building blocks. Matches were based on whether the expected program or service MOE in question was qualitatively judged by the research team to be an example or operationalization of one of the subcomponents within a building block. If an MOE was determined to fit a subcomponent description, it was matched to that block. MOEs could match to more than one block. The actual matching process was implemented as described next.

Four independent coders were involved in the multistep process to match MOEs from the 26 MWR programs and services in the study's scope. We started with a preliminary matching task to calibrate the matching among the four coders. Four randomly selected MWR programs and services were each coded by the four raters. After independently matching MOEs to building blocks, the group met to discuss any discrepancies and reconciled all of the pairings. As part of this preliminary matching process, we established criteria for matching MOEs to building blocks. For example, when matching MOEs of KSAs, we determined that specific KSAs must be clearly operationalized in the program documentation for the MOE to be matched with a building block.

[1] Building blocks in the background domain are not included in this exercise as we do not expect MWR programs and services to have an impact on these characteristics (e.g., age, gender, socioeconomic status). Rather, background factors may influence individuals' exposure to and utilization of building blocks at the other levels.

For example, Community Centers may offer courses in financial management, taught by program staff. However, because the types of courses and the content of courses vary across installations, we were unable to identify a specific building block associated with the MOE identified for Community Centers: "Increased program- and service-specific knowledge, skills, abilities (based on objectives and activities)." Ultimately we felt that available documentation on Community Centers did not provide us with enough information to make the link to a specific building block. This could change, however, if program materials become more detailed.

The second step of the matching process involved two teams of two coders. We divided the remaining MWR programs between the two teams and each coder within a team independently matched the MWR programs assigned to that team. Then the same procedure of discussion and reconciliation took place between the two team members. After each team completed the procedure, the entire team of four coders reviewed and discussed the matching for all programs to ensure consistency across the teams. As a final step, an independent set of three team members reviewed and finalized the matches.

The match between an MOE and a building block is not always one to one, as some MOEs are linked to multiple building blocks. For example, the MOE of "increased community connectedness" is matched to both sense of belonging at the individual level and sense of community at the community level. Moreover, multiple MOEs can be matched to one building block. For example, both "increased family interaction" and "improved family cohesion" are associated with the family functioning and relationships building block. In addition, an MOE is matched to a building block if it is linked to any components of the building block. For example, the individual-level building block of physical health includes physical activity, exercise, and nutrition. The MOE "improved physical fitness" of the Alpha Warrior program was matched to physical fitness even though it was only related to one of the three components of physical fitness. The fact that matches may not reflect coverage of all the subcomponents in a building block is an important limitation of our analysis that we discuss later in this chapter.

It is also important to note that the matching analysis provides information regarding the number of resilience and readiness building blocks that are linked to MWR programs and services. The results from this analysis do not illustrate how well MWR programs and services contribute to promoting these building blocks. To show an actual effect on the building block, and the extent of that effect, an outcome evaluation is required (see Chapter Three).

Results

We analyzed the results of the matching process by (1) building blocks and (2) MWR programs and services. The analysis by building blocks focuses on which building blocks are covered by MWR programs and services and provides information to identify any gaps and/or overlap in coverage (i.e., building blocks that are not linked to any MWR programs, and building blocks that are targeted by multiple MWR programs). Thus, findings from the building block analysis can inform the Air Force about the breadth of the MWR portfolio as a whole. The

analysis by MWR program and service provides information about how many different building blocks each MWR program or service targets, and at which system levels (individual, family, peer/squadron, community).

Analysis by Building Blocks

Table 4.1 summarizes the numbers of MWR programs and services and associated MOEs matched with each building block across all four system levels. In total, 18 of the 22 building blocks were matched to at least one program or service. The four blocks that were not matched are positivity (individual level), sense of purpose (individual level), positive parenting (family level), and family values (family level). All the building blocks at the peer/squadron and community levels were matched to at least one MWR program or service. According to the first column in Table 4.1, the building blocks most frequently matched to programs and services are social network (peer/squadron), with 20 matched programs and services; sense of belonging (individual), with 17 matches; sense of community (community), with 16 matches; access to community activities (community), with 15 matches; family functioning and relationships (family), with 14 matches; and coping strategies and skills (individual), with 12 matches. Figure 4.1 depicts these results graphically, with building blocks organized by system level.

Figure 4.1. Coverage of Building Blocks by MWR Programs and Services

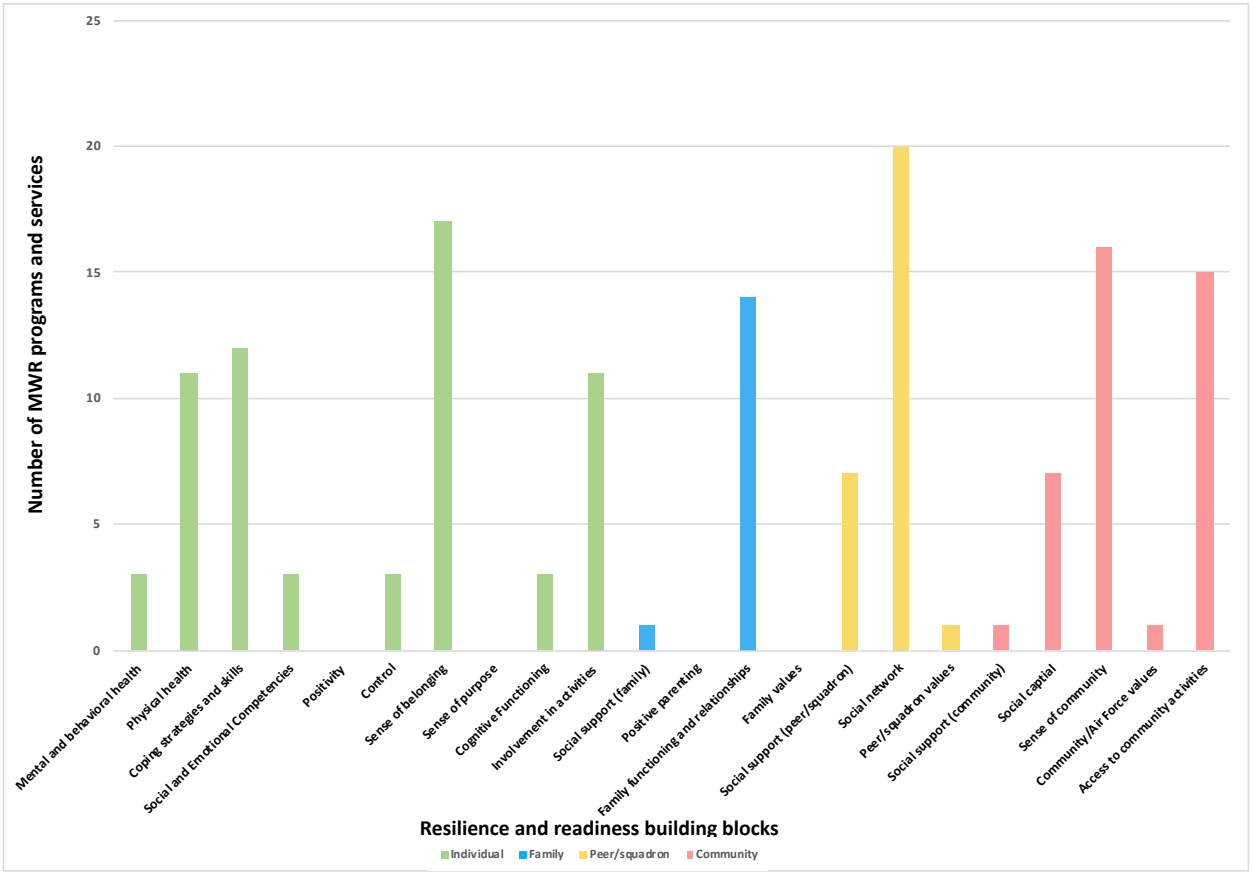


Table 4.1. Numbers of MWR Programs/Services and Associated MOEs Matched with Resilience and Readiness Building Blocks

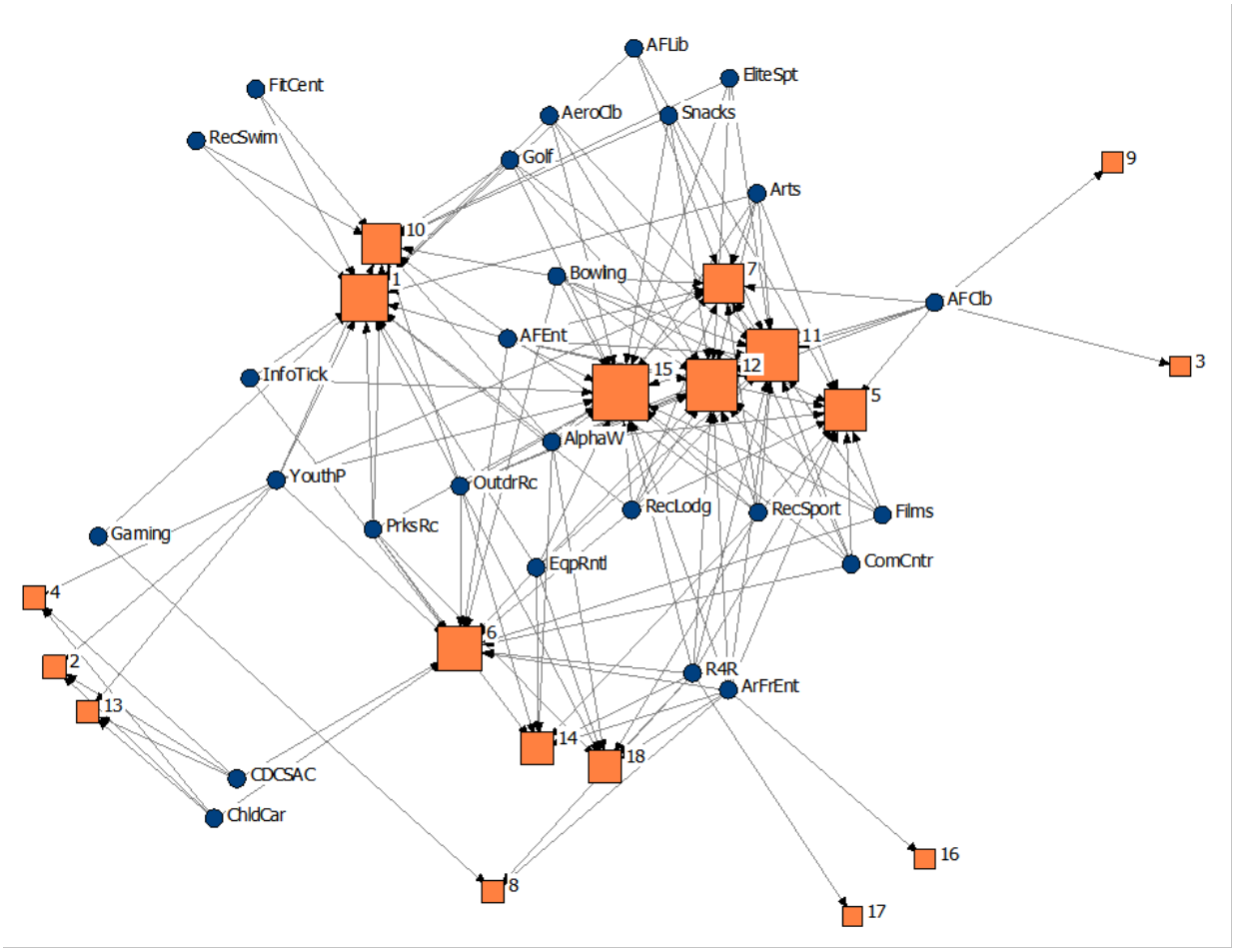
System Level	Number of Matched MWR Programs and Services	Number of MOEs Covered by Building Block
Individual-Level Building Blocks		
Sense of belonging	17	3
Coping strategies and skills	12	4
Physical health	11	9
Involvement in activities	11	3
Mental and behavioral health	3	4
Social and emotional competencies	3	1
Cognitive functioning	3	1
Control	3	1
Positivity	0	0
Sense of purpose	0	0
Family-Level Building Blocks		
Family functioning and relationships	14	5
Family social support	1	1
Positive parenting	0	0
Family values	0	0
Peer/Squadron-Level Building Blocks		
Social network	20	3
Peer/squadron social support	7	2
Peer/squadron value	1	1
Community-Level Building Blocks		
Sense of community	16	3
Access to community activities	15	20
Social capital	7	1
Community social support	1	1
Community/Air Force value	1	1

NOTE: The numbers of matched MOEs and MWR programs and services differ because MWR programs and services sometimes have the same MOEs. For example, Child Development Centers (CDC), School Age Care (SAC), and the Family Child Care (FCC) program have the same MOE ("improved ability to meet career and personal obligations, goals, and/or needs"), which is matched with the individual-level building block "control." Thus, control is matched with one MOE from two MWR programs and services.

The second column in Table 4.1 shows the number of MOEs in program and service logic models that are covered by each of the building blocks. The most MOEs were matched to the "access to community activities" building block. Given that the MWR portfolio is designed to provide Airmen and their families with access to recreational activities, this result is not surprising. The building blocks with the next highest MOE coverage are physical health, followed by family functioning and relationships.

Another way to display the results of the matching analysis is to use a network diagram. Figure 4.2 displays a network diagram that focuses on the overlap in coverage of building blocks by MWR programs and services. In the diagram, each blue circle corresponds to a MWR program

Figure 4.2. Network Diagram Linking MWR Programs and Services to Building Blocks



NOTES: Blue circles are MWR programs and services; orange squares are building blocks. The lines represent matches between programs and services and building blocks.

In the square key that follows, C = community level; F = family level; I = individual level; P/S = peer/squadron level. Square key: 1 = access to community activities (C); 2 = cognitive functioning (I); 3 = community/Air Force values (C); 4 = control (I); 5 = coping strategies and skills (I); 6 = family function and relationships (F); 7 = involvement in activities (I); 8 = mental and behavioral health (I); 9 = peer group/squadron values (P/S); 10 = physical health (I); 11 = sense of belonging (I); 12 = sense of community (C); 13 = social and emotional competencies (I); 14 = social capital (C); 15 = social network (P/S); 16 = social support (C); 17 = social support (F); 18 = social support (P/S). Family values (F), positive parenting (F), sense of purpose (I), and positivity (I) are not shown, as they did not match to any program or service.

Program/service abbreviations used in the figure as follows: AFClb = Air Force Clubs; AFEnt = Air Force Entertainment; AFLib = Air Force Libraries; ArFrEnt = Armed Forces Entertainment; Bowling = Air Force Bowling Program; CDCSAC = Child Development Centers and School-Age Care; AerClb = Aero Club; AlphW = Alpha Warrior; ComCntr = Community Centers; EliteSpt = Elite Sports Program; EqpRntl = Equipment Rental; ChldCar = Family Child Care; FtCntr = Fitness Centers and Programs; InfoTick = Information, Tickets, and Travel; Films = Motion Pictures; OutdrRc = Outdoor Recreation; PrksRec = Parks and Recreation; R4R = Recharge for Resiliency; RecLodg = Recreational Lodging; RecSprt = Recreational Sports Programs; RecSwim = Recreational Swimming; Snacks = Snack Bars, Beverages, and Juice Bars; YouthP = Youth Programs.

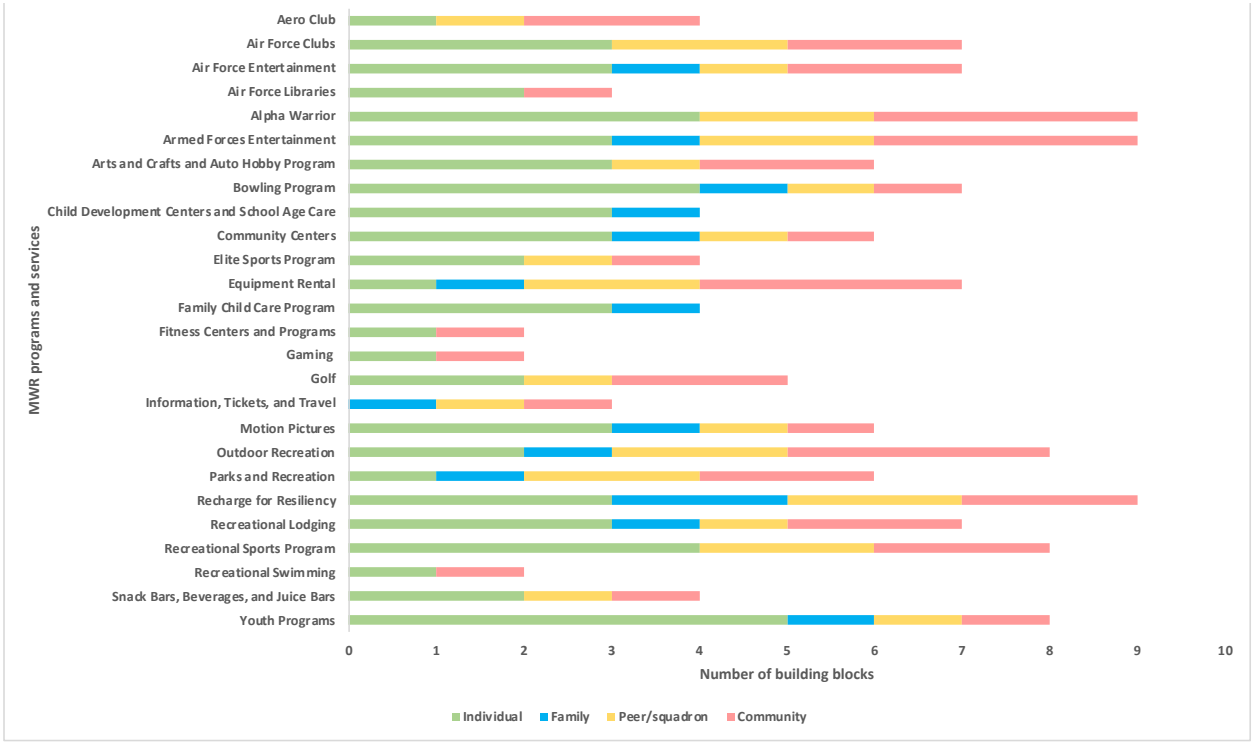
or service included in our analysis. Orange squares represent the 18 building blocks that were matched to at least one program or service; each is numbered, with a key provided in the figure note. The lines represent matches between programs and services and building blocks. For example, in the upper left portion of the figure we see that Fitness Centers are connected, via a one-way arrow, to building block 10, which is physical health.

The lines and arrows in the figure are known as indegree centrality in network models. One can think of indegree centrality as a measure of popularity. The size of the squares in Figure 4.2 are determined by indegree centrality—that is, the larger the square, the more programs and services connected to the building block. Building block 15, social network—located in the center of Figure 4.2—is the largest square. As shown in Table 4.1, 20 programs and services were matched to this building block. Conversely, building block 9—peer group/squadron values—is much smaller. In Table 4.1, we see that it was matched to only one program in the MWR portfolio. Notice also that block 15 is more centrally located in the figure than block 9. Blocks on the periphery have less overlap in coverage by MWR programs and services than do blocks near the center of the diagram.

Analysis by MWR Programs and Services

Figure 4.3 summarizes the number of building blocks each MWR program targets. On average, MWR programs and services link to six building blocks, with a range between two and nine links. All programs and services matched with building blocks at two or more system levels,

Figure 4.3. Number of Building Blocks Linked to MWR Programs and Services, by System Level

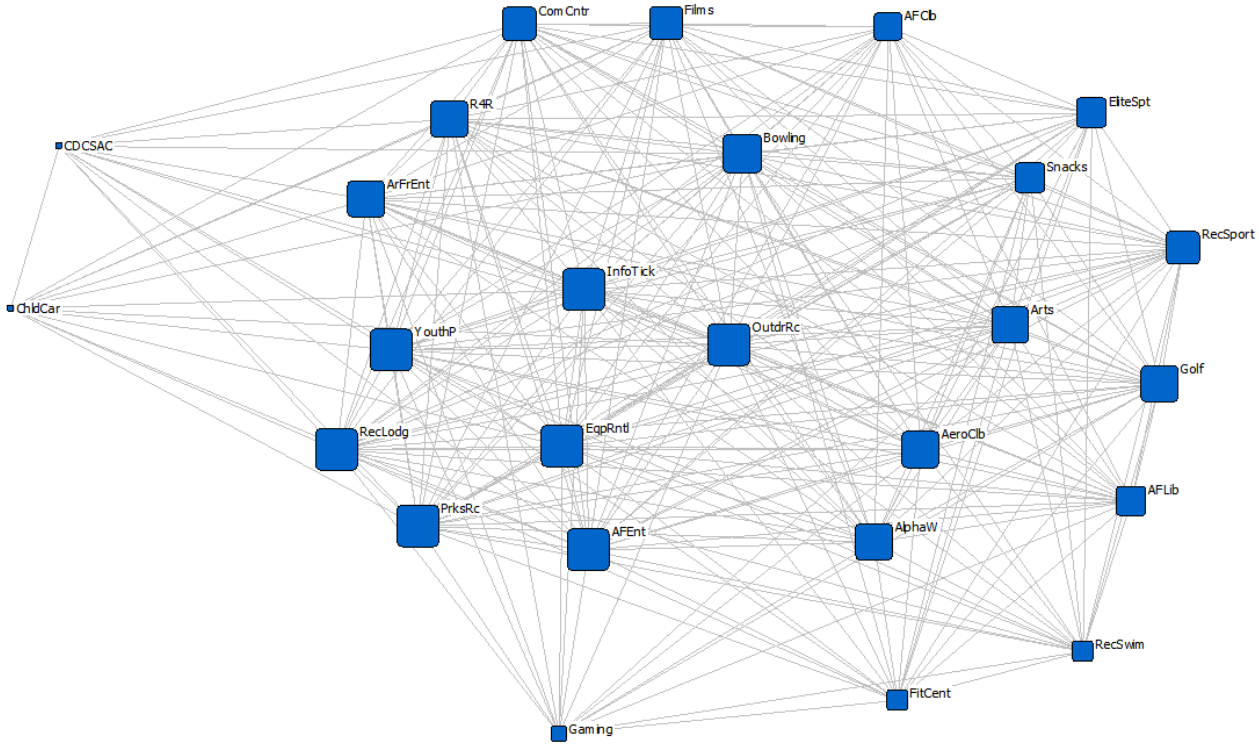


with six programs and services covering two levels, nine covering three levels, and 11 covering all four levels (as represented by the colored bars in Figure 4.3).

Only one MWR service (Information, Tickets, and Travel) did not match with any individual-level building blocks. Twenty-four programs and services link to building blocks at the community level, 20 at the peer/squadron level, and 14 at the family level. Three of the six MWR programs and services that were matched with the most building blocks relate to physical activity: Alpha Warrior, Outdoor Recreation, and Recreational Sports. The other three programs and services matched to the most building blocks were Armed Forces Entertainment, Recharge for Resiliency (R4R), and Youth Programs.

Like the network diagram described above, we can also use a network diagram to show how closely different MWR programs and services are linked to one another. In Figure 4.4, the blue

Figure 4.4. Network Diagram of Overlap in Building Block Coverage, by MWR Program and Service



NOTES: Blue squares are MWR programs and services. Lines between squares represent building blocks that programs and services have in common. The larger the square, the more building blocks the program or service has in common with other programs and services.

Program/service abbreviations used in the figure as follows: AFClb = Air Force Clubs; AFEnt = Air Force Entertainment; AFLib = Air Force Libraries; ArFrEnt = Armed Forces Entertainment; Bowling = Air Force Bowling Program; CDCSAC = Child Development Centers and School-Age Care; AerClb = Aero Club; AlphW = Alpha Warrior; ComCntr = Community Centers; EliteSpt = Elite Sports Program; EqpRntl = Equipment Rental; ChldCar = Family Child Care; FtCntr = Fitness Centers and Programs; InfoTick = Information, Tickets, and Travel; Films = Motion Pictures; OutdrRc = Outdoor Recreation; PrksRec = Parks and Recreation; R4R = Recharge for Resiliency; RecLodg = Recreational Lodging; RecSprt = Recreational Sports Programs; RecSwim = Recreational Swimming; Snacks = Snack Bars, Beverages, and Juice Bars; YouthP = Youth Programs.

squares represent programs and services. The lines connecting the squares represent building blocks that programs and services have in common. These connections are known as degree centrality in network modeling. The larger the blue square, the higher the degree centrality measure of that block. That is, the larger the square, the more building blocks the program or service has in common with other programs and services. Programs and services in the center of the diagram, such as Outdoor Recreation, have more in common with other programs and services than do those on the periphery, like CDCSAC on the outer left edge of the diagram. What Figure 4.4 shows is that the MWR portfolio is very dense, with many programs and services sharing the same building blocks. This suggests that removing a central program or service may not result in loss of coverage of any given building block; however, removal of a program or service at the periphery may. As we discuss later in this chapter, overlap in coverage of a building block is likely not the only consideration that should be used to justify making changes to the portfolio. Program or service access, participation, quality, and many other factors are also important determinants when making such decisions.

Conclusion

The purpose of the matching analysis was to examine the extent to which MWR programs and services contribute to resilience and readiness building blocks. To do so, we examined the breadth and depth of coverage of the building blocks across all programs and services, as well as the coverage of building blocks by each program and service. Overall, findings from the analysis provide insight into how many resilience and readiness building blocks are linked to MWR program and service intended outcomes. This information can also offer insight into the MWR portfolio and its potential contribution to the building blocks of resilience and readiness.

Building Block Coverage Across All Programs and Services

MWR programs and services are linked to the majority of building blocks. Eighteen out of 22 of the building blocks were covered by at least one MWR program or service, indicating a breadth of coverage. This finding suggests the MWR portfolio provides programs and services that have the potential to promote several factors that contribute to resilience and readiness.

Although most building blocks were covered by at least one MWR program or service, there was variability in the depth of coverage across building blocks. For example, within the individual-level building blocks, four out of the ten building blocks are covered by almost half of the MWR programs and services. The remaining building blocks are linked to only a handful of programs and services, and two individual-level building blocks are not linked to any program or service. We found a similar pattern for the other three system levels (family, peer/squadron, and community). This finding suggests that there are considerable redundancies in coverage, such that multiple MWR programs and services are linked to a small number of building blocks. However, programs may differ in the subgroups they serve, whether by design or not, so it is

unclear whether this redundancy in offerings also translates into redundancy in the promotion of building blocks for a given subgroup.

There are also gaps in building block coverage. Four building blocks do not link to any MWR programs or services: positivity, sense of purpose, positive parenting, and family values. That said, MWR programs and services may not need to cover all building blocks to successfully promote resilience and readiness. Some building blocks, such as positive parenting, are not necessarily within the scope of MWR programs and services. Thus, it may not be practical to expect all building blocks to be covered by MWR programs and services. Relatedly, there may be a point where adding new building blocks, or coverage of even more building blocks, results in diminishing returns. That is, is there a point at which additional building block coverage may not provide any value? This is an empirical question to which we do not yet have an answer.

Across the four system levels, the building blocks that are covered by the largest number of MWR programs and services are related to interpersonal relations. At the individual level, the sense of belonging building block was covered by the largest number of programs and services. At the family level, the family functioning and relationships building block was covered by the largest number of programs and services. Among peer/squadron-level building blocks, the social network building block was covered by the largest number of programs and services. Finally, the sense of community building block was covered by the largest number of programs and services at the community level. It appears that MWR programs and services are especially oriented toward promoting and maintaining positive relationships and sense of belonging among Airmen and their families.

Examining the most frequent MOEs across the programs and services similarly yields a theme of interpersonal relations. Fifteen MWR programs and services have the MOE of "increased community connectedness," which links to both the sense of belonging building block and the sense of community building block. In other words, there is considerable overlap in how MWR programs and services contribute to building blocks; 15 of them do so by increasing community connectedness. The MOE of "increased social interaction" matches with the social network building block; and the MOE of "increased family interaction" matches with the family functioning and relationships building block. Seven MWR programs and services have both MOEs, which means seven programs and services have the potential to promote two building blocks across two system levels (peer/squadron and family). Another frequently matched MOE is positive use of leisure time. It matches with two individual-level building blocks: coping strategies and skills and involvement in activities. Nine MWR programs and services contribute to these building blocks by providing positive leisure activities to Airmen and their family members.

In Chapter Two we compared the resilience and readiness building block model to the CAF framework and found that there is substantial overlap, such that every building block at the individual, family, peer/squadron, or community level can be tied to at least one CAF tenet, covering all four domains (mental, physical, social, and spiritual). It is worth noting that building

blocks that are associated with social fitness are well represented in the MWR programs and services (e.g., sense of belonging, social network, family functioning/relationship, and sense of community). In fact, these building blocks match with the largest number of MWR programs and services. Building blocks associated with mental and physical fitness match with the next highest number of programs and services (e.g., coping strategies and skills, physical health, involvement with activities, and access to community activities). In contrast, building blocks that relate to spiritual fitness receive the least coverage by MWR programs and services. For example, only one MWR program or service contributes to peer/squadron value and community/Air Force value each.[2] Of the nine building blocks that map onto the spiritual domain in the CAF framework, three do not link to any MWR programs or services: positivity, sense of purpose, and family values. The exception is sense of community, which is covered by 16 MWR programs and services. Increasing the coverage of building blocks related to spiritual fitness could improve MWR portfolio's ability to support CAF and resilience and readiness in Airmen and families.

Building Block Coverage by Individual MWR Programs and Services

Based on the results of the matching process, we found that all MWR programs and services contribute to promoting multiple resilience and readiness building blocks. The number of building blocks matched to a specific program or service ranged from two to nine (for the specific building blocks matched to each program or service, see Appendix C). Fitness Centers and Programs, Gaming, and Recreational Swimming were matched with two building blocks each. By contrast, the Alpha Warrior program, Armed Forces Entertainment, and R4R were matched with nine building blocks. It is important to note that the number of building blocks matched does not necessarily translate into the size of the impact an MWR program or service may have on resilience and readiness. It is possible that MWR programs and services that contribute to fewer building blocks can have a larger effect on outcomes than programs and services that contribute to more building blocks but have a smaller effect. An outcome evaluation of MWR programs and services would allow for an assessment of the actual (versus potential) contribution of programs and services on intended outcomes.

All programs and services link to building blocks from at least two system levels. Overall, 25 programs and services link at the individual level, 20 link at the peer/squadron level, and 24 link at the community level. Interestingly, building blocks at the family level link with the fewest MWR programs and services (n =14). Because we identified MOEs based on documented information (e.g., program websites, AFIs), it is possible that more MWR programs and services contribute to family-level building blocks but the information was not available—or, more likely, family involvement was not explicitly mentioned in these resources. Such cases may represent a

[2] It is possible that other more frequently supported building blocks, like sense of community, sense of belonging, and involvement with activities, may indirectly be associated with peer/squadron and community/Air Force values.

missed opportunity for the Air Force to engage families in MWR activities; for example, if the local Arts and Crafts shop offers scrapbooking classes for parents and children but this is not clear or obvious to a family new to an installation, those families may miss an opportunity for positive family time and interactions with other Air Force families. In contrast to the family level, all but one service (i.e., Information, Tickets, and Travel) matched to at least one building block at the individual level. When deciding on what types of MWR programs and services to offer, installations may want to consider whether the breadth of the programs and services currently offered covers building blocks from multiple system levels, and aim to choose programs and services that contribute to building blocks across levels.

Limitations

The matching analysis allows us to map the extent to which resilience and readiness building blocks link to different MWR programs and services. The results provide insight into the degree to which the overall MWR portfolio and individual programs and services connect to building blocks across the four system levels. However, there are certain limitations to the matching analysis. First, the analysis does not address the question regarding the quality of MWR programs and services. Findings indicate the number of building blocks linked to the programs and services but do not address how well the programs and services promote the linked building blocks. Second, the matching analysis also does not account for whether an MOE is linked to all or some of the components of a building block. It is possible that some MOEs are related to only one aspect of a building block and some are related to multiple aspects. Although the matching analysis found overlap between MWR programs and services in terms of their coverage of building blocks, it does not automatically translate into elimination of any programs or services, as these programs and services may be serving different populations. Additional information about the target populations and more comprehensive data on usage of MWR programs and services would be needed before making decisions about how these findings might shape the MWR portfolio. Finally, it is likely that we have not identified all MOEs that would be associated with MWR programs and services, as the process of identifying MOEs is limited to available information. As such, it is possible that MWR programs and services may link to additional resilience and readiness building blocks.

Recommendations for MWR Portfolio Management

Based on these results of the building block matching analysis, we provide the following recommendations for the Air Force, and specifically AF/A1S, when thinking about how to manage the overall MWR portfolio.

- **Consider the full range of goals that the MWR portfolio is designed to achieve.** Promoting resilience and readiness is likely not the only goal of the MWR portfolio. It is important to keep in mind that MWR programs and services that do not directly link to readiness and resilience building blocks may be promoting other important potential

impacts, such as retention, morale, or QoL. Therefore, although this analysis provides information about how MWR programs and services may promote resilience and readiness, there are other considerations that may guide decisionmaking about the MWR portfolio. Air Force leadership must decide what it wants the MWR portfolio to achieve.

- **Determine which resilience and readiness building blocks are relevant to the goals of the MWR programs and services.** The MWR portfolio may not be expected to cover all resilience and readiness building blocks. As such, if a program or service in the portfolio does not contribute to any of the building blocks, it should not automatically be considered for removal or closure. It is up to the Air Force to decide which building blocks are most relevant and significant to the mission of the MWR portfolio. Similarly, the Air Force must also decide if some programs and services that do not cover the set of building blocks described here may serve some other purpose (e.g., contributing to morale, retention, or QoL).
- **Consider focusing on additional building blocks if the Air Force decides that promoting spiritual fitness is one of the goals of the MWR portfolio.** For example, some programs and services that already target sense of community—one of the building blocks related to spiritual fitness—could more explicitly incorporate other building blocks that overlap with the tenets in the spiritual domain: peer/squadron values, community/Air Force values, and sense of purpose. However, spiritual fitness is likely targeted by other Air Force services outside the MWR portfolio, as well as community programs and services outside the Air Force, and may not be necessary for MWR programs and services to target.
- **Conduct a process evaluation to understand whether overlap in coverage of building blocks is functional.** MWR programs and services as a whole have a substantial amount of overlap in their coverage of building blocks; however, at the installation level, a process evaluation can help identify if some degree of overlap may actually be beneficial. For example, such an evaluation should take into account the usage of different programs and services by different subgroups (e.g., junior enlisted, families with young children, single Airmen). If programs and services that overlap in building block coverage are used by different subgroups, maintaining this overlap may increase the promotion of resilience and readiness factors for all Airmen and families.
- **Conduct an outcome evaluation to understand how MWR programs and services *actually* contribute to resilience and readiness.** The matching analysis is based on the *expected* MOEs from each program and service; however, an outcome evaluation of MWR programs and services is needed to determine whether programs and services are achieving their intended goals. This will provide greater confidence that programs and services are targeting the resilience and readiness building blocks matched to each MOE and determine the degree to which these programs and services are successful in doing so.
- **Make the intended purposes of MWR programs and services more explicit.** Clearly communicating a program or service's intended objectives will make it easier to identify associated MOEs, which can then be linked to building blocks of resilience and readiness. Doing so should also facilitate rigorous program evaluation.

In Chapter Five, we turn to a discussion of data management practices that will facilitate the type of evaluations that are needed to determine exactly whether and to what extent MWR programs and services contribute to Airman and family resilience and readiness.

5. Data Management Practices

Chapter Four described the ways in which the MWR programs and services we reviewed may contribute to resilience and readiness. However, to formally determine whether they are being implemented as intended and ultimately achieving their expected outcomes, it will be important to conduct evaluations of these programs and services. High-quality program evaluations are both comprehensive in nature and grounded in data (National Center for Chronic Disease Prevention and Health Promotion, 2011; American Evaluation Association, 2013). The results of any program evaluation are only as good as the data they rely on for assessing performance and effectiveness. Thus, high-quality data are essential for any effort to measure the extent to which MWR programs and services operate as intended and contribute to Airman resilience, readiness, and other outcomes of interest (e.g., QoL and retention).[1]

In earlier sections of this report (see Chapter Three) we discussed the development of logic models that describe key program components (i.e., resources, activities, outputs, and outcomes) and described two types of measures used to assess the components of these logic models: MOPs, which assess the program's or service's operation and focus on the resources, activities, and outputs of a program; and MOEs, which focus on the short-term and intermediate outcomes that programs and services are expected to achieve. The identification of MOPs and MOEs informs the types of data needed to conduct a comprehensive evaluation grounded in data.

The data needed to assess programs and services with respect to MOPs and MOEs are often collected in different ways. Most of the data needed for assessing program and service performance on MOPs are commonly collected as part of regular operations (e.g., budget reports, registration and attendance forms, calendars of events). The collection of these data can occur nearly in real time as individuals interact with program staff or program offerings. By contrast, collecting data needed for program effectiveness measures (i.e., MOEs) commonly requires additional efforts and resource expenditure beyond normal program operation. While some MOE data can be collected indirectly (i.e., without directly engaging program participants), it is more common that this type of data is gathered through follow-up engagement with program participants through surveys, focus groups, or interviews (Wholey, Hatry, and Newcomer, 2010).

Data for MOEs assessing short-term outcomes can sometimes be collected immediately following a participant's exposure to the program. For example, some programs and services are designed to target certain KSAs, and improvement in these areas may be observable immediately after completion of the program or service. In this case, a measure of the KSAs that the program

[1] The term *high-quality data* refers to six dimensions of the data: completeness, consistency, uniqueness, validity, accuracy, and timeliness. To learn more about these dimensions, see DAMA United Kingdom (2013).

or service is designed to target could be administered immediately following completion. But for other short-term MOEs, and for intermediate and longer-term MOEs, data should be collected after a sufficient amount of time has passed to allow for the desired changes to occur. For example, intermediate outcomes, such as unit cohesion, are not expected to be observed until more than a year following participation in a program or service; therefore, collection of data to measure this outcome would require additional efforts following the conclusion of participation in the program or service.

Understanding what data are needed, the sources of data, and when and how the data should be collected can help inform a data collection plan tailored to the programs and services in the Air Force's MWR portfolio. In the next section we provide further information about the sources of data that evaluations often rely on. The remainder of this chapter then focuses on the features of optimal data systems used for collecting and managing MOP and MOE data; the current state of Air Force data systems and collections; existing survey collection efforts that may be leveraged for the evaluation of MWR programs and services; and an examination of how existing data management systems and data collection efforts differ from recommended practice. The chapter concludes with recommendations for how to advance current practices to more closely reflect optimal practices.

Data Sources

Evaluations commonly rely on a wide array of data types and multiple data sources (Wholey, Hatry, and Newcomer, 2010). In Chapter Three we presented information about subjective and objective data, as well as qualitative and quantitative data. When preparing to conduct an evaluation, another important consideration is the source of these data, typically categorized into primary and secondary sources. We present a brief introduction of each data source and a brief overview of the benefits and challenges associated with each data source that are critical to consider in devising a data collection system.

Primary data refers to information that is being collected directly by the MWR programs overseen by AFSVA. These data are gathered either by staff or directly from program participants. Primary data sources relevant to MOPs might include attendance lists or satisfaction surveys administered to program participants, and primary data sources relevant to MOEs might include knowledge tests or participant surveys of self-reported behaviors. There are advantages to both collecting and utilizing primary data in program evaluations. These include having direct and immediate control over what information is collected by staff and from participants, how the data are collected and measured (e.g., monthly attendance counts versus daily attendance), and the timing of each data collection (e.g., in real time, exactly six months after program participation). Any limitations to the data (e.g., participants in first three months of program were not included) would be well documented and known by those who will use the data for an evaluation.

Primary data comes with certain challenges as well. First, the Air Force, either through the program or AFSVA, bears the cost of collecting these data. This includes staff time for developing data collection instruments, training for staff to ensure consistency of data collected across programs and services and installations, and storage of secure data. Another challenge is that primary data are often collected only from program and service participants, and not from individuals who do not participate in MWR programs. As was described in Chapter Three, more rigorous evaluation methods require data on an equivalent comparison group of individuals who did not participate in MWR programs to estimate program effectiveness.[2] Ensuring that data are collected on both participants and nonparticipants requires additional resources, including time and money.

Secondary data refers to data that are collected and managed by external organizations, either internal or external to the Air Force, which can be leveraged to inform program operations or for evaluations of MWR programs and services. For example, the Military Community and Family Policy's (MCFP) MWR Customer Satisfaction Survey is administered periodically to assess personnel experiences with MWR programs across all military branches. Some of the questions asked in the Defense Manpower Data Center's Status of Forces Survey (SOFS) may provide information useful for calculating MOPs (e.g., which populations of Air Force personnel are using MWR programs and services) or MOEs (e.g., ratings of unit cohesion for those who do and do not report using MWR programs and services). Data that are collected as part of the evaluation of another program or service within the Air Force that reach a similar audience, have similar goals, or have similar short-term and intermediate outcomes may also be useful.

Like primary data, secondary data have both benefits and challenges. An important benefit of secondary data is that the burden for data collection falls to the collecting organization; this can be helpful if a program or service serves many people or has few resources. For example, secondary data sources that could be leveraged for an evaluation include administrative or personnel records, such as records that contain missed duty days, unit readiness indicators, and disciplinary infractions. Secondary data may also be collected regardless of whether a person participated in MWR programs and services, enabling the identification of an equivalent comparison group for analysis. Regarding challenges, because AFSVA is not responsible for collecting these data, it will not have control over the methods used to collect data (e.g., population sampling) or content of the data (e.g., specific questions that are asked or numbers

[2] An equivalent comparison group is a set of individuals who do not participate in MWR programs and who do not differ statistically from the group of individuals participating in MWR programs on critical characteristics (e.g., gender, race, pay grade, installation, family structure). This equivalence is measured on the characteristics of individuals prior to involvement in MWR programs and services. Where measures are available, the comparison group and the participant group should also be similar on outcomes measure (e.g., social interaction, unit cohesion) prior to MWR program participation. Using an equivalent comparison group improves the confidence that measured outcomes are attributable to MWR programs and services rather than other external factors (e.g., experiencing a PCS).

that are tracked). It can also be challenging to fully know the limitations associated with secondary data (e.g., mistakes or errors in the data; see Hox and Boeije, 2005; Wassenich, 2009). Moreover, using data that are collected for substantially different purposes (e.g., for job evaluations rather than program improvement), data that are outdated, or data from a population of individuals that no longer reflect current MWR program or service participants may lead to inaccurate conclusions about program performance or effectiveness in an evaluation. Further, access to secondary data can also pose a significant resource challenge, both in terms of the time it may take to get approval to use such data and the manpower required to complete applications to acquire and use the data. Thus, secondary data should be used only with careful consideration for the quality of those data, the context in which they were gathered, and the effort require to obtain them.

With an understanding of the data that may be needed to assess the performance and effectiveness of MWR programs and services, AFSVA needs to identify the ways in which these data will be collected and stored in preparation for evaluations. In the next section of this chapter, we present characteristics of a hypothetical, optimal system for managing evaluation-related data. Because the recommended MOPs and MOEs for each program are largely based on quantitative data, certain of these recommendations focus on a system for managing this type of evaluation data, though these features generally apply to the collection of any type of data.

Key Features of an Optimal Data Management System

Data management is the process by which data are consistently collected and recorded, securely stored, and prepared for analysis to guide daily operations or in program evaluations (Krishnankutty et al., 2012; BetterEvaluation, 2014). Data management is critical for ensuring that all data can be utilized with relative ease for an evaluation.[3] In what follows, we describe characteristics of an optimal data management system that would allow AFSVA to manage its MWR program and service data in a way that enables and facilitates rigorous program evaluation.

An optimal data management system for MWR programs and services to organize operations and evaluation data is one that is standardized and has key capabilities such as automation, tracking, integration, and compliance. These features are important for increasing the utility of data for both operational and evaluation purposes, decreasing duplication of data collection, and increasing efficiency and improving resource utilization.

[3] The term *ease* does not mean that these data are not securely protected or managed. Rather, *ease* refers to the idea that staff with the appropriate credentials, following all established safeguards, are able to aggregate data from multiple sources to create the data file(s) needed to analyze MOPs and MOEs. Ideally, there is little manipulation or intervention needed to get data into analysis-ready, comprehensive data files.

Standardization

Standardization, or establishing a set of standards and practices to which all individuals and organizations conform, has two elements. The first relates to the software used to manage data, and the second relates to the qualities of the data that are stored in a data management system. Regarding software, an optimal data management system may capture data from multiple, complementary computer- or web-based software or rely on a single, comprehensive software that serves all AFSVA operational and evaluation needs. Ideal software would enable the collection of program and service operation and utilization data, including all information necessary to collect MOP data such as dates of program use, the installation at which the program was utilized, and the specific program activity a person or family participated in (e.g., renting kayaks from Outdoor Equipment Rental or attending an Air Force Entertainment talent show at a Community Center).[4] The chosen software would, preferably, also store outcome data for all MWR participants to assist in the analysis of MOEs for each program or service.[5] The key to standardization of the system is that each individual MWR program or service (e.g., Community Centers) would have a standardized software or set of software such that the program or service, regardless of installation, relies on the same system. By standardizing within program or service and across installations, software can be tailored to specific operating practices while simultaneously reducing burden through streamlined training and the sharing of best practices with staff at other installations.

It is beyond the scope of this study to identify such a software package, and it is possible that the ideal system does not currently exist. Thus, the Air Force may need to adapt a current commercial, off-the-shelf package, or build its own system. We are aware that the newly created Air Force Chief Data Office is currently tackling similar issues, with the goal of allowing Airmen to make data-driven decisions in all that they do (Frank, 2018). Moving forward, synergies among all these related efforts should help the AF/A1S get closer to a standardized software system.

The second feature of standardizing the data system is that each MWR program or service operates with a standardized data lexicon, recording the same information in the same way, regardless of installation or populations served. Standardized program and service data across installations allows for aggregation of data up to the enterprise level, enabling evaluations to look across the entire MWR portfolio. But more than that, standardization ensures that evaluators are comparing apples to apples and that evaluation results are not influenced by the different ways programs and services format their data (e.g., number of unique individuals served each

[4] These data systems should not be thought of as solely for program evaluation. Streamlining all needed data for program evaluation along with other program management, marketing, compliance, and reporting (e.g., injury and safety reporting) data could help in reducing redundancy and increasing efficiency.

[5] In the event that chosen evaluation methods require an equivalent comparison group, the data management software would ideally collect and manage data for both participants and nonparticipants.

year as compared to total number of program registrations received). Standardization with each MWR program or service is critical for evaluation; standardization across the MWR portfolio would further increase the utility of data and allow for cross-program and cross-service comparisons. Standardized data practices would also streamline the training of staff across all installations or programs and services, lessen the potential for errors through consistent messaging and documentation, and reduce resource expenditure (e.g., staff time to learn multiple systems, overhead fees associated with multiple data management software).

Automation Capabilities

Another key feature of an optimal data system is the degree of automation—that is, data collection that does not rely on manual data entry. One consideration in selecting any data management software or system should be the auxiliary technology or tools that can be used through or in conjunction with the selected system. For example, computer-assisted technology (e.g., Common Access Card readers to register attendance; participant web platforms integrated with program staff interfaces) can improve data quality, particularly in instances where data are complex or sensitive in nature (Wholey, Hatry, and Newcomer, 2010). Moreover, automated data collection practices can reduce error that comes from manual data entry.

Data management software that has client-facing portals often include the capacity to send email or communications to program participants. Using these automated options can ensure data are comprehensive and timely. For example, systems could be automated to send a quick (i.e., five-question or two-minute) survey on program satisfaction or short-term MOEs at a set interval of time (e.g., 48 hours) following program participation. The responses provided by program participants would then be directly linked back to the participant's profile, so that MOP data—and certain MOE data—are stored together.

Not all organizations are able to rely solely on automated data collection, whether due to data safeguarding requirements of the institution or the comfort of participants using technology to share personal or subjective data (i.e., personal opinions, beliefs, and experiences). Where manual data entry is still needed, standardized data management software can assist in reducing error by restricting data fields to limited types of characters or response. For example, participant age could be limited to two or three numeric digits (e.g., 76) and restrict nonsense entries (e.g., 7y6). The data system may also be able to provide error messages or warning flags that identify errors in data entry to ensure data quality remains high.

Tracking Capabilities

An optimal data system also allows for tracking of individuals and their use of all MWR programs and services over the course of their Air Force career, including time served as active duty serviceman, reservist, guardsman, veteran, and/or time as an Air Force dependent. Many program evaluation analysis methods require longitudinal data (i.e., data on the same people or populations across multiple time points). An optimal system would facilitate the collection of

MOP and MOE data over multiple years, and in this way, enable more sophisticated analytic techniques (e.g., difference in differences or fixed effects regression models). Using more sophisticated statistical methods increases the certainty that the outcomes measured can be attributed to MWR programs and services rather than other influencing factors (e.g., living on or off an installation). Tracking individuals is made possible through the assignment of a unique ID to each individual in the data and using that ID across all data management software and each year of data collection. Unique IDs have three key characteristics: every individual in the system receives an ID, each individual has one and only one ID, and two or more individuals never share the same ID. Notably, all individual-level data are connected to the individual's ID.

Given that MWR programs serve families and Air Force dependents in addition to Airmen, an optimal data system might also allow for family profiles to link so that individual activities and collective family activities (i.e., programs all family members attended) could be tracked simultaneously. Rather than having to enter data for each family participant that attends a program, data could be entered using the family profile and captured for each individual, reducing duplication of and potential error in data entry. Even if linking profiles is unavailable through the chosen software system, each family could be assigned a unique family identifier, in addition to their unique individual IDs. This common family identifier would allow for engagement and outcomes to be assessed at the family level rather than just at the individual level. Moreover, program managers looking to target families could use the available information to improve their outreach. This is an example of how program and service evaluation data can be integrated with the other program operations data to improve and streamline operations and responsibilities.

Integration Capabilities

The unique IDs mentioned in the tracking capability section also enable integration of external data sources (e.g., personnel records) with MWR data. To make the connection with Air Force and DoD data, including administrative records tracking deployments or records in the Defense Enrollment Eligibility Reporting System (DEERS), the ID used in MWR data systems would need to be consistent with, or easily connected to, the unique ID used in other Air Force and DoD databases.[6] A major benefit in creating a consistent, unique ID for all data systems is reduction in the redundancy of data collected, and therefore burden on participants; participants will not need to be asked by each program or service they engage with about their pay grade, family structure, years of Air Force experience, recent deployments, and the like.

[6] When IDs do not match across data systems, a crosswalk is required. Creating a crosswalk requires sufficient collection of overlapping data points to make the connect possible. For example, the collection of names, pay grade, date of birth, and squadron may allow for the linking of persons in one data system to the same person from another data system.

Compliance Capabilities

Any data system, and the procedures established for collecting, managing, and analyzing data, must be implemented in accordance with federal policy, as well as DoD and Air Force regulations. Before collecting new data or beginning program evaluation activities, it is critical for staff to understand DoD and Air Force policy and guidance related to the protection of human subjects and data security and privacy. Below we provide some guidance on the policies and regulations related to human subjects' protections.

Evaluation-related activities which involve human subjects—both data collection and analysis—must be conducted in compliance with established policy. Evaluations of MWR program and service performance and outcomes may be designated as quality improvement activities rather than research activities if "the results of the evaluation are only for the use of Government officials responsible for the operation or oversight of the program being evaluated and are not intended for generalized use beyond such program" (U.S. Department of Defense, 2002). However, this official determination should be made following a formal ethics review by an established Institutional Review Board (IRB).

Based on the initial review of the proposed research, an IRB may then determine that further review is necessary. If such review is required, the IRB will also need to approve all evaluation activities and reviews how evaluation results will be used. All formal or systematic processes for gathering data for the evaluation, whether that be in the form of surveys, course evaluations, or customer feedback, must be vetted and approved by the review board prior to fielding the data collection instruments. Data collected as part of routine program activities (e.g., program registration and attendance, facility reservations) must also be acknowledged in an application submitted to the IRB. The board will require documentation on how all data collected and used for program evaluation will be securely maintained. AFSVA staff need to coordinate with the appropriate personnel, at the installation or enterprise level, to ensure that all protocols and practices are accurately and adequately identified and followed.

The relevant policy and guidance related to human subjects' research protections and survey administration include the following:

- 32 Code of Federal Regulations 32.219, Protection of Human Subjects
- Department of Defense Directive 3216.02, *Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research* (U.S. Department of Defense, 2002)
- Air Force Instruction 40-402, *Protection of Human Subjects in Biomedical and Behavioral Research* (U.S. Air Force, 2005)
- The Privacy Act of 1974
- Air Force Instruction 38-501, *Air Force Survey Program* (U.S. Air Force, 2010)
- Air Force Medical Support Agency, *AFMSA/SGE-C Guidance Memorandum 2016-0002G: Guidance on Activities That May Be Research on Human Subjects* (Air Force Medical Support Agency, 2016b)
- Air Force Medical Support Agency, *Attachment: Not Research Involving Human Subjects Worksheet* (Air Force Medical Support Agency, 2016a).

Current Data Systems and Collection Efforts

To better understand current data systems and data collection efforts relevant to MWR programs and services, we spoke with staff in our sponsor's office (AF/A1S) and in AFSVA in San Antonio, as well as staff working with MWR programs and services at the installation level. The intent of these nonstructured, confidential conversations was to gain insight into the software systems currently in use, how they were selected, how installation-level data systems and practices may differ from those at headquarters, what types of data are currently collected by programs, and what data, if any, are shared with AFSVA staff by installation-level programs and services. These conversations provided a broad overview of current data practices, as well as data currently available for evaluation purposes.

We also conducted a review of MWR program and service documentation, and web searches, to prepare for and complement the conversations on current data systems and data collection efforts. Namely, we used AFIs, installation websites, and Air Force news announcements to identify data management software currently available to or in use by MWR programs and services. Additional web searches on the identified systems were used to expand our understanding of the specific software. We also used our document review and web searches to identify surveys currently or previously approved for us in the Air Force community that may collect relevant MOP and MOE data. Below we present an overview of current data management practices and highlight key data collections that AFSVA could leverage for evaluations of MWR programs and services. We then compare the findings from our conversations and the document review and web search to the optimal data management system qualities presented above.

Data Management Systems

We learned that MWR programs and services do not currently utilize a single data management software system or integrated set of data management software systems across all installations. There is no centralized support or requirements for how MWR programs and services are expected to manage their data. Decisions regarding the identification, purchase, management, and training of software are delegated to leadership at the installation Force Support Squadron (FSS). According to our confidential discussions, MWR programs commonly rely on multiple "legacy data systems," some more than a decade old that use outdated technology, or use spreadsheet programs or other manual process to capture required data. The data held by these legacy systems, and managed by local MWR program and service staff are stored across various Air Force networks and may reside on local computers of MWR program and service staff as well.

The review of MWR program and service documentation suggests that some installations may be utilizing data management software developed specifically for military MWR programs, including RecTrac, WebTrac, and CYMTrac. A web search of these platforms demonstrates that they have point-of-sales capabilities for program staff to utilize in real time and web interfaces program participants can use to reserve facilities or sign up for programs. These software

packages also provide the capability to generate standardized reports. Similarly, MWR program and service documentation identifies the ORCA data system, tailored to tracking the utilization of Air Force golf courses.[7] This system also provides real-time data capture and analyzes local data on common golf course performance indicators.

Regarding existing data management systems, we did not see a list of the data collected or the exact set of data systems currently in use within the MWR portfolio. However, our discussions with AFSVA and installation staff indicated that the data that are collected mainly focus on program operations (e.g., program attendance, registration, and funding). With some modification and adaptation, these current collection practices could be leveraged to support program evaluation. However, it appears data required to assess short-term, intermediate, and long-term outcomes of the MWR programs and services is not part of current data collection by programs, installations, or headquarters. To assess program outcomes, AFSVA, in conjunction with AF/A1S, FSS staff, and program and services staff, can either identify potential sources of outcome data that can be utilized or design the necessary new data collection tools to gather such data. Having a data system with the features described above (e.g., an automated way to send follow-up surveys or assessments to program or service participants 48 hours after an activity) would help to facilitate this process.

Approved Surveys

To identify potential secondary sources of MOP or MOE data that the AFSVA can take advantage of, we reviewed surveys currently or previously approved for use in the wider Air Force community. This included the list of surveys located on the Air Force Survey Office's website on the Air Force Portal, and was supplemented with study team member expertise of Air Force and DoD surveys to expand on this list. The surveys reviewed include the MCFP's MWR Customer Satisfaction Survey, the SOFS, and the web-based Interactive Customer Evaluation. This is not, however, a comprehensive list of surveys currently implemented by the Air Force; for example, we were unable to obtain the questionnaires for the FSS Customer Satisfaction Survey, the Golf Satisfaction Survey, and the Air Force Child and Youth Program Questionnaires.[8] It is possible that additional sources of secondary data exist that can be used for program evaluation purposes.

The surveys reviewed provide a handful of useful indicators for evaluating MWR programs and services. First, indicators of which populations are using or not using MWR programs and services can be identified through both the SOFS and the MCFP's MWR Customer Satisfaction

[7] The developers of RecTrac, WebTrac, and CYMTrac provide an alternative to the ORCA system called GolfTrac.

[8] Survey Control Numbers (SCNs) for these surveys are as follows: MWR Customer Satisfaction Survey SCN: DD-P&R (OT)26268); Active Duty Status of the Forces Survey (SOFS) SCN: DD-P&R(AR)2145); FSS Customer Satisfaction Survey SCN: AF18-020NR; Golf Satisfaction Survey SCN: AF17-078NR); Air Force Child and Youth Program Questionnaires SCN: AF16-125A1S.

Survey. These surveys ask about program and service use, and also connect with demographics (e.g., age and marital status) and military characteristics (e.g., pay grade and years of active duty service) of the respondent. Second, both surveys include measures of unit cohesion, an intermediate outcome for programs such as Outdoor Recreation, R4R, and Recreational Sports. Third, the SOFS asks about current work and personal levels of stress, as well as what types of MWR programs and services, if any, were used for coping with stress. R4R, for example, is intended to help Airmen deal with stress, and the information from the SOFS could provide some indication for whether individuals are using the programs for its intended purpose. Finally, the Interactive Customer Evaluation web portal provides an opportunity for participants to indicate their satisfaction with facilities, equipment, hours of operation, programs, and services offered by each MWR program at an installation. All MWR programs and services include an MOP focused on client satisfaction.

The reviewed surveys do have items that correspond to some of the program MOPs (e.g., utilization) and MOEs (e.g., unit cohesion). However, there are limitations of these surveys as a secondary data source. First, the identification of who has or has not used MWR programs and services in these surveys is coarse. Although respondents are asked to identify which programs or services they utilized in the last 12 calendar months, the programs and services provided under the MWR portfolio are often combined into broad categories in these surveys. Thus, the information gained from these survey responses does not identify the specific program or service used, how many times a participant engaged with each program or service, or in which specific activities of a program or service the participant engaged (e.g., computer/internet access or a life-planning class held at a Community Center). Because these survey data are collected in a deidentified manner, there is no opportunity to link responses to the data collected by MWR programs and services about individual or family utilization.

In addition, these surveys rarely measure short-term outcomes, prioritizing the longer-term impact measures (e.g., resilience, readiness, and retention). As discussed in the description of logic models in Chapter Three, without first establishing that participation in MWR programs and use of MWR services result in expected short-term outcomes, attributing changes in longer-term outcomes and impacts to MWR programs and services may be inappropriate. Short-term outcomes represent an important mechanism of change through which we expect the MWR portfolio to impact force-level constructs like resilience and readiness. Without understanding these intermediate mechanisms, it is also more difficult to rule out alternate explanations for why a connection between use or participation and impacts may exist. Finally, to accurately use survey data from other sources, detailed information on who was invited to participate and who did or did not respond to the survey is critical to ensuring that responses are given the appropriate amount of weight in any analysis. Ignoring nonresponse or other potential bias in data may under- or overstate MWR program and service utilization and short- and longer-term outcomes.

Comparison of Optimal Data System Qualities with Current MWR Data Management and Collection Efforts

The review of existing data management systems and data collection efforts suggests that some MOP and MOE data are being collected, even if they are not currently being used for evaluation purposes. However, based on our review of documentation and key informant discussions, we learned that there were many ways in which the current data management systems and data collection efforts fall short of the optimal features described above. In what follows we compare current data management and collection practices relative to the optimal features. The comparisons are summarized in Table 5.1.

Standardization

Standardization relates to both the data management software used and the types of data collected. Currently there is no single data management software system or set of software systems used by MWR programs and services across all Air Force installations. There are software systems tailored specifically to the operations and needs of military MWR programs and services (e.g., RecTrac, CYMTrac), but the onus is on installation FSSs to identify, purchase, and prepare staff to use these systems. Second, and potentially a result of not having standardized software, we found little evidence of standardization regarding what types of data are collected, the format these data take, or the frequency of data collection across programs, services, or installations.

Having specialized software is an advantage that AFSVA can leverage; utilizing these software systems across the enterprise and allowing for central data communications can advance current data practices. Historically among staff in AFSVA, there was less of an understanding around the value an enterprise-wide data system could provide to the organization. But there is emerging interest in and understanding around developing a system-wide data structure to better support MWR programs and services, including an interest in demonstrating how MWR programs and services contribute to Airman resilience and readiness. Notably, staff at all levels of the enterprise would need to develop a shared understanding around data characteristics, quality, and collection to ensure consistency in the data entered into a standardized system across all program locations.

Automation

Based on our review and discussions, we know that some installations are using point-of-sale systems for MWR programs that automate the collection of certain data (e.g., number of sales, revenue). However, it is worthwhile to consider other ways that MOP and MOE data collection could be automated. For example, AFSVA may consider ways that Common Access Card readers could be used to track participation at events, or ways that point-of-sales systems or online registration systems could be programmed to send follow-up surveys after use of an MWR program or service or participation in a particular activity. Though an up-front investment

Table 5.1. Comparison of Optimal Data Management System Qualities and the Current Air Force MWR Data Management System

Quality	Description of Optimal Data Management System	Current Air Force Data Management System
Standardization	Each individual MWR program or service uses the same data management system, which is used across all installations. The system can comprise multiple, complementary computer or web-based software or rely on a single, comprehensive software that serves all operational and evaluation needs. A shared data lexicon ensures all data are recorded in the same way, regardless of location, and that actual data collected are comparable across locations.	No single data management software or integrated set of data management software is used across all installations and MWR programs in the AFSVA portfolio. MWR programs rely on multiple legacy data systems, some more than a decade old, and the data from these systems are stored across various Air Force networks. There is little evidence of standardization regarding type of data collected, format these data take, or the frequency of data collection across programs, services, or installations.
Automation	Computer-assisted technology can improve data quality, reduce error, and improve timeliness of data collection, particularly if data are complex or sensitive.	Some installations use of point-of-sale systems for MWR programs that automate data collection.
Tracking capabilities	Tracking of individuals over time provides information on patterns of behavior, allowing for use of more sophisticated analytic techniques in evaluations. Tracking individuals is made possible through the assignment of a unique ID to each individual; all individual-level data are connected to the appropriate unique ID.	There is no tracking of users of MWR programs and services over time. There is no record of using a single, unique ID for each MWR program and service participant.
Integration	Use of unique IDs consistent with other Air Force organizations enables integration of external data sources (e.g., personnel records) with MWR program/service data, reducing redundancy of data collected and information requested of participants.	Lack of IDs prevents linking of MWR program and service utilization data to data systems outside MWR, at least at the individual level.
Compliance	Established procedures for collecting, managing, analyzing, and reporting data must be implemented in accordance with federal, DoD, and Air Force policies and regulations.	Reviewed surveys, approved by the Air Force Survey Office, are in compliance; however, no information was ascertained about compliance of installation-specific data collection.

may be required to develop these types of technologies, they ultimately have the potential to streamline data collection and reduce error caused by manual data collection and entry.

Tracking

Currently the data collected by MWR programs and services are entered into in multiple files, stored on multiple Air Force networks, and collected without a clear connecting variable (e.g., a unique participant ID). This is in part due to the fact that programs and services receive funding from multiple business lines and report required data associated with those funding

streams in independent ways. Given that no unique ID is utilized, no comprehensive data set encompassing an Airman's interaction with MWR programs and services can be created from current data collections to support evaluation efforts. According to AFSVA staff, the only time currently collected data are likely to be connected is when an MWR program or service is centrally managed (i.e., by AFSVA-level staff).

Integration

The lack of a single common ID per individual across data management systems—or the collection of sufficient personal information—prevents the integration of data collected by organizations other than AFSVA with primary sources of MOP and MOE data. This connection is further limited due to Air Force and DoD surveys being collected in a deidentified manner (i.e., without a linking ID). If it were possible to link survey responses or other DoD and Air Force data to the information from MWR program and service point-of-sales software, it would allow for a more nuanced exploration of the association between MWR program or service use and outcomes of interest. (For example, does the particular combination of programs or services have an impact? Is a greater impact on outcomes of interest observed among individuals who use the programs more often?)

Compliance

The surveys that we reviewed that have been approved by the appropriate review boards and offices (e.g., the Air Force Survey Office) are in compliance with Air Force, DoD, and federal regulations. However, we did not ascertain information about the compliance of installation-specific data collections with necessary regulations. As efforts are made to develop additional data collection instruments to gather both MOP and MOE data, it will be important to ensure that these practices and instruments comport with all regulations.

Recommendations to Advance Current Data Systems and Practices

The current data management practices and data collection efforts available to support evaluations of MWR programs and services do not align with optimal data management or collection practices for evaluations. As such, what follows is a set of recommendations for how to move from current data activities to a more optimal set of data practices that enable high-quality program evaluations. We conceive of multiple actors, at various levels (e.g., policy, monitoring, and implementation) in the establishment and implementation of these recommendations into practice to include AF/A1S, AFSVA, FSSs, and installation-level MWR program and service managers and staff. Where appropriate, we highlight which group within the enterprise may need to be engaged around specific recommendations. Notably, these recommendations are neither in order of importance, nor are they always sequential in nature. The recommendations may include actions that should occur simultaneously with other recommendations in this list.

Examine the Data Infrastructure to Identify System(s) to Support Collection and Management of High-Quality Data for Evaluation

In conversations with AFSVA staff, we learned that MWR programs and services rely on a disparate set of data systems and data collection practices. We recommend reviewing current technology and data systems to identify whether the current infrastructure already allows for, or could be modified to support, a unified, standardized collection of required MOP and MOE data. Such a review should include the following:

- **A review of current data systems and their capabilities.** This would include an assessment of legacy data systems or data collections to determine where data are currently housed and maintained; whether the necessary data files speak to one another to create comprehensive data files (i.e., data can be linked through unique individual identifiers across all systems); and where new or additional data management software systems are needed to fill in gaps or whether a single data management software system could collect the universe of information needed by AF/A1S, AFSVA, FSSs, and installation program and service staff. A review of installation-specific data platforms currently in use may provide helpful insight into the range of available software to meet identified program evaluation needs. Ideally, any installation-based data collection systems would communicate with systems at the enterprise level such that a portfolio-wide analysis could be conducted.
- **An examination of storage and computing capabilities.** It will be important to assess the Air Force information technology system's ability to store comprehensive data files and support data analysis software (e.g., Stata, R, SPSS) that could be used to analyze evaluation-related data. These software packages use computer memory when operating, need access to data files that include secure or private data (e.g., participant ID, participant pay grade), and often include free updates (via the internet) to support all desired analysis.
- **A review of the availability of infrastructure to support automation.** This would involve a review of available technology and infrastructure that supports the collection of data at installations in ways that remove manual data entry from the process (e.g., card readers that register the swipe of an identification card to log attendance or web portals that log participant facility reservation made online). Such data need to be collected in the same way across all installations and MWR programs and services to ensure data quality and comparability. This step would also include an exploration of ways to collect data directly from participants (e.g., online surveys) that take into consideration confidentiality, data security, cost, timing of data collection, and other factors. This includes identifying new practices and also considering ways to modify current data collection tools (e.g., Interactive Customer Evaluation) that could be improved to enhance data quality and utility.

Review Existing Data to Assess Alignment Between Currently Available Data and the MOPs and MOEs Recommended for Evaluating MWR Programs and Services

Beyond examining the data infrastructure, a review of the types of data currently collected at the program and service, installation, or enterprise levels that might be used for evaluations is an important step in developing a robust data management system that enables program evaluation.

Any review of data should look at the cross-section of available data (i.e., data at one point in time) while also examining the longitudinal data (e.g., data collected over multiple years or multiple program operating cycles). Evaluations tend to improve with the availability of multiple years of data on participants of MWR programs and services. The goal of this review would be to identify where existing data and current data collection practices meet needs, areas where current data and practices could be adapted to meet needs, and where new data collection will be needed to ensure all MOP and MOE can be assessed. A data review could include:

- **An examination of the types and quality of data currently collected.** By "types of information collected" we mean whether programs are recording program registration and attendance, types of equipment rented, and the extent to which clients are satisfied with the programs/services offered and the programs/services they participated in, as well as the format of that data (e.g., attendance is tracked by date or attendance as a cumulative count of times participating in a particular program in the last year). Quality of data, as previously identified, includes completeness (i.e., how much data is missing when it should not be), timeliness (i.e., whether all data have been added to the data system, or the information is lagging by six months), and consistency (i.e., items collected or stored in two different systems provide the same information).
- **A comparison of the data currently collected against the provided list of recommended MOPs and MOEs for each MWR program.** This evaluation would identify overlaps and data points that will be needed in the future, take note of where data are in a format that needs to be modified (e.g., daily attendance for each Airman at a fitness center is needed rather than total hours an Airman spends in a fitness center each year), and determine whether it is feasible to adapt current data if they are not collected in the format needed for evaluation.
- **Coordination with other data collection efforts.** This step could include identifying all annual, biannual, or other occasional survey administrations already conducted by DoD or the Air Force, and then determining whether MOPs or MOEs are already covered in these administrations or whether these surveys can be adapted to collect data more aligned with MOPs and MOEs. This coordination reduces the need to create duplicate or additional surveys, minimizing AFSVA resource expenditure and the time requested of MWR program participants.
- **An investigation into which data are collected across the Air Force enterprise that AFSVA staff could request and link with MWR program and service data.** Personnel records, for example, provide information into an Airman's professional trajectory in the Air Force, demographic and military characteristics, information about family composition, and so on. There are likely varying levels of information that can be shared with offices across the Air Force; understanding policy around data privacy and security will be necessary for any request of these data. The more sensitive the data requested (e.g., disciplinary infractions), the higher the levels of data security and/or restricted-access AFSVA will need in its own data protection plans. Finally, AFSVA needs to investigate what information about an individual (e.g., DoD ID), at minimum, must be collected by AFSVA to ensure MWR data can be integrated with other sources of Air Force or DoD data.

Develop Needed Data Collection Processes and Instruments to Address Gaps Between Current and Recommended Data for Evaluation

After conducting a review of current data collections, it will be important to establish a plan for how AFSVA will collect the remaining data points needed for measuring both MOPs and MOEs. The collection of MOP data can likely be incorporated into daily data collection practices conducted by MWR program and service staff. Collecting MOE data may be more resource intensive in terms of developing data collection tools (e.g., surveys) and gathering the necessary data from both MWR program and service participants and nonparticipants. It will be important for AF/A1S, AFSVA, and FSS staff to determine the approach to collecting MOPs and MOEs that best suits the organization's resources and data system capabilities, and to identify ways to garner buy-in at the installation program and service levels.

- **Ensure that everyone within the enterprise understands the importance, as well as key elements and aspects, of data collection.** Program- and service-level staff will inevitably collect some of the data needed for assessing MOPs, and potentially for MOEs. Ensuring everyone within the enterprise is on the same page and has the necessary training and skills to collect this information is imperative. Establish clear, written guidance and procedures for data collection to facilitate understanding by all contributing staff. Consider enacting some easy-to-implement data checks that FSS staff can utilize to ensure data quality. Conduct these data checks early and regularly, and document procedures taken to correct errors if or when they occur. These checks are especially important when relying on manual data entry where human error can create inaccuracies or problematic data.
- **Utilize existing survey items and instruments to the extent possible.** When developing new surveys or measures to include on surveys, consider using existing instruments that have been developed and validated through previous research or evaluation projects. For example, we recommend two preexisting scales to assess the intermediate outcome of Community Connectedness. These are the Brief Sense of Community Scale (Peterson, Speer, and McMillan, 2008) or the Military Family Institute's Base Cohesion Scale (McClure and Broughton, 2000; see Appendix B). Using previously validated measures reduces the amount of effort required to construct new surveys but also ensures results will be evidence-based or evidence-informed.

Identify What Resources Are Required to Narrow the Gap Between Existing Data Management and More Optimal Data Management

Take stock of the resources (e.g., manpower, expertise), systems (e.g., information technology (IT)), or processes that can be utilized or established at all organizational levels that will support data collection and management across Air Force installations and MWR programs and services. Any resource assessment should consider both the quantity and quality of a resource along with the stability and consistency of each resource across all program and service locations. Document whether resources have the potential to decrease or increase in level in the near-term (e.g., next three years) and how those changes might impact planned activities. If or

where resource gaps exist, it will be necessary to determine how to cover shortfalls until the needed resources can be procured.

Resource development should be conducted centrally where there are opportunities to reduce resource burden for installations and improve systematic data collection for the MWR portfolio. Some potential ways to develop resources centrally and reduce installation-burden include:

- **Create data collection tools with well-defined measures to promote consistency in how data are collected across locations.** This process should involve staff from multiple installations, both FSS and program and service managers, to ensure utility and feasibility of accurate and timely data collection across all installation types.
- **Provide centralized training for staff who will be actively engaged in data collection activities to reduce local resource burden and increase consistency of information across programs and installations.** This should include training on any new or existing data management software, data collection technology (e.g., troubleshooting card reader issues), a data lexicon that establishes common terminology across all installations and MWR programs and services, and any required data security and handling procedures.
- **Consider implementing new data collection practices in phases across the MWR portfolio to maximize use of limited resources until all resources have been procured.** Start with a subset of the MWR programs to reduce start-up resource strain, potentially beginning with programs that have more structured data collection in place already and have familiarity with standardized data collection. Consider prioritizing those outcomes that may be less resource intensive to collect. Gradually incorporate additional MWR programs and services into the new data practices until all needed resources have been identified, procured, and allocated for data collection and management.

Ensure Compliance with All Federal, DoD, and Air Force Regulations on Research, Human Subjects' Protection, and Data Management

Staff unfamiliar with federal, DoD, and Air Force policy must have an understanding of expected data practices and protocols. Moreover, any procedures established to ensure the privacy, security, or confidentiality of data must be adhered to by all staff, from the headquarters level down to staff for each program or service on an installation. It is important to provide the necessary training so staff know what to do in the event of data mishandling, including who to contact, what information to document, and what actions to take to address the issue in the short or long term. At minimum, the following should be enacted to ensure compliance with policy and regulations:

- **Establish data handling procedures tailored to the specific roles and responsibilities of MWR program and services staff at all levels of the enterprise.** In doing so, ensure that staff are informed of modifications to data handling procedures as new policy or guidance is issued. Consider providing training at the time of hiring and periodic booster trainings to certify compliance with required practices.
- **Ensure that all data collection tools and instruments have been approved by the necessary Air Force offices before putting new data collection practices into the**

field. The approval processes can be slow and staff should ensure that sufficient time is set aside for the review procedures.

- **Understand what implications the Privacy Act of 1974 may have on the use of existing data for new purposes.** According to the Privacy Act of 1974, any changes to how current data collected by a federal agency will be used must be documented in advance of those new uses in the Federal Register with a system of records notice.[9] As a first step, AF/A1S staff will need to review the currently documented purposes, scope, and length of existing data holdings (i.e., how long records are to be maintained) and then determine whether the modifications to current data practices affect the public documentation about data uses.

Create a Communication Plan to Inform the Enterprise on the Purpose of New Data Practices

A key consideration for any change in data practices is developing a strategic communication plan to inform relevant parts of the enterprise about the planned changes and the purposes those changes will serve. The communication plan should target key stakeholder groups.[10] These audiences include

- **Installation-level staff (including FSS and program/service managers and staff),** who must understand the purpose of the planned changes and what role and responsibilities they will have in implementing and sustaining these changes; this should also include how program and service operations will benefit from new data collection.
- **Current and prospective program participants** (e.g., Airmen and their families), who might need to be educated about the importance of understanding how well a program or service is being implemented and whether it is producing the intended outcomes, so that they respond to requests for information (e.g., surveys collecting MOE data); this should include an overview of changes that they will experience registering for programs and services or when entering MWR facilities. They may also need reassurance about the security and confidentiality of their data and what steps are being taken to protect it.
- **Air Force unit commanders and leaders,** who must appreciate the importance of assessing MWR programs and services to ensure they ultimately support Airman resilience and readiness.
- **Senior Air Force leadership** (e.g., AF/A1S, AFSVA) who make strategic decisions about the MWR program portfolio and who advocate for needed resources.
- **Other collaborators,** such as information technology staff, staff from the Defense Manpower Data Center, the Office of People Analytics, or other DoD offices that may already be collecting relevant data (e.g., MCFP's MWR Customer Satisfaction Survey), who might support aspects of the AFSVA planned data system or who will provide secondary data to the AFSVA and AF/A1S staffs.

[9] For more information, see U.S. Department of Justice (2015).

[10] Results from the 2016 Where Airmen Get Information Survey may provide useful information on how to best target and reach intended audiences; see U.S. Air Force (2017).

The communication plan should include a variety of different methods for educating stakeholders on the planned changes to data collection and the rationale for these modifications, including presentations, written documentation, and training sessions that can be tailored to how the stakeholder group will be engaged in the data collection practices. The goals of these different communication strategies are twofold: to establish a common understanding for why practices are changing and to garner support for these new data collection endeavors.

Conclusion

Table 5.2 shows how the recommendations made in this chapter align with each of the key characteristics associated with an ideal data management system. One key takeaway from this table is that the five characteristics of an optimal data management system identified in this chapter are interrelated and are often addressed by the same recommendation. The exception, perhaps, is compliance, which may have its own unique requirements.

Table 5.2. Mapping Data Management System Characteristics to Recommendations

Recommendations	Standardization	Automation	Tracking	Integration	Compliance
Examine the data infrastructure to identify system(s) to support collection and management of high-quality data for evaluation	X	X	X	X	X
Review existing data to assess alignment between currently available data and the MOPs and MOEs needed for evaluating MWR programs and services	X		X	X	
Develop needed data collection processes and instruments to address gaps between current and recommended data for evaluation	X	X	X	X	X
Identify which resources are required to narrow the gap between existing data management and more optimal data management	X	X	X	X	
Develop a culture of compliance with all federal, DoD, and Air Force regulations on research, human subjects' protection, and data management					X
Create a communication plan to inform the enterprise on the purpose of new data practices	X	X	X	X	X

6. Overall Conclusions and Next Steps

Collectively the MWR portfolio of programs and services is expected to improve Airman and family resilience and readiness. However, a necessary first step in determining the possible impact of the portfolio is to identify and then assess how each individual program or service contributes to precursors of resilience and readiness. The present study aimed to develop an evidence-informed model of factors that contribute to Airman and family resilience and readiness, and then to develop an evaluation framework for MWR programs and services that identified short-term and intermediate outcomes that contribute to Airman and family resilience and readiness.

We began by conducting a comprehensive review of the literature to develop a model of the building blocks of resilience and readiness. Through this review, we identified a set of building blocks that operate across four system levels—individual, family, peer/squadron, and community—as well as a set of background characteristics that have been associated with resilience and readiness.[31] Some of these building blocks are hypothesized to have a direct impact on resilience and readiness, whereas others are proposed to have a more indirect effect by influencing a direct building block. Though this research is still growing and our building blocks model draws on research from a range of methodologies, this evidence-informed model provides insight into the types of factors that contribute to resilience and readiness. Moreover, a crosswalk between the building blocks model and the CAF domains and tenets revealed that every building block could be tied to at least one CAF tenet, covering all four CAF domains. This suggests that the CAF concept of fitness is aligned with the resilience and readiness building blocks described in the literature.

Our next step was to develop logic models, MOPs, and MOEs for each of the MWR programs and services within the scope of this study. Logic models are a way to visually depict a program or service's operations and outcomes and are a useful tool for conducting a program evaluation. A program evaluation can provide valuable information about whether a program is adequately serving its target audience, whether participants are satisfied, and ultimately whether the program is achieving its goals in the short and intermediate terms. Program evaluations can include both a process evaluation component (an evaluation of a program's implementation and usage, which are measured with MOPs and an outcome evaluation component (determining whether a program had its intended effect, which is measured using MOEs). Using the logic

[31] As was explained in Chapter Two, each building block in our model was identified as contributing to resilience, and a subset of these were also found to be associated with readiness. However, the readiness literature is less well developed than the research related to resilience, and it may be that future research will identify additional building blocks for readiness.

models as a foundation, we identified MOPs and MOEs for each MWR program and service. It is important to keep in mind that we relied on only the information that we had available (e.g., AFIs, program or service websites) to identify components of the logic models; thus, the logic models provided in this document should be seen as "living documents" that may need to be updated as programs and services better document their intended outcomes and develop and revise policy regarding their implementation.

In addition to providing the Air Force with a framework for evaluating the MWR programs and services, we used the logic models and MOE lists to explore the ways in which each program and service may contribute to resilience and readiness. More specifically, we conducted an analysis to examine the match between each program and service MOE and the building blocks in our model. This analysis indicated that, of the 22 building blocks, 18 were covered by at least one MWR program or service. The building blocks targeted by the largest number of programs included social network, sense of belonging, sense of community, access to community activities, family functioning and relationships, and coping strategies and skills—representing building blocks at all system levels. This analysis also highlighted that all MWR programs and services target at least two building blocks, though some programs were matched with as many as nine building blocks. Moreover, we found that there is a fair amount of overlap in the specific building blocks covered by programs and services, suggesting that many offerings in the MWR portfolio are contributing to resilience and readiness through similar pathways.

That said, there are limitations to this analysis. First, though there may be overlap in coverage of building blocks across MWR programs and services, we are unable to form conclusions about the specific populations that are utilizing these programs and services. To the extent that these programs may be reaching a range of populations, having redundancy in coverage of the building block could be an asset. Second, this analysis focused on only matches at the overall building blocks level. Each block contains subcomponents (e.g., the control building block includes personal choice, perceived control, internal locus of control, agency, autonomy, self-directedness, and control over schedule and tasks as subcomponents) and we did not conduct our analysis at this subcomponent level. Thus, although we did find overlap in the coverage of many building blocks, it may be that at the subcomponent level there is far less overlap. Third, these matches were based on the expected outcomes of these programs and services; however, it will be important for the Air Force to determine if they are actually achieving these outcomes. Conducting both process and outcome evaluations for programs and services in the MWR portfolio would provide more context for the interpretation of these results.

Finally, in anticipation of future program evaluation efforts, we reviewed current MWR data management systems and data collection efforts. As part of this review, we determined what data are being collected that could be used for the measurement of MOPs and MOEs. For example, some MWR programs are utilizing data management software developed specifically for military MWR programs that have point-of-sales capabilities and participant-facing web interfaces. These systems could be leveraged to collect data about program and service utilization. Similarly, some

existing surveys, such as the MCFP's MWR Customer Satisfaction Survey, collect basic demographic information, broad measures of MWR program and service use, and measures of unit cohesion—an MOE proposed for several programs and services. It is possible that these secondary data sources could be used as part of an evaluation effort. In addition to reviewing these sources, we evaluated the existing data management systems and surveys with respect to several characteristics of "optimal" data management systems: standardization, automation, tracking, integration, and compliance. This revealed some room for improvement in current MWR data practices. For example, there is no single data management software or integrated set of software used across all installations and MWR programs and services; relatedly, there is no consistent tracking of users over time and no way to link various data sources at the individual level. Efforts to standardize data systems, allow for tracking of participants over time and the integration of data, and automating data collection—while remaining in compliance with established federal, DoD, and Air Force policies and regulations—will be key to supporting any large-scale MWR program evaluation effort.

Overall Recommendations

Based on these findings we developed a set of recommendations related to management of the MWR portfolio (as described in Chapter Four), as well as recommendations related to data management practices (as described in Chapter Five). Here we briefly review these recommendations.

MWR Portfolio Management Recommendations

Our process of matching MOEs to resilience and readiness building blocks revealed that the current network of MWR programs and services is very dense, with substantial overlap in the building blocks that are targeted by most MWR programs and services. In some ways, this could be a strength of the portfolio: If different populations are using different programs and services, having overlap in the building blocks they cover will ensure that these building blocks are being promoted across populations. However, if the same population (or populations) are consistently using a similar set of programs or services, which target the same building blocks, it could mean that there is unnecessary redundancy. **Conducting a process evaluation would provide further information about who is using these programs, and what the overlap in building blocks means for the broader MWR portfolio (e.g., whether overlap is functional).** Moreover, if a certain population is not currently engaged in MWR programs and services, there may be opportunities to consider their needs and interests and then identify ways to meet those in a way that links to the resilience and readiness building blocks.

Relatedly, though our analysis provides information about the match between MOEs and building blocks, each of the building blocks had several subcomponents, as described in Chapter Two. With more detailed information about the activities offered by each program and service, it

may be possible to link MOEs and building blocks at this subcomponent level, which would also provide a more nuanced understanding of the ways that MWR programs and services promote resilience. **Thus, it is important to make the intended purposes of MWR programs and services more explicit to facilitate mapping of expected outcomes to the building blocks that build resilience and readiness.**

Currently the portfolio is especially oriented toward promoting and maintaining positive relationships and a sense of belonging among Airmen and their family members. Other building blocks—such as community/Air Force values, mental and behavioral health, and family social support—received less coverage. There was also a subset of four building blocks not connected to any program or service (i.e., positivity, sense of purpose, positive parenting, and family values). That said, some building blocks may be less relevant to the portfolio of MWR services. **Therefore, it will be important for the Air Force to consider which building blocks are within the scope of the MWR portfolio, and whether certain building blocks are more appropriately targeted by programs or services outside the MWR portfolio (e.g., those related to spiritual fitness).** In addition, resilience and readiness are just two important targets of MWR programs and services; impacts such as increased morale, retention, and QoL are also worthwhile considerations. Each of these impacts likely has its own set of building blocks, which may or may not overlap with those identified in this study. **Thus, it is important for the Air Force to consider the full range of goals that the MWR portfolio is designed to achieve when making portfolio-level decisions.**

Finally, as mentioned, these matches were based on the expected program outcomes. **However, it will be important for the Air Force to conduct outcome evaluations of MWR programs and services to determine if they are actually achieving these outcomes, and therefore contributing to resilience and readiness as hypothesized.**

Data Management Recommendations

Although there are existing data management systems used by MWR programs, our review identified certain limitations to these systems. To address these limitations, we offer six recommendations.

Our first recommendation is that the Air Force examine the existing data infrastructure to identify system(s) that could be used to support data collection. This includes an understanding of current data systems, including their storage and computing capabilities, and then determining if they already allow for, or could be modified to support, collection of high-quality data.

Our second recommendation is that there be a review of current data collection efforts to see if existing data could be used for program evaluation. We conducted an initial review, and—within the sources we reviewed—most data being collected relate to program and service usage. This type of data is consistent with many of the MOPs we identified, and therefore could be leveraged as part of a process evaluation. However, we were unable to identify

comprehensive efforts to collect MOE data. That said, there may be additional types of information being collected at the program, installation, or enterprise level that could be leveraged for evaluation purposes.

An understanding of current data collection efforts will reveal any MOPs and MOEs that are not currently being collected. **Our third recommendation is for the Air Force to develop data collection processes and instruments to address any remaining gaps between current data collection and the MOPs and MOEs recommended as part of this study.**

Our review of current data management systems revealed certain limitations. **Our fourth recommendation is thus that the Air Force should determine what resources are required to address the gap between current and optimal systems.** This might include staff training and reexamining software and/or hardware needs.

Our fifth recommendation is to develop a culture of compliance with any laws, regulations, and policies that govern research, human subjects' protection, and data management. This may require staff training, as well as the development of specific procedures for data handling and monitoring compliance.

Finally, these changes will impact a number of key stakeholders, ranging from program participants to providers and staff to Air Force leadership. **Our sixth recommendation is thus to develop a communication plan to ensure that all stakeholders are aware of and understand the rationale for these changes related to data management.** Ultimately this will help to promote buy-in and engagement.

Next Steps

These recommendations provide a blueprint for steps that can be taken to ensure that the MWR portfolio of programs and services achieves at least part of its mission: fostering resilient and ready Airmen and families. They also serve as a guide for developing a data management system that will support evaluation efforts. That said, many of these recommendations are designed to be addressed over an extended period of time. Therefore, we also offer a set of recommended immediate next steps that could be implemented by the Air Force over a three- to six-month time frame.

First, we recommend that the Air Force finalize the logic models for each program and service, make any needed updates to the proposed MOPs and MOEs, and then formalize the MOPs and MOEs in program and service documentation. The more explicit resources such as AFIs and websites are about the intended goals of a program or service—including the target population, the intended activities, and the expected short-term and intermediate outcomes—the easier it will be to develop a concrete evaluation plan and determine if programs and services are achieving their goals.

Second, we recommend that AF/A1S, with the assistance of AFSVA, FSSs, and program and service staff at the installation level, conduct an environmental scan to identify all

existing data sources, to include Air Force–wide surveys, administrative data sets, and data collected for current program and service evaluations. Although we conducted an initial review of data sources, as discussed in Chapter Five, we know that there may be additional surveys that are in the field or data collection efforts at the installation level that were not available to review. An understanding of existing data sources will help the Air Force determine if there are ways these secondary data can be used for evaluation purposes. It will also allow for an assessment of inconsistencies in the way that data are being collected across installations—for example, if attendance data are being tracked in different ways—so that efforts can be made to identify a common definition and collection method.

Finally, we recommend conducting a gap analysis between the data needed for evaluations (i.e., MOPs and MOEs) and data currently available. Ultimately, by identifying such gaps, it will be possible for the Air Force to develop plans for the collection of these data (e.g., ways data will be obtained, how certain MOPs or MOEs will be measured, or how data from across sources can be linked to support an evaluation).

Conclusion

This study developed an evidence-informed framework of resilience and readiness, as well as a framework for evaluating a set of programs and services in the MWR portfolio. This allowed us to determine how MWR programs and services may contribute to resilience and readiness of Airmen and families, and ultimately will serve as the foundation for future efforts to evaluate the implementation and outcomes associated with MWR programs and services.

Online Appendixes

Three appendixes are available for this report:

- Appendix A, Complete List of Citations, by Building Block, provides a complete list of the citations used in the building block model.
- Appendix B, Logic Models and MOP/MOE Lists, provides the goals, logic models, and MOP and MOE lists for each program and service within the scope of the study as described in Chapter 3.
- Appendix C, MOE-Building Blocks Matching Analysis Detailed Results Tables, provides detailed results about the MOE-building block matching analysis, as described in Chapter 4.

These appendixes are available for download at www.rand.org/t/RR2670.

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