March 2026

Defense Health Agency Strategic Research Plan: Environmental Exposures

Defense Health Agency ®

REVISION HISTORY

Revision	Entered by	Reason	Date
1	Kathy Fullerton	Removed SRP hierarchy elements outside of DHP S&T scope	March 2026

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1. OVERVIEW AND ORGANIZATION

The Defense Health Agency (DHA) Research and Engineering (R&E) Directorate leads the discovery and development of innovative medical solutions responsive to the needs of Combatant Commands, the Military Services, and the Military Health System (MHS). DHA R&E provides oversight and management of the Defense Health Program (DHP) Science and Technology (S&T) research budget to support priority medical research which includes the appropriation for research, development, test, and evaluation (RDT&E) Budget Activities (BA) 6.1-6.3 (Basic Research, Applied Research, Advanced Technology Development). The cornerstones of the DHA S&T management approach are as follows:

- Portfolio Managers directly accountable for the health and performance of their research Portfolios
- Alignment of research investments to validated medical capability gaps, operational requirements, and the needs of the Joint Force
- S&T efforts that focus on areas where DHP investments can make the most impact and accelerate delivery of knowledge and materiel products to product development and other transition partners or end users
- Informing multi-year program plans that allow adaptation to emerging (or declining) requirements

The DHA Deputy Assistant Director (DAD) for R&E employs Strategic Research Plans (SRPs) to inform and describe how Department of War (DoW) medical capabilities will be developed over time. SRPs are not investments plans, but drive recommendations for Future Years Defense Program (FYDP) plans and serve as a critical tool for aligning investments with military medical health priorities. SRPs include information that will enable the Portfolio Manager to perform the following activities:

- Develop, on an annual basis, the FYDP plans in alignment with SRPs and anticipate the resources that will be required for the respective Program Objective Memorandum (POM) cycle
- Provide the oversight and concurrence of Year of Execution (YOE) spend plans that Program Managers (PMs) will be responsible for developing as a recommendation to the Portfolio Manager
- Facilitate discussion with leadership (e.g., DHA and Assistant Secretary of Defense – Health Affairs) and stakeholders regarding the research activities required to address Capability Requirements

The following DHP S&T criteria apply to scope for inclusion in an SRP and associated SRP-based S&T program planning:

- Medical research providing knowledge or materiel products relating to preventing, stabilizing, preserving, repairing, and/or resolving diseases or injuries affecting Service members across military operational environments
- Medical research addressing Joint MHS capability requirements or gaps
- Research that is operationally relevant, transition oriented, traceable to clinical practice, informs military doctrine, and/or informs health or product development

Research areas that do not meet these criteria and are excluded from SRPs include:

- Human performance enhancement (beyond baseline)
- Medical surveillance
- Non-research infrastructure maintenance

- Healthcare policy assessments
- Personal protective equipment/weapon systems evaluation
- Non-medical Military Occupational Series (MOS) training
- Clinical practice implementation science

SRPs are organized into four levels:

- **Capability Areas (CAs)** reflect the highest structural elements that encompass broad areas of medical research within an SRP
- **Capability Requirements (CRs)** are derived from key source documents (e.g., Joint Capabilities Integration and Development System – JCIDS) and outline Capabilities (knowledge or materiel) required to meet current or future military medical needs
- **S&T Paths (STPs)** describe the high-level research activities needed to support the transition of Capabilities to product development, other transition partners, or end users
- **Capabilities** describe the S&T knowledge and/or materiel products to be transitioned to product development or end users

Figure 1-1 shows the hierarchical relationship between the components of the SRP, with the associated reference schema.

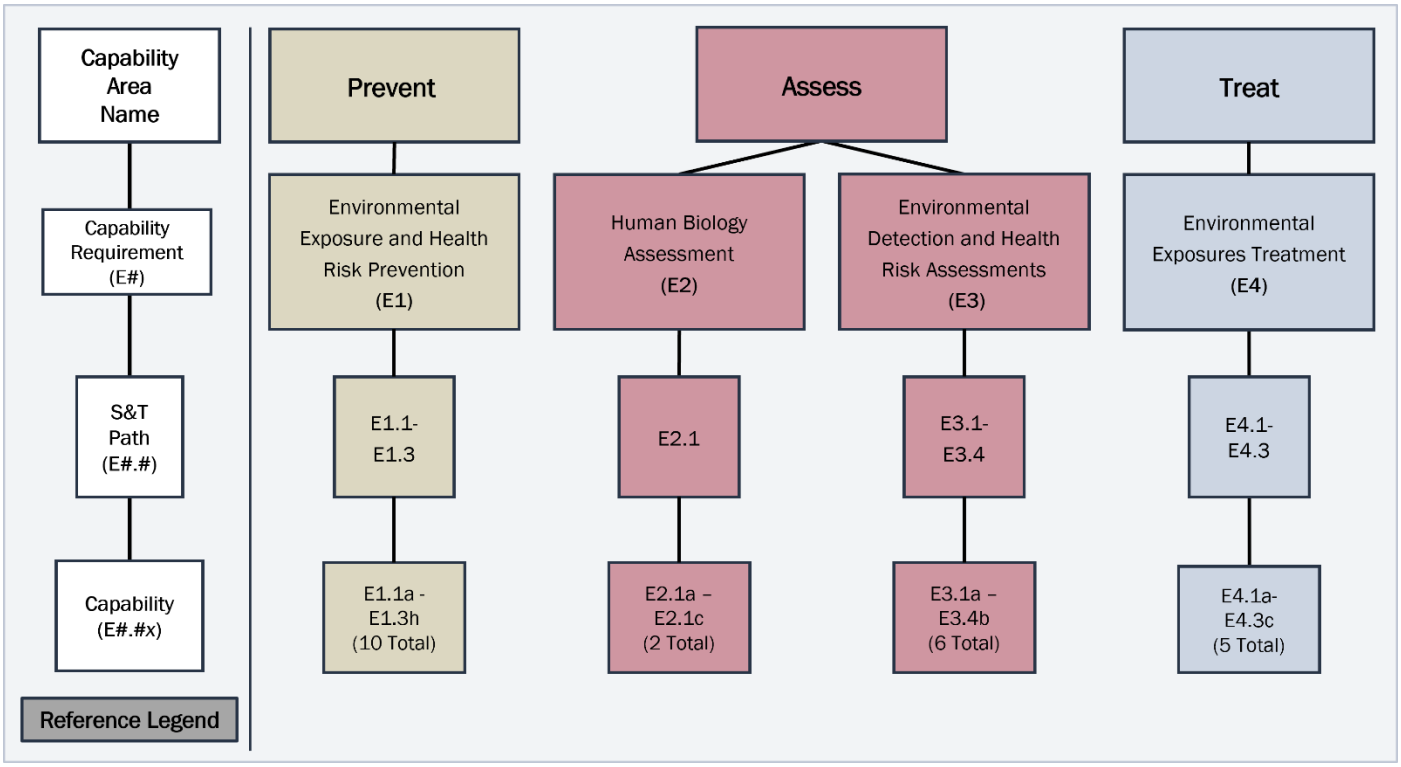


Figure 1-1 SRP Hierarchy

Military environmental exposure refers to encountering the wide range of chemical, physical, and environmental hazards that are part of the military environment. While environmental exposures include chemicals, this SRP excludes the use of chemical warfare agents (e.g., nerve agents), which are addressed within the scope of the DoD Chemical Biological Defense Program. Exposures to these factors can occur while deployed or in a garrison and have the potential to produce adverse health effects, either alone or in combination [1]. The scope of this DHA Environmental Exposures (EE) SRP includes CRs relating to the prevention, assessment, and treatment of illnesses and injuries related to environmental exposures to support Force Health Protection in training and operational environments. SRPs only outline the CRs deemed as priorities. These priorities have been identified based on assessment of the current and future medical and operational needs and/or existing research gaps of the military medical community. Inclusion of a CR in the SRP does not guarantee that funding will be aligned to its STPs.

The priority EE CRs in this SRP are organized into the following CAs, as shown in Table 1-1.

Table 1-1 Capability Areas Included in the SRP Iteration

Capability Area	Capability Area Description
Prevent	Preclude the onset of health conditions caused by environmental exposures.
Assess	Utilize and/or develop tools and technologies to identify exposures and evaluate service members' health and readiness in relevant environments.
Treat	Provide effective treatments and return to duty strategies for illness and injury caused by environmental exposures.

The CRs are listed in Table 1-2, with each CR noted via an E number (e.g., E1, E2). Section 2 describes the STPs leading to defined Capabilities for each CR. The numeric labeling schema is only intended to organize the CRs for ease of use and it is not meant to represent relative priority of the CRs.

Table 1-2 Capability Requirements Included in the EE SRP

CR #	CR Name	Capability Requirement Description
E1	Environmental Exposure and Health Risk Prevention	Develop mechanisms/countermeasures to prevent health threats associated with environmental exposures. [2, 5-7, 19-20]
E2	Human Biology Assessment	Develop assessments for measuring illness and injury vulnerability when exposed to environmental stressors. [2, 4-7, 9, 19-20]
E3	Environmental Detection and Health Risk Assessments	Develop assessments of environmental exposures including detection, analysis, and modeling of health risks. [1, 19-20]
E4	Environmental Exposures Treatment	Develop means to treat the harmful effects of extreme environmental exposures. [2, 5-9, 12, 19-20]

2. CAPABILITY REQUIREMENTS AND ASSOCIATED S&T PATHS

This section outlines the EE priority CRs, STPs, and Capabilities. The Capabilities described are expected to transition to product development or other end users (e.g., members of the clinical or operational community) to aid in fulfillment of the requirement when they reach the appropriate Technology Readiness Levels/Knowledge Readiness Levels (TRL/KRL). Product development will then perform, as appropriate, additional development activities required to mature these Capabilities to the extent to which they can be delivered for full clinical or operational use by the intended end user. Each CR in the sections that follow is depicted as a figure in the format shown in Figure 2-1.

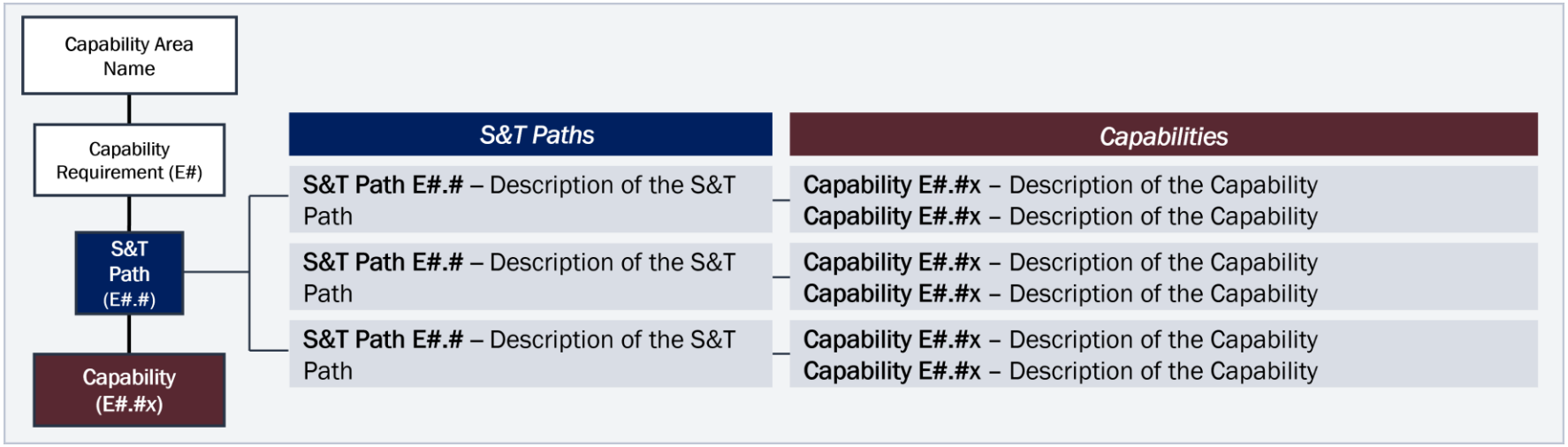


Figure 2-1 Capability Requirement Graphic Example

2.1 Environmental Exposure and Health Risk Prevention (E1)

In the complex landscape of military operations, environmental exposures pose unique challenges to the health and well-being of service members. From harsh climates to potential exposures to hazardous substances, service members face diverse risks that demand vigilant preventive measures. The Environmental Exposures and Health Risk Prevention CR outlines the need and associated activities for developing safe and effective mechanisms and countermeasures to prevent health threats associated with environmental exposures. To ensure the protection and readiness of the force, a comprehensive understanding of environmental factors and their impact on the health of service members is needed. 2026 Revision Note: Numbering may not be sequential as a result of movement, deletion, and/or consolidation of SRP hierarchy elements.

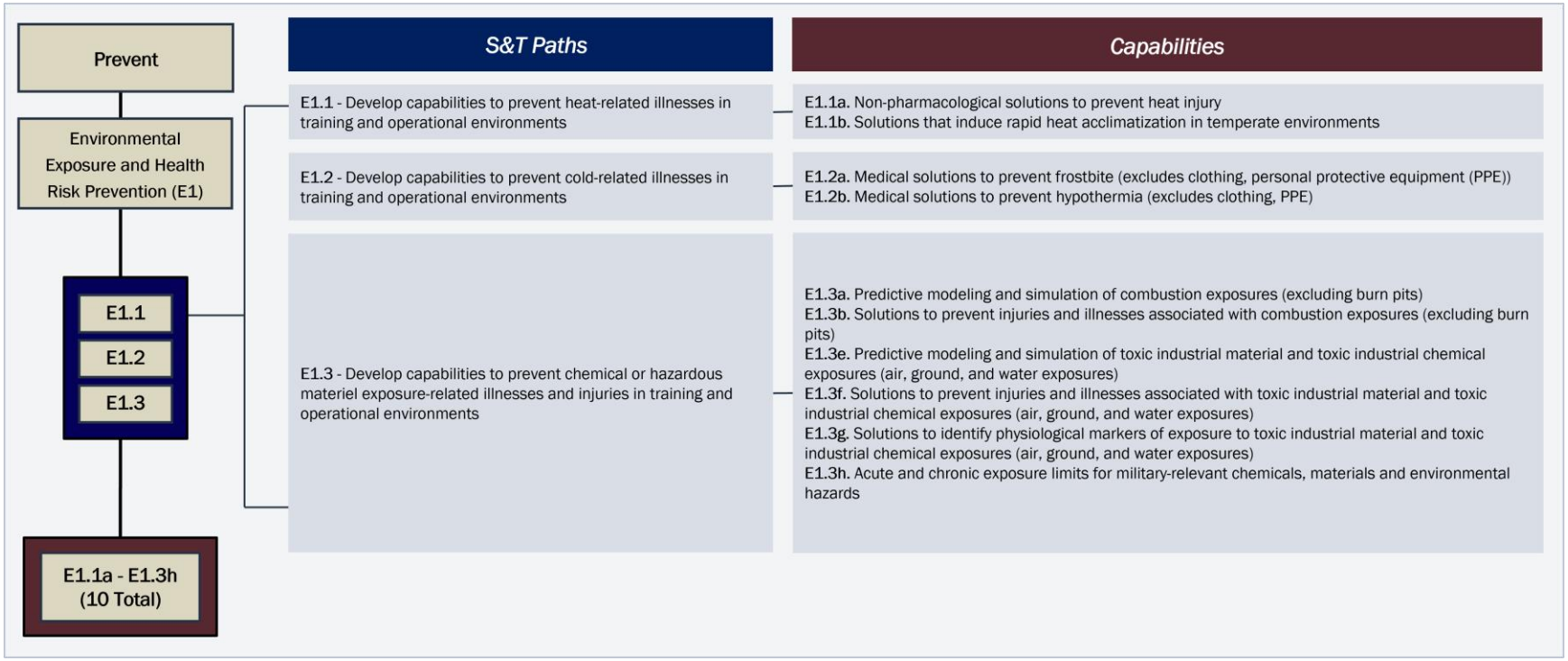


Figure 2-2 Environmental Exposure and Health Risk Prevention S&T Paths and Capabilities

2.2 Human Biology Assessment (E2)

Military personnel are frequently exposed to extreme environmental conditions that can cause an array of illnesses or injuries. However, individual response to environmental hazards is highly variable due to complex interplay among several factors, such as duration and timing of exposure, individual health, and genetics. Assessing this intricate interplay is paramount to the health and well-being of service members. The Human Biology Assessment CR outlines the need and associated research activities for developing safe and effective assessments for determining illness and injury vulnerability when exposed to environmental stressors. The dynamic relationship between biological systems and external environmental influences can be exploited to understand, mitigate, and adapt to the myriad environmental factors impacting human health. 2026 Revision Note: Numbering may not be sequential as a result of movement, deletion, and/or consolidation of SRP hierarchy elements.



Figure 2-3 Human Biology Assessment S&T Paths and Capabilities

2.3 Environmental Detection and Health Risk Assessments (E3)

The detection and assessment of environmental exposure hazards plays a pivotal role in ensuring military resilience and readiness. There is a need for products and tools to effectively assess environmental exposures-related injuries. The Environmental Detection and Health Risk Assessments CR outlines the need for developing safe and effective assessments of environmental exposures including detection, analysis, and modeling of health risks. Developing such assessments will emphasize understanding health threats that service members experience (e.g., physiological monitoring) rather than tools that assess the environment independent of the service member (e.g., area sensors to measure airborne contaminants). 2026 Revision Note: Numbering may not be sequential as a result of movement, deletion, and/or consolidation of SRP hierarchy elements.

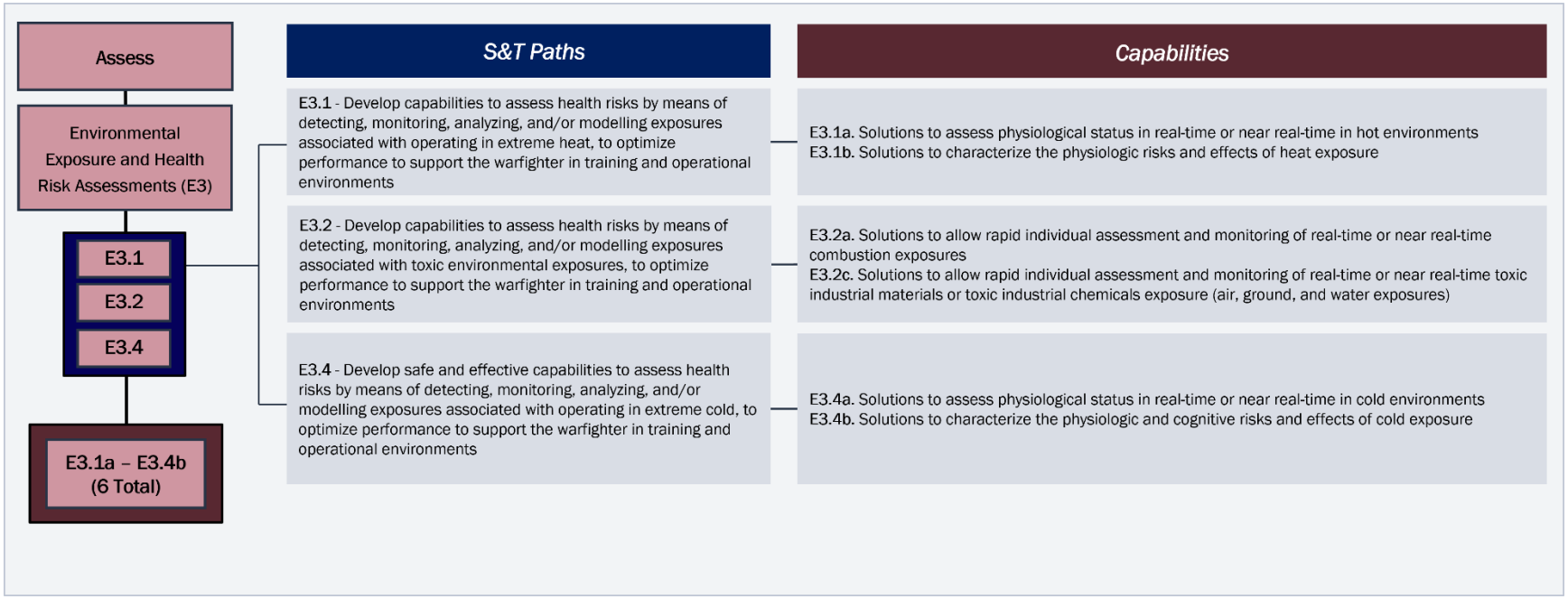


Figure 2-4 Environmental Detection and Health Risk Assessments S&T Paths and Capabilities

2.4 Environmental Exposures Treatment (E4)

Effective treatment strategies for environmental exposures are a vital aspect to the resilience and readiness of our armed forces. The Environmental Exposures Treatment CR outlines the need for developing safe and effective means to medically treat the harmful effects of environmental exposures. These treatment areas reflect the climates, operational environments, and hazardous substances experienced by the warfighter. 2026 Revision Note: Numbering may not be sequential as a result of movement, deletion, and/or consolidation of SRP hierarchy elements.

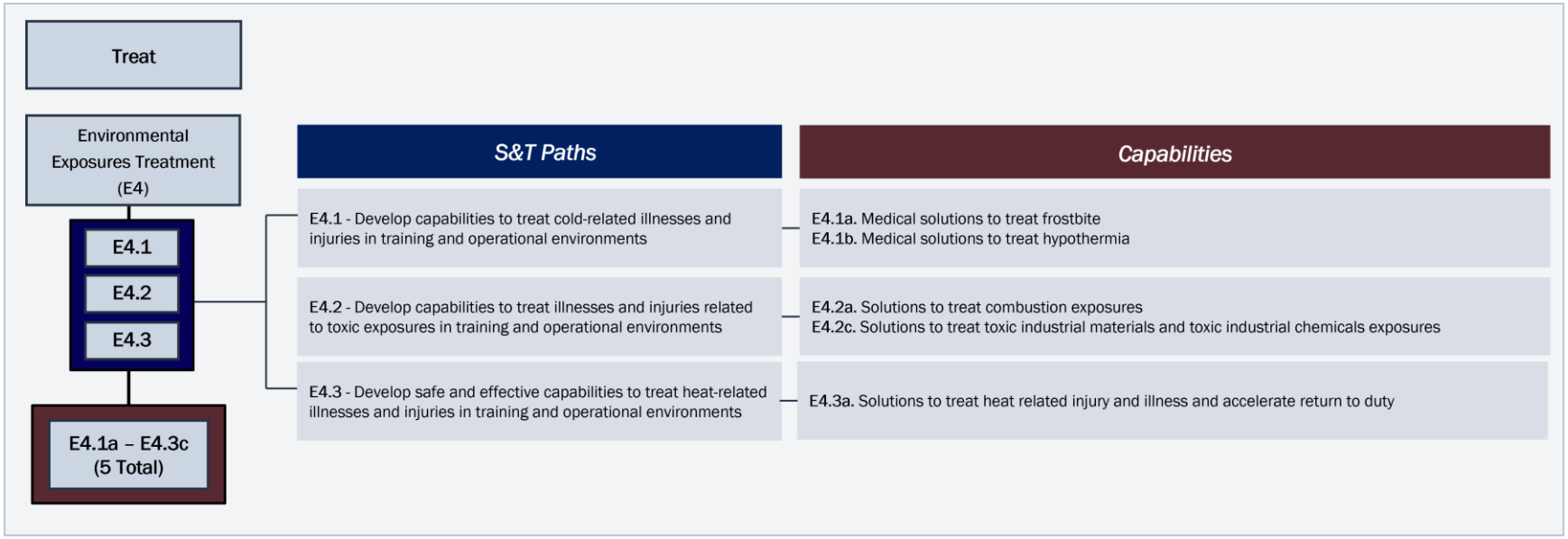


Figure 2-5 Environmental Exposures Treatment S&T Paths and Capabilities

3. REFERENCES

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[20] Office of the Assistant Secretary of Defense for Health Affairs (OASD[HA]); Joint DOTmLPF-P Change Recommendation (DCR) For Department of Defense (DoD) Comprehensive Exposure Monitoring (CEM) 5 May 2023.

APPENDIX A. KEY DEFINITIONS

Terminology	Definitions
6.1	Budget Activity (BA) for Basic Research increases knowledge/understanding: discovery; hypothesis testing. ~TRL 1–2
6.2	BA for Applied Research is the refinement of concepts into solutions: pre-clinical studies; drug formulation; device defined in animal model. ~TRL/KRL 2–3.
6.3	BA for Advanced Technology Development is candidate solution development; proof of concept and product safety demonstrated (e.g., Phase 1–2a trials). ~TRL/KRL 3–6.
Advanced Development	Performs the additional development activities required to mature Capabilities developed in S&T to the extent to which they can be delivered for full clinical or operational use by the intended end user.
Assess (Capability Area)	Utilize and/or develop tools and technologies to identify exposures and evaluate service members' health and readiness in relevant environments.
Budget Activity	Categories within each appropriation and fund account that identify the purposes, projects, or types of activities financed by the appropriation or fund.
Capability Area	Reflect the highest structural element that encompasses broad areas of medical research within an SRP.
Capability Gap	The inability to meet or exceed a Capability Requirement, resulting in an associated operational risk until closed or mitigated. The gap may be the result of no fielded Capability, lack of proficiency or sufficiency in a fielded Capability solution, or the need to replace a fielded solution to prevent a future gap.
Capability Requirement	Derived from key source documents [e.g., Joint Capabilities Integration and Development System (JCIDS)], and outline Capabilities (knowledge or materiel) required to meet current or future military medical needs.
Capability	The S&T knowledge and/or materiel products to be transitioned to product development or other end users.
Medical Readiness	Ensuring warfighters are healthy, protected from potential threats, and ready for operations or contingencies.
Military Community	SMs, beneficiaries, and DoD civilian personnel.
Non-pharmacological	Therapies that do not involve drugs; non-medication treatments.
Operational Effectiveness	The ability of an individual warfighter, unit, or force to successfully conduct its assigned tasks and accomplish its mission.
Operational Environment	The composite of the conditions, locations, and scenarios whereby military forces are employed to address crises and conflicts that are not limited to a geographic location.
Prevent (Capability Area)	Utilize and/or develop tools and technologies to identify exposures and evaluate service members' health and readiness in relevant environments.
Priority Capability Requirement	A CR that, through analysis by the Portfolio team, is deemed worthy of funding and pursuit.
Research Landscape Analysis	The empirical characterization of the current state of recently completed and ongoing intra- and extramural S&T research activities and projects relevant to the DHA EE Portfolio.
Research Gap/S&T Gap	The lack of S&T research activities identified through the RLA.

Terminology	Definitions
S&T Path (STP)	Describes the high-level research activities needed to support the transition of Capabilities to product development or other end users.
Treat (Capability Area)	Provide effective treatments and return to duty strategies for illness and injury caused by environmental exposures.
Toxic Industrial Chemicals	Toxic industrial chemicals are industrial chemicals that are manufactured, stored, transported, and used throughout the world. Toxic industrial chemicals can be in the gas, liquid, or solid state. They can be chemical hazards (e.g., carcinogens, reproductive hazards, corrosives, or agents that affect the lungs or blood) or physical hazards (e.g., flammable, combustible, explosive, or reactive). [17]
Toxic Industrial Materials	Toxic industrial materials are chemicals other than chemical warfare agents that have harmful effects on humans. Toxic industrial materials, often referred to as toxic industrial chemicals (TICs) are used in a variety of settings such as manufacturing facilities, maintenance areas, and general storage areas. While exposure to some of these chemicals may not be immediately dangerous to life and health, these compounds may have extremely serious effects on an individual's health after multiple low-level exposures. [18]

APPENDIX B. ACRONYMS

AHP	Analytical Hierarchy Process
BA	Budget Activity
CA	Capability Area
CBA	Capabilities-Based Assessment
CBRN	Chemical, Biological, Radiological and Nuclear
CEM	Comprehensive Exposure Monitoring
CHS	Comprehensive Health Surveillance
CR	Capability Requirement
CREMO	Cold Region Expeditionary Medical Operations
DAD	Deputy Assistant Director
DCR	DOTmLPF-P Change Recommendation
DHA	Defense Health Agency
DHP	Defense Health Program
DoD	Department of Defense
DoW	Department of War
EE	Environmental Exposures
GDF	Guidance for the Development of the Force
FHP	Force Health Protection
FY	Fiscal Year
FYDP	Future Years Defense Program
HPO	Human Performance Optimization
INDOPACOM	United States Indo-Pacific Command
JCIDS	Joint Capabilities Integration and Development System
JCD	Joint Capabilities Document
JCM	Joint Casualty Management

JHU/APL	The Johns Hopkins University Applied Physics Laboratory
KRL	Knowledge Readiness Level
MHS	Military Health System
MOM	Military Operational Medicine
OEM	Operational and Environmental Medicine
PACAF	Pacific Air Forces
POM	Program Objective Memorandum
PoP	Period of Performance
PPE	Personal Protective Equipment
PM	Program Manager
R&E	Research and Engineering
RLA	Research Landscape Analysis
S&T	Science and Technology
SM	Service Member
SME	Subject Matter Expert
SOF	Special Operations Forces
SRP	Strategic Research Plan
STMP	Science and Technology Management Process
STP	S&T Path
TIC	Toxic Industrial Chemicals
TIM	Toxic Industrial Material
TRL	Technology Readiness Level
USAMRDC	United States Army Medical Research and Development Command
USD	U.S. Dollar
YOE	Year of Execution