# Military Service History and Status Profiles

## Introduction

The following is design document for FHIR profiles and extensions intended to fill gaps in current implementations of HL7 Version 2 and RESTful APIs currently available to implementers. This design document is an example of best practices for organizations that are planning to reuse and extend profiles and apply them to an expanded set of requirements.

This specification also identifies code systems and terminology gaps that require extensions and change proposals to LOINC and SNOMED CT.

## Military Service History and Status

This implementation guide design document is intended to create a set of profiles and extensions to support Military Service History and Status reporting consistent with US regulatory requirements (i.e. Title 38 Veteran Benefits) and extensible to other realms/jurisdictions (e.g. Canadian Forces) .

It harmonizes the requirements of the U.S. Department of Veterans Affairs (VA) and the Centers for Disease Control and Prevention (CDC) to more easily record this information in support of administrative and clinical workflows and the work and social history of patients who are also Veterans.

* **ZMH** (Military Service History) Z-segment used to represent service and deployment history in HL7 Version 2 transactions. This segment is used to exchange information about
* **ServiceHistoryEpisode** and **Deployment** Schemas for the VA Veteran Verification API (<https://developer.va.gov/explore/verification/docs/veteran_verification?version=current>)
* HL7 FHIR Profile: [**odh-CombatZonePeriod**](http://hl7.org/fhir/us/odh/StructureDefinition-odh-CombatZonePeriod.html) from Occupational Data for Health (ODH), Release 1.0 (Standard for Trial Use) (<http://hl7.org/fhir/us/odh/>)

## Use Case Analysis

The following is a set of requirements and associated capabilities to manage and exchange information about Military Service History and Status. All requirements are analyzed as use cases involving actors/participants and system interactions.

Note: Certain requirements were discussed, deemed to be out-of-scope, and deferred (see [Deferred Requirements](#BKM_CB4D4746_7B24_4E2C_AA4E_FA6CBF63E1F5) ).

Figure 1 is a summary of scenarios (use cases) representing the requirements for recording self-reported military and combat history. It also illustrates how FHIR-based APIs can be used to validate employment history information reported by Veterans.



Figure 1: Use Case Analysis Overview

### Military Service History Requirements

This section describes the use cases needed to manage Military Service History both as self-reported employment history and API-supported verification of detailed military service history.

##### Request Employment History part of Social History

The clinician is requesting employment information in conjunction with their social history. If the patient is a Veteran, their employment history will include military service information. This was a core requirement of the Occupational Data for Heath (ODH) Implementation Guide we analyzed and reused. The current specification expands this use case to specify application (i.e. EHR) capabilities as well as reusable FHIR-based APIs that may be provided by an authoritative organization (e.g. US Department of Veterans Affairs).

##### Record Military Service History and Status

The social history information reported by the patient - including employment and military service history - is entered in the system of record (i.e. EHR).

##### Verify Veteran History

The EHR system, acting as a FHIR client, uses a standards-based VA RESTful API (FHIR Observation with profiles and extensions) to verify that the patient is a Veteran and served in the military.

* ***Question:*** Is there a similar DoD API?

##### Verify Veteran Status

The Verification API proposed in this document determines the Veteran’s status by using demographic information submitted as a query (search operation) to a FHIR server that supports **Observation** resource - - using the profiles described in the [Information Requirements](#BKM_0837D0F3_42BA_4560_AB07_2F06324BBA47) section (see [Military Service Episode](#BKM_1EE5C72B_FAB7_48FE_81D2_FE7E3F24BBE0)).

##### Search Service History

This use case is part of in the proposed verification API based on FHIR. If this search operation returns one or more **Observation** resources that conform [Military Service Episode](#BKM_1EE5C72B_FAB7_48FE_81D2_FE7E3F24BBE0) to the proposed profile, the Veteran's status confirmed. If the search operation does not find any matching Observation resources, the Veteran's status could not be confirmed.

The presence of one or more Observations that conform to the [Combat Episode](#BKM_15AF665A_23CD_4387_A2F0_EA121D7063E0) profile proposed here indicates that Veteran served in combat.

### Deferred Requirements

The following use cases were discussed and deferred because they are out-of-scope for the profiles and extensions described in this implementation guide design document:

##### Prior Authorization

U.S. Department of Defense (DoD) administrative transactions are currently used for prior authorization for healthcare services. This use case will not be addressed in this document, but it may be relevant to future FHIR profiling efforts.

##### Apply for coverage

A Veteran's military history and other service-related information are relevant to applying for healthcare coverage. This use case was discussed with the Financial Management Workgroup on March 31, 2020 and it will remain out-of-scope for this iteration of the specification. Military service history is relevant to establish level of care but will not be explored further in this document.

##### Schedule service-connected visit

Another potential use case included scheduling a visit for a service-connected disorder or condition. This use case was discussed and deemed out-of-scope for now since it is related to level of disability and service-connected problems, as well as:

* an encounter related to a service-connected disability, special authority designation and those services are not billable;
* care may be covered by special authority (e.g. neck/throat cancer); and,
* coding system for special authority and service-related not in scope.

## Information Requirements

In HL7 Version 2 interfaces, the data required to exchange military service history and status is accomplished using extensions segments (i.e. Z-segments). The naming convention for extensions in HL7 Version 2 requires that new segment names start with the letter "Z".

For instance, the VA extension for "Military Service" is "ZMH". This extension can be added to message payloads (e.g. administrative transactions) to convey this content.

This section represents a harmonization of HL7 Version 2 and RESTful APIs used at VA. It also harmonizes the content of the Occupational Data for Health Implementation Guide developed by CDC to enhance social history and employment history reporting from EHR systems.

The profiles described in this design document are available at: <https://github.com/HL7/fhir-military-service>

Figure 2 summarizes the proposed profiles and extensions needed to document military service history. The profiles described here constrain and extend the normative Observation resources profile (Release 4 and later) to ensure stability and reusability. FHIR Release 4 marked the first time some FHIR resources have attained normative status and will be maintained in a manner that ensure backwards compatibility. Furthermore, using [Observation R4 and later](http://build.fhir.org/observation.html) - rather than [Basic](http://build.fhir.org/basic.html) resource - is the recommended approach to creating extensible APIs based on FHIR.

**Note:** FHIR implementation, localization, and profiling best-practices are under development and evolving. This design document is intended to provide reasoning and context for future projects.



Figure 2: Information Requirements

#### Employment History Episode

Employment history consists of a series Employment Episodes. In the past these episodes have been represented as Z-segments and added to various transactions to support social history determination, benefit, etc. This profile is intended to represent employment history for International use, and it may be localized by HL7, IHE, and other profile developers.

The Employment Episode profile of is the base profile for [Military Service Episode profile](#BKM_1EE5C72B_FAB7_48FE_81D2_FE7E3F24BBE0) and [**ODH Past or Present Job**](http://hl7.org/fhir/us/odh/StructureDefinition-odh-PastOrPresentJob.html) profile and other profiles intended to describe specific types of employment.

|  | **Multiplicity** | **Notes** |
| --- | --- | --- |
| **id** uuid | [1...1] | Unique identifier of the episode- typically assigned by a FHIR server. It may be used to retrieve a specific or latest version of the FHIR resource (i.e. Observation) used to represent military service episode(s) for a Veteran.   * Path: **Oservation.id** as globally/universally unique identifier (uuid) |
| **url** | [1...1] | Profile canonical url used to reference this profile in an Observation that conforms this profile. Fixed value in the [StructureDefinition.url](#StructureDefinition.url)   * http://hl7.org/fhir/StructureDefinition/employment-episode   Path: **Observation.meta.profile**  This profile may be used along with other profiles met by the Observation resource. |
| **identifier** | [0...1] | This data element may be used to specify a business identifier of the employment episode that could be referenced across FHIR APIs.   * Path: **Observation.identifier** |
| **code** CodeableConcept | extensible LOINC value set  [1...1] | Standard code that describes a generic employment episode using an extensible value set binding.  This data element is mandatory (cannot be null) is this profile and any of its derivation.  The value set binding is extensible, but it requires a LOINC code.   * Path: **Observation.code**   **The value set associated with this data element includes:**   * 11341-5 (History of Occupation) * 87511-2 (Combat zone AndOr hazardous duty work dates**)**   **extensible LOINC value set** |
| **startDate** date | [0...1] | Data when the employment period started. This data element is optional in profile.   * Path: **Observation.effectivePeriod.start** |
| **endDate** date | [0...1] | End of employment date. if this employment episode is on-going, this data element is empty.   * Path: **Observation.effectivePeriod.end** * Derived information: active employment episode if this data element is missing. A data-absent-reason extension may be used to clarify that the end of the period is [***not-applicable***](http://hl7.org/fhir/R4/codesystem-data-absent-reason.html). |
| **industry** CodeableConcept | [0...1] | For this profile, this component/element contains the industry in which the patient was or is currently employed.  This data element optional in this profile but it may be mandatory, required, or conditionally used in a derived profile. It may also be localized for required terminology in each realm. For example, in the US, implementers are expected to use “Industry CDC NAICS 2012 (ODH)”  <https://phinvads.cdc.gov/vads/ViewValueSet.action?id=5718C508-111B-4737-A48C-FDCFD301C0DF>”   * Path**:** **Observation.component.valueCodeableConcept** * The **Observation.component.code** is fixed to **86188-0 (LOINC**) |
| **supervisoryLevel** CodeableConcept | [0...1] | This data element corresponds to the Pay Grade associated with a military service episode. The value is intended to be a [CodeableConcept](#CodeableConcept). This data element may be localized to use a US-specific value set (e.g. "Supervisory Level or Pay Grade" : https://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.7613)  Path**:** **Observation.component.valueCodeableConcept**   * The **Observation.component.code** if fixed to: **87707-6 (LOINC)**. |
| **category** CodeableConcept | [1...1] | Employment history is a part of the patient's social history. Therefore this data element is fixed to ["social-history"](#observation-category-social-history). This information in inherited by profiles derived from this constrainable profile.   * Path: **Observation.category** |

#### Military Service Episode

This profile design describes how we use Observation resources to represent Military Service as a type of [Employment History Episode](#BKM_10745799_4EB4_45E8_9722_23C558816347).

A patient/Veteran may have zero or more military service episodes. The contents of this profile is based on the HL7 Version 2 **ZMH** segment and the **ServiceHistoryEpisode** schema specified in the current [Veteran Verification API](https://developer.va.gov/explore/verification/docs/veteran_verification?version=current) and it allows this API to migrate to FHIR and to be consistent with the prior work done by Center for Disease Control (CDC) National Institute for Occupational Safety and Health (NIOSH).

A service history episode may reference zero or more Combat episodes. This profile is based on the default FHIR Observation profile and The base profile is a newly defined [Employment Episode](#BKM_338246A9_68AC_41FA_BCF2_160954A8D9F2) profile. This profile is similar **ODH Past or Present Job** profile ( http://hl7.org/fhir/us/odh/StructureDefinition-odh-PastOrPresentJob.html). The major distinction from the ODH Is that Military Service History Episode does not require any information the job performed by the Veteran during their service.

The following is a list of constraints applied to [Employment History Episode](#BKM_10745799_4EB4_45E8_9722_23C558816347) to describe military service episodes:

|  | **Multiplicity** | **Notes** |
| --- | --- | --- |
| **url** | [1...1] | Profile canonical url used to reference this profile in an Observation that conforms this profile,  **http://hl7.org/fhir/us/StructureDefinition/ms-military-service-episode**   * Path**:** **Observation.meta.profile** |
| **code** CodeableConcept | LN:Extension  [1...1] | LOINC concept: to be defined - a member of "employment episode" value set.  Path: **Observation.code**  **Constraints**:  Cardinality: [1,1]  **Fixed code value: TBD**  **LN:Extension** |
| **startDate** date | [1...1] | Start of military service episode. It is a mandatory data element for a valid military service episode.   * Path: Observation.effectivePeriod.start   **Constraints**:  Cardinality: [1,1] |
| **endDate** date | [0...1] | End of military service episode date. It must be specified (mandatory) for any valid military service episode.   * Path: **Observation.effectivePeriod.end**   **Constraints**:  Cardinality: [1,1] |
| **industry** MilitaryBranchCode | [1...1] | For this profile, this component/element contains the branch military or a code indicating national guard or reserve.  *"Branch of military including National Guard or Reserve status."*  The CDC OMB 2010 (or 2020) *Industry* concepts are sufficient to describe the Military Branch including "National Guard or Reserve" - as a single concept.  These US-specific concept will be added to the SNOMED CT US extension maintained by NLM. Based on feedback from VA implementers, it' snot necessary to distinguish “reserve” from “national guard” service.   * This profile will use a subset of Industry concepts related to military service.   **Constraints**:   * Cardinality: [1,1] * Value set binding for component.valueCodedConcept: [MilitaryBranchCode](#BKM_BE5D4E9C_A245_4F0E_A2F6_98F8B589AC43) |
| **dischargeStatus** DischargeStatusCode | [0...1] | For this profile, the data element specifies to "discharge status" described as "Character of discharge from service episode."  This data element is mandatory for service history reported by the VA, but it may be empty if the patient is still active military.  **Path:** Observation.component (code: **to be added to LOINC**). See Logica Solor page: https://logica.atlassian.net/wiki/spaces/SOLOR/pages/865271876/Military+Service+History+and+Status  **Constraints**:   * Cardinality: [1,1] * Value set binding for component.valueCodedConcept: [DischargeStatusCode](#BKM_69D9F4E3_FE3B_41BE_B6D9_CAAC44AE48D5) |
| **supervisoryLevel** PayGradeCode | [1...1] | This data element corresponds to the Pay Grade associated with a military service episode.  **Constraints**:   * Cardinality: [1,1] * Value set binding for component.valueCodedConcept: [PayGradeCode](#BKM_CCBE5EDA_C9CA_456F_9D80_186017054BA4) |
| **separationReason** SeparationReasonCode | [0...1] | Additional text description for **separation** reason beyond discharge status value. It's an optional, coded data element (see [SeparationReasonCode](#BKM_B454F681_0DD8_4F97_BB93_55FEF75585D7) for a list of proposed concepts to be added to SNOMED CT).  **Path:** Observation.component (code: **to be added to LOINC**). See Logica Solor page: https://logica.atlassian.net/wiki/spaces/SOLOR/pages/865271876/Military+Service+History+and+Status  **Constraints**:   * Cardinality: [1,1] * Value set binding for component.valueCodedConcept: [SeparationReasonCode](#BKM_E4F59E0A_7366_4ACB_94EB_E3D6CEB81063) |

#### Combat Episode

This profile definition similar to [Combat Zone Period profile](http://hl7.org/fhir/us/odh/StructureDefinition-odh-CombatZonePeriod.html) (url: http://hl7.org/fhir/us/odh/StructureDefinition/odh-CombatZonePeriod ) and includes the requirements specified in ZMH and [Deployment Schema](https://developer.va.gov/explore/verification/docs/veteran_verification?version=current).

The base profile reuses the [Combat Zone Period profil](http://hl7.org/fhir/us/odh/StructureDefinition-odh-CombatZonePeriod.html)e and adds new components:

|  | **Multiplicity** | **Notes** |
| --- | --- | --- |
| **url** | [1...1] | Proposed canonical URL for this profile: http://hl7.org/fhir/us/odh/StructureDefinition/ms-combat-episode |
| **id** uuid | [1...1] | Unique identifier of the episode. It may be used to retrieve a specific or latest version of the FHIR resource (i.e. Observation) used to represent combat episode(s) for a Veteran.  The guidance to implementers is to use an auto generated **UUID** rather than a long integer. Both options are supposed by the FHIR base standard by open-source FHIR server implementations (e.g. HAPI). |
| **code** CodeableConcept | LN:87511-2  [1...1] | LOINC concept **87511-2** "Combat zone AndOr hazardous duty work dates".  **LN:87511-2** |
| **startDate** | [1...1] | The start date must be specified for combat episodes.   * Path: **Observation.effectivePeriod.start**   **Constraints**:   * Cardinality: [1,1] |
| **endDate** | [1...1] | The end date must be specified for combat episodes because this profile specifies historical data.   * Path: **Observation.effectivePeriod.end**   **Constraints**:   * Cardinality: [1,1] * Mandatory |
| **country** CountryCode | [1...1] | This data element is an additional component to the base profile. It's intended to specify the country where the combat episode occurred.  **Constraints**:   * Cardinality: [1,1] * Mandatory   Path**:** **Observation.component.valueCodeableConcept**   * The **Observation.component.code** is fixed to: a **concept (LOINC**)   See resolution at: https://logica.atlassian.net/wiki/spaces/SOLOR/pages/865271876/Military+Service+History+and+Status |
| **mission** MissionCode | [0...1] | This data element corresponds to “military service history type” (e.g. Persian Gulf, Operation Iraqi/Enduring Freedom) in addition to locale-based (e.g. Somalia, Lebanon, Grenada, Yugoslavia, Panama).  Additional questions re: combat episodes:   * Do we need to identify POW status re: combat episode? * Is the d the “service component” necessary (e.g. regular, activated reserve, activated national guard)? |
| **category** CodeableConcept | [1...1] | "social-history" - fixed value fort this profile. |

#### CountryCode

ISO 3166 country code.

#### MissionCode

A SNOMED CT concept that describe additional information about combat/

## Terminology Requirements

An initial gap analysis of SNOMED CT terminology identified that we are missing significant content related to discharge status requirements in [DischargeStatusCode](#BKM_69D9F4E3_FE3B_41BE_B6D9_CAAC44AE48D5).

Other terminology extension and harmonization targets are:

* [MilitaryBranchCode](#BKM_BE5D4E9C_A245_4F0E_A2F6_98F8B589AC43)
* [PayGradeCode](#BKM_CCBE5EDA_C9CA_456F_9D80_186017054BA4)

Another gap is "separation reason" that requires a coded concept for its Observation component and its allowed values.

In the future, the [MissionCode](#BKM_52B053B5_943F_4ACA_BDF1_5A6B28C74F6B) may also need a SNOMED CT extension if the VA API requires it.

For a complete set of terminology extension, refer to the Logica Solor page intended to address the concept gaps: https://logica.atlassian.net/wiki/spaces/SOLOR/pages/865271876/Military+Service+History+and+Status

Figure 3 summarizes the



Figure 3: Terminology Requirements

#### Job Supervisory Level or Pay Grade (ODH)

This code system is used in value set:**" Job Supervisory Level or Pay Grade (ODH)"**

https://phinvads.cdc.gov/vads/ViewValueSet.action?id=B35E2ABE-C20F-EA11-8183-005056ABE2F0

What is the code system URL?

#### Industry CDC NAICS 2012 (ODH)

This code system used in value set: "**Industry CDC NAICS 2012 (ODH)**" <https://phinvads.cdc.gov/vads/ViewValueSet.action?id=5718C508-111B-4737-A48C-FDCFD301C0DF>

Code system url: ?

#### SNOMED CT

SNOMED CT will be used to fill any terminology gaps that are not already addressed by FDA code systems in the US.

#### DischargeStatusCode

A SNOMED CT Extension needed to describe the status when an individual leaves military service.

The VA API and Z-segment specification declares local extensions to SNOMED CT corresponding to **subtypes** of **"Left Military Service" 266964007 concept.**

**Question:** Should it include "active" because we may have a DoD API that works in a similar way?

**Answer**: No, the cardinality should allow for this data element to omitted if the service episode is the current episode..

|  | **Multiplicity** | **Notes** |
| --- | --- | --- |
| **general** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT. |
| **honorable** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT. |
| **dishonorable discharge** | [1...1] | This status has an equivalent concept in SNOMED CT: **276086007** |
| **bad-conduct** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT. |
| **other-than-honorable** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT.  Relationships:  This concept has two child concepts:   * honorable-for-va-purposes * dishonorable-for-va-purposes |
| **dishonorable-for-va-purposes** | [1...1] | This status is obtained when "other-than-honorable" is later deemed to be **dishonorable** for Title 38 Veteran Benefits criteria.  This concept is a gap in SNOMED CT.  Relationships:  This concept is a subtypes of **"Other-than-honorable" .** |
| **honorable-for-va-purposes** | [1...1] | This status is obtained when "other-than-honorable" is later deemed to be **honorable** for Title 38 Veteran Benefits criteria.  This concept is a gap in SNOMED CT.  Relationships:  This concept is a subtypes of **"Other-than-honorable"** |
| **honorable-absence-of-negative-report** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT.  Relationships:  This concept is a subtype of **"honorable-discharge ?"** |
| **uncharacterized** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT. |
| **unknown** | [1...1] | [Additional description pending.]  This concept is a gap in SNOMED CT.  Missing information about discharge status. |

#### MilitaryBranchCode

"The military branch associated with service, National guard, and Reserve."

The **Military Branches** coded concepts are documented in PHIN VADS as [Industry CDC NAICS 2012 (ODH)](#BKM_88153D8A_5607_4708_BEE7_B475C00F042A).

**Localization Note:**

* From an occupational standpoint, any foreign military service should be captured as well as US military service. The profile allows an "**extensible**" terminology binding to allow a service history that includes service in US and foreign armed forces.
* The VA API will be limited to US Armed Forces; similarly, Canadian Forces will implement a realm-specific approach that accommodates Canadian requirements.

**Note:** the following is complete list of concepts to describe the military branch.

|  | **Multiplicity** | **Notes** |
| --- | --- | --- |
| **U. S. Armed Forces - Branch not specified** | [1...1] | Code:  9870: Military Reserves or National Guard  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **U. S. Army** | [1...1] | Code:  9670 (U.S. Army)  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **U. S. Air Force** | [1...1] | Code:  9680: U.S. Air Force  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **U. S. Marine Corps** | [1...1] | Code:  9770 (U.S. Marines)  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **U. S. Navy** | [1...1] | Code:  9690: U.S. Navy  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **U. S. Coast Guard** | [1...1] | Code:  9780: U.S. Coast Guard  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **Military Reserves or National Guard** | [1...1] | Concept (id: 9870] is used to specify Reserves or National Guard service.  Code:  9870: Military Reserves or National Guard  System URL: <http://terminology.hl7.org/CodeSystem/PHIndustryCDCCensus2010> |
| **Non-US Armed Forces (out-of-scope)** | [1...1] | **Question**: Is it useful to document service in foreign armed forces?  **Answer**: No, not at this time.  This concept is out-of-scope at this time. |

#### PayGradeCode

Defines the level of compensation for a position, normalized across military branches. This value set harmonizes the concepts used in VA with those specified by FDA for Occupational Data for Health implementations.

The current ODH specifies this data element as local concept in the "Supervisory Level or Pay Grade" value set in PHIN VADS: https://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.7613

However, this specification will use the latest FDA value set specified in [PayGradeCode](#BKM_0D6D76FC_1E59_4574_B56F_1BD12F5BD18F)

#### SeparationReasonCode

"Additional description for separation reason beyond discharge status value."

**Note:** This may need to be specified as a code value rather than a text value.

Separation reason codes. These codes will be addressed as gaps/change requests in SNOMED CT using the Solor Project: https://logica.atlassian.net/wiki/spaces/SOLOR/pages/865271876/Military+Service+History+and+Status

Requirements:

