

## VA.gov health products: Cerner API requirements

### Background

In December 2019, VA decided veterans would interact digitally with VHA health services through a suite of health products delivered on VA.gov. These products will be tightly integrated into the VA.gov digital experience and will integrate seamlessly with any data source or service, including Vista and Cerner owned data and services.

A number of integration points with existing VA data sources and services are already available (namely through the MyHealtheVet and Mobile Application Platform systems). Similarly, Cerner has made several integration points available for their customers, as described in their Cerner Open Developer Experience (<https://code.cerner.com/>) program.

The subject of this memorandum is to describe the integration points (herein referred to as application programming interfaces, or APIs) that will be required of Cerner by the VA.gov team in order to deliver the aforementioned health products on VA.gov. This document does NOT include APIs needed for VA mobile applications; this will be shared in a separate document.

### Intended outcomes

The global outcome sought for this effort is for veterans to easily access a single, intuitive suite of health products on VA.gov that empower and enable them to manage their health care regardless of the electronic health record or any other system dependencies.

### Single source of truth

Regardless of the application used to obtain it, the VA.gov user shall see the same data in the same manner. This means that all of the APIs developed by Cerner on behalf of the VA will provide access to any and all data for which Cerner has control over and is authorized to disseminate, including any data accessed from existing and/or future VA systems.

### User experience

The user experience shall be a consistent, coherent, and valuable experience for all veterans, caregiver, and representatives when using the health tools, irrespective of the data source. This includes VA-developed and maintained applications such as VA.gov, as well as those provided by third parties such as the Apple iPhone Health app, Humetrix, and future consumers of VA health data via the VA's Lighthouse API program.

### Security and Authorization

Veteran and non-veteran users will leverage a single authentication and authorization strategy for accessing data and services made available through Cerner APIs.

### Methodology

We expect the development and operations of all APIs for consumption by the VA to be optimized for flexibility, modularity, alignment with user needs, simplicity, collaboration, and rapid iteration.

### Preference for agile

VA and Cerner shall prefer the development of small, discrete pieces of work delivered at a high frequency with many opportunities for learning over large, requirements-based workflows delivered intermittently or at the end of a long-running development cycle with few opportunities to learn. This includes investing time in research, technical discovery, and design before beginning development, defining and pursuing a minimum viable product to validate approach against user needs, and continual iteration throughout the product lifecycle to constantly realign the product with user needs, changing technologies, and evolving business needs.

### Communication

All VA and Cerner teams involved shall utilize regular and ad hoc communication between all team members, including communication between those persons directly responsible for the technical implementation. This is not intended to preclude or replace regular communication and documentation efforts at the project management level, but to reduce the chances of misinterpretation or misunderstanding between teams.

### Reuse

This effort should leverage existing work done within the VA, Cerner, and the larger health IT community rather than building customized software or defining new, narrowly scoped standards. This includes preferring the use of community-maintained open source software and standards. However, the teams should also recognize situations where all existing solutions are inappropriate or inadequate to meet the unique needs of the VA's users.

### General Requirements

To ensure the intended outcomes above are achievable, the following requirements must be met. Note that this document is far from providing complete requirements and full API specifications. It puts into place some of those things. However, it is anticipated that much discovery, UX research, and additional learning obtained through agile practices and continuous delivery will contribute to what's ultimately built, measured, and evaluated.

### API environments

Sandbox and production environments shall be made available for every Cerner API and meet the following requirements:

- Developers will use automated methods that do not require human intervention to access documentation for both sandbox and production environments. APIs, and thus documentation, shall be identical for sandbox and production environments.
- Developers will use automated methods that do not require human intervention to enable programmatic access to live endpoints for APIs in sandbox environment.
- Developers will request access to live endpoints for APIs in the production environment. Such requests will be manually reviewed against predefined criteria
- All APIs in production environments shall maintain 99.9% uptime (reachability and availability) inclusive of planned maintenance, upgrades, and holidays.

- All APIs in sandbox environments shall be available during normal working hours (8am ET to 5pm PT M-F) and maintain 99.0% uptime (reachability and availability) inclusive of planned maintenance, upgrades, and holidays.
- No real PHI/PII shall be communicated across any APIs in sandbox environments. Representative data will be used to cover possible use cases.
- The status, uptime, and incident history of all environments must be programmatically available to all API users.

### Data Federation

Given all of the desired outcomes above, Cerner and VA data and system federation will occur in a single place within a VA-managed environment to ensure continue support of existing implementations such as VAOS, MyHealthVet, and the Apple iPhone app support of VA/Vista data.

### Authentication and Authorization

Cerner APIs shall accept security tokens and identifiers provided by VA, validating these against APIs and infrastructure provided by VA to guarantee and enforce all necessary security controls and policies.

A single API should exist for each functional area supporting authentication of identities that support individual end users with the narrowest possible scope (e.g. a single veteran accessing only their data), proxy/advocate support (e.g. VSO or PoA accessing previously authorized veterans data), or empowered individuals with a very large scope (e.g. VA staff accessing data for many veterans). Cerner shall not build different versions of functional APIs simply to address different authentication methods or different end users (ex: “veteran-facing” vs “clinician-facing” vs “system-to-system” APIs).

In addition, existing VA applications should only integrate with Cerner functional APIs. They should not be required to connect to additional Cerner APIs solely for the purpose of acquiring Cerner identifiers, tokens, or credentials.

Furthermore, the same authentication methods and architecture should be used for end-users consuming both internal (to VA) and external applications.

### API specifications

#### REST

All Cerner APIs shall be RESTful APIs, adhering to industry standard best practices and conventions.

#### OpenAPI v3.0

All Cerner APIs shall be OpenAPI v3.0 specification compliant.

#### FHIR

All Cerner APIs shall be compliant with SMART-on-FHIR/FHIR standards where applicable and as directed by VA. While FHIR R4 is preferred for all resources, a DSTU2 implementation is acceptable until the resource can be updated to support R4.

## Assumptions

- All secure messages are unique to MHV or Cerner and duplicates will not exist.
- VA.gov will be the first consumer of these APIs, but others will follow.

## Specific API capabilities

### Secure Messaging

### User Stories

Cerner APIs shall support the following user stories:

- As a {veteran; authorized caregiver or representative}, I am able to receive a notification in a timely fashion (frequency and method to be discussed) when I have received a new message from {my; the veteran I care for or represent} provider or care team.
- As a {veteran; authorized caregiver or representative}, I am able to view all of the messages for {me; the veteran I care for or represent} from any VA provider or staff in a paginated list for a default date range (i.e. one year), or for a date range that I specify in a search. (See user story #3 below).
- As a {veteran; authorized caregiver or representative}, I am able to search my inbox for a secure message that I have received from a VA provider or care team using the following parameters:
  - subject line
  - date range
  - provider or message author
  - has attachment (yes/no)
  - keyword search (Keyword search is a post-MVP priority, and would search body of message and title of attachments.)
- As a {veteran; authorized caregiver or representative}, I am able to select a message and view the details of that message.
- As a {veteran; authorized caregiver or representative}, I am able to archive a message from any VA provider or staff.
- As a {veteran; authorized caregiver or representative}, I am able to retrieve and view attachments from a secure message. VA will follow Cerner's file size and file type restrictions.
- As a {veteran; authorized caregiver or representative}, I am able to reply to a selected message from {my; the veteran I care for or represent} messageable VA provider(s) within a set time period (i.e. 45 days) of receiving the message. After that time, I will need to initiate a new message.
- As a {veteran; authorized caregiver or representative}, I am able to initiate a message to {my; the veteran I care for or represent} messageable VA provider(s).
- As a {veteran; authorized caregiver or representative}, I am able to attach file(s) to a secure message and submit the file to a provider. VA will follow Cerner's file size and file type restrictions.

- As a {veteran; authorized caregiver or representative}, I am able to view a list of VA provider pools that I may message related to my care. If I am a new patient, I may also have access to pools for Red Coats, patient care coordinators, or other VA staff.
- As a {veteran; authorized caregiver or representative}, I want to be able to view an audit trail for secure messages that I have sent that have been opened by {my, the veteran I care for or represent} VA provider. Audit trails include a read receipt, including the date and time that a VA provider, member of their pool, or other staff opened the message; who in the pool read the message; and who else has read the message (in the event that a message is forwarded).
- As a {veteran, an authorized caregiver or representative, or a provider}, I want to be able to add a flag to a message that I initiate to mark it as sensitive. Only the initiator {veteran or authorized caregiver or representative} and the provider pool may view or reply to a sensitive message. When a provider initiates a sensitive message to the veteran OR to the authorized caregiver or representative, only the intended recipient can view and reply to that message. A privacy flag must be included in the API, so that a user accessing messages on any device is only able to see messages intended for them. VA will follow DOD rules around sensitive messaging and adolescent users as appropriate.
- As a {VA provider, Power Chart user}, I am able to end a message thread with a veteran and/or authorized caregiver or representative. Users may not reply to a message thread that has been ended.
- As a Power Chart user, I am able to add a flag to block a Veteran from being able to message me. An audit trail is created including the user who added the flag, and the date and time the flag was added.

The following stories will be implemented partially or entirely at the application level and are not dependent on Cerner APIs:

- As a {veteran; authorized caregiver or representative}, I am able to create, save, and resume a draft of a secure message to {my; the veteran I care for or represent} messageable VA provider(s). **This user story is not required for MVP, but is a desired future addition to enable a user to resume a draft across devices.**
- As a {veteran; authorized caregiver or representative}, I am able to create an organization system for saving older messages.
- As a {veteran; authorized caregiver or representative}, I am able to set message preferences for my messages so that I do not have to provide this information each time I send a message.

#### *Applicable FHIR standards*

The following FHIR standards applicable to the APIs supporting this functionality may include, but are not limited to:

- DocumentReference
- Communication
- Media

## Medical Imaging

### *User Stories*

Cerner APIs shall support the following user stories:

- As a {veteran; authorized caregiver or representative}, I am able to request, view, and download diagnostic images as they are made available.
- As a {veteran; authorized caregiver or representative}, I am able to request, view, and download related reports as they are made available.
- As a {veteran; authorized caregiver or representative}, I am able to request, view, and download non-diagnostic images as they are made available.
  - An example of a non-diagnostic image is a picture of a mole or a wound that may be attached to a report.

### *Applicable FHIR standards*

The following FHIR standards applicable to the APIs supporting this functionality may include, but are not limited to:

- ImagingStudy

## Health History

### *User Stories*

Cerner APIs shall support the following user stories:

- As a {veteran; authorized caregiver or representative}, I am able to view and download {my; the veteran I care for or represent} Continuity of Care Document (LOINC 81214-9) inclusive of the following parameters:
  - I can select among the following data parameters to include:
    - medication use (LOINC 10160-0)
    - immunizations (LOINC 11369-6)
    - allergies (LOINC 48765-2)
    - health issues/problem list - reported (LOINC 11450-4)
    - admissions, discharges, & encounters (LOINC 46240-8)
    - vitals and readings (LOINC 8716-3)
    - labs and tests (LOINC 30954-2)
    - radiology reports (LOINC 30954-2)
    - pathology reports (LOINC 30954-2)
    - microbiology (LOINC 30954-2)
    - procedures (LOINC 47519-4)
    - visit summaries, assessment & plan (LOINC 18776-5)
    - clinical notes/functional assessment status notes (47420-5)
    - social history (LOINC 29762-2)
    - family history (LOINC 10157-6)

- appointments (future and past up to 2 years)
- diet & nutrition narrative (61144-2)
- history of medical device use (LOINC 46264-8)
- advance directives (LOINC 42348-3)
- documents, summary of responses sent via patient questionnaire
- compensation & pension exam notes (VA specific)
- As a {veteran; authorized caregiver or representative}, I am able to view and download, as TXT, XML, or PDF, all or part of {my; the veteran I care for or represent}'s health history (Blue Button) based on parameters that I am able to configure, such as date range.
- Currently, C&P exam notes have a 30-day hold policy, radiology has a 96-hour hold, and other health reports have a 36-hour holding period. If a specific FHIR resource, CCD, or Blue Button report is pulled within the hold period for a result, that result will not be included in the Blue Button report. The API will support the current shared policies across DOD & VA.

#### *Applicable FHIR standards*

The following FHIR standards applicable to the APIs supporting this functionality may include, but are not limited to:

- C-CDA on FHIR Implementation Guide

#### *Appointments*

##### *User Stories*

Cerner APIs shall support the following user stories:

- As a {veteran; authorized caregiver or representative}, I am able to view a list of {my, the Veteran I care for or represent} upcoming and past appointments, with patient-friendly statuses.
  - Upcoming appointment statuses ([with FHIR equivalents](#)): confirmed (accepted), pending request (tentative), canceled (declined)
  - Past appointment statuses (current): canceled (declined), completed (fulfilled), no-show (noshow), checked in (arrived) unknown
- As a {veteran; authorized caregiver or representative}, I am able to view specific location details for my appointment—including links to telehealth appointments, as appropriate.
  - Location includes: Facility name, facility address, facility contact number, clinic/department name, clinic contact number, location of clinic within facility (i.e. building 1, third floor), operating hours, type of care, and has telehealth resources (yes, no). See <https://developer.va.gov/explore/facilities> for more information.
- As a {veteran; authorized caregiver or representative}, I am able to find out if I am eligible to get the type of care {I, the veteran I care for or represent} am requesting via community care while I am scheduling my appointment. See community care eligibility API documentation: [https://developer.va.gov/explore/health/docs/community\\_care?version=current](https://developer.va.gov/explore/health/docs/community_care?version=current)

- As a {veteran; authorized caregiver or representative}, I am able to find out if {my; the veteran I care for or represent} requested care is eligible for telehealth while I am scheduling my appointment.
- As a {veteran; authorized caregiver or representative}, I am able to request VA, telehealth, or community care appointments, based on the type of care that I need. I may only request a VA appointment for a specific type of care at a VA location that offers that type of care.
  - Need to know from location endpoint: Which locations (facilities, CBOCs, telehealth) offer what types of care. Currently, we get this from stop codes.
- As a {veteran; authorized caregiver or representative}, I am able to self-schedule VA appointments for types of care that allow self-scheduling and at locations that offer that type of care.
- As a {veteran; authorized caregiver or representative}, I am able to self-schedule telehealth appointments only at locations that support telehealth appointments.
- As a {veteran; authorized caregiver or representative}, I am able to search for a provider with whom {I; the veteran I care for or represent} have a current relationship, if I search by these parameters: name, location, type of care, and organization (DOD, VA).
- As a {veteran; authorized caregiver or representative}, I am able to view a list of providers with whom I am able to schedule an appointment. I can only schedule an appointment with a provider with whom I have an established relationship.
- As a {veteran; authorized caregiver or representative}, I am able to receive a notification in a timely fashion (frequency and method to be discussed) when there is a status change or reminder for {my; the veteran I care for or represent} appointment.

#### *Applicable FHIR standards*

The following FHIR standards applicable to the APIs supporting this functionality may include, but are not limited to:

- Argonaut Scheduling Implementation Guide
- Location resource (distance, near-distance, type)
- FHIR Resource Organization (organization identifier to identify as Cerner organization)

## Prescription Management

### *User stories*

Cerner APIs shall support the following user stories:

- As a {veteran; authorized caregiver or representative}, I am able to view a list or lists of {my; veteran I care for or represent} prescriptions, medications, and medical devices, including:
  - medications that a VA provider has prescribed for me to take on a routine short or long-term basis (outpatient medications/VA prescriptions)
  - medications that a VA provider administered to me while I was inpatient at a VA medical center and are not intended for continued use (Inpatient medications)



- medications that a VA provider administered to me while I was outpatient at a VA medical center and are not intended for continued use (clinic or emergency medications)
- medications prescribed by a non-VA provider that I have reported in an encounter with VA staff or reported on a patient questionnaire, and are part of my VA health record (self-reported medications/non-VA medications). Self-reported medications/Non-VA medications are not ordered or dispensed by the VA Pharmacy, but may be included in my personal health record. I get these medications outside of the VA.
- medical devices (i.e. prosthetic limbs, prosthetic socks, hearing aids, hearing aid batteries) that a VA provider has prescribed for me to use on a routine short or long-term basis.

*For VA prescriptions / outpatient medications*

- As a {veteran; authorized caregiver or representative}, I am able to view the following fields for each of my VA prescriptions or outpatient medications<sup>1</sup>:
  - patient name (reference: patient; [MedicationRequest.subject](#))
  - prescription number ([medicationdispense.identifier](#) or [medicationrequest.identifier](#))
  - actual medication name & form, i.e. Nadolol 20mg tablet ([MedicationRequest.medication\[x\]](#))
    - brand name of medication, if applicable
  - dosage ([dosage](#), [MedicationRequest.dosageInstruction](#) or [MedicationRequest.medication\[x\]](#))
  - encounter associated with the original prescription ([MedicationRequest.encounter](#))
  - status (original prescription, refill, partial refill)
  - issue date and time of original prescription, refill, or partial refill ([MedicationRequest.authoredOn](#))
  - fill date/dispense date ([MedicationDispense.whenprepared](#), [MedicationDispense.whenHandedOver](#))
  - last date & time prescription was filled ([MedicationRequest.eventhistory](#) may be derived from fill date history)
  - number of refills remaining ([numberOfRepeatsAllowed](#))
  - next possible fill date (derived from [dispenseInterval](#))
  - date prescription expires and is no longer fillable ([validityPeriod](#))
  - date prescription is canceled by provider, if applicable (may be [MedicationRequest.status](#), [RequestHistory](#), plus a date of event)
  - status of medication for patient. i.e. active; expired; pending; discontinued; active, on provider hold; active, refill in process, active, submitted; non-VA; clinic order, (partly [MedicationRequest.status](#), [MedicationRequest.statusReason](#) but potentially with additional delineation)

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<sup>1</sup> Where possible, the FHIR resource for this parameter is noted.

- substitution ([medicationRequest.substitution](#), [substitution.allowed\[x\]](#), [substitution.reason](#))
- quantity of medication dispensed ([initialFill.quantity](#), [dispense request.quantity](#))
- days of supply ([initialFill.duration](#), [expectedSupplyDuration](#))
- prescribing provider ([medication.request.requester](#), [MedicationRequest.recorder; reference: practitioner](#))
- condition or reason for prescription ([MedicationRequest.reasonReference](#); [MedicationRequest.reasonCode](#))
- contraindications, if applicable, ([MedicationRequest.detectedissue](#))
- ID, name, address, and phone number of prescribing facility's pharmacy or CBOC
  - If ID stays the same, address & phone number for the facility's pharmacy or CBOC may be able to draw from <https://developer.va.gov/explore/facilities/docs/facilities?version=current>
- instructions for use; i.e. take one tablet per day with food ([MedicationDispense.dosageInstruction](#), [dosage.Patientinstruction](#), [dosage.additionalinstruction](#), [Dosage.text](#), [Dosage.sequence](#), [Dosage.timing](#), [Dosage.asNeeded\[x\]](#))
- status of request & delivery instructions, such as pick up at the VA or mailed to Veteran ([medicationdispense-status](#), [MedicationDispense.destination](#))
- remarks from pharmacist (may be: [Dosage.text](#))
- RxNorm Code (<https://www.nlm.nih.gov/research/umls/rxnorm/overview.html>)
- National Drug Code (The application layer will use this to get an image for the prescription to display to a user)
- setting/category ([medicationrequest-category](#))
- substitution allowed ([MedicationRequest.substitution](#))
- As a {veteran; authorized caregiver or representative}, I am able to initiate a refill for a qualified prescription.
- As a {veteran; authorized caregiver or representative}, I am able to view a list of all of the VA prescriptions filled by a VA Mail Order pharmacy and mailed in the last 45 days.
- As a {veteran; authorized caregiver or representative}, I am able to view and track the status of a refill request. In addition to some of the fields named above (NDC, dispensed date) additional relevant data fields include:
  - VAMC tracking number (if sent from a VAMC pharmacy) OR CMOP tracking number (if prescription sent from CMOP)
  - Dispense status if transmitting to a CMOP (i.e. transmitted, dispensed, not transmitted, not dispensed, reason)
  - date shipped
  - shipping carrier, i.e. FedEx (usually relevant to CMOP prescriptions)
  - carrier tracking number
  - number of prescriptions in the package
  - quantity of each prescription shipped

- NDS of prescriptions in package (this will be used to gather an image of the prescription).
  - substitutions, if any
- As a {veteran; authorized caregiver or representative}, I am able to initiate a renewal for a qualified prescription.
- As a {veteran; authorized caregiver or representative}, I am able to submit information about compliance with {my; the veteran I care for or represent} prescription, i.e. taking as prescribed, taking not as prescribed, not taking ([MedicationStatement](#)).
- As a {veteran; authorized caregiver or representative}, I am able to view information I submitted about compliance with {my; the veteran I care for or represent} current or previous prescriptions.

Additional fields VA may need in the API but may not show to the Veteran:

- ID and name of outpatient pharmacy division that filled the prescription
- Drug schedule (ie. Schedule I, Schedule II)

#### *For inpatient, clinic, or emergency medications*

- As a {veteran; authorized caregiver or representative}, I am able to view the following fields for a VA prescription or outpatient medication<sup>2</sup>:
  - patient name (reference: patient, `MedicationRequest.subject`)
  - actual medication name & brand name of medication, if applicable (`MedicationRequest.Medication[x]`)
  - dosage
  - form
  - setting/category ([medicationrequest-category](#), [MedicationRequest.encounter](#))
  - status of request, ([medicationdispense-status](#), [medicationdispense-context](#), [medicationdispense-location](#))
  - RxNorm Code
  - NDC

#### *For non-VA medications*

- As a {veteran; authorized caregiver or representative}, I am able to see the following information about a non-VA medication. ([MedicationRequest.reported](#), [MedicationStatement](#))
  - Drug name including dosage and form (generic and/or brand name, as available)
  - Date this medication was entered into my record
  - VA provider who entered this medication into my record
  - Date I started taking this medication
  - Date I stopped taking this medication (if applicable)
  - Status (active, discontinued, etc.)
  - Prescribing provider

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<sup>2</sup> Where possible, the FHIR resource for this parameter is noted.

- NDC if available
- RXNorm Code

#### *For medical devices*

- As a {veteran; authorized caregiver or representative}, I am able to view a list of my previous orders of medical devices (i.e., hearing aids) and supplies (i.e., hearing aid batteries)
- As a {veteran; authorized caregiver or representative}, I am able to view the medical devices currently on-file for me, including device name, model, type, prescribed date, the body site at which the device is deployed, and package quantity
- As a {veteran; authorized caregiver or representative}, I am able to view previously ordered accessories, such as hearing aid batteries, associated with their parent device

#### *Applicable FHIR standards*

The following FHIR standards applicable to the APIs supporting this functionality may include, but are not limited to:

- MedicationOrder
- MedicationRequest
- MedicationDispense
- MedicationAdministration
- DeviceDefinition
- Device

#### *Clipboard/Questionnaire*

##### *User Stories*

Cerner APIs shall support the following user stories:

- As a {veteran; authorized caregiver or representative}, I want to receive and send {self; veteran}-entered data through the clipboard/questionnaire to be added to {my; the veteran I care for or represent} health record.

#### *Applicable FHIR standards*

The following FHIR standards applicable to the APIs supporting this functionality may include, but are not limited to:

- Questionnaire resource