



OPS DDCC/RACSEL LACPASS Seminars: "Digital Documentation of Covid-19 Certificates" Pan American Health Organization

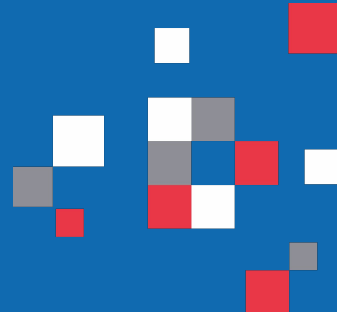
Alejandro Medina,
Technical Leader Implementation - CENS

Goal

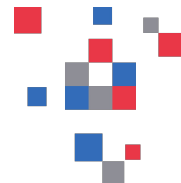
The participants will get to know the documentation and the processes around the DDCC and their relation with interoperability standards.

Agenda

- What is DDCC?
- Technical Guides WHO
- DDCC:VS
 - Use cases
 - Dataset
 - Technical aspects
 - HL7 FHIR Implementation guide
 - Implementation scopes



DDCC: Digital Documentation of Covid-19 Certificates



- Standards promoted by the WHO
- Global reference framework for the record and exchange of clinical information of individuals related to COVID-19.
- Suggests a reliable and safe form of querying and validating the information for all the instances involved in health care.

DDCC



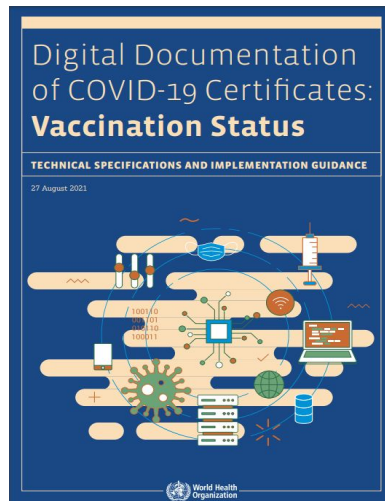
World Health Organization



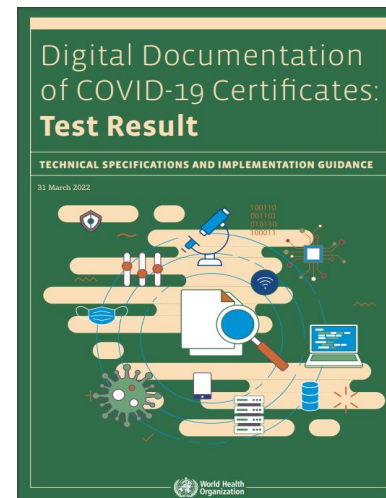
An opportunity for cross-border interoperability of health data.

DDCC: Digital Documentation of Covid-19 Certificates

The technical guides and guidelines of the DDCC focus on vaccination certificates (DDCC:VS) and results of detection tests (DDCC:TR) for Covid19.

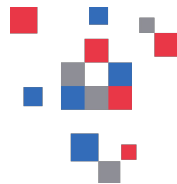


<https://www.who.int/publications/i/item/WHO-2019-nCoV-Digital-certificates-vaccination-2021.1>



<https://www.who.int/publications/i/item/WHO-2019-nCoV-Digital-certificates-diagnostic-test-results-2022.1>

DDCC: Digital Documentation of Covid-19 Certificates



- These directives emphasize that it is the decision of the countries to define the purposes, the relevance, the adaption and the application of the different scenarios associated with the DDCC:VS and DDCC:TR.
- This standard can be escalated and used for other health care events of national or international interest.
- Promotes the progress of the interoperability and the implementation of the International Patient Summary (IPS).

DDCC

World Health Organization

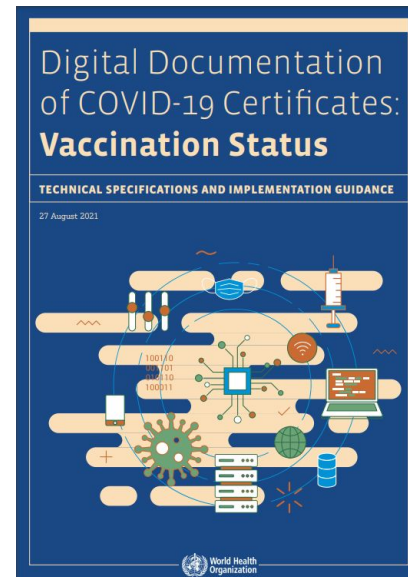
An opportunity for cross-border interoperability of health data.

DDCC:VS

Digital Documentation of Certificates related to COVID-19: Vaccination Status

What is this?

A digital vaccination certificate which states a person's current COVID-19 vaccination status and can be used for continuity of care or as a proof of vaccination for different purposes of health care.



DDCC:VS

Digital Documentation of Certificates related to COVID-19: Vaccination Status

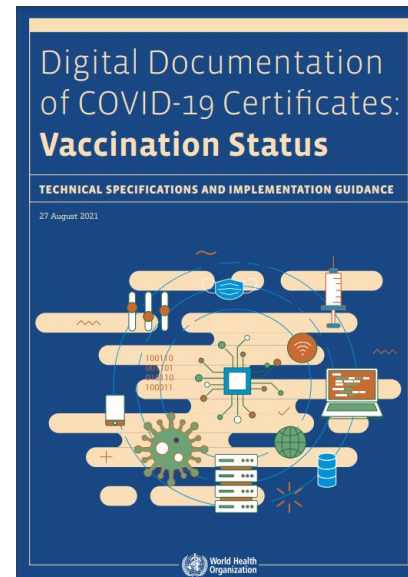
- It's a digitally signed representation of data which describes a vaccination event.
- The content of the **DDCC:VS** respects the dataset and follows directives of **HL7 FHIR** detailed in an implementation guide.

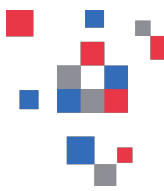
Important acronyms:

DDCC: Digital Documentation of Certificates related to COVID-19

DDCC:VS: Digital Documentation of Certificates related to COVID-19: Vaccination Status

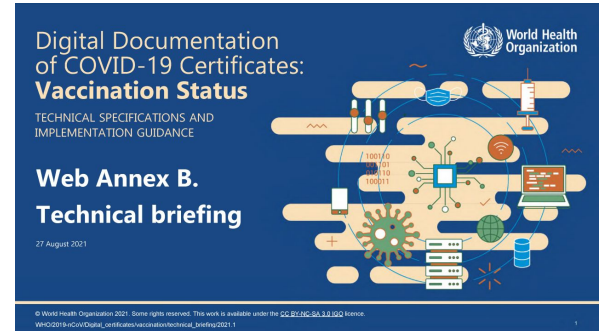
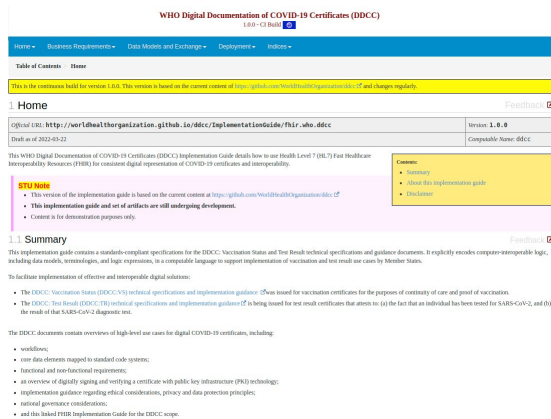
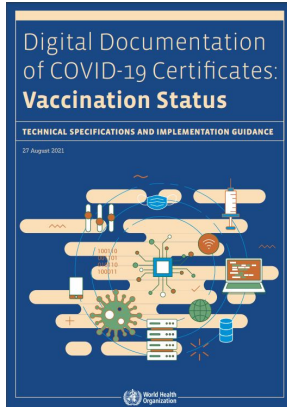
HL7 FHIR: Fast Healthcare Interoperability Resources





DDCC:VS

Digital Documentation of Certificates related to COVID-19: Vaccination Status

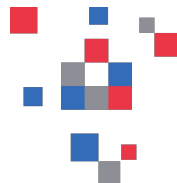


TECHNICAL SPECIFICATIONS AND ORIENTATION FOR THEIR INTRODUCTION
<https://www.who.int/publications/i/item/WHO-2019-nCoV-Digital-certificates-vaccination-2021.1>

IMPLEMENTATION GUIDE
HL7 FHIR
<https://worldhealthorganization.github.io/ddcc/>

TECHNICAL SUMMARY
<https://www.who.int/publications/i/item/WHO-2019-nCoV-Digital-certificates-vaccination-technical-briefing-2021.1>

DDCC:VS Dataset



Patient data

- Name
- Date of birth
- Unique identifier
- Gender

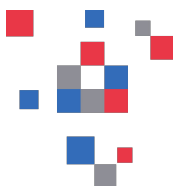
Certificate data

- Issuer of the certificate
- Health certificate identifier
- Validity start date
- Validity end date
- Certificate system version


Vaccination data


- Vaccine code (CIE11)
- Vaccine manufacturer
- Holder who authorizes vaccine
- Lot number
- Date of vaccination
- Vaccination validity start date
- Number of doses
- Total doses
- Country of vaccination (ISO3166-3)
- Vaccination center
- Signature of health worker
- Identifier of health worker
- Active pathogen (CIE11)
- Date of next vaccination

Complete Dataset: <https://worldhealthorganization.github.io/ddcc/dictionary.html>

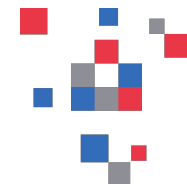


DDCC:VS Use cases

SECTION		
3	Continuity of Care scenario	
<ul style="list-style-type: none">Provides data to enable a health worker to provide certain health services or information on the administered vaccination doses.		

SECTION		
4	Proof of Vaccination scenario	
<ul style="list-style-type: none">Verification of vaccination status.Allows to validate the status in certain institutions authorized to do so.		

Technical aspects DDCC:VS



Actors



Services



Use cases

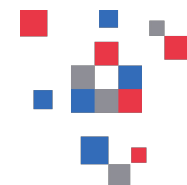


Transactions



Data structures

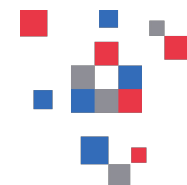
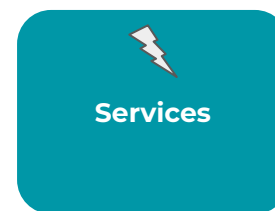
Technical aspects DDCC:VS



Continuity of care

Function	Description
Subject of care	The person who receives the vaccination.
Holder of the DDCC:VS	The person who has the Subject of Care's vaccination certificate. The person is usually the Subject of Care but does not have to be. For example, a caregiver may hold the DDCC:VS for a child or other dependant.
Vaccinator	The person who has the Subject of Care's vaccination certificate. The person is usually the Subject of Care but does not have to be. For example, a caregiver may hold the DDCC:VS for a child or other dependant.
Personnel in charge of data entry	The person who enters the information about the Subject of Care (as outlined in the core data set) that has been manually recorded at care sites into a digital system. Health workers can also be the Data Entry Personnel if a point-of-care system is in place that allows health workers to digitally document a vaccination event right away.
Public health authority	An entity or organization under whose auspices the vaccination is performed and the DDCC:VS is issued.

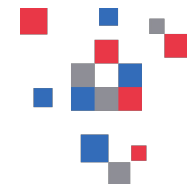
Technical aspects DDCC:VS



Continuity of care

Digital service	Description
Digital health solution	Secure system which is used at the service point or health center, e.g. an electronic immunization record, an electronic health record or a shared health record.
DDCC:VS generation service	<p>Service in charge of collecting data about the administration of a vaccine, converting them to the FHIR standard, signing the FHIR HL7 document, returning it to the digital health solution and making the digital document available for its use to maintain the continuity of care and as a proof of vaccination use cases.</p> <p>The signed FHIR HL7 document is the DDCC:VS. The digital health solution in turn provides the DDCC:VS and all the related data representation (e.g. The QR code) to the holder of the DDCC:VS according to the policy of the public health authority.</p>

Technical aspects DDCC:VS

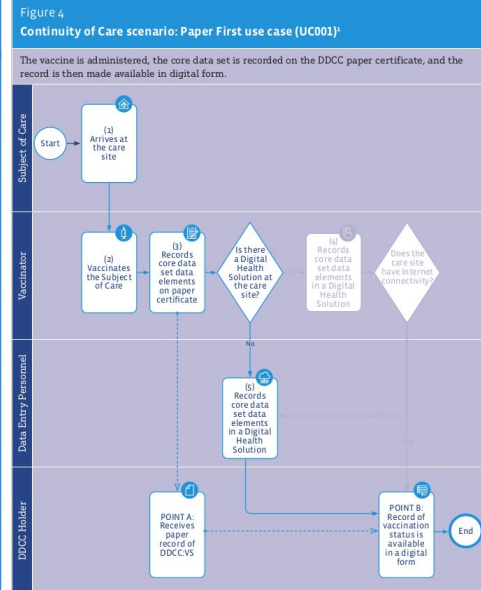


Continuity of care

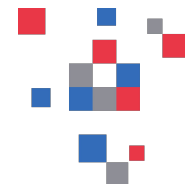


First on paper

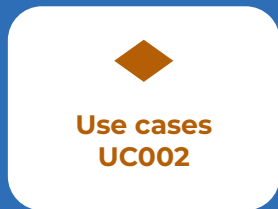
- Paper record
- The certificate is provided to the holder with the handwritten dataset
- Usage of unique identifier on the certificate
- Requires entry in digital solution
- Generation of digital certificate with delay until the data is sent



Technical aspects DDCC:VS

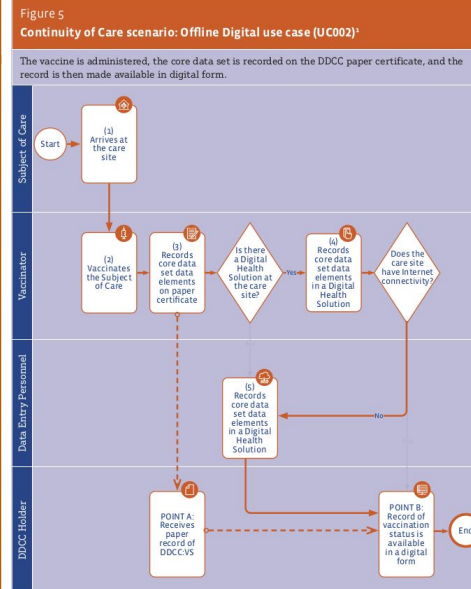


Continuity of care

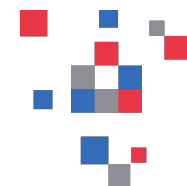


Digital Offline

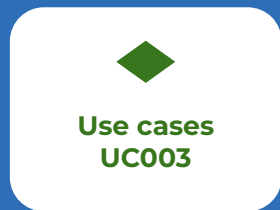
- Record in digital offline solution
- The certificate is provided to the holder with the printed or handwritten dataset
- Usage of unique identifier on the certificate
- Generation with delay until the data is sent
- Generation of digital certificate with delay until the data is sent



Technical aspects DDCC:VS



Continuity of care

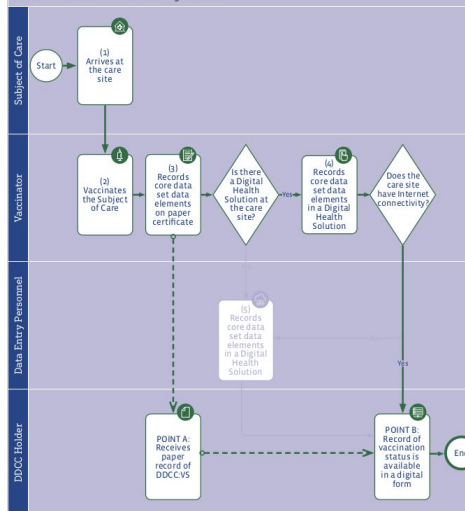


Digital Online

- Record in digital online solution
- The certificate is provided to the holder with the printed dataset
- Usage of unique identifier
- Real time generation

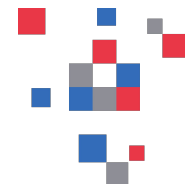
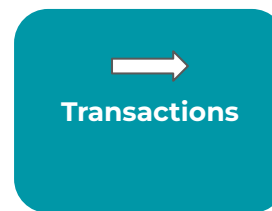
Figure 6
Continuity of Care scenario: Online Digital use case (UC003)¹

The vaccine is administered, the core data set is recorded on the DDCC paper certificate, and the record is then made available in digital form.



Technical aspects DDCC:VS

Continuity of care



- **Submit Health Event:** Send the dataset to the generation service, which generates the DDCC:VS and returns it to the digital solution.
- **Store Health Certificate:** Store the DDCC:VS, responsibility of the generation service.
- **Register Health Certificate:** Register the signed DDCC:VS based on the transaction according to the MHD profile, responsibility of the generation service.

Technical aspects DDCC:VS

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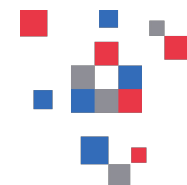
Data
structures

Continuity of care

The data structures are based on the HL7 FHIR standard according to the DDCC implementation guide

- Profiles
- Logical models
- Extensions
- Value Sets
- Concept maps
- Structure maps
- Definition of operations

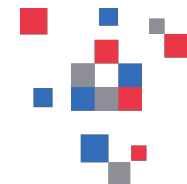
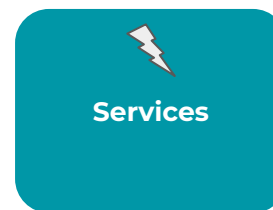
Technical aspects DDCC:VS



Proof of vaccination

Function	Description
Holder of the DDCC:VS	In the context of Proof of Vaccination, the DDCC:VS Holder is the person who wants to assert a claim related to a COVID-19 vaccination status. This person could be the same as the Subject of Care or, for example, could be a caregiver who may hold the DDCC:VS for a child or other dependant.
Verifier	The person or entity that wants to verify the vaccination status claim, i.e. verify the vaccination status shown on a DDCC:VS.
National Authority of Public Health	The entity that has overall responsibility for vaccinating the country's population. The National PHA is also responsible for the DDCC:VS Generation Service and the DDCC:VS Registry Service.
International Authority of Public Health	Any external PHA to which the National PHA might defer to verify certificates not issued by the National PHA. This could be a PHA in another country, but it could also be any regional-level or international organization.

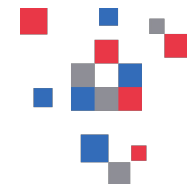
Technical aspects DDCC:VS



Proof of vaccination

Digital service	Description
Health certificate identifier	The health certificate identifier is the principal identifier found on the DDCC:VS. It can be provided by a national system or issued directly by the generation service of the DDCC:VS.
Application to verify the status	Digital solution which can inspect and cryptographically verify the validity of the DDCC:VS. It can be an application on a mobile phone or another device.
DDCC:VS generation service	Service which retrieves data about the administration of a vaccine, converts it to use the FHIR standard, signs the HL7 FHIR document and returns it to the digital health solution.
DDCC:VS registry service	Indexing service which can show meta data related to the DDCC:VS (the signed FHIR document), e.g. the signature. This meta data might be the location from which the DDCC:VS in the DDCC:VS repository, if any, can be restored.
DDCC:VS repository service	Optional service which has a repository or database of the whole DDCC:VS.

Technical aspects DDCC:VS



Proof of vaccination

Manual verification

- Visual reading of a DDCC:VS
- For the verification a subjective criterion based on standards is used
- Offline

Cryptographic offline verification

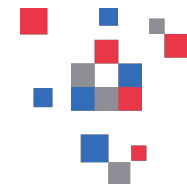
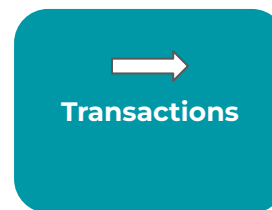
- Digital reading of a DDCC:VS
- For the verification you use the public key provided by the signer to get the hash of the DDCC:VS and compare it to the hash calculated from the data.
- Offline

Online verification

- Digital reading of a DDCC:VS
- For the verification you use the public key provided by the signer to get the hash of the DDCC:VS and compare it to the hash calculated from the data.
- Online
- It can be verified if the certificate was revoked.

Technical aspects DDCC:VS

Proof of vaccination



- **Retrieve Health Certificate Reference:** Obtain references to stored health certificates.
- **Retrieve Health Certificate:** Obtain a health certificate based on its reference.
- **Retrieve Health Folder:** Obtain a list of health certificates of the same identifier.
- **Revoke Health Certificate:** Allows to revoke the validity of a certificate for different reasons.

Technical aspects DDCC:VS

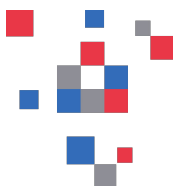


Data
structures

Proof of vaccination

The data structures are based on the HL7 FHIR standard according to the DDCC implementation guide

- Profiles
- Logical models
- Extensions
- Value Sets
- Concept maps
- Structure maps
- Definition of operations



HL7 FHIR Implementation guide

Transactions

Specification of transactions and associated artifacts

Artifacts

Profiles, models, structures, value sets

Work flows

Graphs and general information

Other elements

- Safety considerations
- Reference implementations
- Downloads
- Key concepts
- Summary
- Dependencies
- References
- Change control

Actors

Actors defined in the implementation guide

Data dictionary

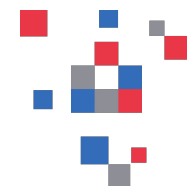
Definition of datasets

Use cases

Main characteristics

<https://worldhealthorganization.github.io/ddcc/>

Scopes OPS/LACPASS 2022



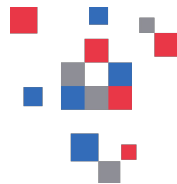
Maturity assessment



Cycles of seminars



Technical enablers



Thank you



Alejandro Medina

Technical Leader Implementation

amedina@cens.cl

www.cens.cl