

IPS Work with SMART Health Links (Tutorial)

Matthew Rahn



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ORGANIZED BY



Speakers



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the National Coordinator for
Health IT (ONC)*

Session Agenda

- Introduction to International Patient Summary (IPS) & Global Digital Health Partnership (GDHP)
- International Origins of QR codes for health
- How Does a SMART Health Link Work?
- The SMART Health Cards and Links Ballot (September 2024)
- Next Steps

What is the IPS (International Patient Summary)?

- A standardized set of basic clinical data, which includes most important health and care related facts
- A summarized version of a patient's clinical data provides health professionals the essential information needed for care during a care transition



The International Patient Summary is a minimal and non-exhaustive set of basic clinical data of a patient, specialty-agnostic, condition-independent, but readily usable by all clinicians for the unscheduled (cross-border) patient care.

Global Digital Health Partnership (GDHP)

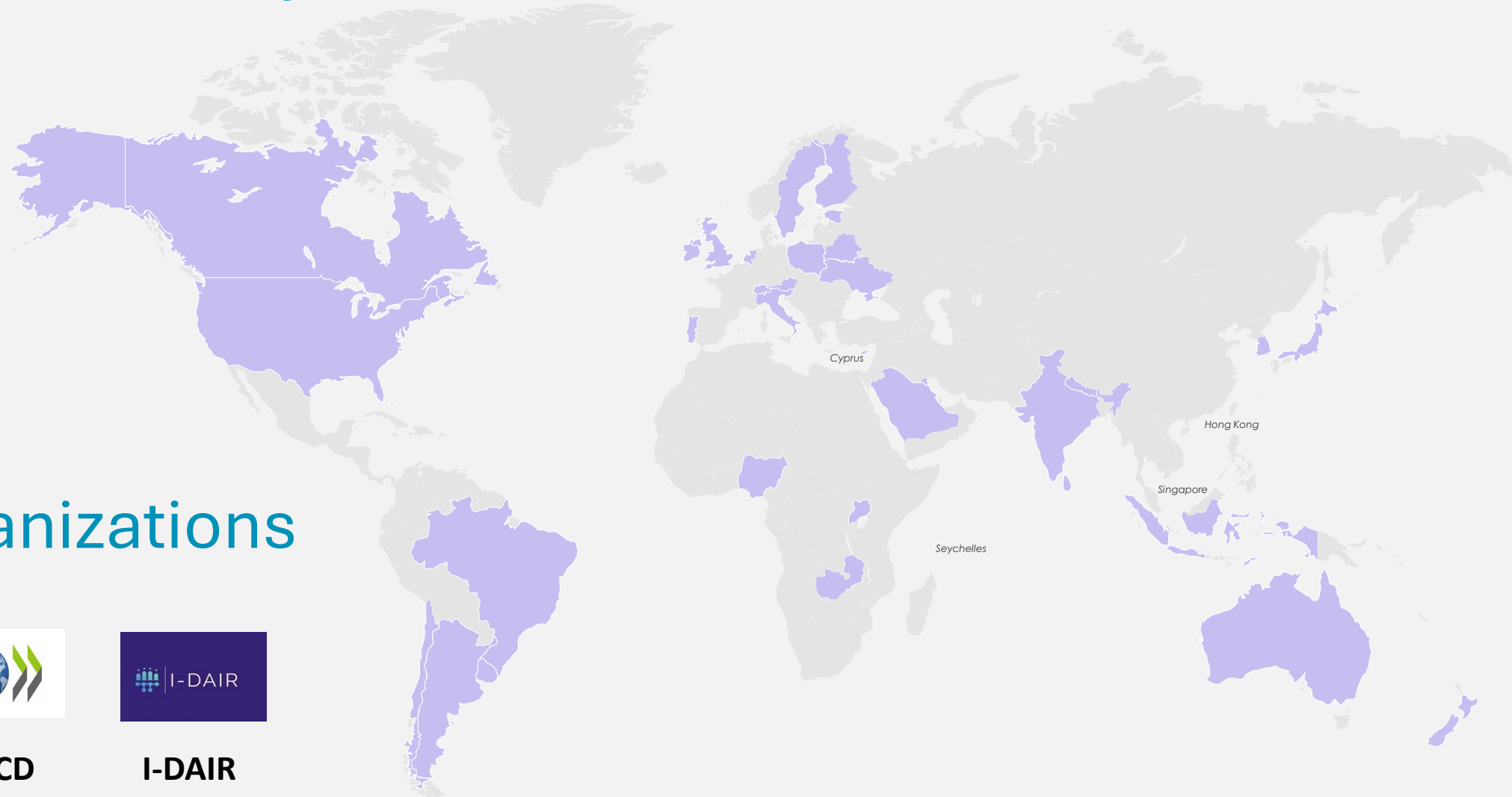
A Global Commitment to Digital Health

The Global Digital Health Partnership is a collaboration of 36 country governments and the World Health Organization (WHO) formed to support the executive implementation of worldwide digital health services.

<https://gdhp.health/>

5 workstreams, 1 focused on interoperability

36 GDHP Country Members



+ 3 Organizations



WHO



OECD



I-DAIR

WHO: World Health Organization OECD: Organization for Economic Co-operation and Development I-DAIR: The International Digital Health and AI Research Collaborative

GDHP IPS Support: 2022 - 2024

- Focus on patient-mediated exchange with goals of advancing standard, piloting and adoption
- Provide venue for nations to learn, connect and discuss about activities related to IPS FHIR development
- Support Connectathon Activities
 - HL7 Connectathons: Jan 2022, May 2022, September 2022, January 2023, May 2023, September 2023, January 2024 and May 2024
 - GDHP Mini-Connectathons (4-hour virtual events): May 2021, June 2021, October 2021, January 2022, June 2022, November 2022 and July 2023
 - IHE Connectathons – 2022 & 2023 LACPass events and Italy 2024

Active Support / Development¹

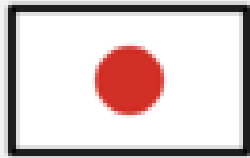
In Discussion²



1. Either an active product available or known development for IPS support (i.e. testing at a connectathon)
2. Vendor has participated in discussion and/or connectathon but no implied IPS commitment

Origins of QR Codes for Healthcare & IPS

1994 → 2002



Developed by Toyota subsidiary in 1994.
Sharp releases first cellphone that can read in 2002

COVID-19



Cellphone adoption and desire for contactless interaction accelerate QR code usage (e.g. vaccine info)

2021



First demo of using a QR code to exchange an IPS FHIR document

Sources: https://en.wikipedia.org/wiki/QR_code <https://vimeo.com/653713828>
<https://www.microsoft.com/en-us/microsoft-365-life-hacks/privacy-and-safety/brief-history-qr-codes>

Introduction to SMART Health Links

SMART Health Cards (Static)

Verified versions of your clinical information, e.g., vaccination history or test results, which contain a secure QR code and may be saved digitally or printed.

Used by

- 20+ US states
- Canada
- Japan
- Sydney, Australia
- 5+ other non-GDHP nations not listed

Uses numeric encoding - encoded as Compact Serialization JSON Web Signatures (JWS)



SMART Health Links (Dynamic)

An embedded URL in a QR code that links to data and/or FHIR endpoints. Generally, they would be used when the information is too big, changes regularly and/or has a need for additional security.

Prototyped in 2022



Uses alphanumeric encoding - logo works due to error correction

A Single Person's Struggle



In 2008, Casey Quinlan was diagnosed with breast cancer

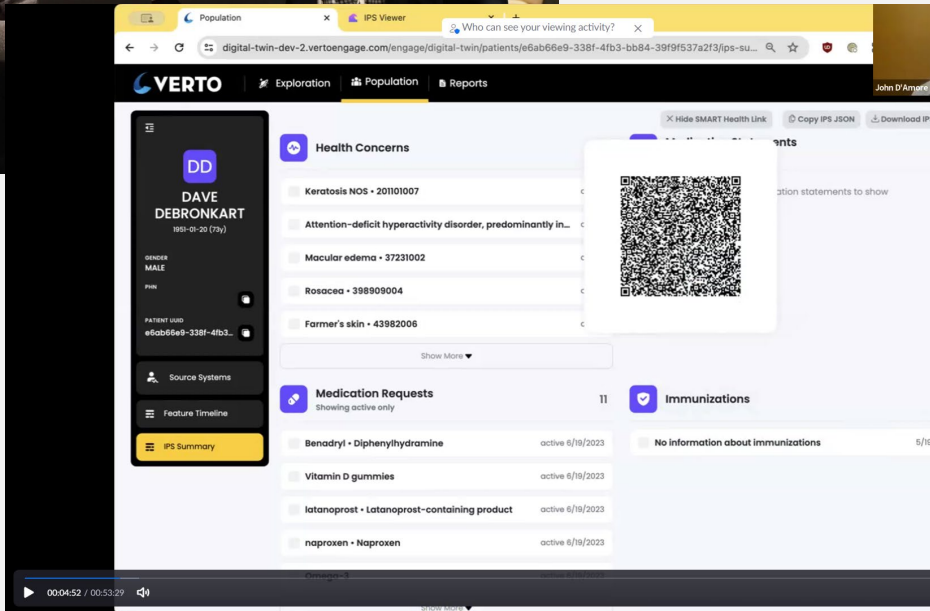
“Some doctors have misunderstood their place in the doctor-patient relationship. We’re partners in our care. People – again - the ones called “patients” in this party, are not worshipers at the altar of medical professional knowledge, nor are we lesser beings because we don’t have MD behind our names...**you’re the partner in your own care**”

“Why did I do this? Because I’ve been waiting for the medical-industrial complex to deliver on their promise of health information exchange (HIE), the promise that they’ve been making for years, but have yet to fork over” (2015 QR Code Tattoo)

She passed in hospice on April 25, 2023

Sources: <https://www.healthcareittoday.com/2023/04/28/a-tribute-to-casey-quinlan-advocate-and-renaissance-woman/>
“An Extraordinary Voice Expressed Through Humor: A Tribute to Casey Quinlan” Journal of Participatory Medicine, 2023(15).

2024 May FHIR Connectathon

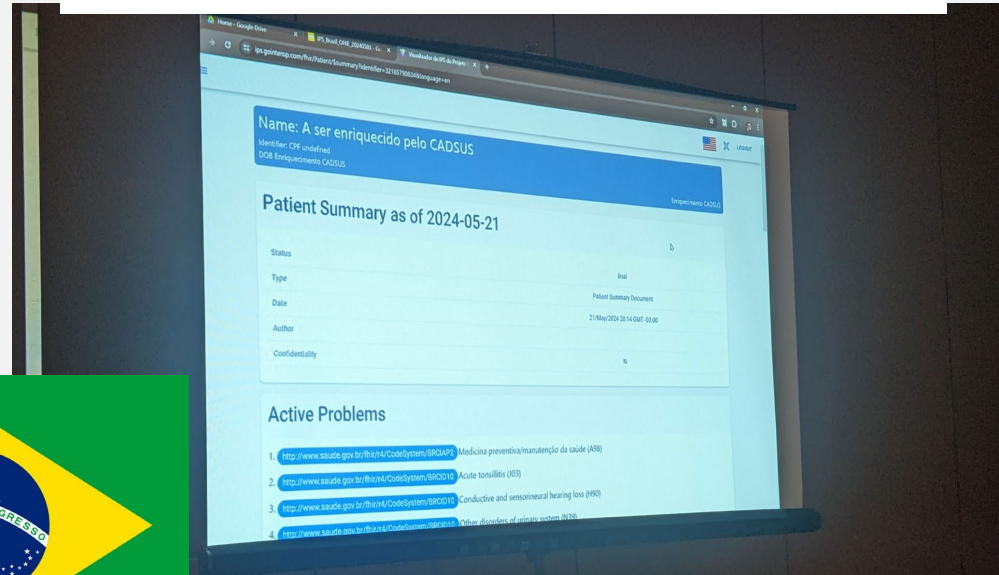


Oxford Open Digital Health, 2024, 00, oqae015
<https://doi.org/10.1093/oodh/oqae015>
 Advance access publication date 07 May 2024
 Case Study

The Brazilian international patient summary initiative

Beatriz de Faria Leao^{1,*}, Italo Macedo do Amaral Costa², Joice Machado¹, Monalisa de Assis Molla²,
 Aline Rodrigues Zamarro², Fabiane Raquel Motter², Gabriel Gausmann Oliveira², Karla L de A Calvette Costa²,
 Blanda Helena de Mello³, Elivan Silva Souza³, Gabriella Nunes Neves³, Robson Willian de Melo Matos³,
 Paula Xavier dos Santos³, José Eduardo Bueno de Oliveira³ and Sabrina Dalbosco Gadenz^{3,4}


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³Coordination of Innovation and Health Informatics, Secretariat of Information and Digital Health/Brazilian Ministry of Health, Esplanada dos Ministérios - Bloco G - Edifício Sede, Brasília, DF.70058-900, Brazil
⁴Syrian-Lebanese Institute for Teaching and Research/ Syrian-Lebanese Hospital, Prof. Daher Cutait Street, 69, Bela Vista, São Paulo, SP.01308-06, Brazil
 *Correspondence address. Digital Portfolio, Social Commitment Board/Syrian-Lebanese Hospital, Barata Ribeiro Street, 269, Ground Floor, Bela Vista, São Paulo, SP.01308-000, Brazil. Telephone number: +551194508-3435; E-mail: beatriz.leao@hsl.org.br



WAverify – Digital Vaccine Verification in Washington State

- Digital Vaccine Verification using SMART Health Cards
- Successful Public-Private-Academic Partnership
- Leveraged the shareable components and reusable code
- Rapid 8-week development, deployment, and testing
- Nearly 2 million verification requests since launch (October 2021)
- Demoed printed cards at HIMSS23 Interoperability Showcase
- **Now adding: WAverify+**

SMART Health QR Code and Printed Card

COVID-19 Vaccination Record Card 

Please keep this record card, which includes medical information about the vaccines you have received.


GREEN SAM

Last Name First Name MI

06/15/1968

Date of Birth Patient number (medical record or IIS record number)


Vaccine	Manufacturer/Lot#	Date	Healthcare Site
1st Dose	ABC 123	04/12/2023	
2nd Dose	ABC	04/12/2023	
3rd Dose	1234	04/12/2023	
4th Dose			
5th Dose			



 **HEALTH**

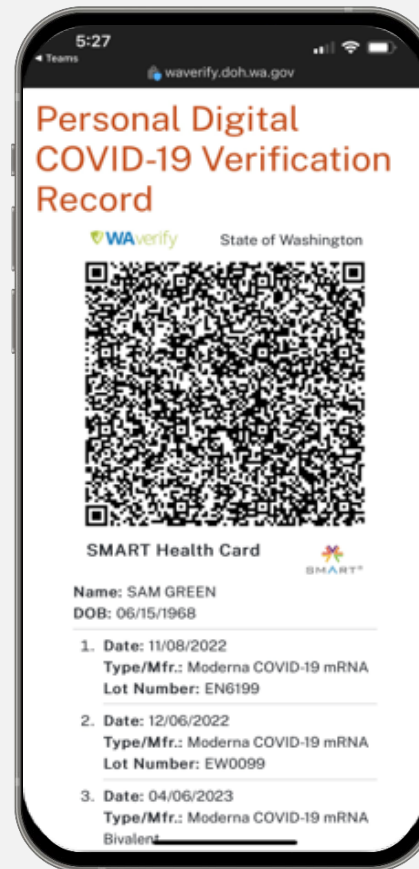
Bring this vaccination record to every vaccination or medical visit. Check with your health care provider to make sure you are not missing any doses of routinely recommended vaccines.

For more information about COVID-19 and COVID-19 vaccine, visit cdc.gov/coronavirus/2019-ncov/index.html

You can report possible adverse reactions following COVID-19 vaccination to the Vaccine Adverse Event Reporting System (VAERS) at vaers.hhs.gov





1

Digital Access

Users can save their QR codes to Health or Wallet app, or as a PDF to file

2

Hardcopy Available

Physical cards available for those with limited mobile device access

WAverify+ Expansion with SMART Health Links

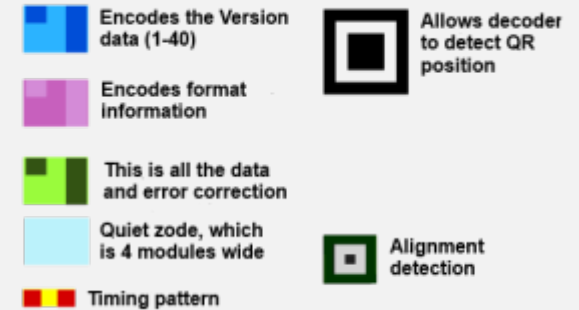
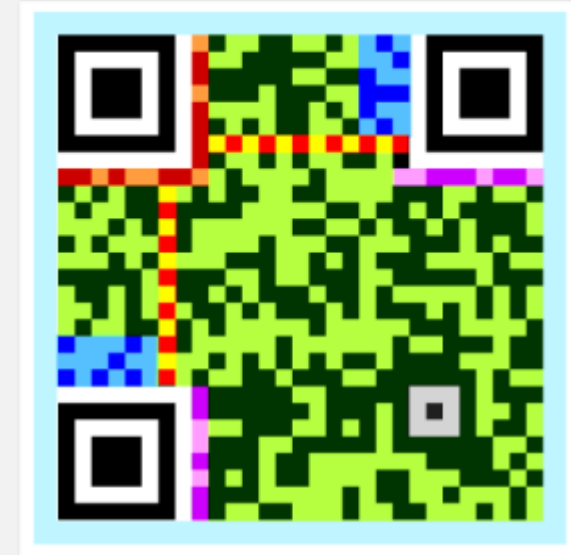
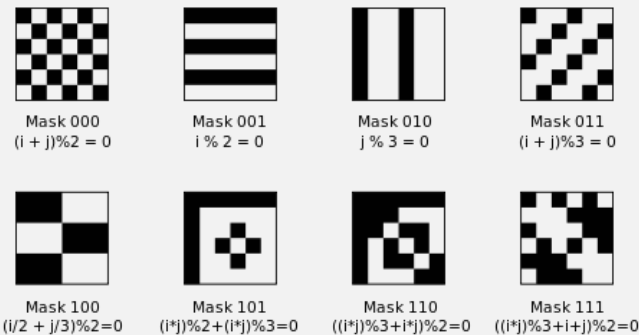
- International Patient Summary (IPS)
- Patient directed key verifiable clinical data for travel
- Embedded URL in a QR code that links to data and/or FHIR endpoints



<https://smart-health-links-ips.cirg.washington.edu/>

Quick Response (QR) Codes

- Designed by Toyota in 1994 to get more than 20 alphanumeric in barcode and more angles
- $(X \text{ bits across} - 17) / 4 = \text{version}$ 3 QR code on right
 - Versions 1-8 common, SMART Health Cards often use v22
- Format information sets how masked to avoid undesirable patterns (e.g. excess whitespace)



- QR codes have built-in error correction (Reed-Solomon Code implementation)


Sources: <https://www.shieldui.com/blogs/qr.code>
<https://blog.qartis.com/decoding-small-qr-codes-by-hand/>

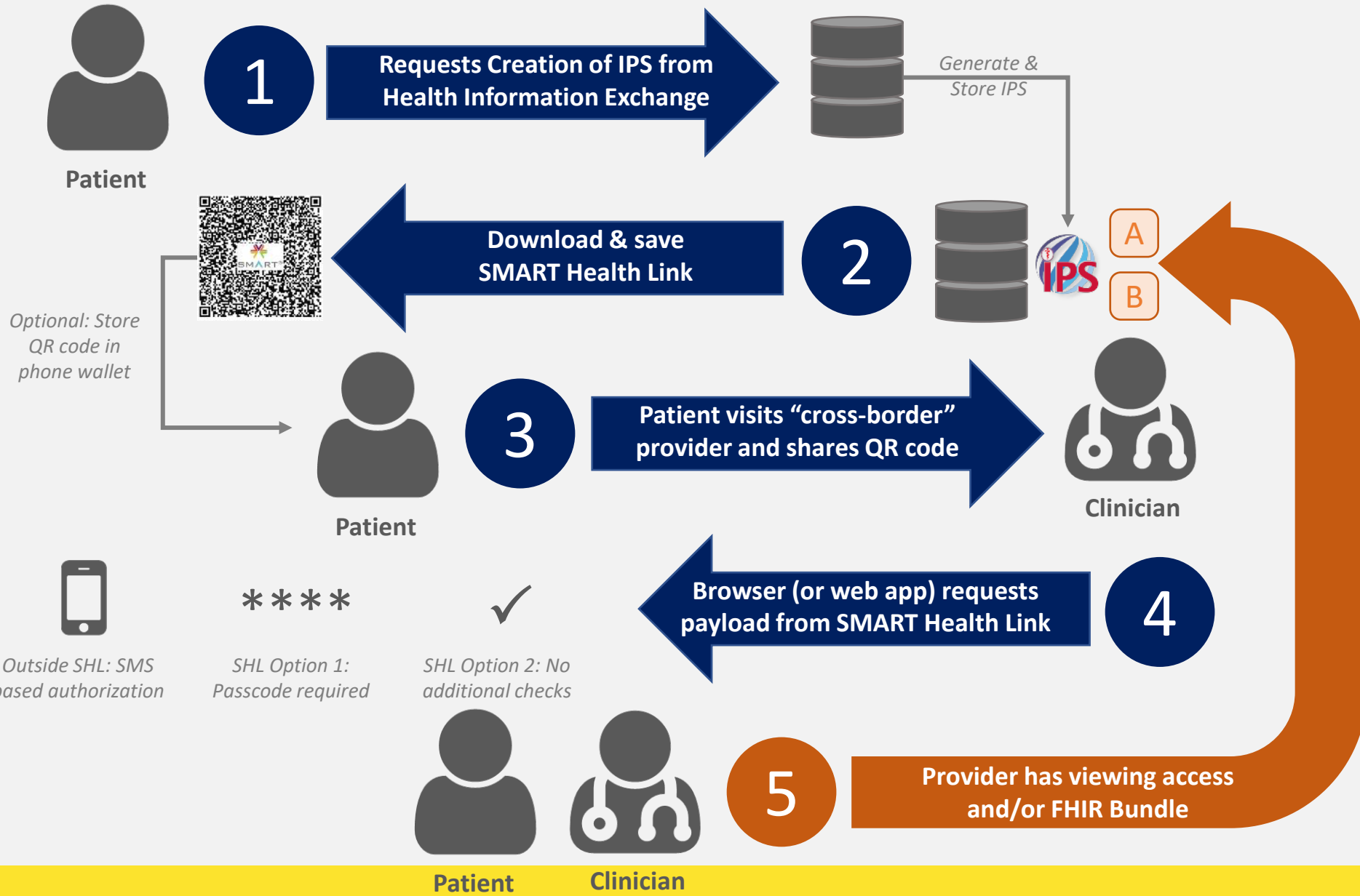
SMART Health Link: How it Works



 = Viewer (no knowledge of FHIR needed)

<https://smart-health-links-ips.cirg.washington.edu/ips#shlink:/eyJ1cmwiOiJodHRwczovL3NtYXJ0LWhlYWx0aC1saW5rcy1zZXJ2ZXluY2lyZy53YXNoaW5ndG9uLmVkdS9hcGkvc2hsL2FZY2JqLW9wNDJldDNzTXVwSUdyY1dvQ3JJWklqeTlleHUwWm8wUnlnSW8iLCJmbGFnljoiliwia2V5ljoibndJRTRYMGxjYU1ubzI6UHdhRHJ1djVkUDIURDZFN2JlcmF1OXI5S2xEUSIsImxhYmVsljoiU0hMIGZyb20gMjAyMy0wOS0xMCBIUGF0aWVudERhdmUglzJiln0>

 = base64 Encoded Information on FHIR Payload Location and Key



A. Readable View (HTML)

A B

B. Computable Data (FHIR)

A

Readable View (HTML)



Allergen	Status	Category	Reaction	Severity	Comments	Onset
Sesame oil (substance)	active	ENVIRONMENT	Difficulty breathing	severe		Sat Jul 27 11:00:00 UTC 1963
Substance with penicillin structure and antibacterial mechanism of action (substance)	active	MEDICATION	Vomiting	severe		Sat Jul 27 11:00:00 UTC 1963

Problem List

Medical Problems	Status	Comments	Onset Date
Problem List			

Medication List

Medication	Status	Route	Sig	Comments	Authored Date
Sertraline 100mg tablets	Active		1 tablet once a day		Fri Nov 10 00:00:00 UTC 2017
Metformin 2G Modified-Release tablets	Active		2 tablets a day		Wed Nov 22 00:00:00 UTC 2017
Metformin 1g modified release tablets	Active		2 tablets a day		Wed Nov 22 00:00:00 UTC 2017

Medication Summary: Medication Requests

Medication	Status	Route	Sig	Date
Metformin 2G Modified-Release tablets	Active		2 tablets a day	Wed Nov 22 00:00:00 UTC 2017
Metformin 1g modified release tablets	Active		2 tablets a day	Wed Nov 22 00:00:00 UTC 2017
Sertraline 100mg tablets	Active		1 tablet once a day	Fri Nov 10 00:00:00 UTC 2017
Sertraline 100mg tablets	Active		1 tablet once a day	Fri Nov 10 00:00:00 UTC 2017

Medication Summary: Medication Statements

B

Computable Data (FHIR)






```


1  {
2  {
3  "resourceType": "Bundle",
4  "identifier": {
5  "system": "urn:uuid:4f4c4327",
6  "value": "50ee4b9-3788-4f92-b591-72548524e62c"
7  },
8  "type": "document",
9  "timestamp": "2023-05-20T13:20:35.552169+00",
10 "entry": [
11 {
12 "fullUrl": "urn:uuid:4f4c4327-437a-4911-9021-e1742b4e4a",
13 "resource": {
14 "resourceType": "Composition",
15 "status": "final",
16 "type": {
17 "coding": [
18 {
19 "system": "http://hl7.org",
20 "code": "88801-5",
21 "display": "Patient Summary Document"
22 }
23 ]
24 },
25 "subject": {
26 "reference": "Patient/d586d75b-c189-441c-b913-c9e607127616"
27 },
28 "date": "2023-05-20T13:20:35+00:00",
29 "author": [
30 {
31 "reference": "urn:uuid:4f4c4327-437a-4911-9021-e1742b4e4a"
32 }
33 ],
34 "title": "Patient Summary as of 01/30/2023",
35 "confidentiality": "N",
36 "section": [
37 {
38 "title": "Allergies and Intolerances",
39 "code": {
40 "coding": [
41 {
42 "system": "http://hl7.org",
43 "code": "88802-2",
44 "display": "Allergies and Adverse Reactions"
45 }
46 ]
47 },
48 "text": {
49 "status": "generated",
50 "div": "div xmlns='http://www.w3.org/1999/xhtml'><table class='table'><tbody><tr><td colspan='2'><h3>Allergies and Intolerances</h3></td></tr></tbody></table>"
51 },
52 "entry": [
53 {
54 "reference": "AllergyIntolerance/53492246-3495-4688-b8b3-008773c13058"
55 },
56 {
57 "reference": "AllergyIntolerance/5030e4f9-573d-4ccb-a429-aaf2caf9ab93"
58 }
59 ]
60 },
61 {
62 "title": "Medication List",
63 "code": {
64 "coding": [
65 {
66 "system": "http://hl7.org",
67 "code": "18008-4",
68 "display": "Medication List"
69 }
70 ]
71 },
72 "text": {
73 "status": "generated",
74 "div": "div xmlns='http://www.w3.org/1999/xhtml'><table class='table'><tbody><tr><td colspan='2'><h3>Medication Summary: Medication Requests</h3></td></tr></tbody></table>"
75 },
76 "entry": [
77 {
78 "reference": "MedicationStatement/8046812c-4345-45ca-b9ff-ec325816c416"
79 },
80 {
81 "reference": "MedicationStatement/67588c86-6c17-4ude-9255-108cb04855"
82 },
83 {
84 "reference": "MedicationRequest/afaa3fd-756b-4d81-a883-d666c76d7fa"
85 },
86 {
87 "reference": "MedicationRequest/c3c6b88d-9c38-4a14-82bc-3facb3da18f7"
88 }
89 ]
90 },
91 {
92 "title": "Problem List",
93 "code": {
94 "coding": [
95 {
96 "system": "http://hl7.org",
97 "code": "11008-4",
98 "display": "Problem List"
99 }
100 ]
101 },
102 "text": {
103 "status": "generated",
104 "div": "div xmlns='http://www.w3.org/1999/xhtml'><table class='table'><tbody><tr><td colspan='2'><h3>Problem List</h3></td></tr></tbody></table>"
105 },
106 "entry": [
107 {
108 "reference": "ProblemList/11008-4"
109 }
110 ]
111 }
112 ]
113 }

```

SMART Health Cards and Links

SMART Health Cards and Links FHIR IG
1.0.0 - CI Build 



Home
SMART Health Cards ▾
SMART Health Links ▾

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SMART Health Cards and Links FHIR IG, published by HL7 International / FHIR Infrastructure. This guide is not an authorized publication; it is the continuous build for version 1.0.0 built by the FHIR (HL7® FHIR® Standard) CI Build. This version is based on the current content of <https://github.com/HL7/smart-health-cards-and-links/> and changes regularly. See the [Directory of published versions](#)

1 Home Page

<i>Official URL:</i> http://hl7.org/fhir/uv/smart-health-cards-and-links/ImplementationGuide/h17.fhir.uv.smart-health-cards-and-links	<i>Version:</i> 1.0.0
Draft as of 2024-05-20	<i>Computable Name:</i> SMARTHealthCardsandLinks

1.1 Overview

Paper medical records—such as vaccination histories and insurance cards—are easily lost or damaged, are difficult to authenticate, and are often not on-hand when they’re needed.

SMART Health Cards and Links are FHIR-based standards that address these challenges, enabling individuals to receive their health information and share it with others in a tamper-proof and verifiable digital form. They provide a digital version of an individual’s clinical information that can be kept at the ready and easily shared with others when the need arises—using a QR code, mobile app or web browser.

Together SMART Health Cards and Links provide options that support multiple goals—from keeping a small amount of verifiable medical information close by to authorizing a trusted party to access their entire medical record. They empower individuals with secure, equitable, and privacy-preserving access to their clinical information.

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- [Contributing](#)
- [Sponsoring HL7 Workgroup](#)
- [Authors](#)
- [Dependencies](#)
- [Cross Version Analysis](#)
- [Global Profiles](#)
- [IP Statements](#)

Next Steps

- Multiple vendors moving forward with support or SMART Health Links and IPS
- GDHP will continue support their development
- Provide your feedback as part of the HL7 Ballots
 - SMART Health Cards and Health Links (September 2024)
 - IPS FHIR IG 2.0 (*planned* September 2024)
 - IPS CDA IG 2.0 (*planned* September 2024)

Come to the Other Session THURSDAY 1:30pm



IPA & IPS: Peanut Butter and Jelly, Better Together



1:30 PM – 2:45 PM at Thomas Swain Room

BEGINNER TUTORIAL

IPA IPS



Bryant Karras

SPEAKER

Chief Medical Informatics
Officer
Washington State
Department of Health
[Speaker's Page](#)



Isaac Vetter

SPEAKER

Integration Team Lead
Epic
[Speaker's Page](#)



Matt Rahn

SPEAKER

Director, Standards
Division
Office of the National
Coordinator for Health IT
[Speaker's Page](#)

Is global interop your jam? Join us for an introduction to two delectable FHIR projects – International Patient Access (IPA) defines a universal realm API for apps and International Patient Summary (IPS) enables cross-border care summary exchange. While the initiatives sound similar, they solve d...

[Read More](#)

Questions?

Go to the SMART Health
Links Ballot



For any questions I cannot
answer, refer here

