



Trillium II

Reinforcing the Bridges and Scaling up
EU/US Cooperation on Patient Summary

**International Patient Summary
standards connecting to EHRs:**
Lessons learned in Trillium II project

Catherine Chronaki
HL7 Europe





The story began with epsos...can trans-European patient summaries be understood across the Atlantic?

Gap analysis

- ✓ Compared patient summary specifications in EU/US
- ✓ Shared clinical elements: problems, medications, allergies

Interoperability Assets

- ✓ Established a terminology prototype CTS-2 service: http://extension.phast.fr/STS_UI
- ✓ Developed Transformer of Patient summaries: <http://informatics.mayo.edu/trillium-bridge>
- ✓ Mediated Differences in EU/US IHE XCPD/XCA profiles for Patient Identity and Document Query/Retrieve

Validation activities: 4 EU countries/ Kaiser Permanente

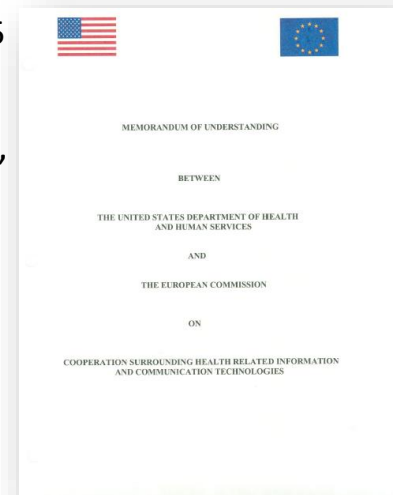
- ✓ EU/US Marketplace; HIMSS 2015; IHE Europe Connectathon 2015, eHealthWeek 2014,15

Feasibility study:

- ✓ Reflected upon standards, cross-vendor integration, incentives, clinical research, security and privacy, innovative business models, education

Recommendation:

“Advance an International Patient Summary (IPS) standard to enable people to **access and share their health information** for emergency or unplanned care anywhere and as needed. At minimum the IPS should include **immunizations, allergies, medications, clinical problems, past operations and implants.**”



Trillium-II partnership: 14 countries – 7 health systems



Standards Organizations:

- ✓ HL7 International Foundation (Scientific Coordinator), BE
- ✓ NEN/CEN TC 251 Health Informatics, NL
- ✓ IHE EUROPE, BE
- ✓ CDISC EUROPE FOUNDATION, BE

Health Systems & Associated Competence centers:

- ✓ MedCom (Administrative Coordinator), DK
- ✓ LISPA - LOMBARDIA INFORMATICA, I
- ✓ THL - TERVEYDEN JA HYVINVOINNIN LAITOS, FI
- ✓ eSANTE - AGENCE eSANTE, LU
- ✓ TicSalut – Catalonia, ES
- ✓ SPMS, PT
- ✓ Reliant, Reliant Medical Group, Inc., US
- ✓ HSCP Healthcare Services Platform Consortium, US
- ✓ KAISER FOUNDATION HOSPITALS, US

Dissemination and Networking:

- ✓ ECHA - Connected Health Alliance CIC, UK
- ✓ ADI - Advanced Digital Innovation LTD UK
- ✓ I~HD - European Institute for Innovation through HealthData, BE

Development and Evaluation:

- ✓ GNOMON Informatics SA, Greece
- ✓ PHAST RESEAU Association, France
- ✓ SRDC, Turkey
- ✓ OFFIS EV, Germany
- ✓ EMPIRICA, Germany
- ✓ LANTANA Consulting Group, LLC, US
- ✓ PROSOCIAL Applications INC, US

Other Parties

- ✓ The Sequoia Project and eHealth Exchange, US
- ✓ AHIMA, US



Scaling-up use of patient summaries

 Consider the IPS as an active window to a person's health data, a landing page to navigate a person's health information across locations & jurisdictions.





 **Trillium-II will select and elaborate**

- ✓ resources to accelerate implementation and sharing of experience
- ✓ new use cases on the use of patient summaries from unplanned emergency care



Scaling-up the use of patient summaries

 *In case of **Emergency**, the IPS is there in our mobile phone and can be understood anywhere in the world*

 ***Emergency response teams** can use aggregated IPS to capture the needs of a community or refugee camp in the aftermath of a disaster.*



Trillium-II's ambition touches the person through their personal hub and the community through an aggregating dashboard making the most of our data-driven economy.

Uses of the IPS through a personal lens

Listening to the patient and the family

- ✓ **Quality assurance**: medication reconciliation by the family
- ✓ **Health goals**: tracking progress and identifying health trends
- ✓ **Early warnings**: frailty in the elderly

Navigating digital health data: portability, trust, and flow

- ✓ **Tracking hypertension**: Chronic disease management
- ✓ **Rare Disease Passport**: patient summaries for patients with rare diseases
- ✓ **European Vaccination Card**: Vaccination of children in communities and refugee camps
- ✓ **Survivor passport**: Survivors of childhood cancer
- ✓ **Mother / Child Summary**: fertility, pregnancy, child birth, infant home records

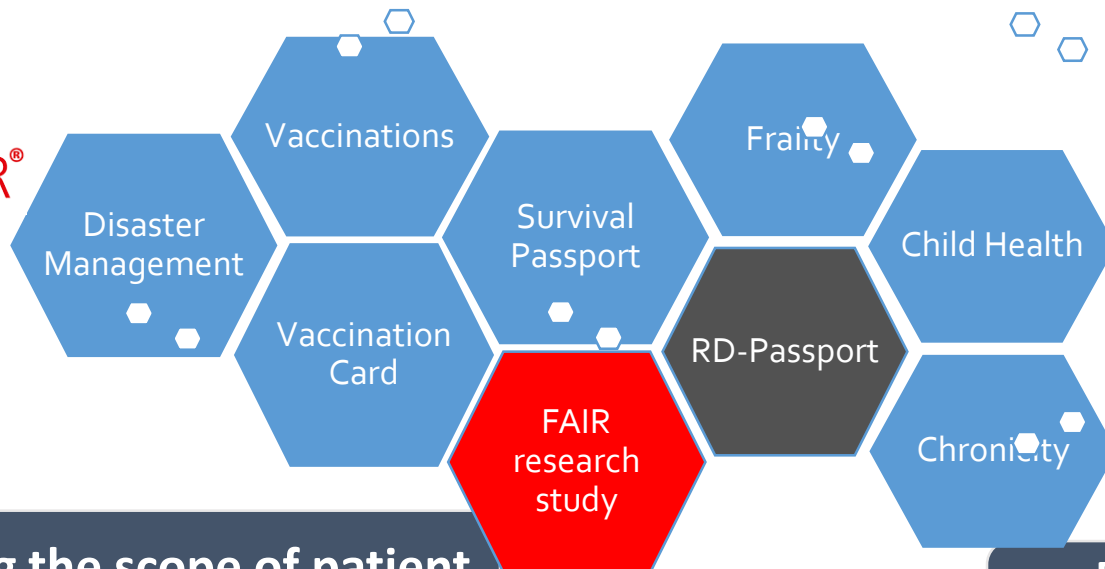
Tracking the health needs in communities

- ✓ Disaster and emergency management
- ✓ My Healthy neighborhood





Advancing adoption of the IPS



Extending the scope of patient summaries beyond emergency/unplanned

Building FHIR IPS "library"

Refine the IPS components, with the knowledge gained from the project.



Building blocks of the International Patient Summary standards and beyond



Trillium II



IPS

Subject

**Medication
Summary**

Immunizations

Vital Signs

**Functional
Status**
(Autonomy/
Invalidity)

Encounters

Author

**Allergies
and
Intolerances**

**History of
Procedures**

**Past History
of
Illness**

**Plan of
Care**

**Image
results**

Attester

Problem List

**Medical
Devices**

Pregnancy
(status +
history
summary)

**Advance
Directives**

lab results

Custodian

**Diagnostic
Results**

**Social
History**

„Header“

Required

Recommended

Optional

Optional



Trillium II International Patient Summary (IPS) Use Cases and tools



➤ **Come Learn about HL7 FHIR IPS and the available implementation tools!**

➤ **Help us Assess the efficiency and effectiveness of HL7 FHIR IPS**

- ✓ **Immunization List**
 - HL7, SPMS, GNOMON, TicSalut, eSanté
 - In collaboration with MOCHA Project
- ✓ **Assessing Frailty**
 - SRDC, SIGLA, HL7
 - In collaboration with FrailSafe Project
- ✓ **Chronic Patient Care**
 - **SRDC, HL7**
 - **In collaboration with C3Cloud Project**
- ✓ **Disaster Management**
 - HL7, SPMS, GNOMON
 - In collaboration with EUMFH, EUMODEX Ro



My Health, My data,
where I need them



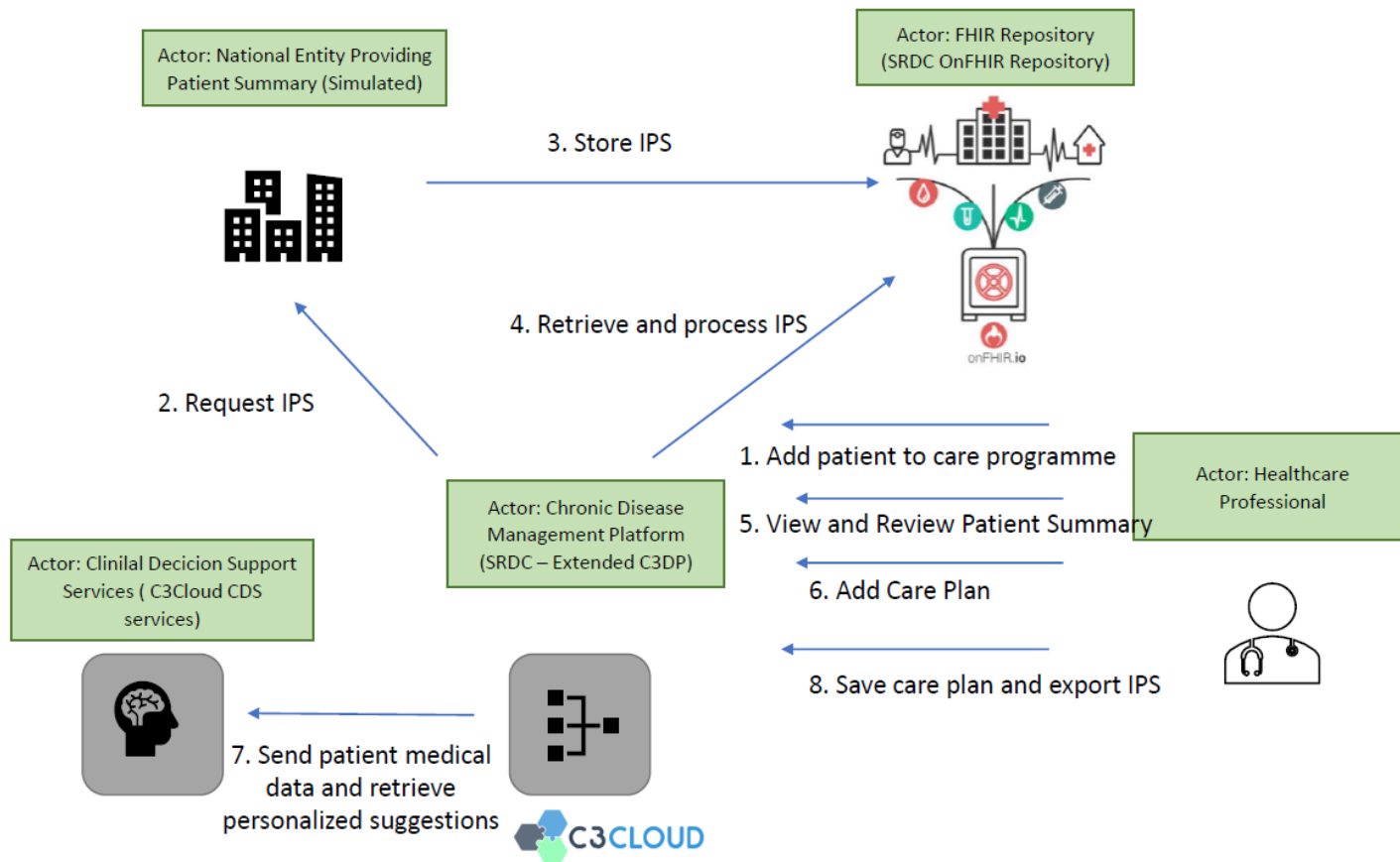
HL7® FHIR®



➤ **Learn how to win the Trillium II prize!**



C3Cloud – Trillium II in FHIR Connectathon, Baltimore US, September 2018





C3Cloud - Trillium II Demo









C3-CLOUD Home My Patients Schedule Messages GB Anna Svensson

Filter Patients: Name... Add Patient

Anna Svensson
General physician

Home My Patients Schedule Messages

Emily A0001	George Test	Josephin Medina
 A0001 69 years (01 Jan 1950) female	 0 85 years (22 Jun 1934) male	 0 83 years (11 Mar 1936) female
Conditions Care Plan Draft	Conditions Care Plan	Conditions Care Plan Draft
<ul style="list-style-type: none">Heart failureChronic kidney disease stage 2Type 2 diabetes mellitusDepression	<ul style="list-style-type: none">Heart failureType 2 diabetes mellitus	<ul style="list-style-type: none">Chronic kidney disease stage 1Type 2 diabetes mellitus
+ Summary Care Plan	+ Summary Care Plan	+ Summary Care Plan

PRUEBAS C3CLOUD OSAKIDETZA	Sven Karlsson(a1)	Test Patient
 211313 68 years (27 Nov 1950) male	 19420816-1010 77 years (16 Aug 1942) male	 19420816-0000 77 years (16 Aug 1942) male
Conditions Care Plan	Conditions Care Plan	Conditions Care Plan Draft
	<ul style="list-style-type: none">Type 2 diabetes mellitus with monone...	<ul style="list-style-type: none">Chronic kidney disease stage 5
	+ Summary Care Plan	+ Summary Care Plan

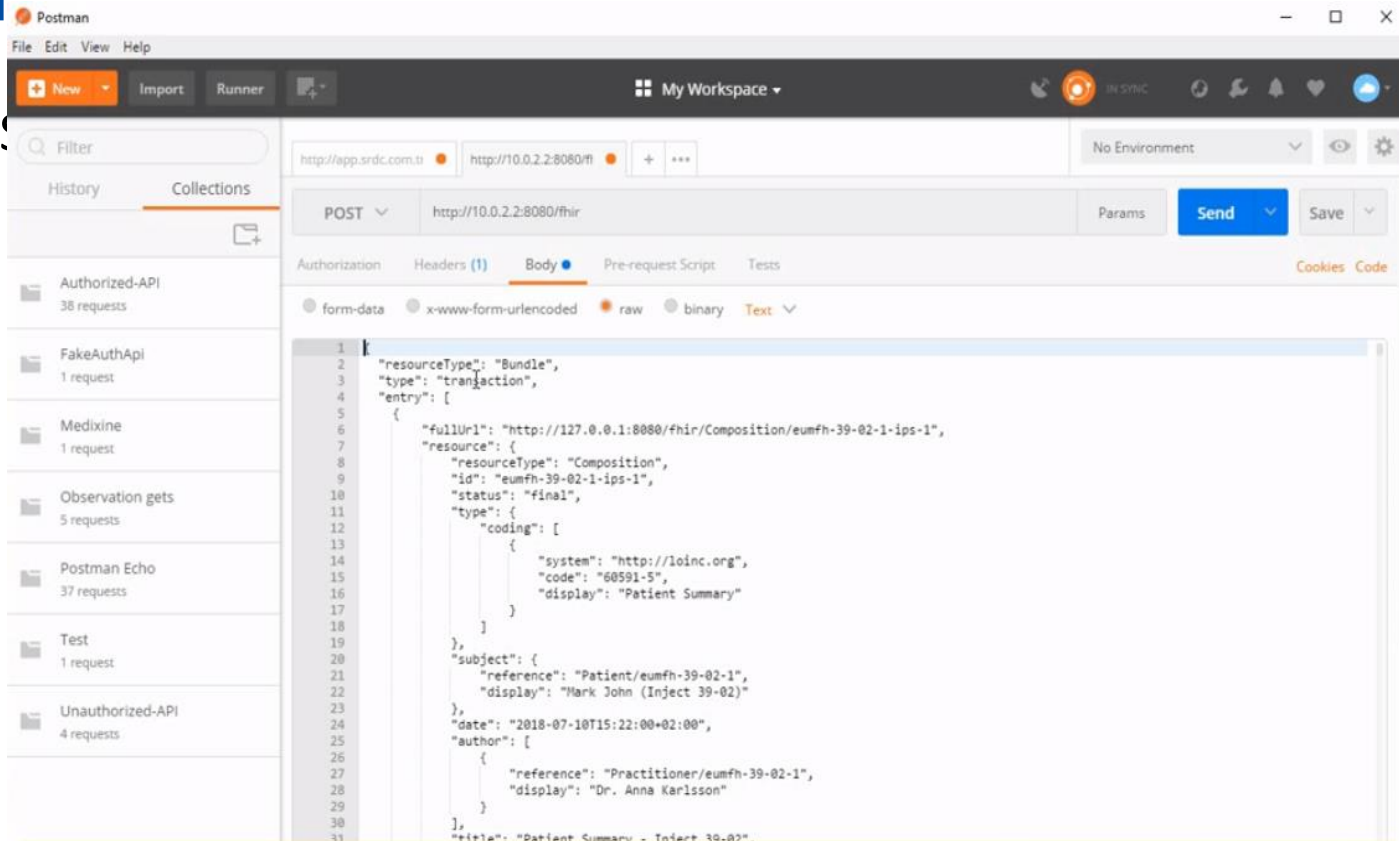
DEMO: https://drive.google.com/file/d/1lXC25gF29qHaLyQw_e_8yhPDWZesEucl/view



Importing IPS



- IPS






Find the patient







C3-CLOUD

Home My Patients Schedule Messages

GB Anna Svensson

 **Anna Svensson**
General physician

Home My Patients Schedule Messages

	John Mark	 39-02	 85 years (22 Jun 1934)		Create New Care Plan	<input type="button" value="+ Create"/>
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Imported IPS



C3-CLOUD

HomeMy PatientsScheduleMessages

Anna Svensson

John Mark

Patient

Age: 84 (22 Jun 1934)

Gender: Male

E-mail: N/A

Phone: N/A

Address: N/A

Medical Summary

Care Plans

Patient Provided Data

Medical Summary of John Mark

Please review the medical summary

Conditions

Diagnosis

Mild cognitive impairment

Chronic kidney disease, stage 3

Prostate Cancer

Type 2 diabetes mellitus

Glaucoma

Essential (primary) hypertension

Hypothyroidism, unspecified

Allergies

John Mark

Patient

Age: 84 (22 Jun 1934)

Gender: Male

E-mail: N/A

Phone: N/A

Address: N/A

Medical Summary

Care Plans

Patient Provided Data

Diagnosis

Date

Status

Mild cognitive impairment

01 Aug 2015

Active

Chronic kidney disease, stage 3

01 Jan 2015

Active

Prostate Cancer

02 Oct 2010

Active

Type 2 diabetes mellitus

02 Apr 2010

Active

Glaucoma

04 May 1998

Active

Essential (primary) hypertension

02 Mar 1993

Active

Hypothyroidism, unspecified

10 Mar 1987

Active

Allergies

Allergy

Reaction

Onset

Penicillins with extended spectrum

Encounters

Health Prof.

Location

Date

Observations

Lab Results

Vital Signs

Risks / Scores

Test

Value

Range

Date

C3-CLOUD

HomeMy PatientsScheduleMessages

Anna Svensson

Product

Dose

Frequency

Commenced

Lisinopril

10 mg

1 times per 1 day

02 May 1993

levothyroxine sodium

100 ug

1 times per 1 day

01 Apr 1987

Procedures

Procedure

Date

Care Barriers

Barrier

Value

Date

Chart

History

Select a measurement to see the details



Creating a new care plan for the patient – checking his existing conditions



C3-CLOUD Home My Patients Schedule Messages Anna Svensson

Create New Care Plan

Title

Care Plan of John Mark

C3-CLOUD Home My Patients Schedule Messages Anna Svensson

Create New Care Plan

Title

Care Plan of John Mark

Diseases

☐ Heart failure

☒ Chronic kidney disease

☒ Type 2 diabetes

☐ Depression

Import Existing Medications *

Patient doesn't have registered medications

Care Team

Add New Member

Search

Anna Svensson

Role

General physician

Manager

Set as manager

Remove

John Mark
Patient
Age: 84 (22 Jun 1934)
Gender: Male
E-mail: N/A
Phone: N/A
Address: N/A

Medical Summary +
Care Plans ↻
Patient Provided Data ♥

John Mark
Patient
Age: 84 (22 Jun 1934)
Gender: Male
E-mail: N/A
Phone: N/A
Address: N/A

Medical Summary +
Care Plans ↻
Patient Provided Data ♥



Reviewing detailed medical summary before asking for personalized goals and activities from CDS



C3-CLOUD Home My Patients Schedule Messages GB Anna Svensson

All BP Management **Glucose Management** Renal Management Lipid Management

Complication Management Diet & Lifestyle Other

John Mark
Patient
Age: 84 (22 Jun 1934)
Gender: Male
E-mail: N/A
Phone: N/A
Address: N/A

Medical Summary +
Care Plan
Care Plan Management
Care Plan Preferences
Care Team

CONDITIONS

☒ Chronic kidney disease

☒ Type 2 diabetes

☐ Previous hypoglycemia

☐ Liver insufficiency

☐ Alcoholism with complications

☐ Arthrosis in hip

☐ Arthrosis in knee

☐ Bladder cancer

MEDICATIONS

☐ Treatment with risk of hypoglycemia

☐ Bosentan

☐ Metformin

☐ Pioglitazone

☐ Sulfonylureas

☐ DPP-4 inhibitor

LAB RESULTS

eGFR

Quantity mL/min/1.73_m2

CONDITIONS

☐ Heart failure

☐ Diabetic ketoacidosis

☐ Hepatic impairment

☐ Malnutrition

☐ Schizophrenia and other psychosis

☐ Uninvestigated macroscopic hematuria

☐ Symptomatic hyperglycemia

MEDICATIONS

☐ GLP-1 analogues

☐ SGLT2 inhibitors

☐ Insulins and analogues

☐ Dapagliflozin

☐ Canagliflozin

☐ Empagliflozin

RISKS

Frailty score

Quantity



Adding a new goal



C3-CLOUD Home My Patients Schedule Messages GB Anna Svensson

All BP Management **Glucose Management** Renal Management Lipid Management

Complication Management Diet & Lifestyle Other

Weight
Quantity kg

Body mass index (BMI)
Quantity kg/m2

Metformin allergy
Sulfonylurea allergy

Hide Saved

John Mark
Patient
Age: 84 (22 Jun 1934)
Gender: Male
E-mail: N/A
Phone: N/A
Address: N/A

Medical Summary +
Care Plan
Care Plan Management
Care Plan Preferences
Care Team

Goals

Title	Start Date	Target

Create New Goal

Computable Suggestions Further Suggestions

☒ Treatment target is supposed to be 46 mmol/mol ($\leq 6.4\%$) <46 mmol/mol

Cancel Create Another Goal Create

Activities



Goal is added to the care plan



C3-CLOUD Home My Patients Schedule Messages GB Anna Svensson

John Mark
Patient
Age: 84 (22 Jun 1934)
Gender: Male
E-mail: N/A
Phone: N/A
Address: N/A

Medical Summary +
Care Plan
Care Plan Management
Care Plan Preferences
Care Team
Care Plans
Patient Provided Data

All BP Management **Glucose Management** Renal Management Lipid Management
Complication Management Diet & Lifestyle Other

Weight
Quantity kg
Body mass index (BMI)
Quantity kg/m2
Hide ✓ Saved

Goals + Add New Goal

Display Inactive Goals

Title	Start Date	Target Date	Target	Actions
● Treatment target is supposed to be 46 mmol/mol ($\leq 6.4\%$)	15 Mar 2019		HbA1c < 46 mmol/mol	

Activities + Add New Activity

Filter by Assignee: Anyone Display Inactive Activities



Personalized activity suggestions



Create New Activity

Computable Suggestions

Further Suggestions

Personalized Suggestions

Annual control of patients who are self-monitoring of blood glucose

If the patient is self-monitoring blood glucose carry out structured assessment annually of the patients testing skills, knowledge to interpret results and the benefit for the patient

☐ Appointment for structured assessment of the patients who is self-monitoring blood glucose

☐ Structured assessment of the patients who is self-monitoring blood glucose

Appointment

Suggestions on self-monitoring of blood glucose

-Do not routinely offer self monitoring if there is no risk of hypoglycemia. -Consider short term self-monitoring if there is no risk of hypoglycemia only when starting oral or intravenous treatment with corticosteroids.

Self-monitoring of Blood Glucose

☐ Self-measurement of blood glucose

Patient Order

Cancel

Create Another Activity

Create

28 August 2020

C3Cloud Final Conference

20



Exporting IPS



C3-CLOUD

HomeMy PatientsScheduleMessages

GBAnna Svensson

John Mark
Patient
Age: 84 (22 Jun 1934)
Gender: Male
E-mail: N/A
Phone: N/A
Address: N/A

Medical Summary

Care Plan

Patient Provided Data

Medical Summary of John Mark

IPS Download

Refresh

Conditions

Diagnosis	Date	Status
Mild cognitive impairment	01 Aug 2015	Active
Chronic kidney disease, stage 3	01 Jan 2015	Active
Prostate Cancer	02 Oct 2010	Active
Type 2 diabetes mellitus	02 Apr 2010	Active
Glaucoma	04 May 1998	Active
Essential (primary) hypertension	02 Mar 1993	Active
Hypothyroidism, unspecified	10 Mar 1987	Active

Medications

Product	Dose	Frequency	Commenced
Gliclazide	80 mg	1 times per 1 day	01 May 2015
Acetylsalicylic acid	75 mg	1 times per 1 day	10 Nov 2012
Metformin	500 mg	2 times per 1 day	01 Oct 2010
Finasteride	5 mg	1 times per 1 day	04 Aug 2010
tamsulosin	0.4 mg	1 times per 1 day	03 Feb 2008
latanoprost	55 ug	1 times per 1 day	16 Feb 2004
Timolol	0.25 %	1 times per 2 day	15 Aug 1998
Atorvastatin	40 mg	1 times per 1 day	02 Apr 1998
Atenolol	50 mg	1 times per 1 day	03 Aug 1994
Bendroflumethiazide	2.5 mg	1 times per 1 day	01 Sep 1993

Allergies

Procedures



C3 Cloud-Trillium cooperation
in EUModel-RO
28 countries, 2800 participants
Israeli Mobile Hospital of 150 people,
7 ICU beds, 30 beds in wards







Lessons Learned...

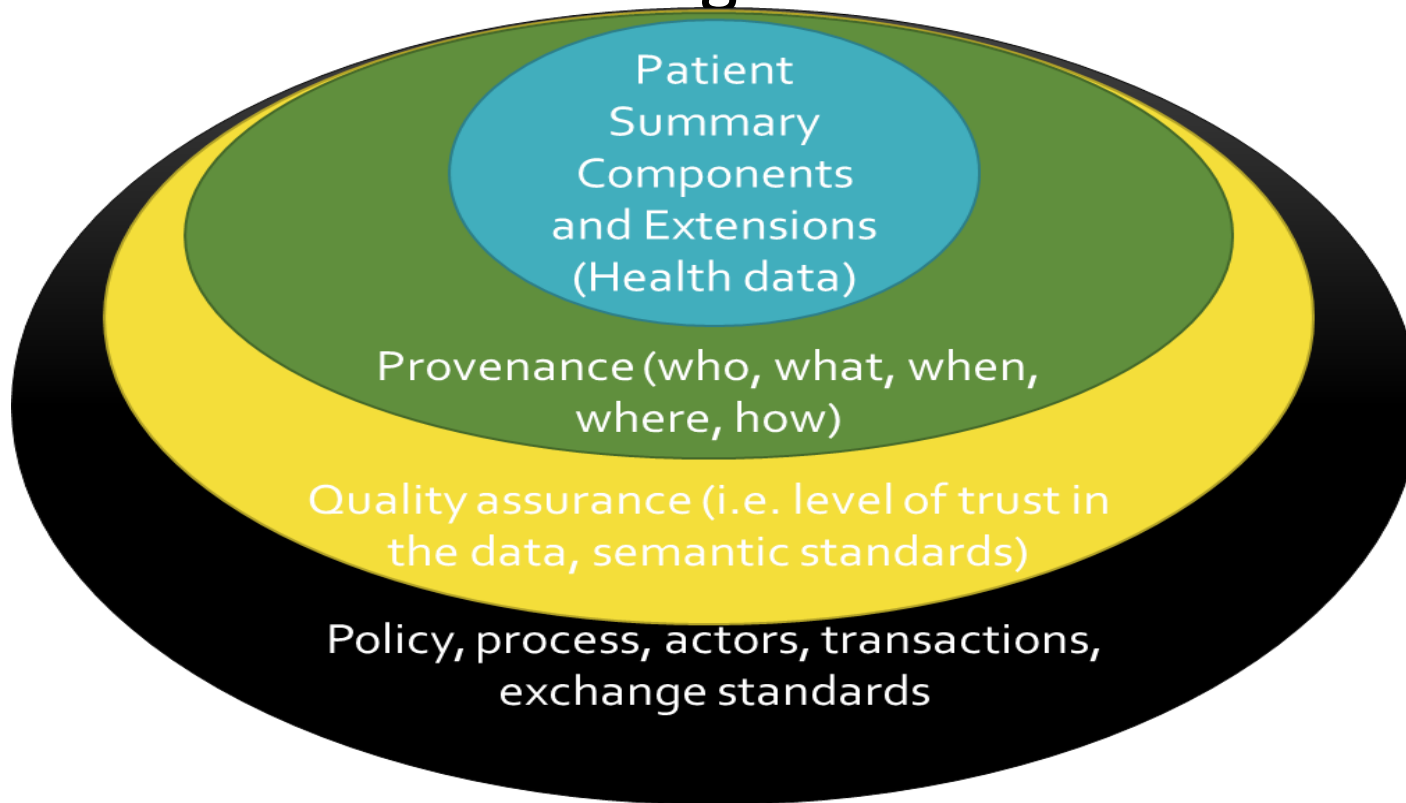


- Lesson 1: Focus on Provenance, Quality, and Trust on the source
- Lesson 2: Align Application Programming Interfaces (APIs) in health
- Lesson 3: Care plans matter for IPS, focus on daily use, make it easy
- Lesson 4: Tools accelerate integration and implementation of standards
- Lesson 5: Prioritize on IPS use, HL7 FHIR for FAIR data
- Lesson 6: Be aware of the gaps, SDO cooperation is a must
- Lesson 7: Invest on education, capacity building, and new ways of work





International Patient Summary Standards connecting to EHRs



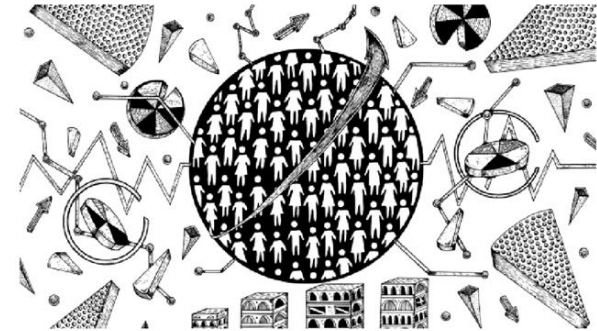
Power of APIs in Healthcare:

The case of Apple

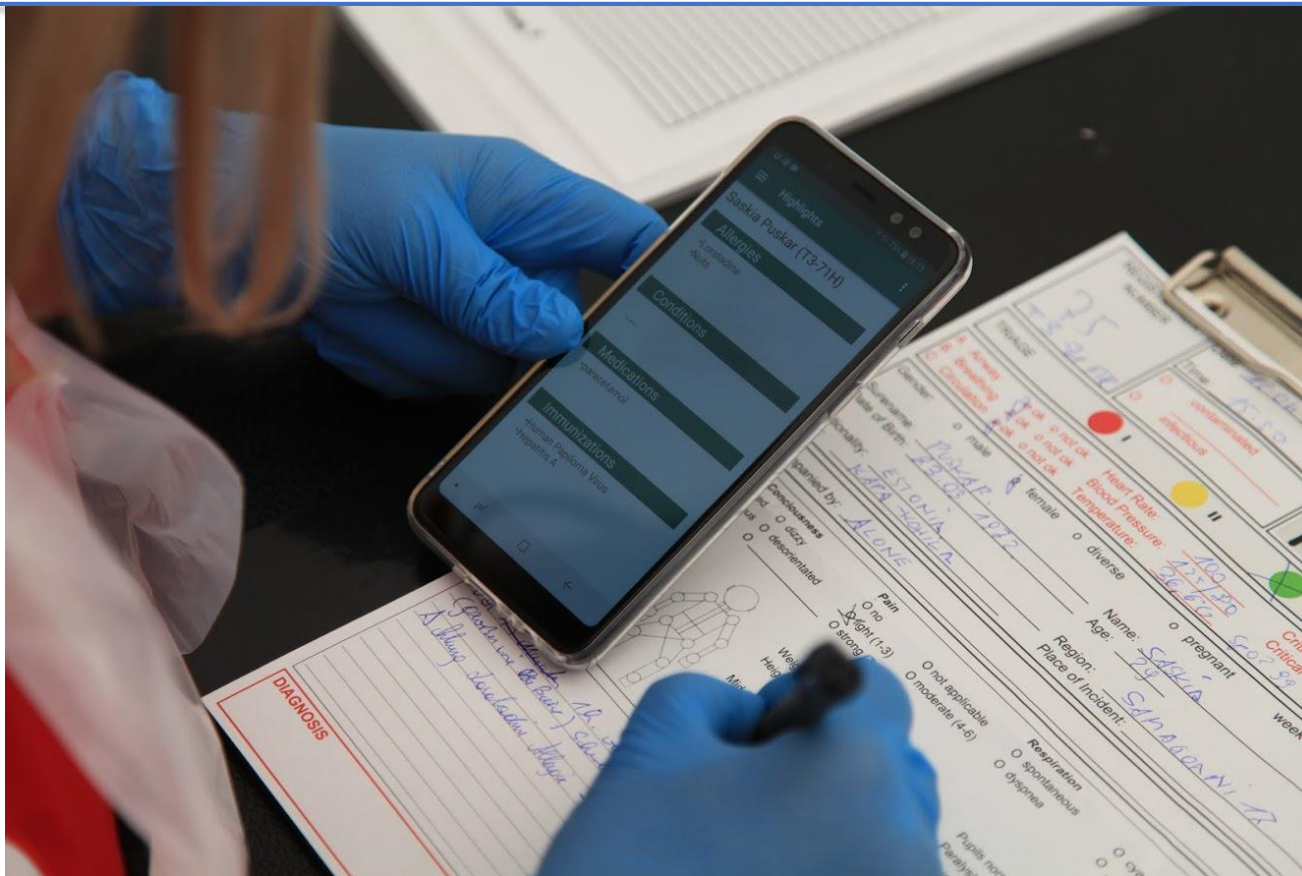
- Apple leads the way towards an IT enabled health ecosystem
- January 24, 2018: *“Apple and 13 prominent health systems, ..., disclosed an agreement that would allow Apple to download onto its various devices the electronic health data of those systems’ patients — with patients’ permission...”*
- End to the inability to make electronic data liquid
 - follow the patient throughout the health system, available for sophisticated analysis for improved patient care and research.
- After long time efforts to liberate and exchange health data focused on doctors and hospitals to share..
- Apple entered with area around 2014 with citizen focus
 - HealthKit – developer tool that allows apps to contribute/share data, e.g. Nike+, AliveCor, DexCom glucose monitor, etc.
 - ResearchKit – developer kit for scientists to carry Human studies
 - CareKit, developers creating apps to let people manage long-term conditions
 - Health Records, access to your own health records across providers

Apple’s Pact with 13 Health Care Systems Might Actually Disrupt the Industry

by David Blumenthal and Aneesh Chopra
MARCH 23, 2018

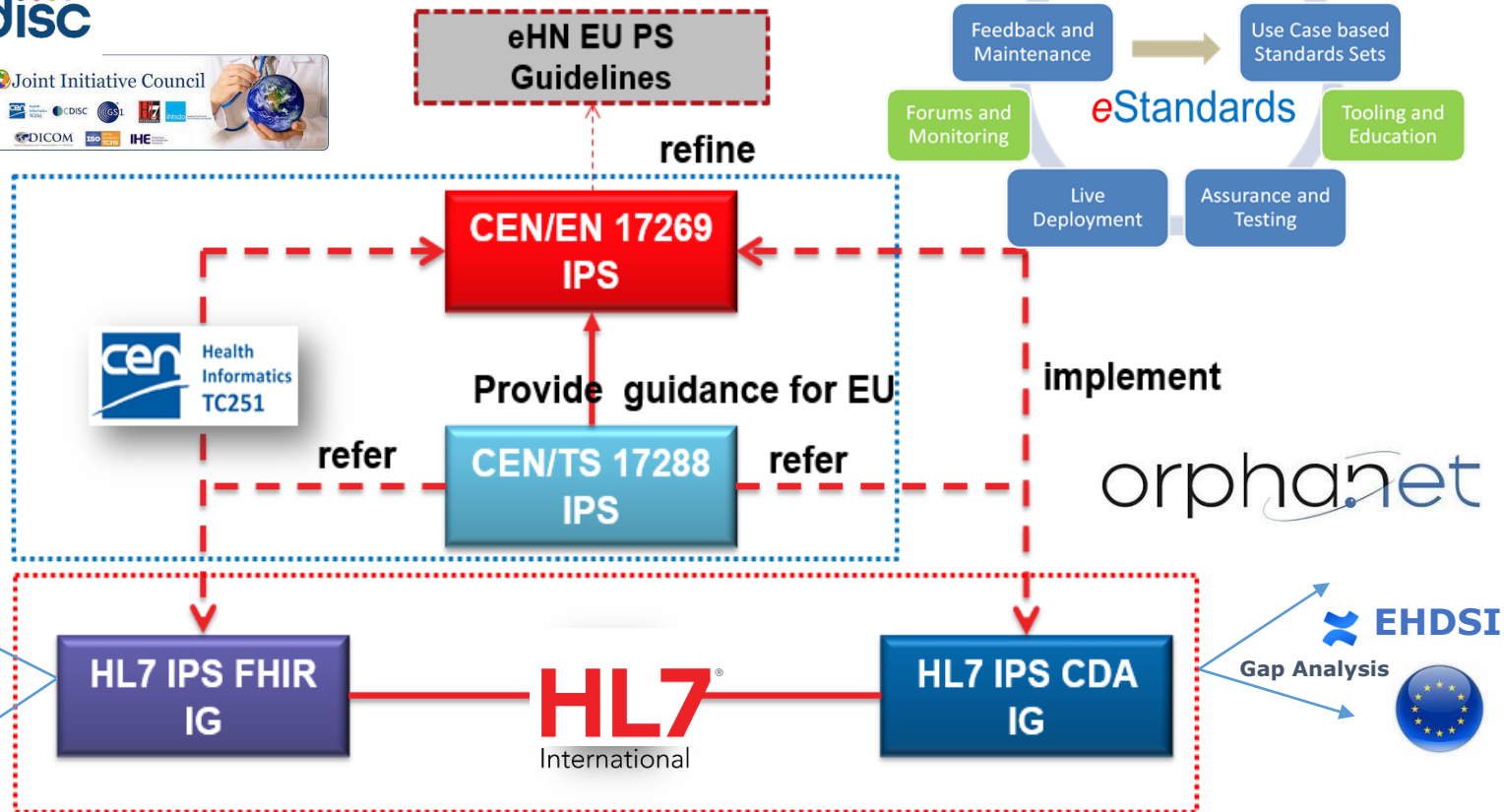


Accessibility matters – how do you get/enter/use IPS data?



Collaborate across **standardization bodies**

Cross-SDO alignment and cooperation on tools



IPS Artifact Maintenance

Artifact	SDO Responsible	Maintenance Cycle	Maintenance Process	Comments
IPS Specification	CEN	Not relevant, transferred to ISO		Move standards into ISO
IPS Specification	ISO/TC215	Systematic reviews (3-5 years)	Can form a maintenance body to add technical updates more frequencies	
IPS Implementation Guide (CDA)	HL7	5-year reaffirmation of normative	STU comments	STU period 1-2 year revisions
IPS Implementation Guide (FHIR)	HL7	5-year reaffirmation of normative	FHIR: JIRA	Management group determines frequency of updates
IPS Profile	IHE	Ongoing as experience is gained	Change Proposals	
IPS Terminology	SNOMED	Updates as required		



What lies ahead?



- IPS Communities of Practice and the challenge of consistency
- Extensions of IPS to address specific needs – diseases – care plans
- COVID-19 aftermath: labs, images, and the eEHRxF

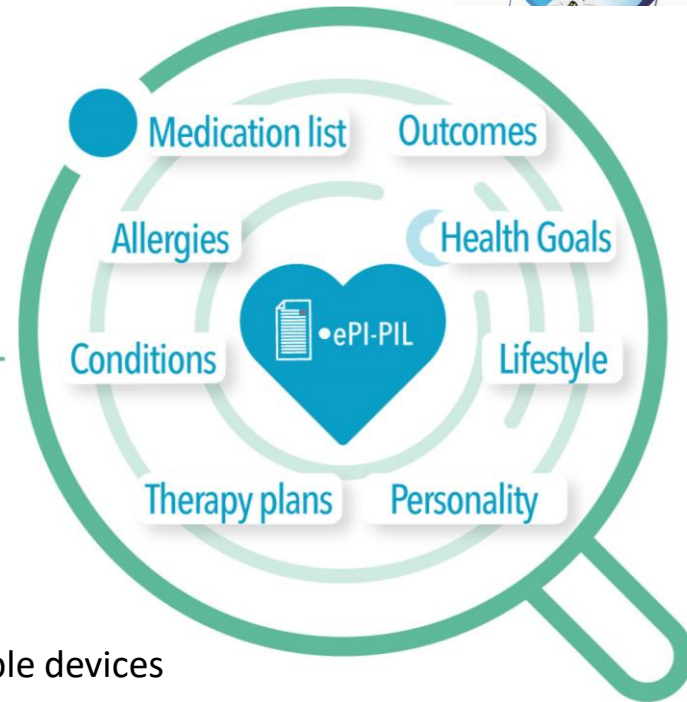




International Patient Summary and Gravitare Lens

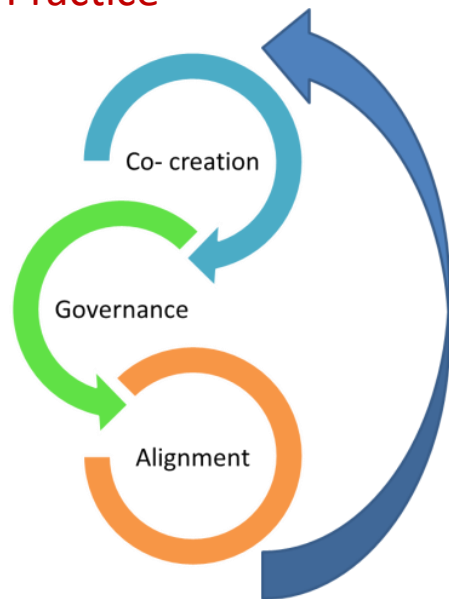


My Health, My data,
where I need them



- Think of the Patient summary as **a window to a person's health** or dashboard to get:
 - Medications, allergies, vaccinations, problems and procedures,
 - labs, diagnostic imaging, recent or planned encounters, implantable devices
 - advance directives
- For Gravitare Health it offers the lens to focus on the contents of the medication leaflet

Global IPS Community of Practice



Mind the Gap

