



C3-Cloud Mission and high-level achievements in the area of multimorbidity

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Theodoros Arvanitis, C3-Cloud Coordinator



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SETTING THE MULTIMORBIDITY SCENE



People living with multimorbidity:



are at greater risk of negative outcomes such as increased mortality, lower quality of life, and greater use of healthcare services, including unplanned admission to care settings.



face challenges in navigating the health and care system and managing their health and are generally less satisfied with the care they receive.



experience too much emphasis on their conditions, and not enough emphasis on how these conditions affect them.



see little attention on the wider determinants of health and how these impact on their lives and outcomes.

MULTI-MORBIDITY IN THE CONTEXT OF C3-CLOUD

- Accumulation of multiple chronic conditions, termed multi-morbidity, including a growing number of functional and cognitive impairment
- Currently, around 50 million European citizens suffer from two or more chronic conditions
 - More than 50% of all older people have *at least 3 chronic conditions*, and a significant proportion *has 5 or more*.
- Multimorbidity is also relating to newly observed trends of older people in the EU, as being identified as more likely than average to be obese
- Multimorbidity can also refer to:
 - disability
 - acute conditions
 - or more severe conditions that are more sudden in onset than chronic diseases, eg a cancer diagnosis
 - have increased vulnerability or decreasing resilience to seemingly cope with minor health events, e.g. infection or medication changes
- **multidimensional view**, taking into account social and environmental as well as physical and psychological factors

CHALLENGES OF MULTI-MORBIDITY



Clinicians' knowledge is insufficient for assessment of multimorbidity – particularly in terms of **care and support planning**.



The current model of health and 'traditional way of doing things' acts as a barrier to client and family participation and involvement in **shared decision-making**.

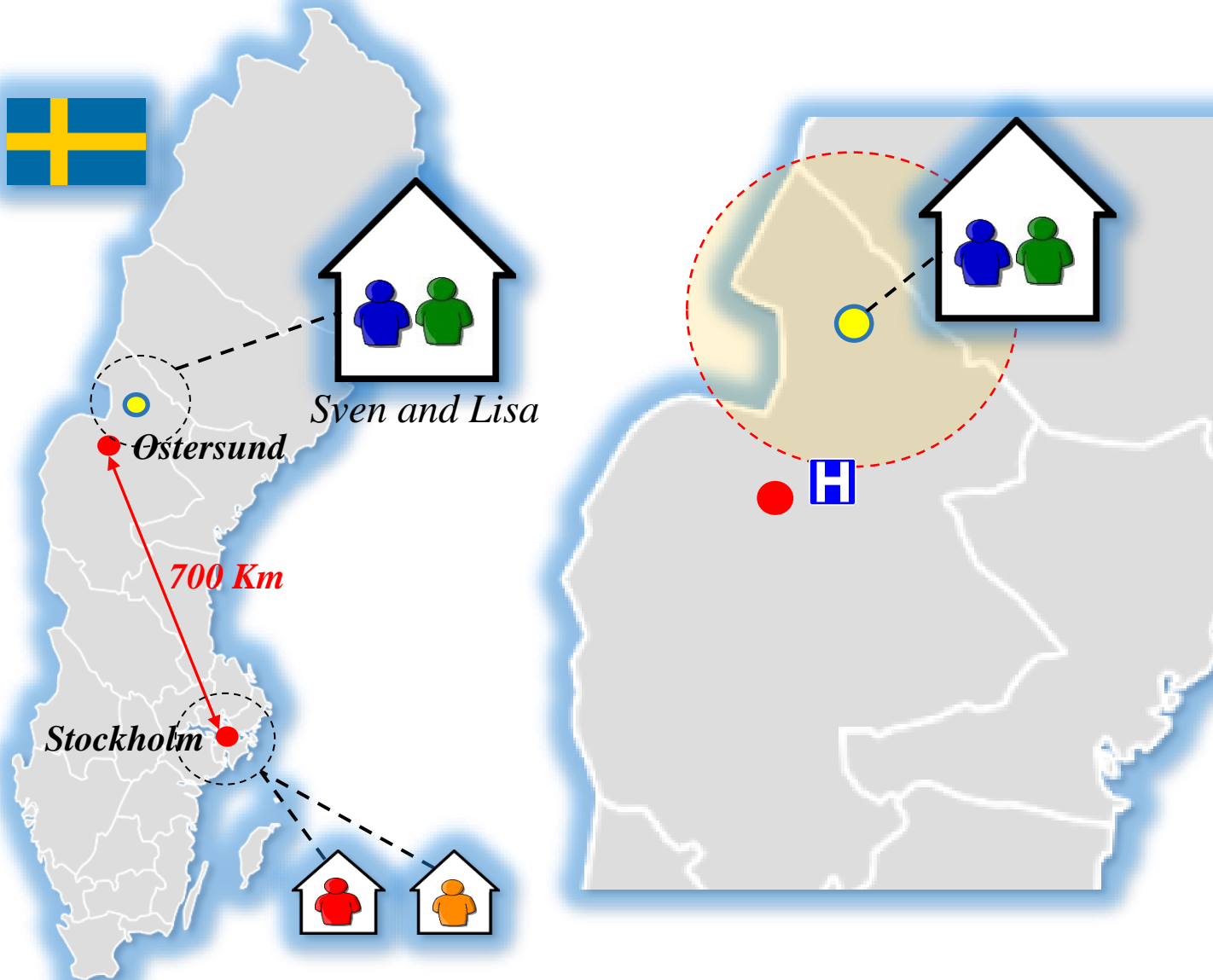


Much of the health and care system and workforce is designed to respond to a **single disease** rather than multiple ones



Movement towards **self-management and social prescribing** for achievement of medium to long term outcomes is inhibited by single disease focus.

OUR QUEST: THE HEALTH AND CARE STORY OF SVEN



Sven is treated for 1) hypertension, 2) type II diabetes, 3) kidney failure



Sven is cared for by a team of clinicians spread out in different locations

*Dr. Anna Svensson
(GP)*

*Martina LC
(Community Nurse)*

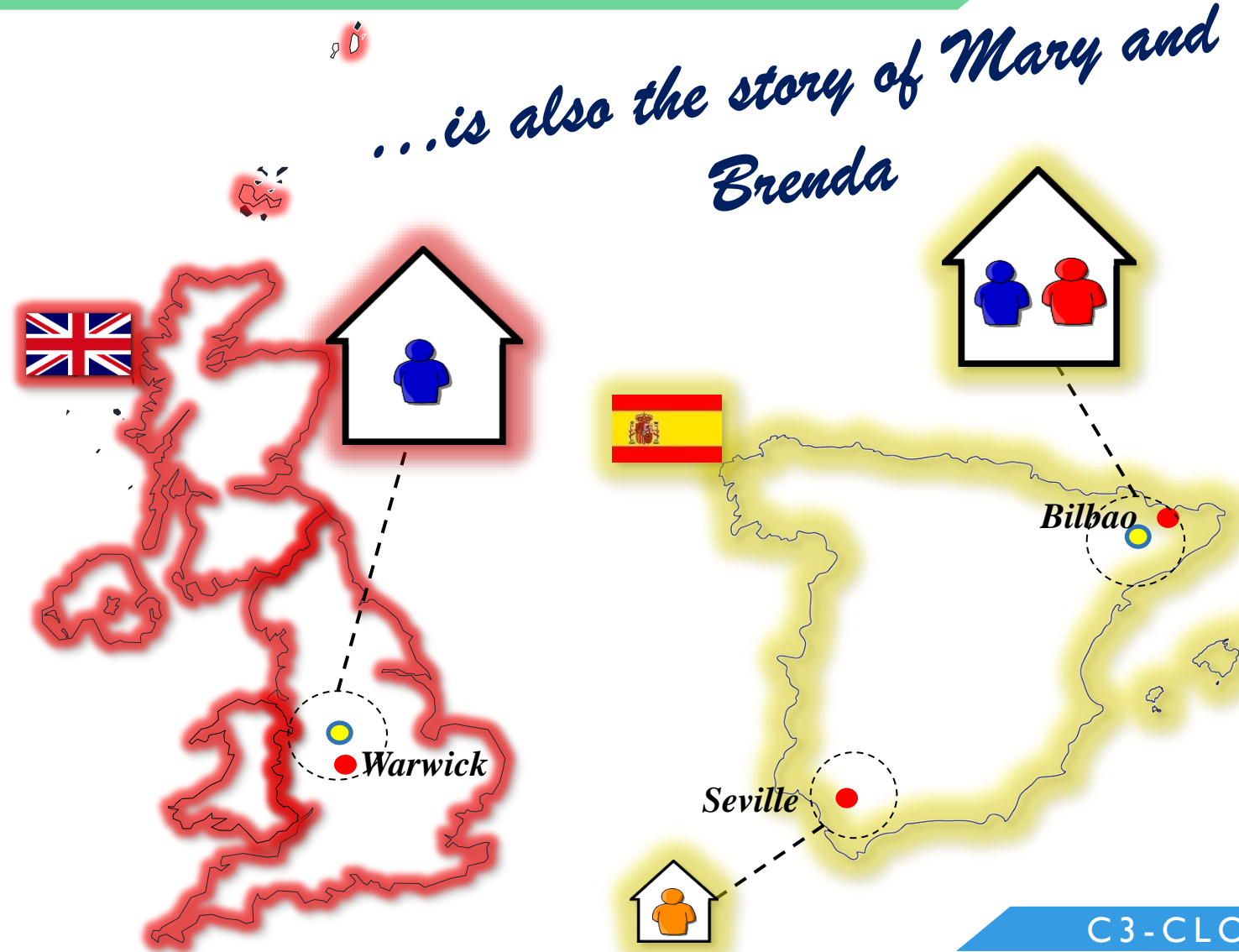
*Erik Larsson
(Diabetes Nurse)*

*Anders Blom
(Nephrologist)*

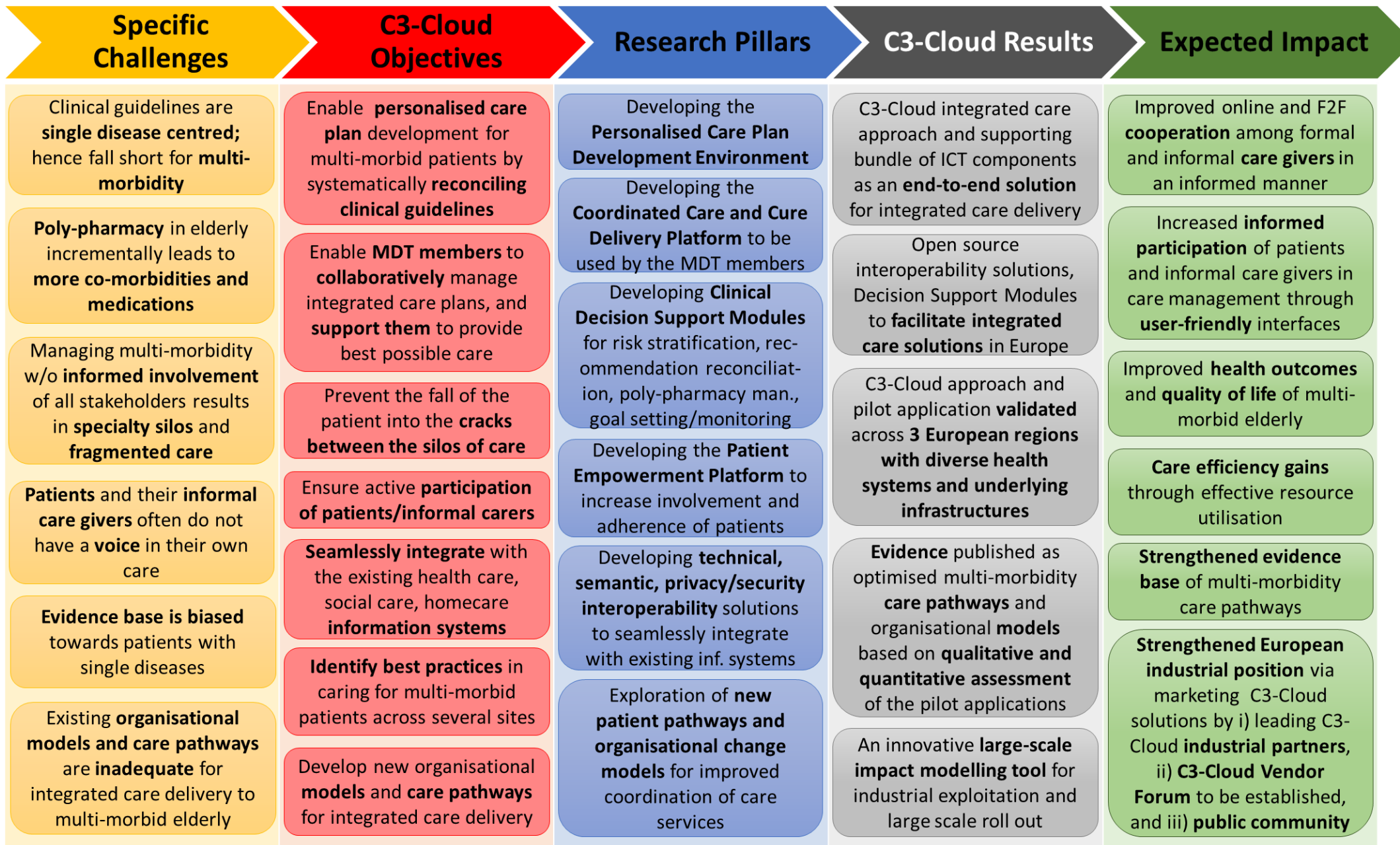
*Stina Ek
(Nutritionist)*

*Helene MM
(Nurse specialist
nephrology)*

THE HEALTH AND CARE STORY OF SVEN




C3-Cloud Journey



CARE PLAN AT THE HEART OF C3-CLOUD





George Best
Patient
Age: 84 (22 Jun 1934)
Gender: male
E-mail: george.Best@emailprovider.com
Phone: (178) 911 1111
Address: 1 The Street A Town GB AA11 2AA (home)

Medical Summary +

Care Plan

Patient Data

Home My Patients Schedule Messages 43

Penicillins with extended spectrum Rush 19 Mar 1994

Encounters

Health Prof.	Location	Date
Dr. Peter Hutchinson	Rother House Medical Centre	20 Feb 2018
Pamela Cousins	Rother House Medical Centre	10 Feb 2018
Optometrist	Boots the Chemist	10 Aug 2017
Mr. G. Mission	Warwick Hospital	06 Jun 2017
Mrs. Carbs	Rother House Medical Centre	23 Feb 2016
Mr. Foot	Community Clinic	09 Mar 2015

Observations

Test	Value	Interpret	Date
Body height	175 cm		20 Feb 2018
Heart rate	80 /min		20 Feb 2018
Body mass index	25 kg/m2		20 Feb 2018
Body weight	90 kg		20 Feb 2018
Blood pressure panel with all children optional			20 Feb 2018
▶ Systolic blood pressure	170 mmHg		
▶ Diastolic blood pressure	90 mmHg		

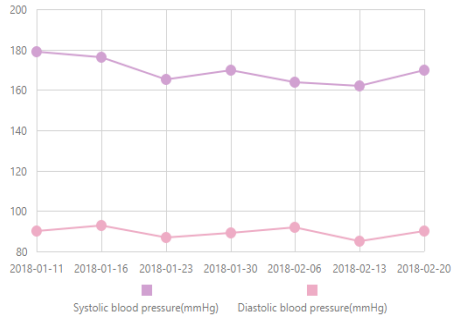
Care Barriers

Barrier	Value	Date
Tobacco smoking status	Ex-smoker	
Forgetful about medication		
Uses walking stick on good day & walking frame on bad day. Must be accompanied by daughter to appointments		
Ignoring diabetic diet - likes chocolate		
Alcohol drink/w	2 drink/w	


Blood pressure panel with all children optional

Chart History

Blood pressure panel with all children optional



Systolic blood pressure(mmHg) Diastolic blood pressure(mmHg)



George Best
Patient
Age: 84 (22 Jun 1934)
Gender: male
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Medical Summary +

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Medical Summary of George Best Last Data Retrieval from the Local EHR System: 02 Aug 2018 12:35

Please review the medical summary and click Continue to proceed. Continue >

Conditions

Diagnosis	Date	Status
Depression	06 Jan 2019	Active
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
Hypertension	02 Mar 1993	Active
Hypothyroidism	10 Mar 1987	Active
Osteoarthritis of hand	13 Jul 2014	Inactive
Cerebral infarction	01 Dec 2012	Inactive

● Active ● Inactive

Medications

Product	Dose	Frequency	Commenced
Gliclazide	80 milligram	1 times per 1 day	01 May 2015
acetylsalicylic acid	75 mg	1 times per 1 day	10 Nov 2012
Metformin	500 milligram	2 times per 1 day	01 Oct 2010
Finasteride	5 milligram	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 milligram	1 times per 1 day	02 Apr 1998
Atenolol	50 milligram	1 times per 1 day	03 Aug 1994
Bendroflumethiazide	2.5 milligram	1 times per 1 day	01 Sep 1993

● Active ● Inactive

Allergies

Allergy	Reaction	Onset
Penicillins with extended spectrum	Rush	19 Mar 1994

● Active ● Inactive

Encounters

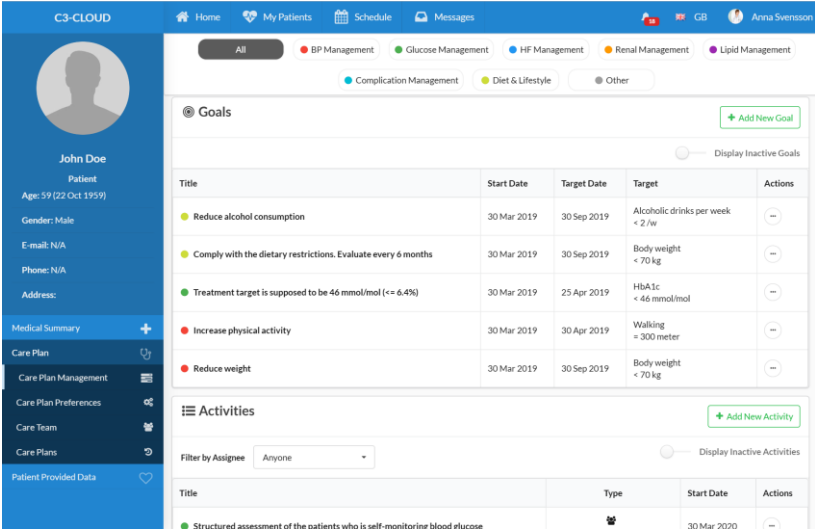
Health Prof.	Location	Date
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Procedures

Procedure	Date
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Care Barriers

+ Add




New Message


New Patient Device Observation

New Questionnaire Response

Patient Observation

- Food Photo
- Progress note on activities


C3CLOUD


George Best

[Home](#)
[Careplan](#)
[Tracking](#)
[Questionnaires](#)
[Messages](#)
[Info](#)

Your careplan

Updated at 03/04/2019 01:23 by Anna Svensson

Current tasks


OBSERVATION

Self-measurement of blood pressure

📅 When: Once a day from 03/04/2019 to 03/05/2019


[Open tracker →](#)

[Add new](#)




Goals (1)

Goals and targets set by your care team.



Activities (1)

Activities you should do to achieve your goals.



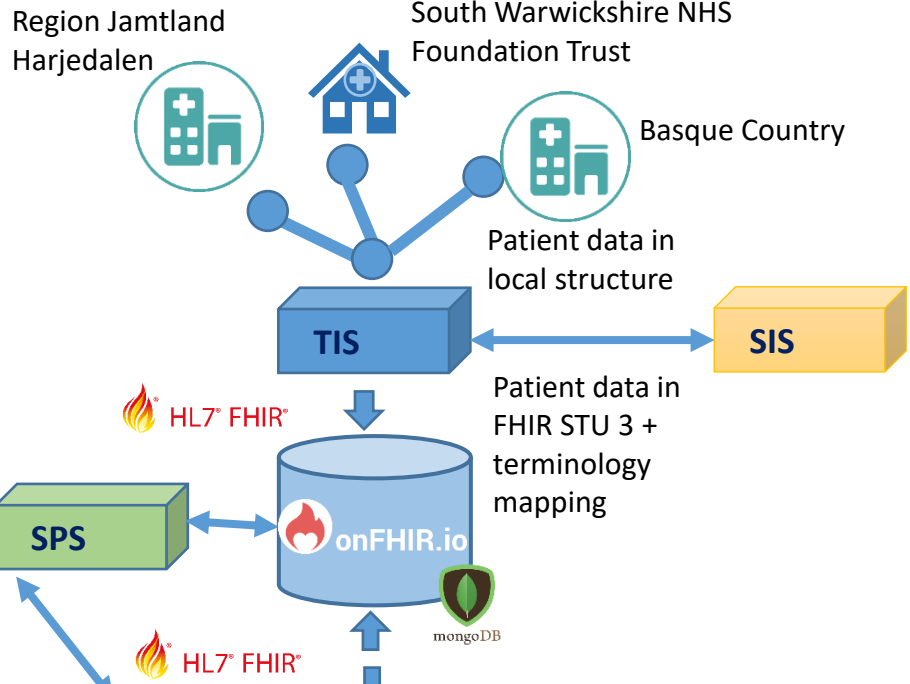
Info (2)

Information materials assigned to you to help you understand your conditions and increase your confidence to manage your health.

[VIEW COMPLETE CAREPLAN](#)

Contact your care team

C3-CLOUD



C3-CLOUD

Home My Patients Activities Inbox

Integrated care plan for hypertension, diabetes type II and renal failure

Meta

Health Concerns Addressed

Goals

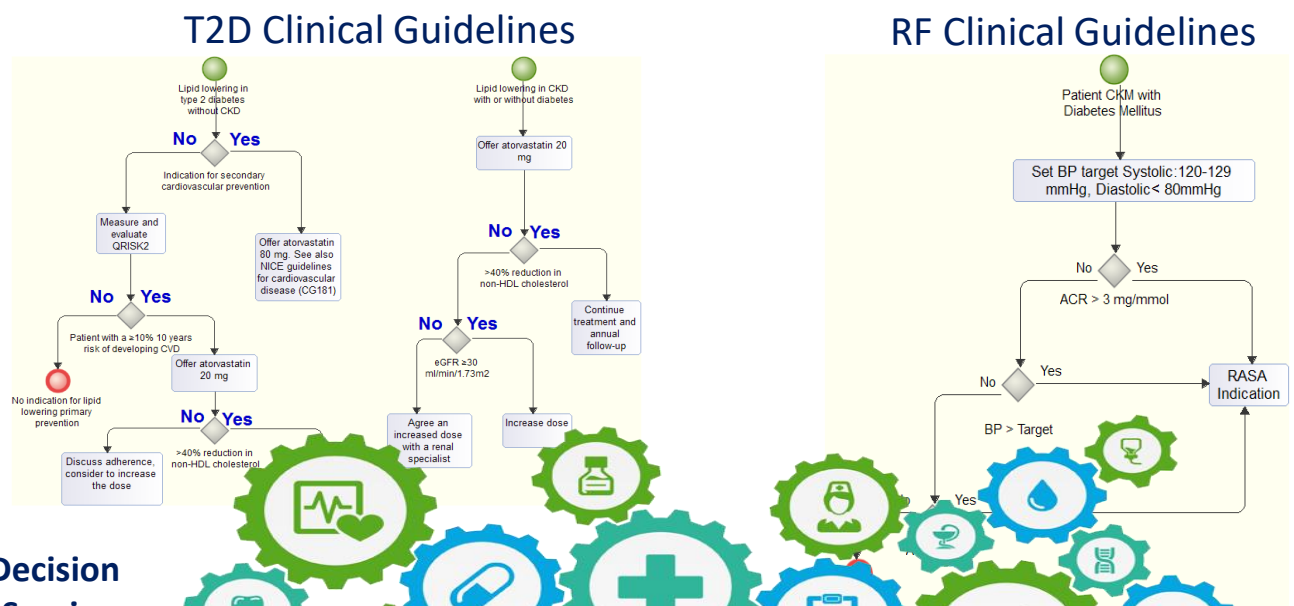
Activities

Care Barriers/Patient Status

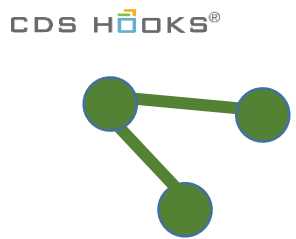
C3DP

HL7[®] FHIR[®] Care Plan Model

C3-Cloud Overall Architecture



Clinical Decision Support Services



DM2 Care Plan

Goals: HbA1c Control, Lipid control, BP control, Weight Loss

Interventions: Metformin Treat., Statin Treatment, ACE-I Treatment, Diet & Exercise

Interactions: Disease-Disease, Disease-drugs, Drugs-Disease, Drug-Drug

RF Care Plan

Goals: Monitor Progress, Manage CVD Risk, BP control, Self Management

Interventions: RASA Treatment, Diet & Exercise

Severity and stage classification	Diet, exercise, training and self-care	Follow-up	Pharmacotherapy
-Modification of the severity and stage	-Significant modifications due to RF -Necessity of new recommendations	-Changes in the content and in the frequency of visits -Criteria of referral to nephrology	-New drugs -Changes in "prescription module": Disease-drug and drug-drug interactions.

DM2 & RF Care Plan

Goals: HbA1c Control, Lipid control, BP control, Weight Loss

Interventions: Insulin Treatment, Statin (Decreased dose), RASA Treatment, Diet & Exercise

Reconciliation of guidance

C3-CLOUD CDS SERVICE FOR MULTIMORBIDITY

1. Identification of the major diseases:
 - a. Type 2 Diabetes, Renal Failure, Heart Failure and Depression
2. Identification of the corresponding evidence-based clinical guidelines
 - a. All NICE guidelines with minor local deviations in our case
3. Detailed analysis of the paper-based guidelines and preparation of flowcharts by the clinical experts
4. Further analysis of the flowcharts to specify implementable technical CDS specifications by technical experts (with clinical support)
5. Software implementation: Integration of CDS services with the C3-Cloud Coordinated Care and Cure Delivery Platform (C3DP) -500 plus rules
<https://github.com/C3-Cloud-eu>

SUMMARY

- Multimorbidity increases the Global Burden of Disease – Challenge in Europe
- C3-Cloud adopts practical steps to enable clinicians to support people with multiple conditions more effectively
- C3-Cloud enables the development of clinical guidelines that reflect and address the experiences of people living with multimorbidity
- C3-Cloud raises awareness of issues describing and understanding multimorbidity to patients, through patient empowerment
- Need for deployment scenarios for its use in COVID-19 like pandemics
- Future support of outcomes-based value-based health and social care service delivery structure

THANK YOU



t.arvanitis@warwick.ac.uk



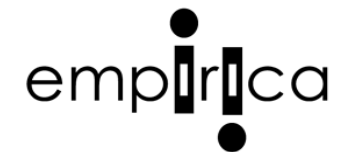
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@c3_cloud



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South Warwickshire
NHS Foundation Trust



Osakidetza

