



eHealth
FORUM 2016

ATHENS
25-26
OCTOBER
MEGARON
ATHENS INTERNATIONAL
CONFERENCE CENTRE

▲▲▲ eHealth: Catalyst for reform
Enabler for growth



CARRE

Personalized patient empowerment and shared decision
support for cardiorenal disease and comorbidities

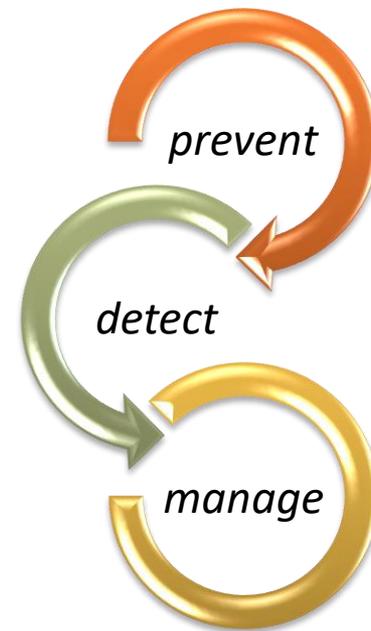
FP7-ICT-61440 Project Presentation

eHealth Forum 2016, Athens, Greece, 25-26 October 2016

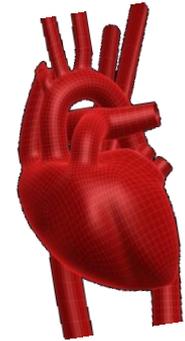


motivation

- significant **increase** in the **prevalence** and **incidence** of chronic disease
- ½ of all chronic patients present **comorbidities**
- the chronic patient is mostly an **outpatient**
 - ↪ needs to care for herself at home
 - ↪ mainly away from continuous professional care
 - ↪ while trying to lead a normal life



medical domain



chronic **cardiorenal** disease and comorbidities

- ↪ simultaneous (causal) dysfunction of **kidney** and **heart**
- ↪ **diabetes** and/or **hypertension** common underlying causes
- ↪ a number of other serious comorbidities often present
nephrogenic anemia, renal osteodystrophy, malnutrition,
blindness, neuropathy, severe atherosclerosis,
cardiovascular episodes, and eventually
end-stage renal disease and/or **heart failure**,
and **death**
- ↪ deterioration to end stage renal/heart disease is
life threatening, irreversible and **expensive** to manage



cardiorenal disease & comorbidities

some numbers...



- ↪ hypertension ⇨ 1/3 of adults (US 2008)
- ↪ diabetes ⇨ 8% of overall population
- ↪ chronic kidney disease ⇨ 9-16% of overall population
- ↪ 44% of chronic kidney disease is due to diabetes
- ↪ 86% of chronic kidney disease has at least 1 comorbidity
- ↪ most patients with chronic kidney disease develop cardiovascular disease

- ⇒ chronic heart failure ⇨ 1-2% of total healthcare costs

- ⇒ end-stage renal disease (dialysis) ⇨ >2% of total healthcare costs



FP7-ICT-2013-611140

consortium: 6 partners from 4 EU countries

coordinator: Eleni Kaldoudi (DUTH)

duration: Nov 2013 – Oct 2016

budget: 3,210,470€

<http://carre-project.eu/>

CARRE

Cardiorenal
comorbidity management
via **empowerment** and
shared informed decision



Democritus Univ. of Thrace
DUTH, GR



The Open
University, UK



Univ. of Bedfordshire, UK



Vilnius Univ. Hospital, LT

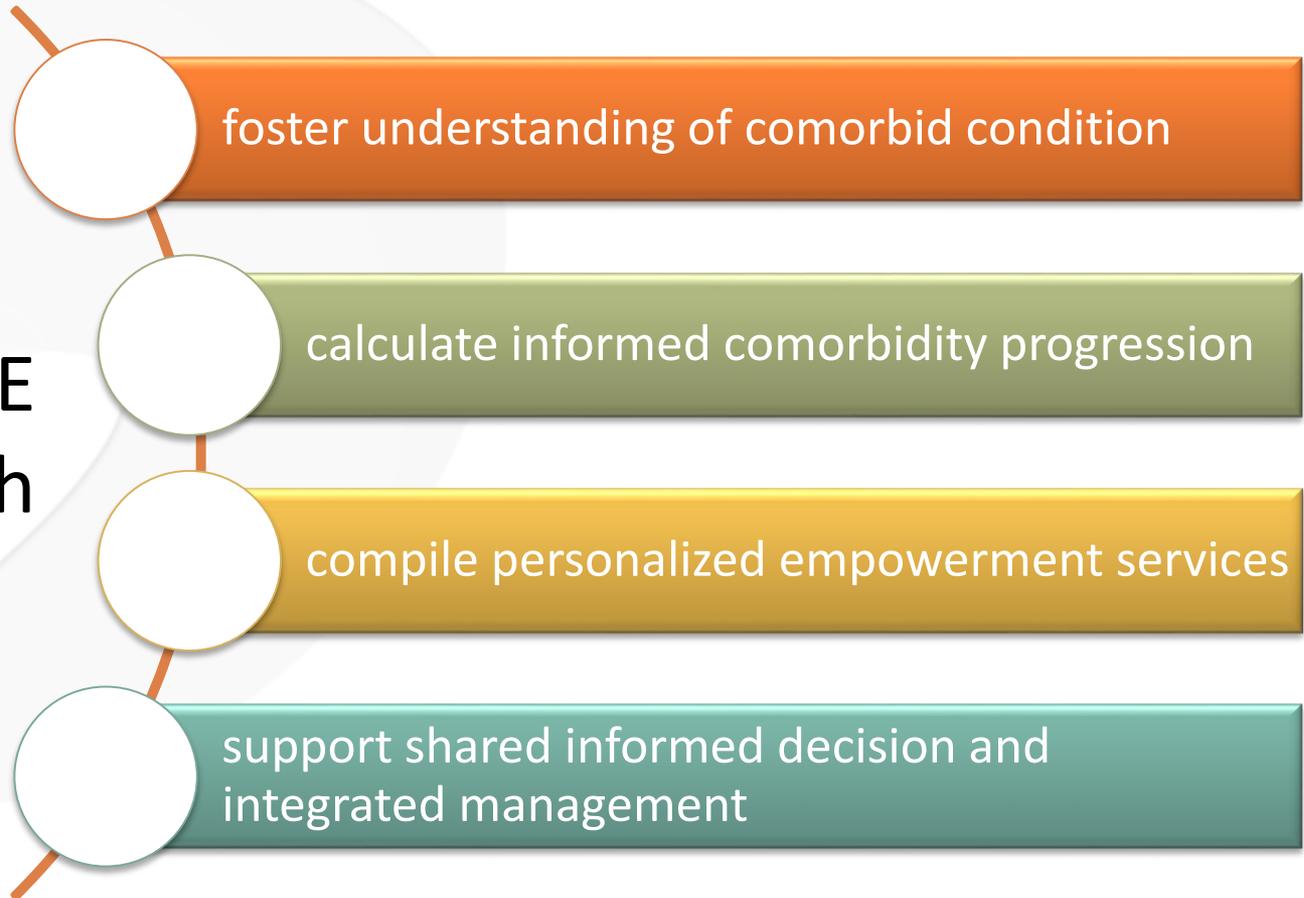


Kaunas Univ., LT



Industrial Research Institute
for Automation & Measurements, PL

CARRE approach



what?

CARRE

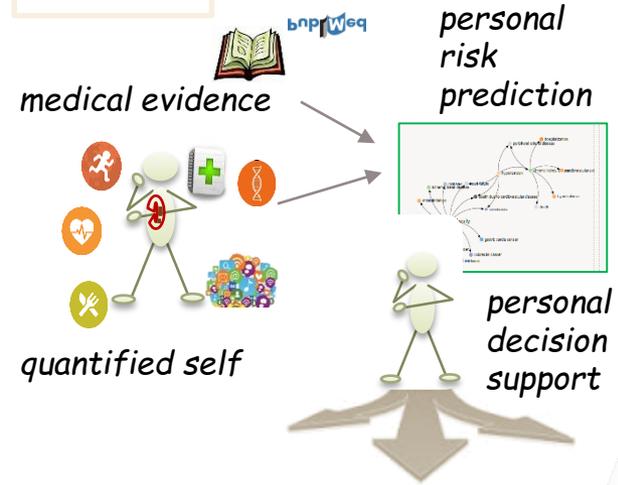
EU FP7-ICT-2013-611140
3.2M, 2013-2016
DUTH, OU, BED, VULSK, KTU, PIAP

why?

cardiorenal disease

chronic, common, dangerous,
expensive, with many causing
factors and complex progression

how?



<http://carre-project.eu>

for the patient

A collage of user interface elements for patients. It includes a large circular network graph, a stick figure with health icons, a bar chart, a line graph, and a map. The elements are arranged in a way that suggests a comprehensive patient dashboard.

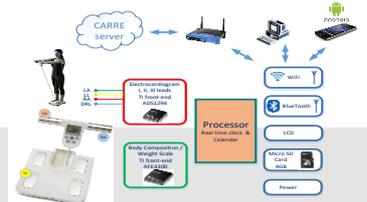
for the medical expert

A collage of user interface elements for medical experts. It features several data dashboards with charts and tables, network graphs, and medical records. The elements are arranged to show a complex data analysis environment.

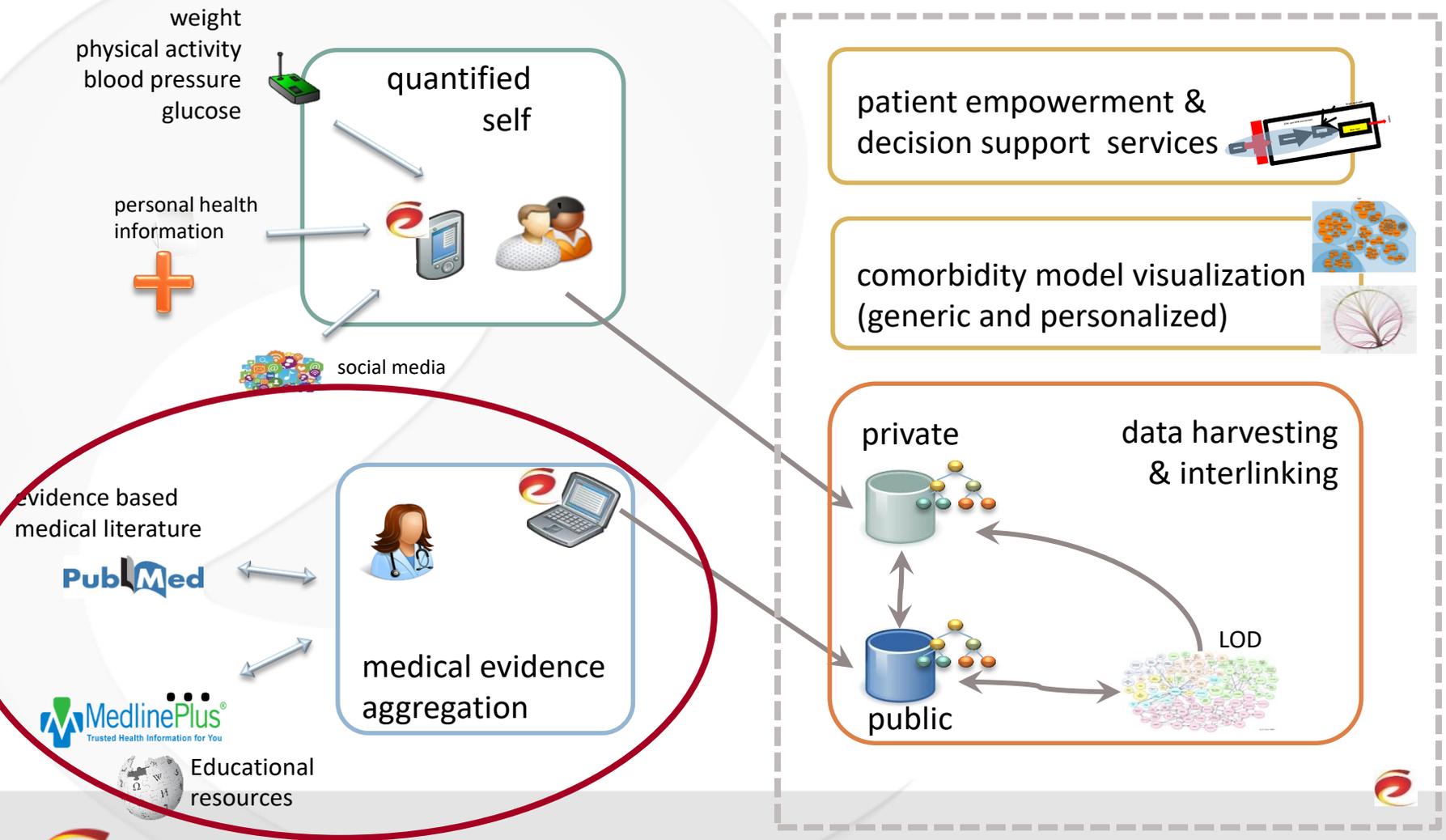
for the ICT expert

A collage of user interface elements for ICT experts, primarily consisting of logos for various health and fitness companies: fitbit, Withings, iHealth, MISFIT, MEDISANA, and VIVALPORT. There are also logos for Conole and Google maps.

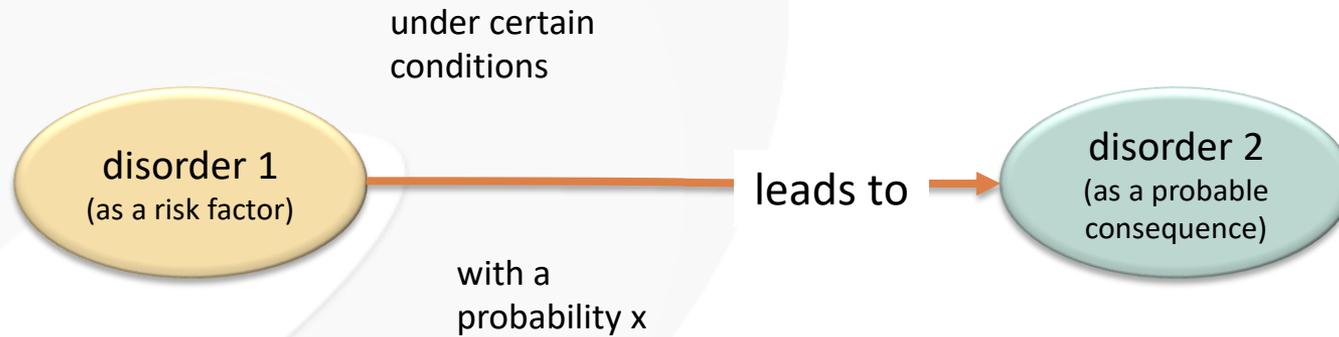
sensor developments



CARRE approach



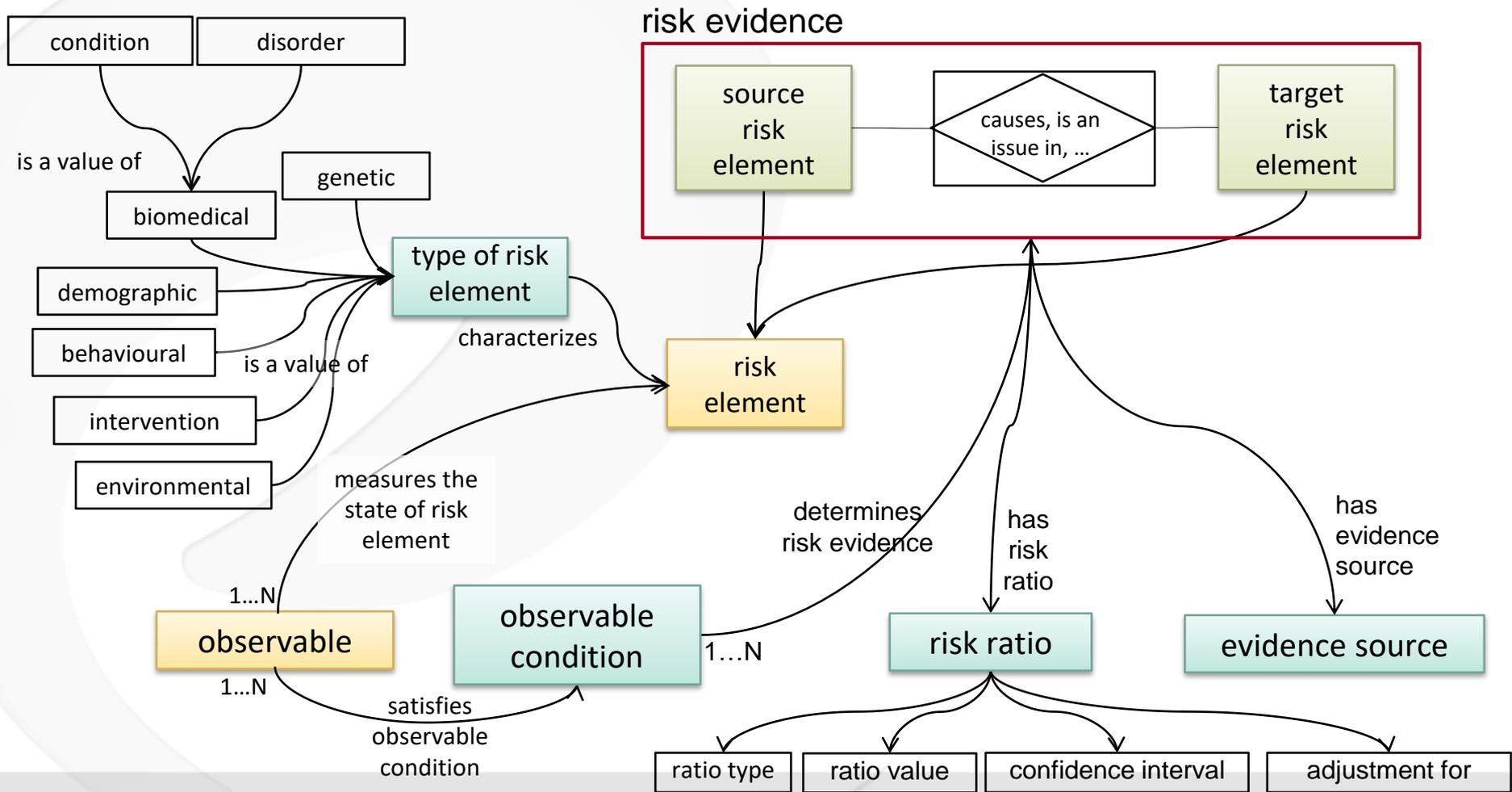
modelling health risk factors



risk factors are reported in medical literature
(top level evidence: systematic reviews with meta-analysis)

E. Kaldoudi, et al. CARRE D.2.1, 2014

modelling health risk factors



http://bioportal.bioontology.org/ontologies/CARRE

BioPortal Browse Search Mappings Recommender Annotator Resource Index Projects Sign In Help Feedback

CARRE Risk Factor ontology

Summary Classes Properties Notes Mappings Widgets

Details

ACRONYM	CARRE
VISIBILITY	Public
BIOPORTAL PURL	http://purl.bioontology.org/ontology/CARRE
DESCRIPTION	Clinical risk factors, evidence and observables
STATUS	Beta
FORMAT	OWL
CONTACT	Allan Third, allan.third@open.ac.uk
HOME PAGE	http://www.carre-project.eu
PUBLICATIONS PAGE	
DOCUMENTATION PAGE	
CATEGORIES	Health
GROUPS	

Metrics

We have not yet calculated metrics for this ontology.

Visits

Download as CSV

Reviews

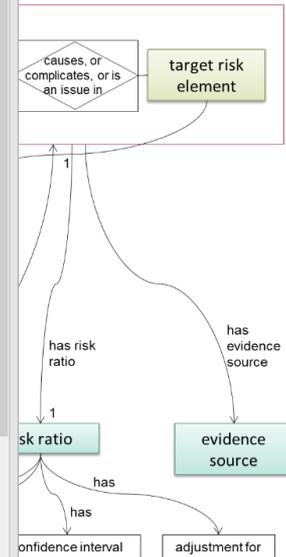
Add your review

No reviews available.

Submissions

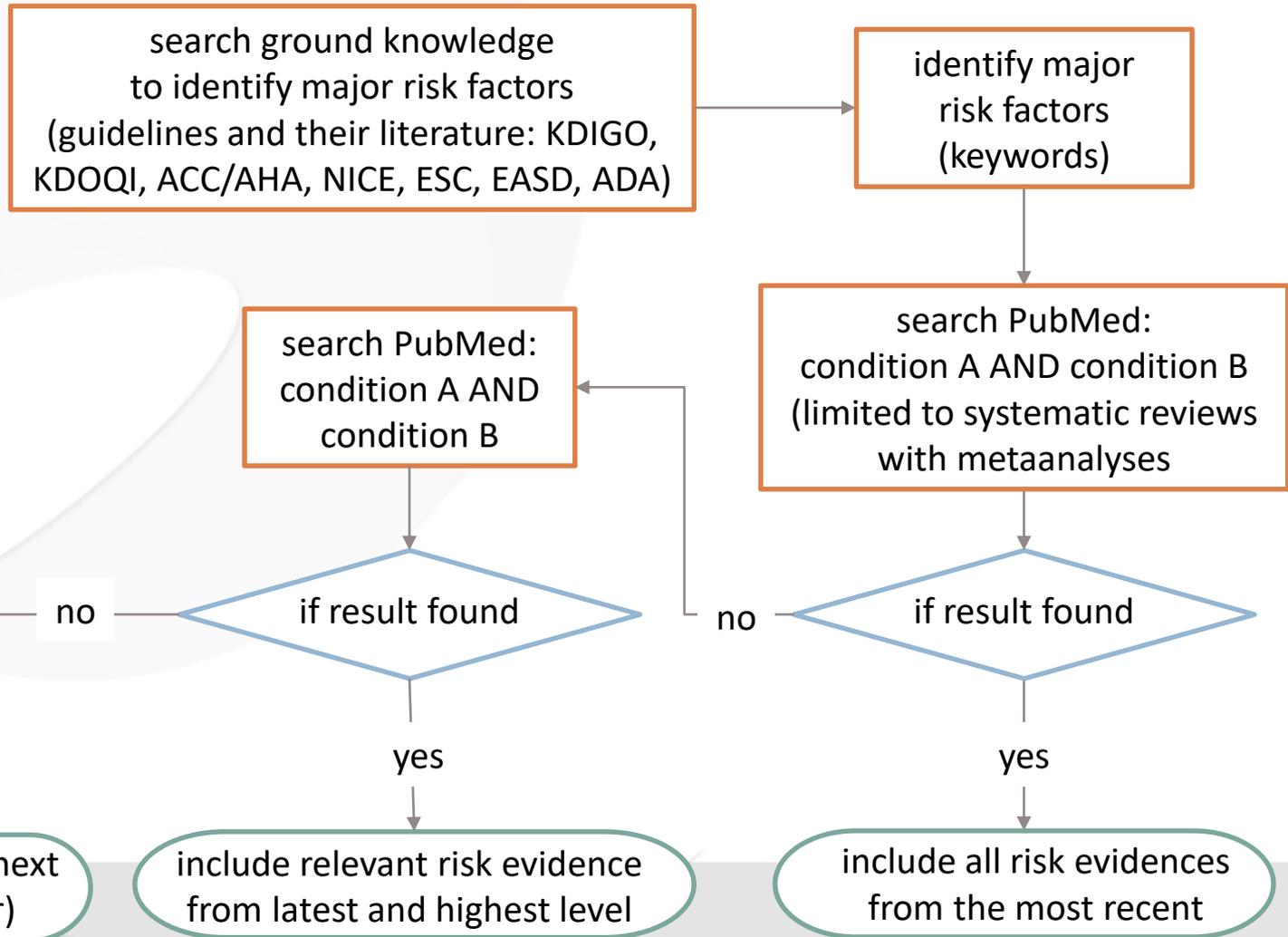
SUBMISSION	RELEASE DATE	UPLOAD DATE	DOWNLOADS
0.2 (Parsed, Indexed, Metrics, Annotator)	09/30/2014	12/08/2014	OWL CSV RDF/XML Diff
0.1 (Archived)	09/30/2014	12/08/2014	OWL Diff
0.1 (Archived)	09/30/2014	09/30/2014	OWL

ceptual model



CARRE ontology published in NCBO BioPortal
<http://bioportal.bioontology.org/ontologies/CARRE>

risk factor identification methodology



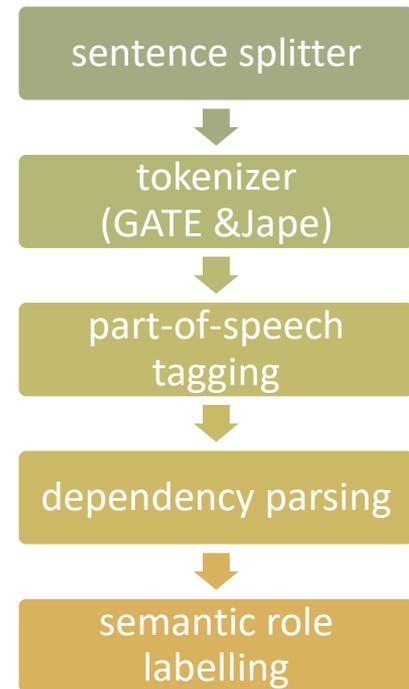
some of the **major** related conditions

1. *Acute kidney injury*
2. *Acute myocardial infarction*
3. *Age*
4. *Albuminuria*
5. *Anaemia*
6. *Angina pectoris*
7. *Asthma*
8. *Atrial fibrillation*
9. *Chronic kidney disease*
10. *Chronic obstructive pulmonary disease*
11. *Cholelithiasis*
12. *Colorectal Cancer*
13. *Coronary and carotid revascularisation*
14. *Death*
15. *Depression*
16. *Diabetes*
17. *Diabetic nephropathy*
18. *Drugs*
19. *Dyslipidemia*
20. *Family history*
21. *Heart Failure*
22. *Hyperkalemia*
23. *Hypertension*
24. *Hyperuricemia*
25. *Hypoglycaemia*
26. *Ischemic heart disease*
27. *Ischemic stroke*
28. *Left ventricular hypertrophy*
29. *Obesity*
30. *Obstructive Sleep Apnoea*
31. *Myocardial infarction*
32. *Osteoarthritis*
33. *Pancreatic Cancer*
34. *Peripheral Arterial Disease*
35. *Physical activity*
36. *Smoking*
37. *...*

medical evidence aggregator

<https://www.carre-project.eu/innovation/medical-evidence-aggregator/>

The screenshot shows a web browser window with the URL `176.58.103.20:8080/mha/`. The search interface includes a dropdown menu for the database (set to 'Pubmed') and a text input field for keywords containing 'sudden cardiac death CKD'. Below the search bar are 'Search' and 'Batch' buttons. The main content area displays search results under a 'Summary' tab, with sub-tabs for 'Results', 'Analysis', and 'Dictionary'. A 'Refine Search' field is also present. The results are presented in a table with columns for 'Summary', 'Year', and 'flag'. The first result is titled '+ Fibroblast Growth Factor 23 and Sudden Versus Non-sudden Cardiac Death: The Cardiovascular Health Study.' and is dated '2015 Jan 5'. Other results include '[FGF23 and the heart]', '[Cardiac magnetic resonance and uremic cardiomyopathy]', 'The interplay between CKD, sudden cardiac death, and ventricular arrhythmias.', 'Why do young people with chronic kidney disease die early?', 'Chronic kidney disease and cardiovascular complications.', and 'Increased concentration of circulating angiogenesis and nitric oxide inhibitors induces endothelial to mesenchymal transition and myocard...'. At the bottom of the browser window, there are download links for 'intro.pdf' and 'talkSRL.pdf', and a 'Show all downloads...' button.



E. Liu, et al. CARRE D.3.4, 2015

medical evidence aggregator

<https://www.carre-project.eu/innovation/medical-evidence-aggregator/>

DB: Pubmed keywords: sudden cardiac death CKD

Search Batch

Results Analysis Dictionary

Refine Search: [clear]

Summary

- + **Fibroblast Growth Factor 23 and Sudden Versus Non-sudden Cardiac Death: The Car Health Study.**
Deo R;Katz R;de Boer IH;Sotoodehnia N;Kestenbaum B;Mukamal KJ;Chonchol M;Sarnak MJ;Siscovick D;Shlipak MG;Ix JH
- + **[FGF23 and the heart].**
Ezumba I;Quarles LD;Kovessy CP
- + **[Cardiac magnetic resonance and uremic cardiomyopathy].**
Di Lullo L;Gorini A;Rivera R;De Pascalis A;Bellasi A;Russo D;Barbera V;Ronco C;Balducci A;Santoboni A
- + **The interplay between CKD, sudden cardiac death, and ventricular arrhythmias.**
Pun PH
- + **Why do young people with chronic kidney disease die early?**
Kumar S;Bogle R;Banerjee D
- + **Chronic kidney disease and cardiovascular complications.**
Di Lullo L;House A;Gorini A;Santoboni A;Russo D;Ronco C
- + **Increased concentration of circulating angiogenesis and nitric oxide inhibitors induce endothelial to mesenchymal transition and myocard...**
Charytan DM;Padera R;Helfand AM;Zeisberg M;Xu X;Liu X;Himmelfarb J;Cinelli A;Kalluri R;Zeisberg EM

intro.pdf talkSRL.pdf

Results Analysis Dictionary

The prevalence of **chronic kidney disease** (CKD) has now reached epidemic proportions and it is very likely that it will continue to rise with the increasing prevalence of juvenile **diabetes mellitus**, **hypertension** and aging population. CKD is a risk factor for **cardiovascular disease (CVD)** and **cardiovascular disease** can lead to CKD. It is also well known that patients with CKD have a higher risk of death from **CVD** than of progressing to **end-stage renal disease** that requires renal replacement therapy. In patients with CKD, there is a higher mortality from sudden cardiac death and congestive heart failure than **coronary artery disease**, which is not the case in the general population. The high prevalence of congestive heart failure in CKD is due to cardiac remodeling which progresses from concentric remodeling to concentric and eccentric hypertrophy, leading to left ventricular hypertrophy with both systolic and diastolic dysfunction. **Recent studies have suggested that, in patients with chronic kidney disease, common traditional risk factors for cardiovascular disease such as hypertension, hyperlipidemia and obesity may not be the main determinants of cardiovascular disease.** Among the various non-traditional **cardiovascular** risk factors present in patients with **chronic kidney disease**, abnormalities of CKD related mineral and bone disorder, which includes elevated fibroblast growth factor 23 (FGF23) have been one of the most extensively studied. However, after many years of research, the debate over the exact pathways by which FGF23 may lead to increased **CVD** still continues. FGF23 may have both direct and indirect effects on the **cardiovascular** system. Better understanding of the most relevant pathophysiologic pathways for FGF23 may lead to therapeutic interventions against **cardiovascular disease** in patients with CKD.

KeywordTags

patients_withTag

NumberFactor

NumberTag PercentTag DecimalTag

CarreTags

CA_NewRiskLinkTag CA_PositiveStrongLinkTag CarreRiskTag CarreResultTag CA_NegativeStrongLinkTag CA_NegativeWeakLinkTag

CA_PositiveWeakLinkTag

HotmapTags

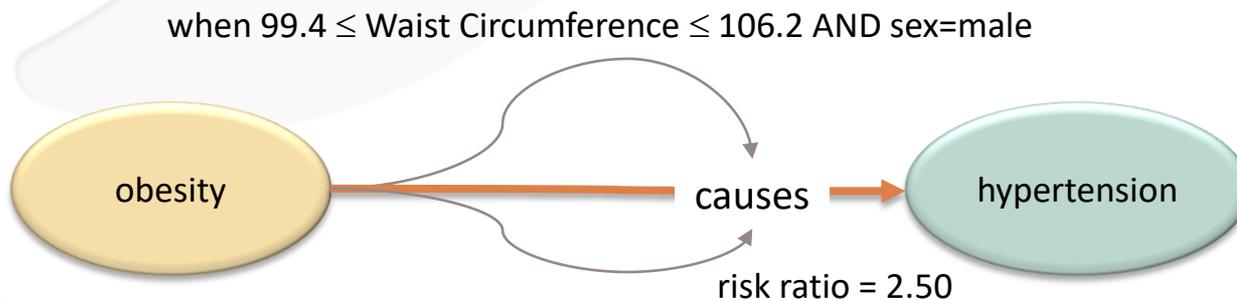
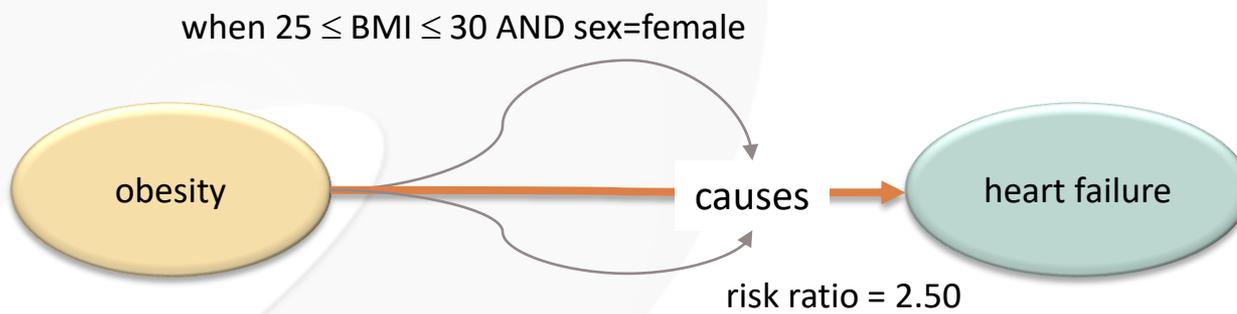
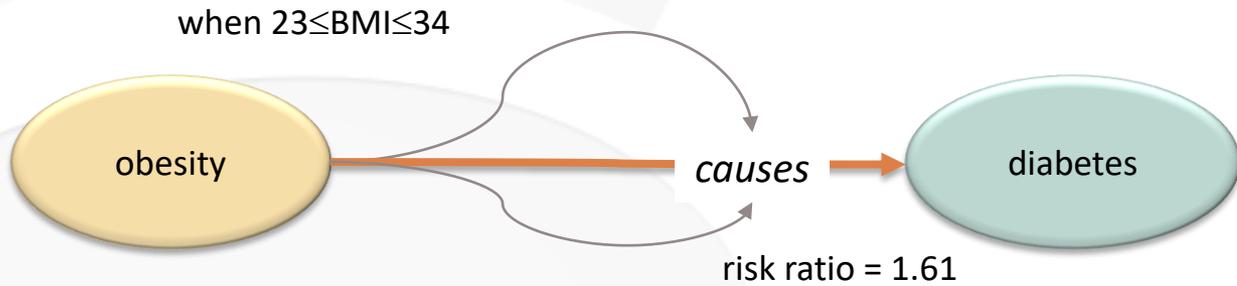
HM_PositiveStrongLinkTag HM_NegativeWeakLinkTag HM_PositiveWeakLinkTag GeneTag HM_NegativeStrongLinkTag TumorTag

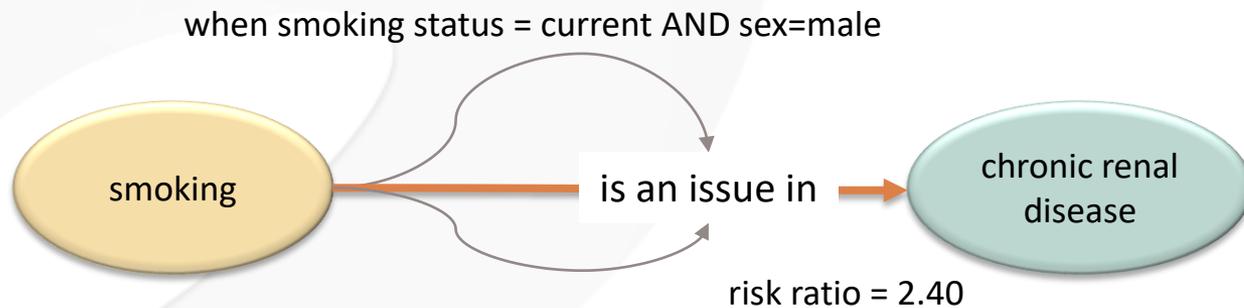
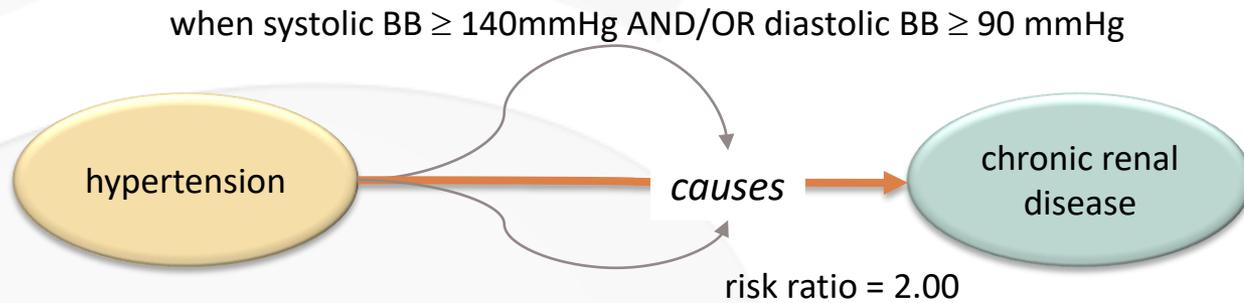
knowledges extracted

- 1. Strong Prove
- 2. Normal Association
- 3. Weak Prove
- 4. Strong Prove
- 5. Normal Association

intro.pdf talkSRL.pdf Show all downloads...

E. Liu, et al. CARRE D.3.4, 2015





so far... **253 major risk associations (or evidences)** identified in medical literature
(which involve 53 health conditions and 82 related observables)
as included in the **CARRE risk factor database and predictive model**

risk factor reference repository

CARRE Risk Entry System Dashboard

Dashboard

Entity	Count	Unreviewed
Risk Factors	96	0
Risk Evidences	253	0
Risk Elements	53	0
Observables	91	17
Citations	60	0

Summary Cards:

- Risk Factors:** 96 (0 unreviewed)
- Risk Evidences:** 253 (0 unreviewed)
- Risk Elements:** 53 (0 unreviewed)
- Observables:** 91 (17 unreviewed)
- Citations:** 60

risk factor reference repository

The screenshot displays the CARRE Risk Entry System interface. The browser address bar shows the URL https://entry.duth.carre-project.eu/risk_evidences/RV_8. The page title is "CARRE Risk entry system". A sidebar on the left contains navigation links: About, Dashboard, Explore, CARRE elements (with a dropdown arrow), Risk Factors, Risk Evidences (highlighted), Risk Elements, Observables, Citations, Measurement Types, and Medical experts. The main content area is titled "Risk evidences" and includes a "Back" button. The central table lists the following details for a risk factor:

Risk factor: age [is an issue in] ischemic heart disease
Observable: age (years), sex
Observable condition: age (years) \leq 59 AND age (years) \geq 54 AND sex = 'female'
Ratio type: relative risk
Ratio value: 5.53
Confidence Interval min: 3.36
Confidence Interval max: 9.08
Is adjusted for: age, study year, and area, smoking, HDL cholesterol ratio, systolic blood pressure, BMI, diabetes
Source: 10069784
Entered by: Kallio Pi Pafili
Reviewed by: Stefanos Roumeliotis, Gintare Juozalenaitė, Ploumis Passadakis

Below the table is a "View RDF source" button. To the right, an "Article" section provides a link to PubMed (10069784) and the following text:

1. Circulation. 1999 Mar 9;99(9):1165-72.

Sex, age, cardiovascular risk factors, and coronary heart disease: a prospective follow-up study of 14 786 middle-aged men and women in Finland.

Jousilahti P(1), Vartiainen E, Tuomilehto J, Puska P.

Author information:
(1)National Public Health Institute, Department of Epidemiology and Health Promotion, Helsinki, Finland. pekka.jousilahti@ktl.fi

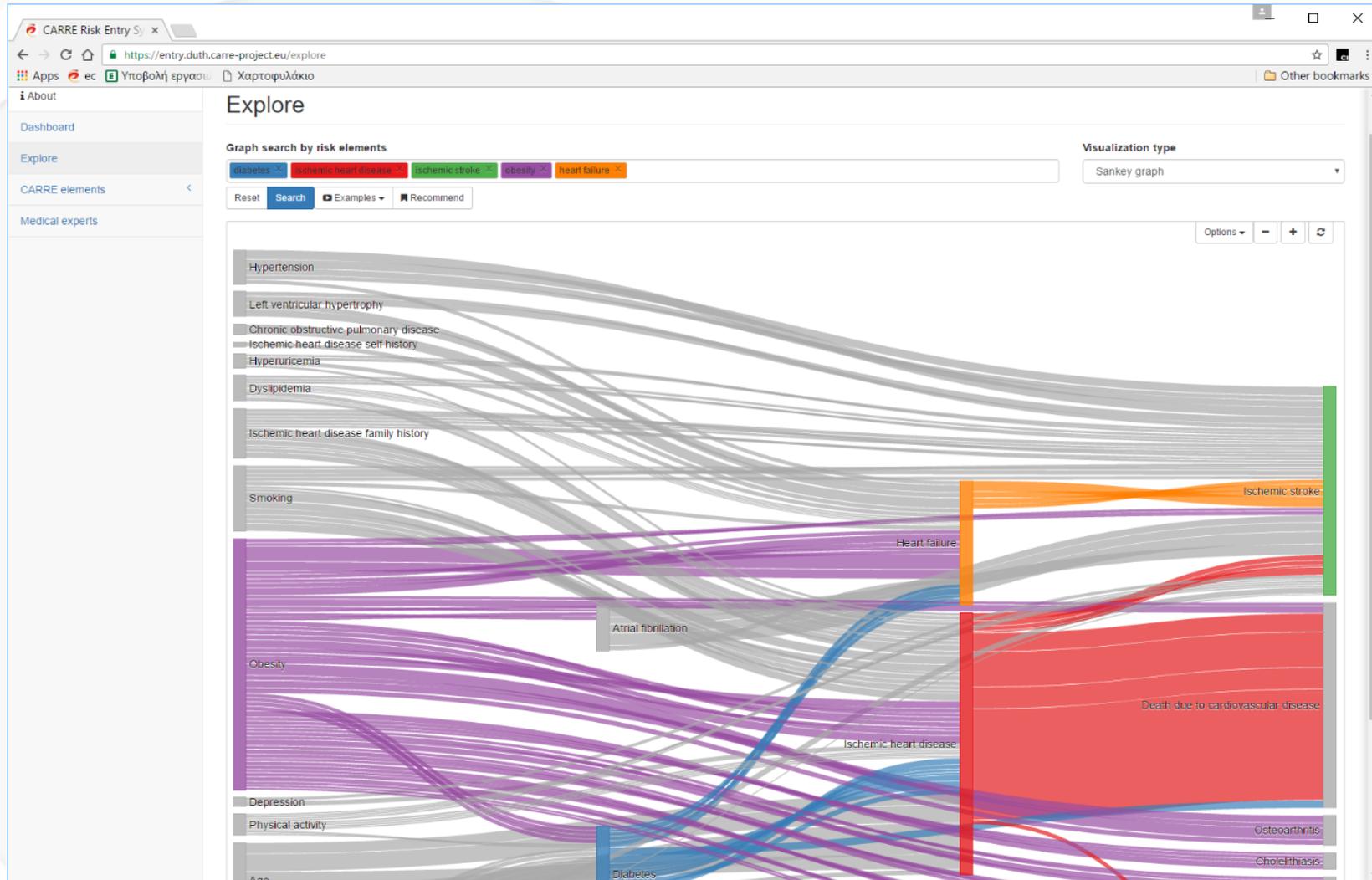
BACKGROUND: Coronary heart disease (CHD) is markedly more common in men than in women. In both sexes, CHD risk increases with age, but the increase is sharper in women. We analyzed the extent to which major cardiovascular risk factors can explain the sex difference and the age-related increase in CHD risk.

METHODS AND RESULTS: The study cohort consists of 14 786 Finnish men and women 25 to 64 years old at baseline. The following cardiovascular risk factors were determined: smoking, serum total cholesterol, HDL cholesterol, blood pressure, body mass index, and diabetes. Risk factor measurements were done in 1982 or 1987, and the cohorts were followed up until the end of 1994. The Cox proportional hazards model was used to assess the relation between risk factors and CHD risk. CHD incidence in men compared with women was approximately 3 times higher and mortality was approximately 5 times higher. Most of the risk factors were more favorable in women, but the sex difference in risk factor levels diminished with increasing age. Differences in risk factors between sexes, particularly in HDL cholesterol and smoking, explained nearly half of the difference in CHD risk between men and women. Differences in serum total cholesterol level, blood pressure, body mass index, and diabetes prevalence explained about one-third of the age-related increase in CHD risk among men and 50% to 60% among women.

CONCLUSIONS: Differences in major cardiovascular risk factors explained a substantial part of the sex difference in CHD risk. An increase in risk factor levels was associated with the age-related increase in CHD incidence and mortality in both sexes but to a larger extent in women.

PMID: 10069784 [PubMed - indexed for MEDLINE]

risk factor reference repository



risk factor reference repository

CARRE Risk Entry S y x

https://entry.duth.carre-project.eu/explore

Apps ec Υποβολή εργασιών Χαρτοφυλάκιο Other bookmarks

About

Dashboard

Explore

CARRE elements

Medical experts

Explore

Graph search by risk elements

diabetes x ischemic heart disease x ischemic stroke x obesity x heart failure x atrial fibrillation x cholesterol x chronic kidney disease x depression x

dyslipidemia x atrial disease x hypertension x lean x hypoglycaemia x rheoarthritis x

Reset Search Examples Recommend

Visualization type

Network graph

The network graph displays various risk factors and diseases as nodes, connected by directed edges. The nodes include: depression, obesity, ischemic heart disease family history, statins, heart level disease, ischemic stroke, death due to cardiovascular disease, atrial fibrillation, diabetes, and colorectal cancer. The edges are labeled with relationships such as 'is an issue in', 'causes', and 'is an issue in'. The graph is visualized as a network graph.

Options - + ↺

CARRE Project © 2015

CARRE project is partly funded by the EC under the grant no. FP7-ICT-611140.

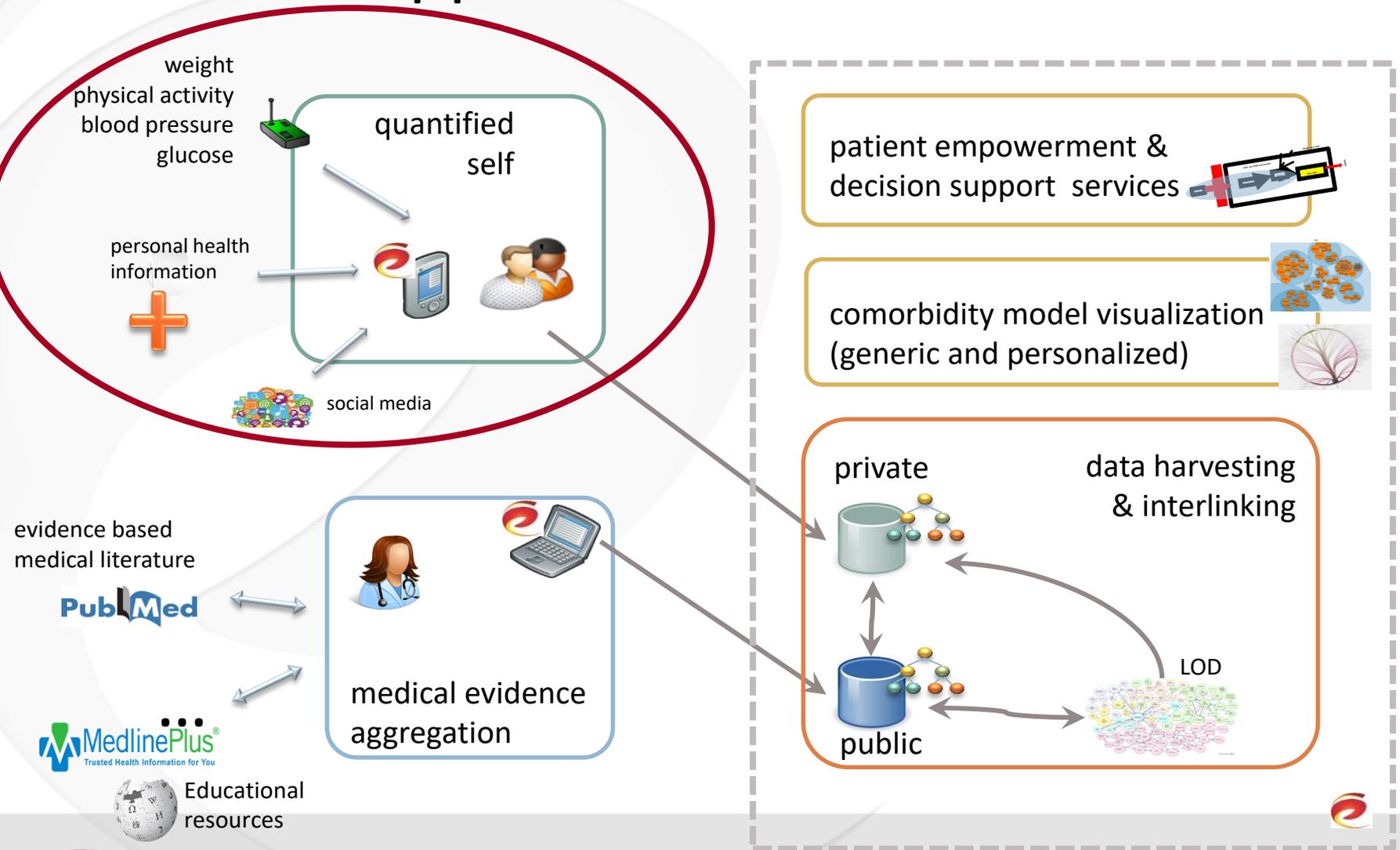
risk factor reference repository

The screenshot displays the CARRE Risk Entry System web interface. The browser address bar shows the URL: https://entry.duth.carre-project.eu/medical_experts/MD_5. The page title is "Medical Experts" with a "Back" button. On the left, a sidebar menu includes "About", "Dashboard", "Explore", "CARRE elements", and "Medical experts". The main content area features a profile for Dimitris Papazoglou, MD, PhD, an Internal medicine specialist at the School of Medicine, Democritus University of Thrace (DUTH), Greece. To the right, a bar chart compares "Entered" (blue) and "Reviewed" (red) items across five categories: Risk Factors, Risk Evidences, Risk Elements, Observables, and Citations. The Y-axis ranges from 0 to 200. The chart shows that Risk Evidences have the highest number of reviewed items (150), followed by Risk Factors (60) and Observables (35). Risk Elements and Citations have very low counts.

Category	Entered	Reviewed
Risk Factors	20	60
Risk Evidences	65	150
Risk Elements	10	25
Observables	5	35
Citations	1	1



CARRE approach



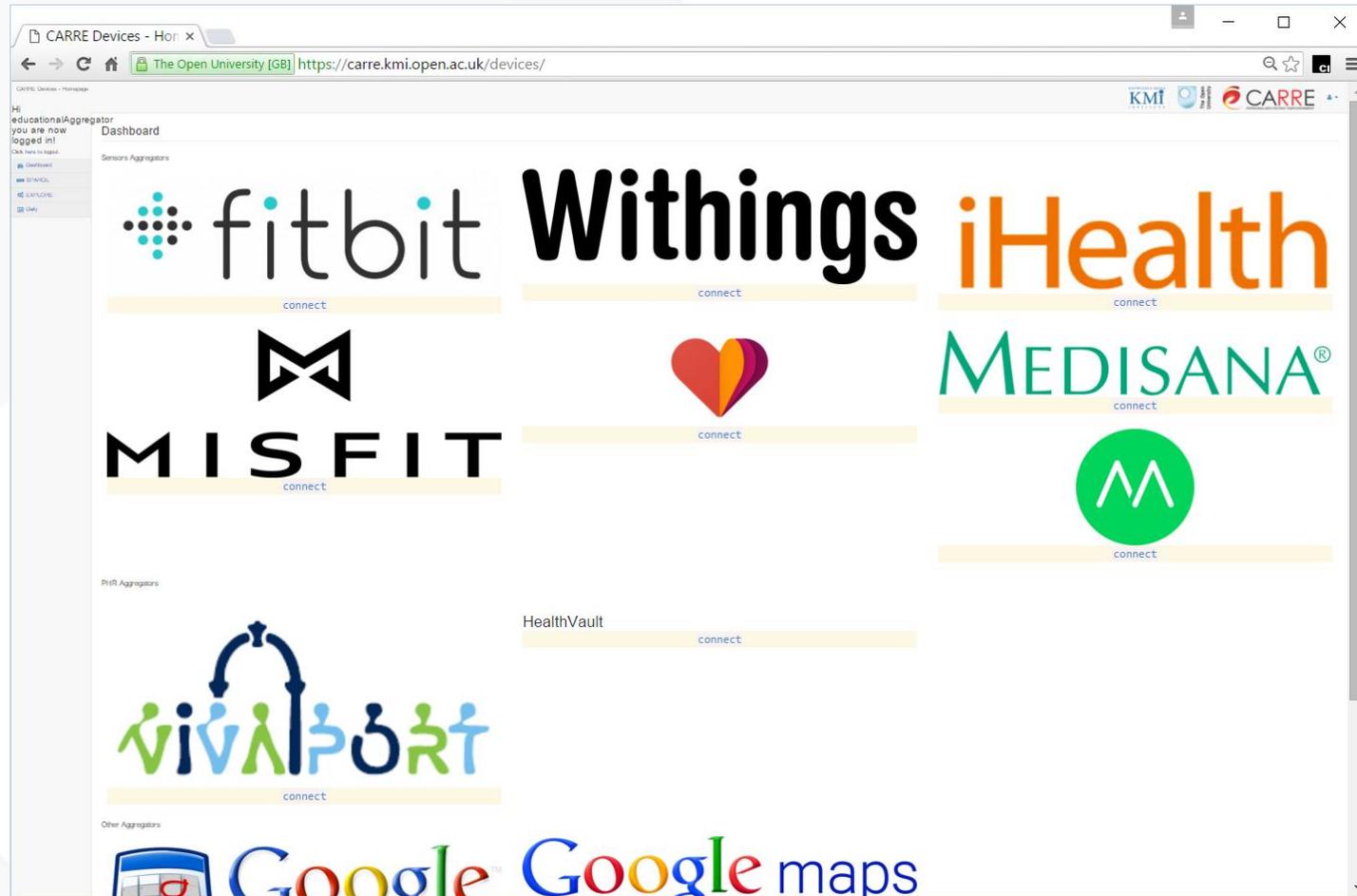
personal data aggregators

- **sensor** aggregators
- medical data aggregators from **personal health record**
- **manual entry** system for personal medical data
- **intention** extraction from **web** searches

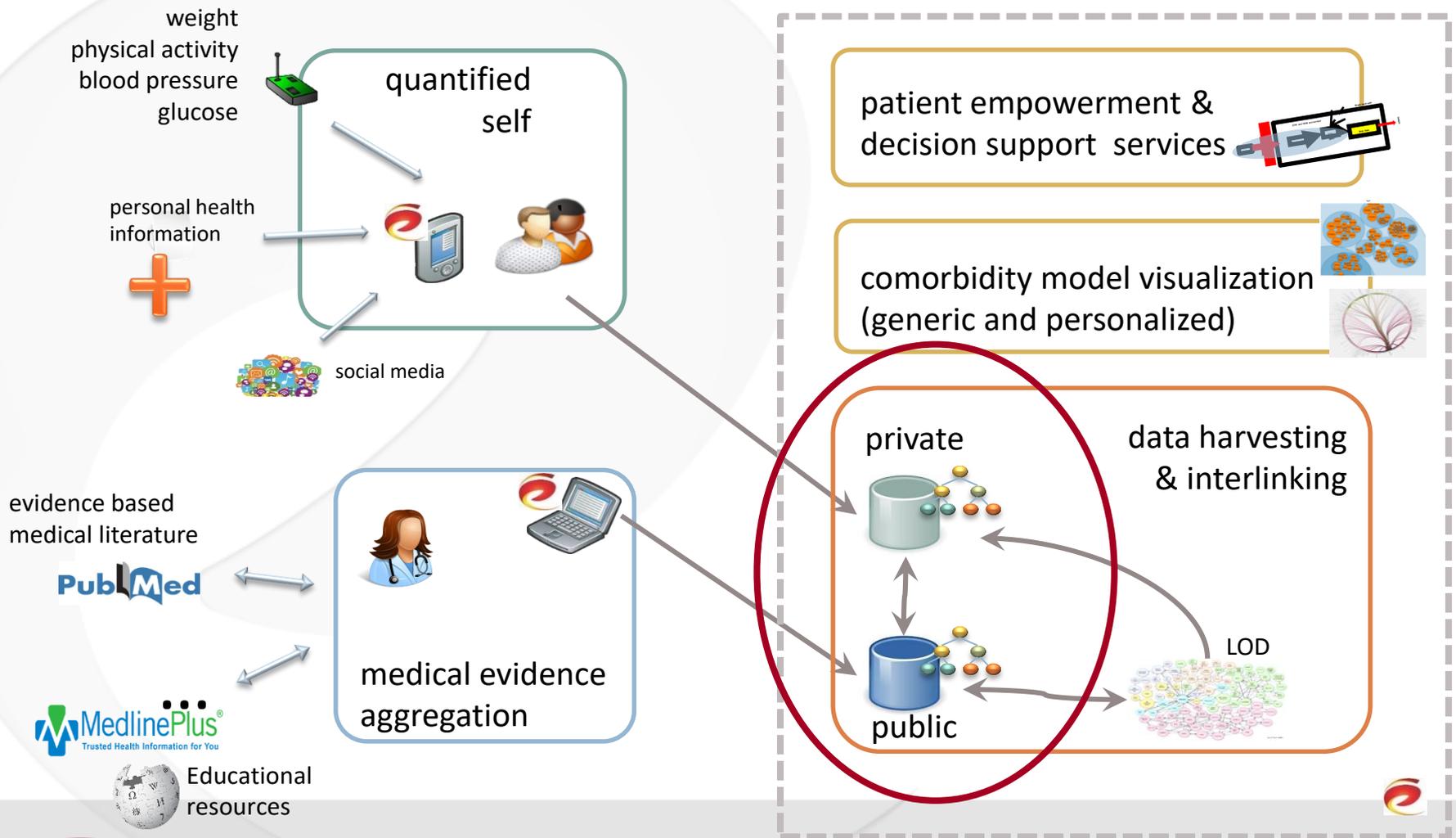
CARRE D.3..2 & D.3.3, 2015

aggregator integration

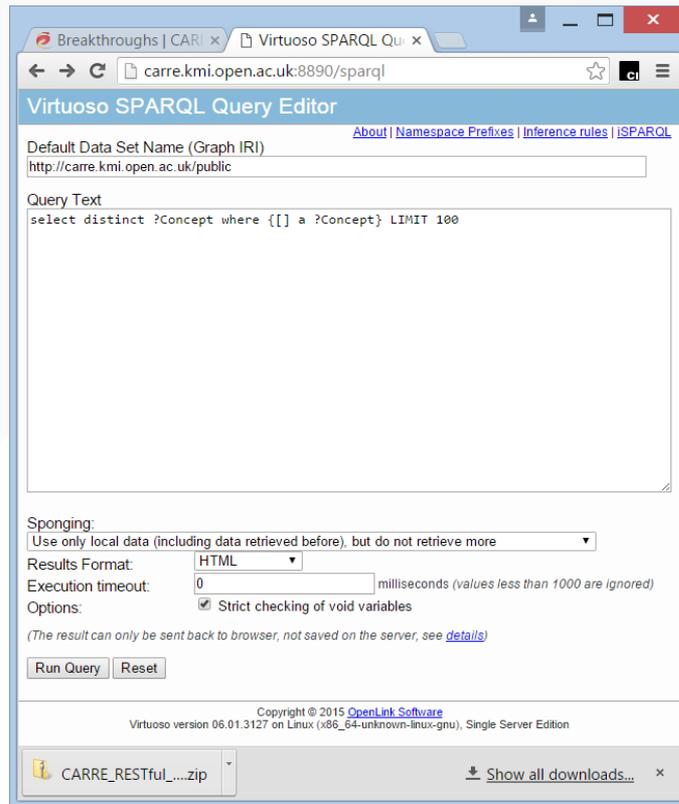
<https://carre.kmi.open.ac.uk/devices/>



CARRE approach



public RDF SPARQL endpoint



Virtuoso SPARQL Query Editor

Default Data Set Name (Graph IRI)

http://carre.kmi.open.ac.uk/public

Query Text

```
select * where {  
  ?s a <http://carre.kmi.open.ac.uk/ontology/educational.owl#object> .  
  ?s ?p ?o .  
} LIMIT 100
```

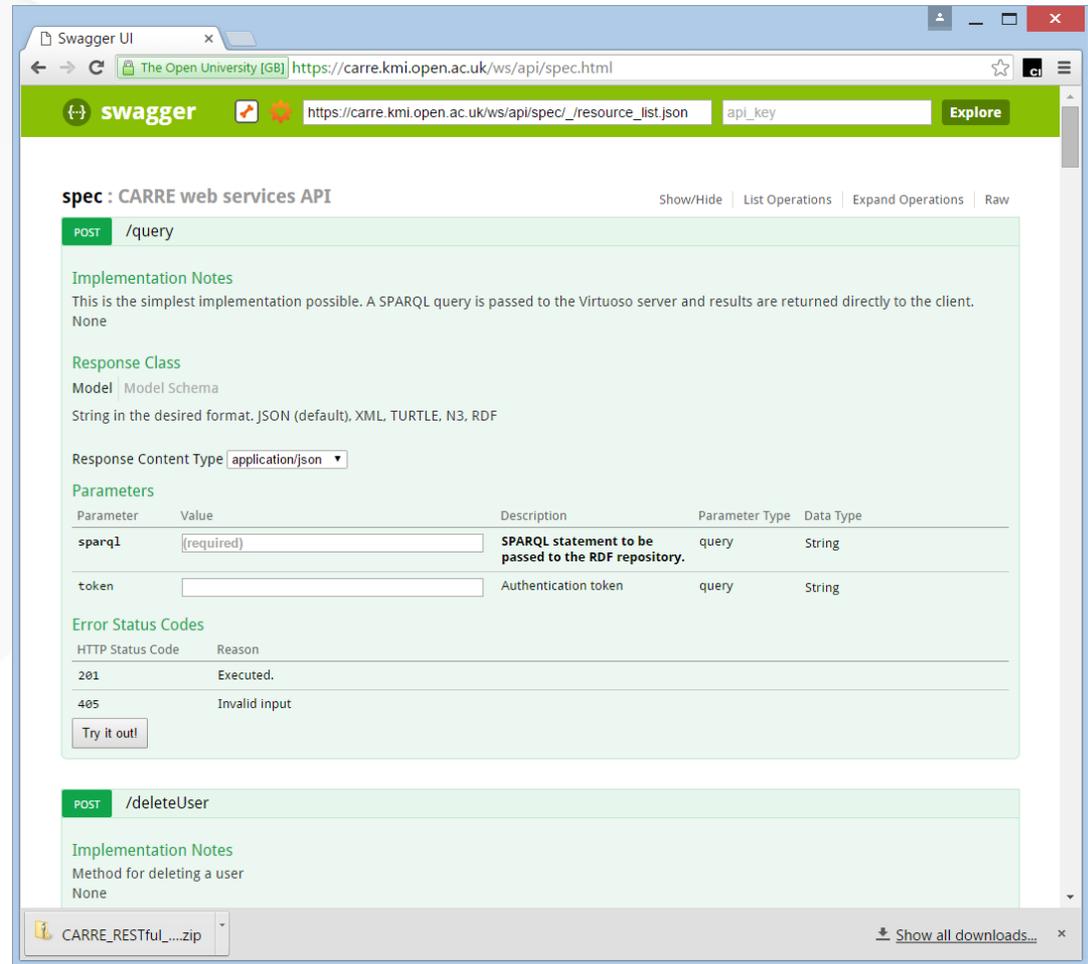
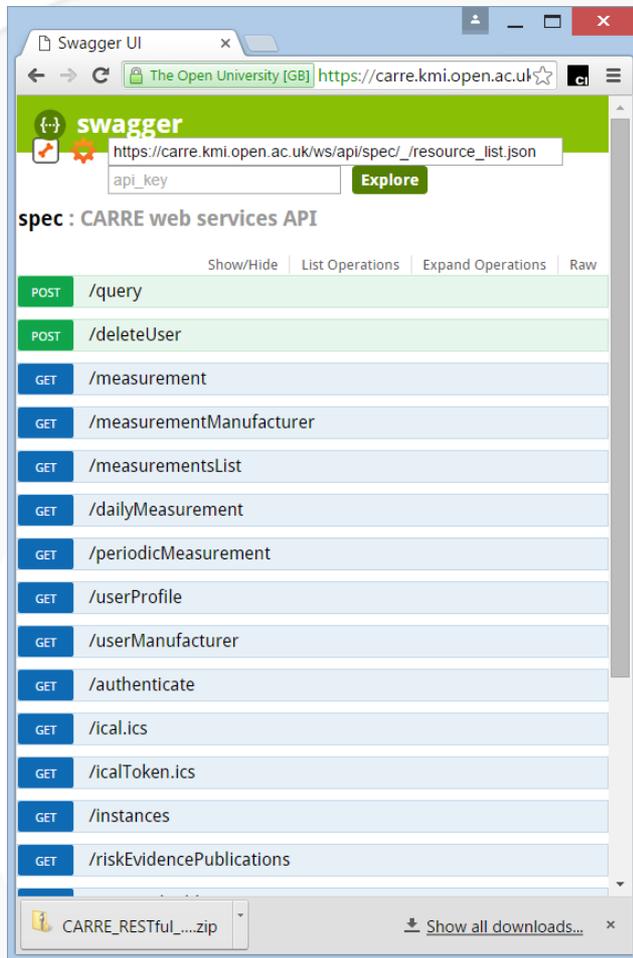
a SPARQL query to retrieve RDF triples about educational objects

A. Third et al, CARRE D.4.1 & D.4.2, 2015

triples about educational objects

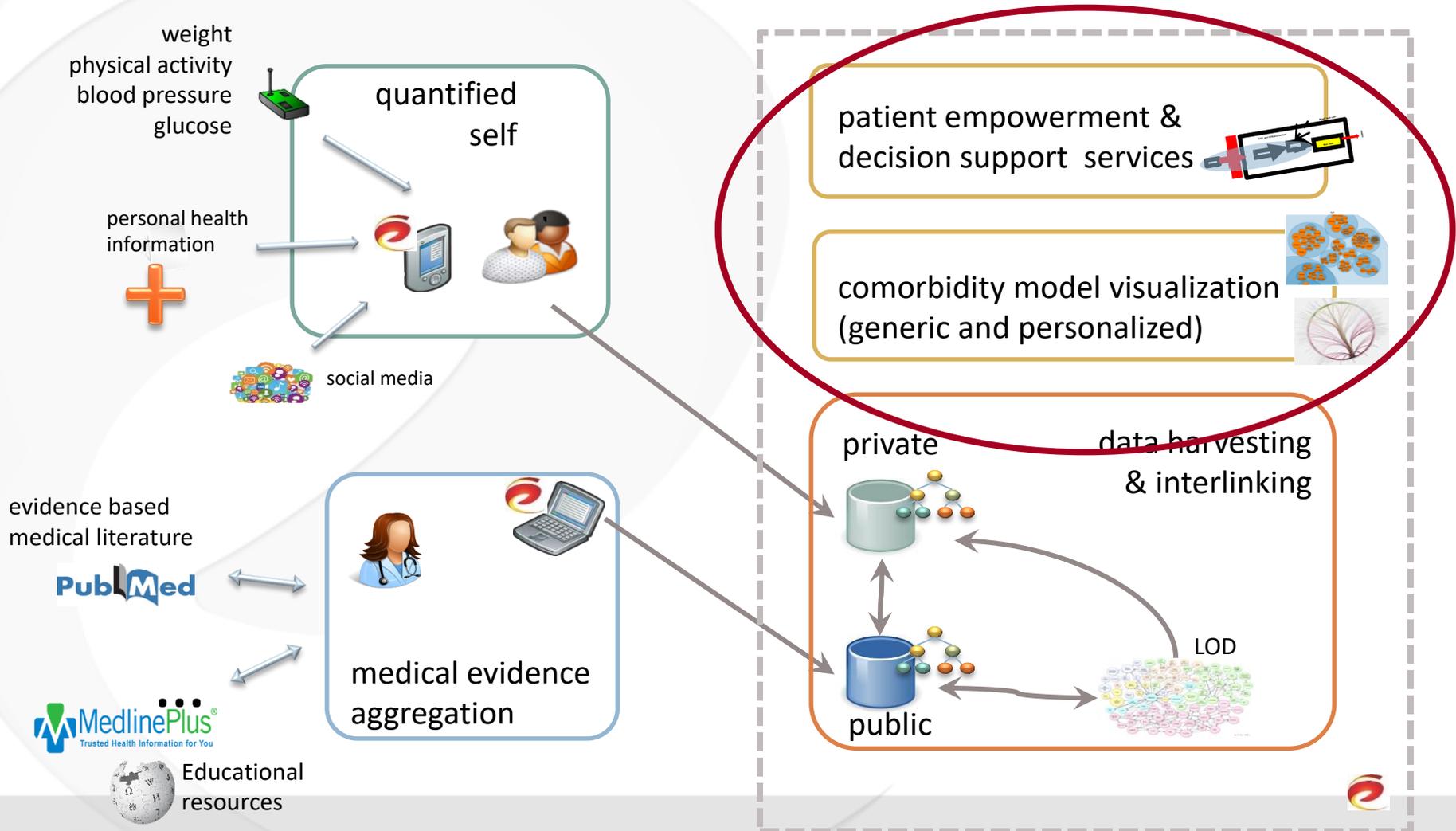
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#url	http://en.wikipedia.org/wiki/Metabolic_syndrome
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#title	"Metabolic syndrome"^^<http://www.w3.org/2001/XMLSchema#stri
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#views	2
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#date_accepted	2015-04-26
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#snippet	"tissue, ultimately promoting visceral adiposity, insulin resistance, dy effects on the bone, causing "low turnover""^^<http://ww
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#language	"English"^^<http://www.w3.org/2001/XMLSchema#string>
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#wordcount	5690
http://carre.kmi.open.ac.uk/beta/educational/dcb53878-7a19-4897-9d7c-cfc69bd16140	http://carre.kmi.open.ac.uk/ontology/educational.owl#webservice	"wikipedia"^^<http://www.w3.org/2001/XMLSchema#string>
http://carre.kmi.open.ac.uk/beta/educational/bedc4c16-ad7e-4052-bf69-156dfd60e136	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://carre.kmi.open.ac.uk/ontology/educational.owl#object
http://carre.kmi.open.ac.uk/beta/educational/bedc4c16-ad7e-4052-bf69-156dfd60e136	http://carre.kmi.open.ac.uk/ontology/educational.owl#url	http://www.nlm.nih.gov/medlineplus/angina.html
http://carre.kmi.open.ac.uk/beta/educational/bedc4c16-ad7e-4052-bf69-156dfd60e136	http://carre.kmi.open.ac.uk/ontology/educational.owl#title	"Angina"^^<http://www.w3.org/2001/XMLSchema#string>
http://carre.kmi.open.ac.uk/beta/educational/bedc4c16-ad7e-4052-bf69-156dfd60e136	http://carre.kmi.open.ac.uk/ontology/educational.owl#views	5
http://carre.kmi.open.ac.uk/beta/educational/bedc4c16-ad7e-4052-bf69-156dfd60e136	http://carre.kmi.open.ac.uk/ontology/educational.owl#date_accepted	2015-03-03
http://carre.kmi.open.ac.uk/beta/educational/bedc4c16-ad7e-4052-bf69-156dfd60e136		"Angina is chest pain or discomfort you feel when there is not enough heart muscle needs the oxygen that the blood carries. Angina may fee chest. It may feel like indigestion. You may also feel pain in your sho a symptom of coronary artery disease (CAD), the most common heart substance called plaque builds up in the arteries that supply blood to t three types of angina:Stable angina is the most common type. It happ

restful API

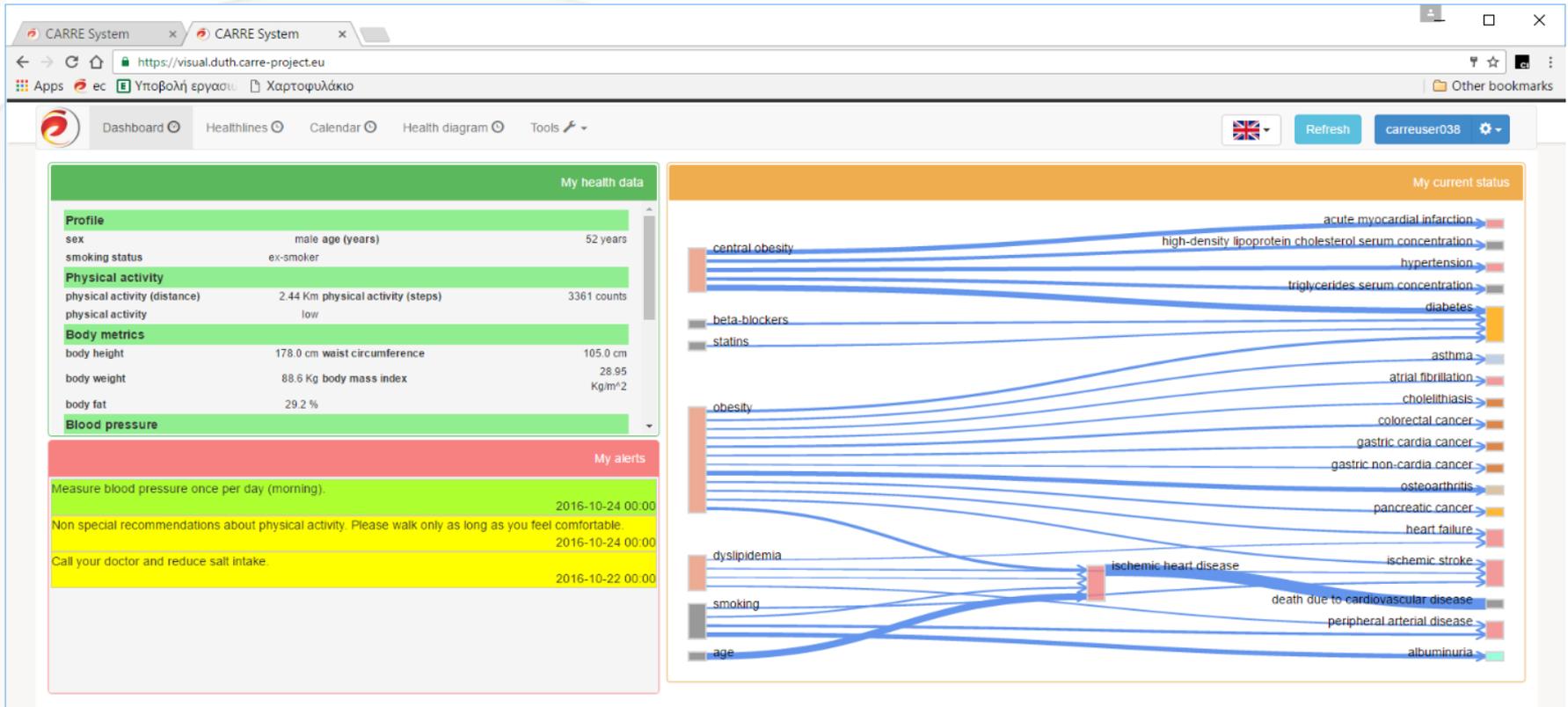


A. Third et al, CARRE D.4.1 & D.4.2, 2015

CARRE approach



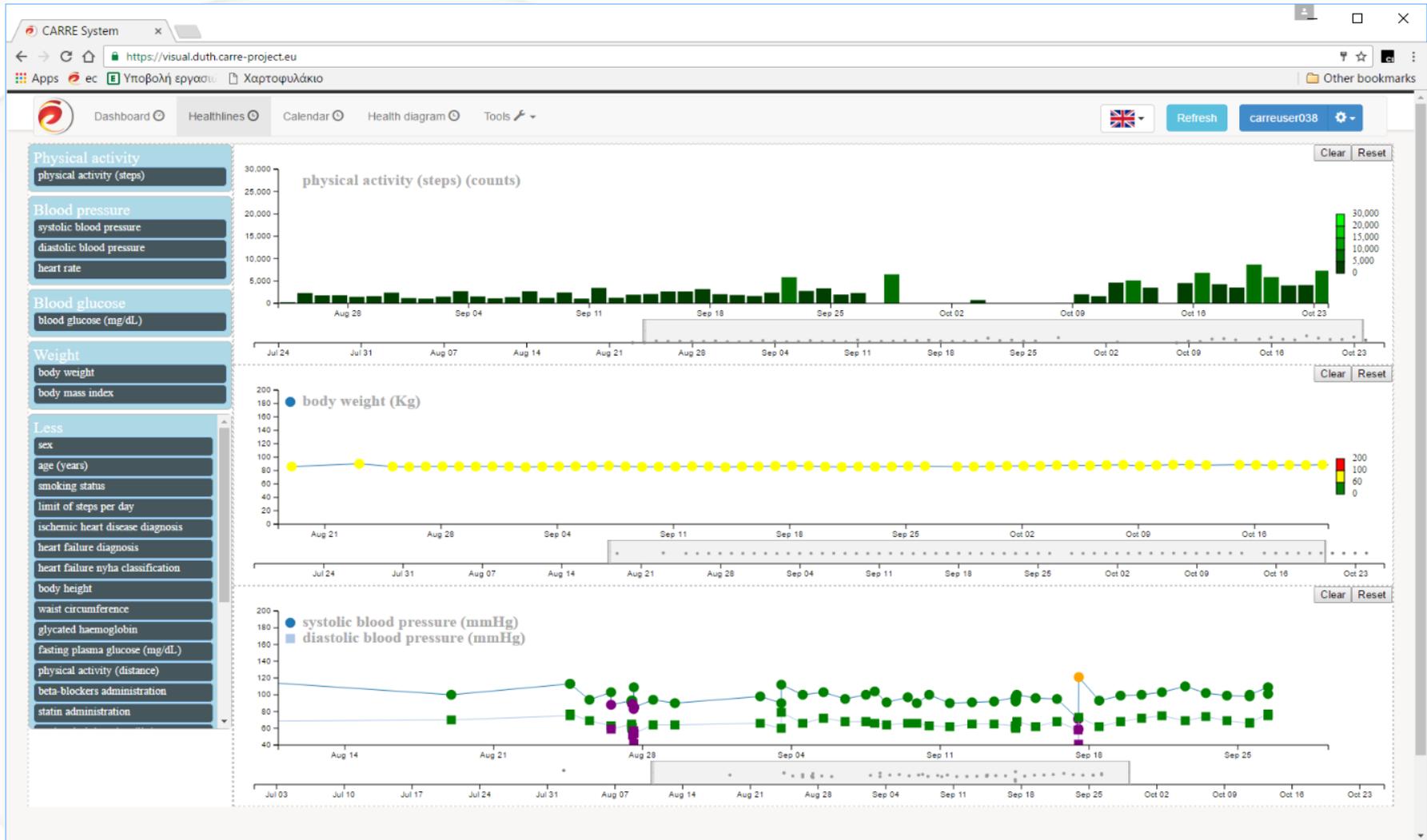
visual analytics for the patient



CARRE project is co-funded by the European Commission under the grant no. FP7-ICT-611140. CARRE Project © 2013 - 2016



visual analytics for the patient



visual analytics for the patient

The screenshot displays the CARRE System web interface. The browser address bar shows the URL <https://visual.duth.carre-project.eu>. The navigation menu includes Dashboard, Healthlines, Calendar, Health diagram, and Tools. The main content area features a 'CARRE calendar' for October 2016. The calendar grid shows days from 01 to 31, with yellow triangles indicating scheduled measurements. A tooltip for the 24th provides instructions on how to measure blood pressure. To the right of the calendar is a large analog clock face with numbers 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24. The bottom of the page includes the text 'CARRE project is co-funded by the' and the European Union flag.

CARRE calendar

Year Month October 2016

Mon	Tue	Wed	Thu	Fri	Sat	Sun
					01 ▲	02 ▲
03 ▲	04	05	06	07	08	09
10	11	12 ▲	13 ▲	14 ▲	15 ▲	16 ▲
17 ▲	18 ▲	19 ▲▲	20 ▲▲	21 ▲▲	22 ▲▲	23 ▲▲
24	25	26	27	28		
31						

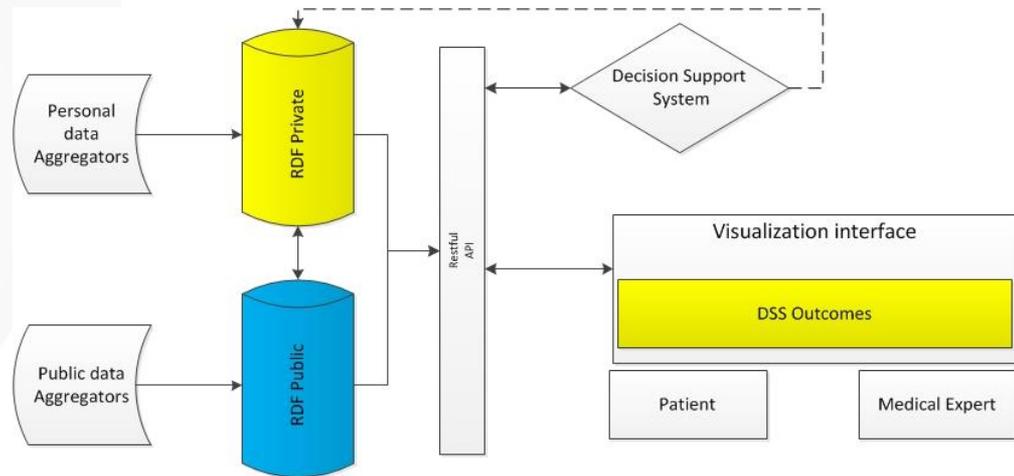
Measure blood pressure once per day (morning).

Monitor your blood pressure once per day; take the blood pressure measurement in the morning before eating or taking any medications. Blood pressure is measured in a quiet room, in the seated position, back and arm supported, after 5 min of rest and with two measurements per occasion taken 1-2 min apart. Avoid food, caffeine, tobacco and alcohol for 30 minutes before taking a measurement. **REMEMBER!** If your blood pressure is ≥ 180 mmHg (systolic) or ≥ 110 mmHg (diastolic), and remains so high after repeated measurement performed within 1-3 min – please call to Emergency Medical Service Center.

decision support services

interlace **personal data** and **medical evidence** for personalized services to

- plan
- monitor
- alert
- educate



CARRE DSS Index Observables Risk elements Risk evidences Risk factors Contact Zarejestrowani Zaloguj

CARRE Decision support service webpage

This is CARRE Decision support service webpage for patient and medical expert. You can create here your individual account and connect with personal database.

© 2015 — CARRE DSS

CARRE D.6.2 & D.6.3, 2016

educational aggregator

<https://edu.carre-project.eu/>

educational repositories

semantic web

Search results for 'acute kidney disease' using MedlinePLUS. The interface shows 18 results. The top result is 'Kidney Failure' with a rating of 4.5. The description states: 'Healthy kidneys clean your blood by removing excess fluid, minerals, and wastes. T and your blood healthy. ...'. Other results include 'Porphyria' and 'Ureapnry Tract Infections'.

Search results for 'acute kidney disease' using Wikipedia. The interface shows 396 results. The top result is 'Renal failure' with a rating of 3.1. The description states: 'blood. The two main forms are acute kidney injury, which is often reversible with adequate treatment, and chronic kidney disease, which is often not reversible'. The text continues: 'known as Nephropathy, means damage to or disease of a kidney. Nephrosis is g of biliary surgery. The syndrome was soon re-associated with advanced liver ure (ARF), is an abrupt loss of kidney function that develops within 7 days. Its'.

Article Rating section for 'Kidney Failure':

Depth of Coverage : ★★★★★	Comprehensiveness : ★★★★★	Relevancy : ★★★★★
Accuracy : ★★★★★	Educational level : ★★★★★	Validity : ★★★★★



CARRE D.3.4, 2015

<http://www.carre-project.eu>

evaluation framework & plan*

	CARRE system functions	Human perspectives			Context and Environment
		Experts	Patients	Admins	
Structure	aggregators and interfaces functioning	changes to working conditions and practices; new skills, & abilities	new skills, and abilities		
Process	service operation correct & valid	induced changes in function and satisfaction	Induced changes in self-management & satisfaction		
Outcome	service usable and reliable	effectiveness	perceived quality of care and life	improving specific clinical parameters	potential to improve the health status and quality of life

* based on the model proposed by Cornford, T., Doukidis, G.I., and Forster, D., *Int. J. Manag. Science*, 22(5), 491-504, 1994

1: component testing

2: service testing & understanding

3: service evaluation

evaluation

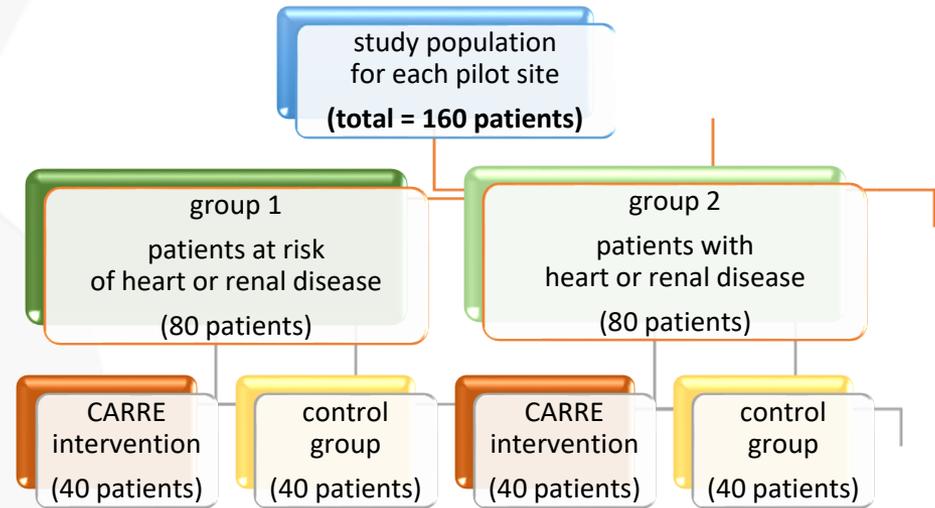
- 2 center randomized control trial
- primary objectives

primary

- increase health literacy
- increase level of patient empowerment (*SUSTAINS instrument*)
- improve quality of life (*SF-36 instrument*)
- reduce personal risk for cardiorenal disease and comorbidities (*biomarkers & disease prevalence*)

secondary

- improve or prevent disease progression (*clinical & laboratory parameters*)
- improve lifestyle habits (*sensor readings*)
- limit no. or dose of necessary drugs (*dose of essential drugs*)
- assess intervention acceptability



what?

CARRE

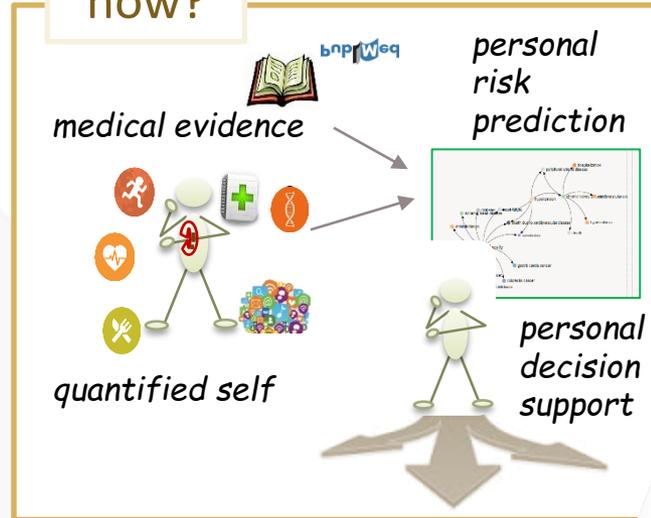
EU FP7-ICT-2013-611140
3.2M, 2013-2016
DUTH, OU, BED, VULSK, KTU, PIAP

why?

cardiorenal disease

chronic, common, dangerous,
expensive, with many causing
factors and complex progression

how?

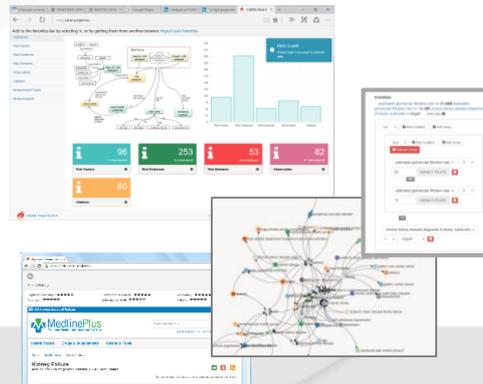


<http://carre-project.eu>

for the patient



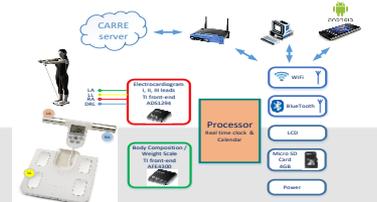
for the medical expert



for the ICT expert



sensor developments



what?

CARRE

EU FP7-ICT-2013-611140

3.2M, 2013-2016

UJH, QUEBEC, VASK, ULIPIA

thank you !!!

why?

cardiorenal disease

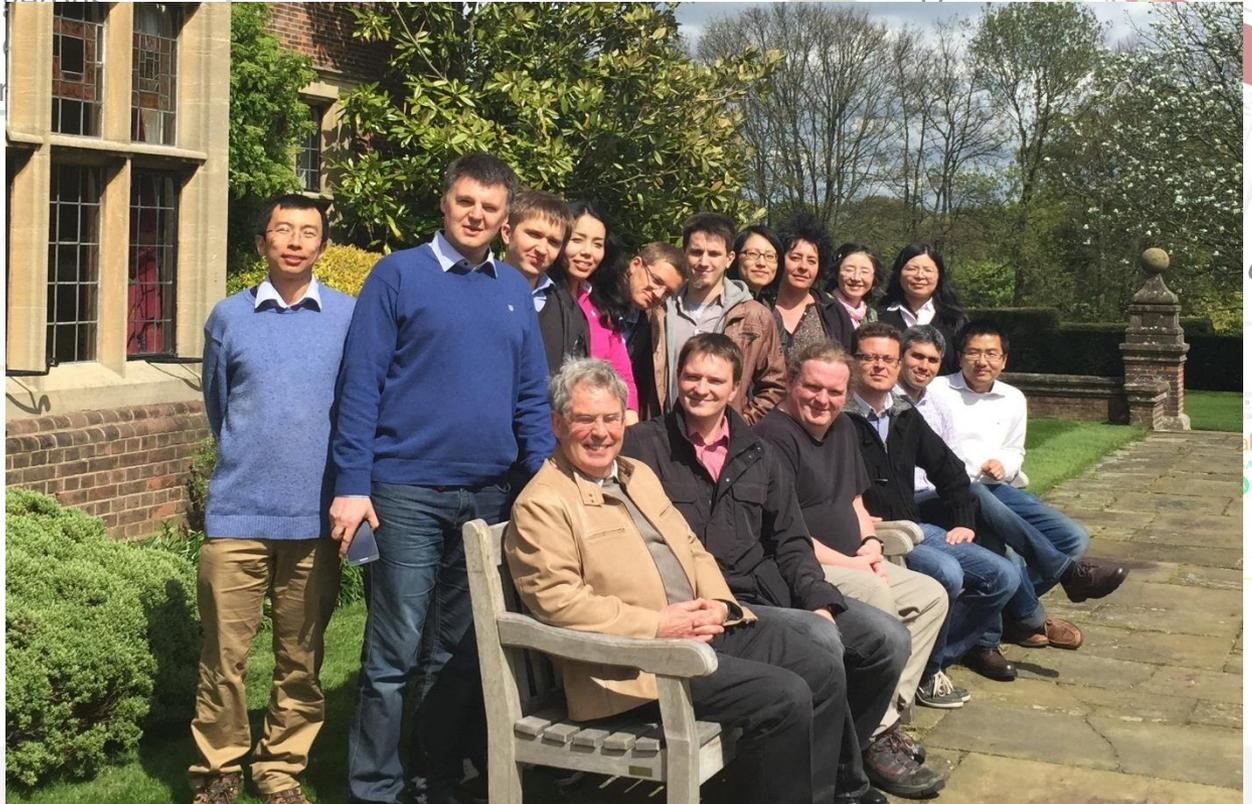
chronic, common, dangerous,
expensive, with many
factors and complex pr

how?



for the patient

This block contains a collage of patient-facing data visualizations and icons. It includes a circular network graph, a stick figure with health icons, a line graph, and a table of data. The table has columns for 'Name', 'Age', 'Sex', 'Risk Score', and 'Recommendation'. The line graph shows a trend over time with a red line and a green shaded area.



eu

alth
ANA

acknowledgment



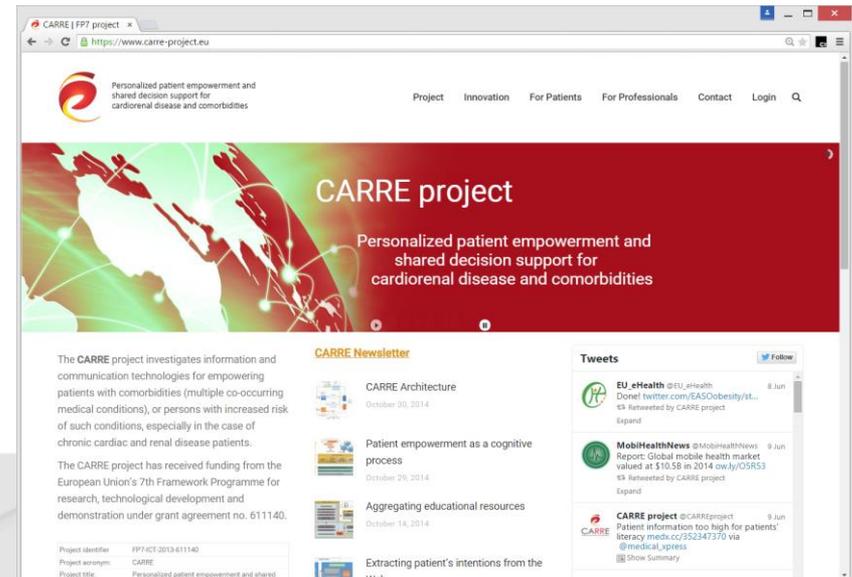
work funded under project CARRE

co-funded by the
European Commission under the
Information and Communication Technologies (ICT)
7th Framework Programme
Contract No. FP7-ICT-2013-611140



CARRE: Personalized patient empowerment
and shared decision support
for cardiorenal disease and comorbidities

<http://www.carre-project.eu/>



Project identifier	FP7-ICT-2013-611140
Project acronym	CARRE
Project title	Personalized patient empowerment and shared

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<http://www.carre-project.eu>



A screenshot of the CARRE project website. The browser address bar shows "https://www.carre-project.eu". The website header includes the CARRE logo and the tagline "Personalized patient empowerment and shared decision support for cardiorespiratory disease and comorbidities". Navigation links for "Project", "Innovation", "For Patients", "For Professionals", "Contact", and "Login" are visible. The main content area features a large banner with the text "CARRE project" and "Personalized patient empowerment and shared decision support for cardiorespiratory disease and comorbidities". Below the banner, there is a "CARRE Newsletter" section with articles like "CARRE Architecture" and "Patient empowerment as a cognitive process". A "Tweets" section on the right shows tweets from @EU_eHealth and @CARREproject.