

# ICTUSnet o com incorporar tecnologies innovadores d'anàlisi de dades per a millorar els sistemes d'atenció integrada de la fase aguda de l'ictus a les regions del sud-oest d'Europa

## Curs d'Actualització en Documentació Mèdica (VI edició)



Interreg   
EUROPEAN UNION

Sudoe

ICTUSnet   
European Regional Development Fund

Partners:

Salut/ Agència de Qualitat i Avaluació Sanitàries de Catalunya



FUNDACIÓ ICTUS



Hôpitaux de Toulouse

IACS Instituto Aragonés de Ciencias de la Salud

ARS NORTE  
Administración Regional de Saúde do Norte, I.P.

Institut d'Investigació Sanitària Illes Balears  
IdISBa

CONSELLERIA DE SALUT I FUNDACIÓ D'INVESTIGACIÓ SANITÀRIA ILLES BALEARS

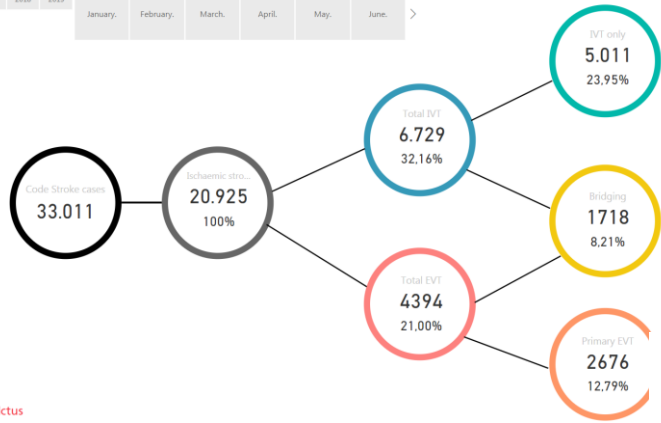
OPEN EVIDENCE

NAVARRABIOMED  
BIOMEDICAL RESEARCH CENTRE

COMPLEXO HOSPITALAR DE NAVARRA



2016 2017 2018 2019 > January February March April May June >



# Newsletter CICAT

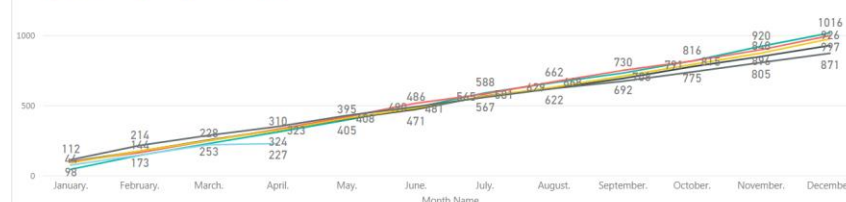
LAST UPDATE

12/4/2021

2016 2017 2018 2019 > January March May July September >  
February April June August October

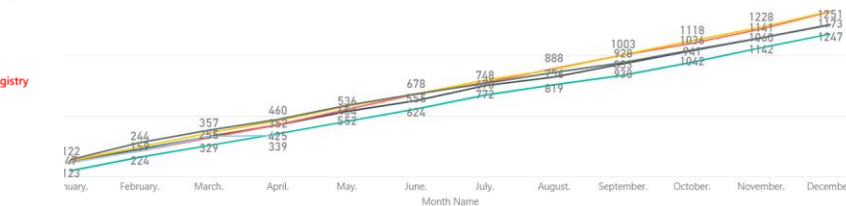
IVT only by month

Year ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ● 2021



IVT all (+ bridging) by month

Any ● 2016 ● 2017 ● 2018 ● 2019 ● 2020 ● 2021



- Local stroke center
- Selecciona-ho tot
  - Althala
  - Arnau de Vilanova
  - Bellvitge
  - Campdevàno
  - Can Ruti
  - Cerdanya
  - Clinic
  - Figueres
  - Granollers
  - Igualada
  - Joan XXIII
  - Josep Trueta
  - La Seu d'Urgell
  - Mar
  - Mataró
  - Moisés Broggi
  - Móra d'Ebre
  - Mútua de Terrassa
  - Olot
  - Palamós
  - Parc Taulí
  - Sant Camil
  - Sant Pau
  - Tremp
  - Vall d'Hebron
  - Verge de la Cinta
  - Vic

2016 2017 2018 2019 > gen. febr. març abr. maig juny jul. ag. set. oct. nov. des.

Codis Ictus: 32.916  
Ictus amb residència: 93,95%  
Ictus sense residència: 6,05%  
SEM Primaris: 18.755  
Ictus amb municipi alerta: 70,33%  
Ictus sense municipi alerta: 29,67%

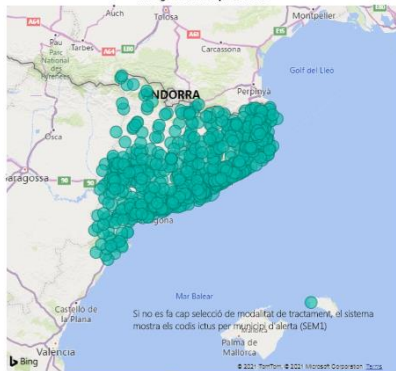
Modalitat  
 Aïllades  
 Desestimat  
 No tractat  
 Primari  
 Rescat

Nombres absoluts segons modalitat seleccionada



Si no es fa cap selecció de modalitat de tractament, el sistema mostra els codis ictus segons comarca de residència.

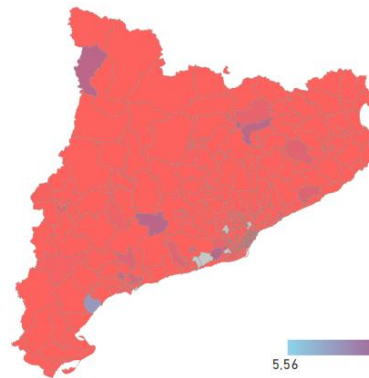
N segons municipi d'alerta



Si no es fa cap selecció de modalitat de tractament, el sistema mostra els codis ictus per municipi d'alerta (SEM1).

2016 2017 2018 2019 > gen. febr. març abr. maig juny jul. ag. set. oct. nov. des.

Proporció Codis Ictus tractats segons modalitat per ABS



5.56 64.00

Data

01/01/2016 12/04/2021

28,51

Taxa Tractaments Codis Ictus

Modalitat Tractament

- Aïllades
- Desestimat
- No tractat
- Primari
- Rescat

33 mil

Codis Ictus

9458

Tractaments

# ICTUSnet

**Xarxa de col·laboració entre diferents regions del sud-oest d'Europa per crear infraestructures de recerca i avaluació que incorporin tecnologies innovadores d'anàlisi de dades per millorar els sistemes d'atenció de l'ictus**





## Objectius específics



**Big data**



**Estratègia**



**Col·laboració internacional**

# ICTUSnet



## Xarxa



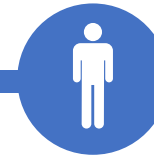
6 SUDOE regions  
**Consortis**



34  
Socis associats



1,3M €  
**Pressupost**



20M  
**Impacte**



## Repte



Agències-Hospitals



Pacients-ciutadania



Pimes



Centres recerca

Project Leadership



AQuAS

Assessment, big data,  
Innovation, health  
Registries, Stroke Program



FMS

Stroke care, Big Data,  
registries



CHUT

Stroke care, Network



BSC

Text mining, Natural  
language processing



Fundació Ictus

Patient experience,  
research



IACS

Assessment, Innovation,  
Best practices



ARS NORTE

Administração Regional  
de Saúde do Norte, I.P.



ARSN

Health services,  
stroke program



IdisBa

Stroke care, Innovation,  
registries



CHUM

Stroke care, Network



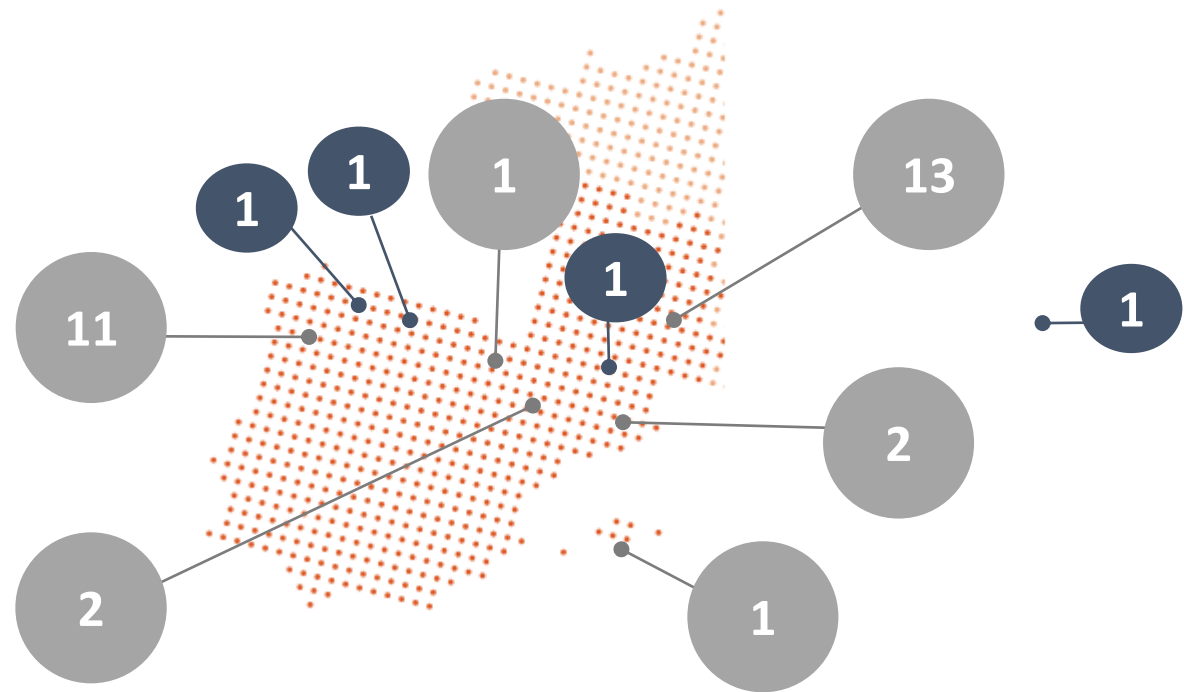
OPEN  
EVIDENCE



Open Evidence

Research, decision making

# ICTUSnet





**WP1**

Regional stroke registries  
+  
Integrated Platform

**WP2**

Artificial intelligence tools  
(text and images)

**WP3**

Analysis and benchmarking of stroke healthcare pathways

**WP4**

Transfer of knowledge

**WP5**

Exchange of knowledge,  
collaboration and mutual learning

# ICTUSnet registry

Deliverable no. D1.1.1  
 Glossary of variables for the  
 ICTUSnet registry

WP 1 Development of regional registries and ICTUSnet platform

Due date: 30/09/2018  
 Actual submission date: 10/10/2018  
 Responsible partner: A2U6  
 Version: Version no. 4  
 Status: Final  
 Dissemination level: Consortium



**6 Regional stroke registries**



**Bilateral Agreements**



**Semantic (SNOMED-CT) and technical Interoperability**



**Integration and Analysis**

DELIVERABLE NO.D1.3.1 –  
 TECHNICAL INTEROPERABILITY  
 DOCUMENT

WP1 Development of regional registries and ICTUSnet platform

Due date: 31/10/2018  
 Actual submission date: 09/11/2018  
 Responsible partner: A2U6  
 Version: Version no. 5  
 Status: Final  
 Dissemination level: Consortium

Name	Description	Concept Id (SNOMED CT)	Term (SNOMED CT)	Format (text, data, numeric)	Values - Code	Values - Description
Id event	Id for every episode	non	non	numeric	random	None
Id region	Identification of the region of the stroke event: Occitania, North Portugal, Aragon, Balearic Islands, Navarre, Catalonia	223496003	Geographical and political regions of the world	Coded - fix value	FR-OCCEVEST FR-OCCEAST PT-FRN ES-AR ES-NC ES-IB ES-CT	Occitania west Occitania east Portugal North Region Aragon Navarre Balearic Islands Catalonia
Resident in the area	The case corresponds to a patient that has his/her residency in the same region where he/she is	416647007	Country of residence	boolean	0 1	no yes
Sex	Sex of the patient	18410006	Patient sex	Coded - single selection	248153007 248152002 82334004	Male Female Undetermined
Age	Age of the patient in the stroke event moment	424144002	Current chronological age	Numeric		
Previous mRS	For the 3-month mRS, if the final value is 6 (which implies death), the data of death will also be indicated	273729003	Rankin scale	Numeric	0 to 5 or 99	
Comorbidities	Relevant history of diagnostics to consider: Past history of myocardial infarction (including angina) Past history of cerebrovascular accident (considered)	398192003	Co-morbid conditions	Coded - multiple selection	275526006 399211009 260413007	History of cerebrovascular accident Past history of myocardial infarction None
Risk factors	Relevant factors that increase patients' risk of stroke, and are present at the time of admission: Atrial fibrillation Hypertension: per physician diagnosis, use of medication, or evidence of at least two raised blood	80943009	Risk factor	Coded - multiple selection	49436004 38341003 73211009 268319002 370992007 260413007	Atrial fibrillation Hypertension Diabetes mellitus Tobacco smoking consumption Dyslipidemia None
Diastolic blood pressure	At time of admission in the emergency department (first measure) Measured in mmHg, with its associated date and time	271650006	Diastolic blood pressure	Numeric	integer	
Systolic blood pressure	At time of admission in the emergency department (first measure) Measured in mmHg, with its associated date and time	72313002	Systolic arterial pressure	Numeric	integer	
Blood glucose	At time of admission in the emergency department (first measure) Measured in mg/dl, with its associated date and time	434912009	Blood glucose concentration	Numeric	Integer	
INR	At time of admission in the emergency department (first measure) International Normalized Ratio	165581004	INR	Numeric	float (1) o 99	
Prior anticoagulation therapy	Active treatment prior to the episode	81839001	Anticoagulant agent		0 1	No Yes
Type of anticoagulation	Active treatment prior to the episode	PENDENT CODI ATC	Anticoagulant agent	Coded - multiple selection	B01AA07 B01AA03 B01AB01 B01AB B01AE07 B01AF01 B01AF02 B01AF03	acenocumarol warfarin heparin iv heparin group (subcutaneous) dabigatran rivaroxaban apixaban edoxaban
prior antiplatelet therapy	Active treatment prior to the episode	108972005	Antiplatelet agent		0 1	no yes
type of antiplatelet therapy		PENDENT CODI ATC			B01AC05 B01AC06 B01AC07 B01AC24 B01AC04	ticlopidine acetylsalicylic acid dipyridamol ticagrelor clopidogrel



▶ Import file

▶ imported files

▶ Registry

▶ Export

▶ Master

☰ User Management ▼

☰ Administration ▼

Import

+ Choose

⬆ Upload

⊗ Cancel



Last refresh  
25/02/2021

[Project & Kpis Definition](#)

[Distribution](#)

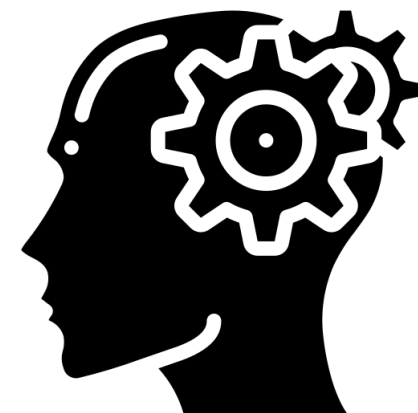
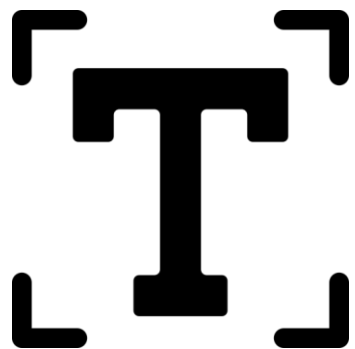
[Case by Region](#)

[Process indicators for EVT](#)

[Outcomes indicators for EVT](#)

[Global Results](#)

Altres eines desenvolupades pel consorci

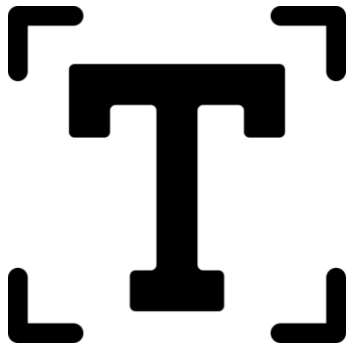




ICTUSnet  app

AVC Forms 🔍

<input type="checkbox"/>	First Name	Last Name	IPP	Id Region	Resident in the area	Sex	Age	Previous mRS	Comorbidities
<input type="checkbox"/>	Jane	Doe	1234	Occitania west	Yes	Female	57	0	Myocardial Infarc <input type="button" value="✎"/> <input type="button" value="🗑️"/>



### ICTUSnet

[Cargar informes](#) [Icons: Print, Download, Refresh, Delete]

- Bandeja de entrada**
- Completados
- Todos los informes

**321108781.utf8**

- 321687159.utf8
- 324602237.utf8
- 325139862.utf8
- 328077361.utf8
- 328342806.utf8
- 328359837.utf8
- 330011073.utf8
- 330459779.utf8
- 330682083.utf8

#### Entrada y salida del paciente

**Inicio de los síntomas**

Fecha	Hora
02/01/2016	23:00

**Llegada al hospital**

Fecha	Hora
dd/mm/aaaa	01:58

**Ingreso**

Fecha	Hora
03/01/2017	

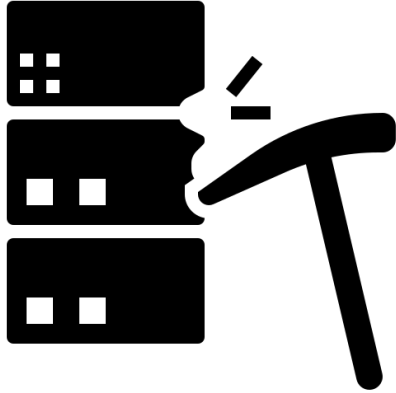
**Alta**

Fecha	Hora
10/01/2017	16:00

[Siguiente](#)

- Diagnóstico**
- Procedimientos I - trombóllisis**





## ICTUSnet WP 3.3 Analysis Dashboard

Implementation by [Juan González García](#)

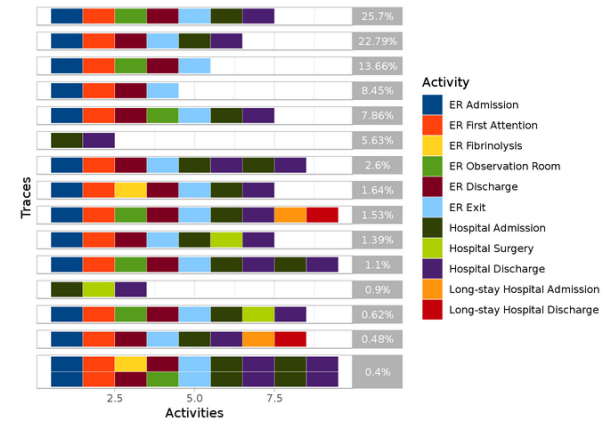
03 September, 2019, 12:04

### Process discovery results

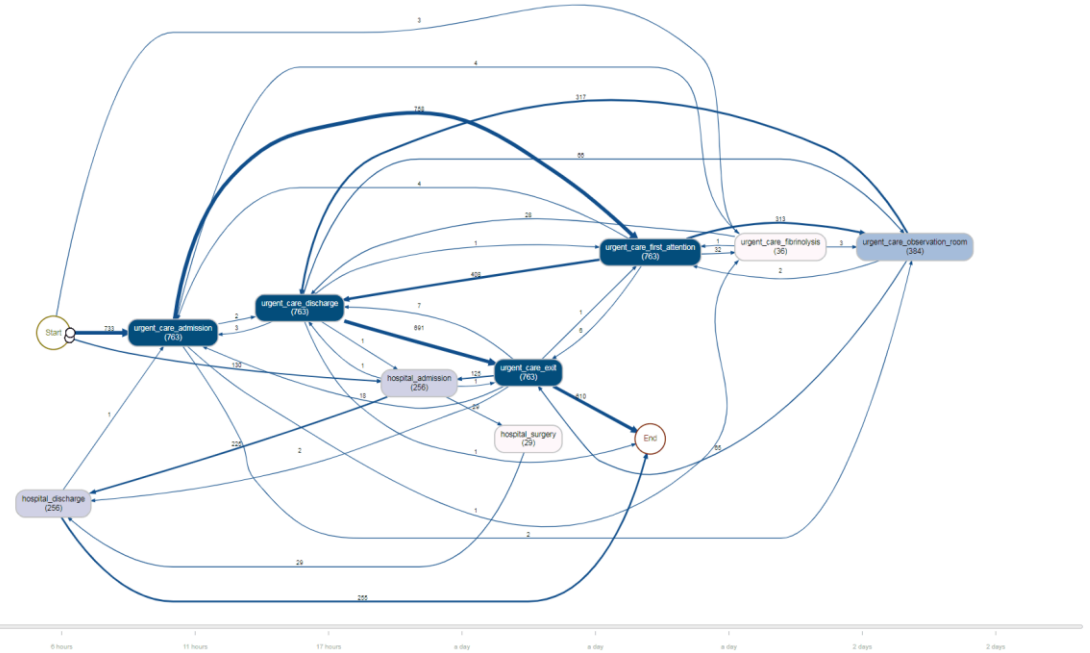
Overall [Ischemic Strokes](#) [Hemorrhagic Strokes](#) [R Session Info](#)

#### Trace Explorer

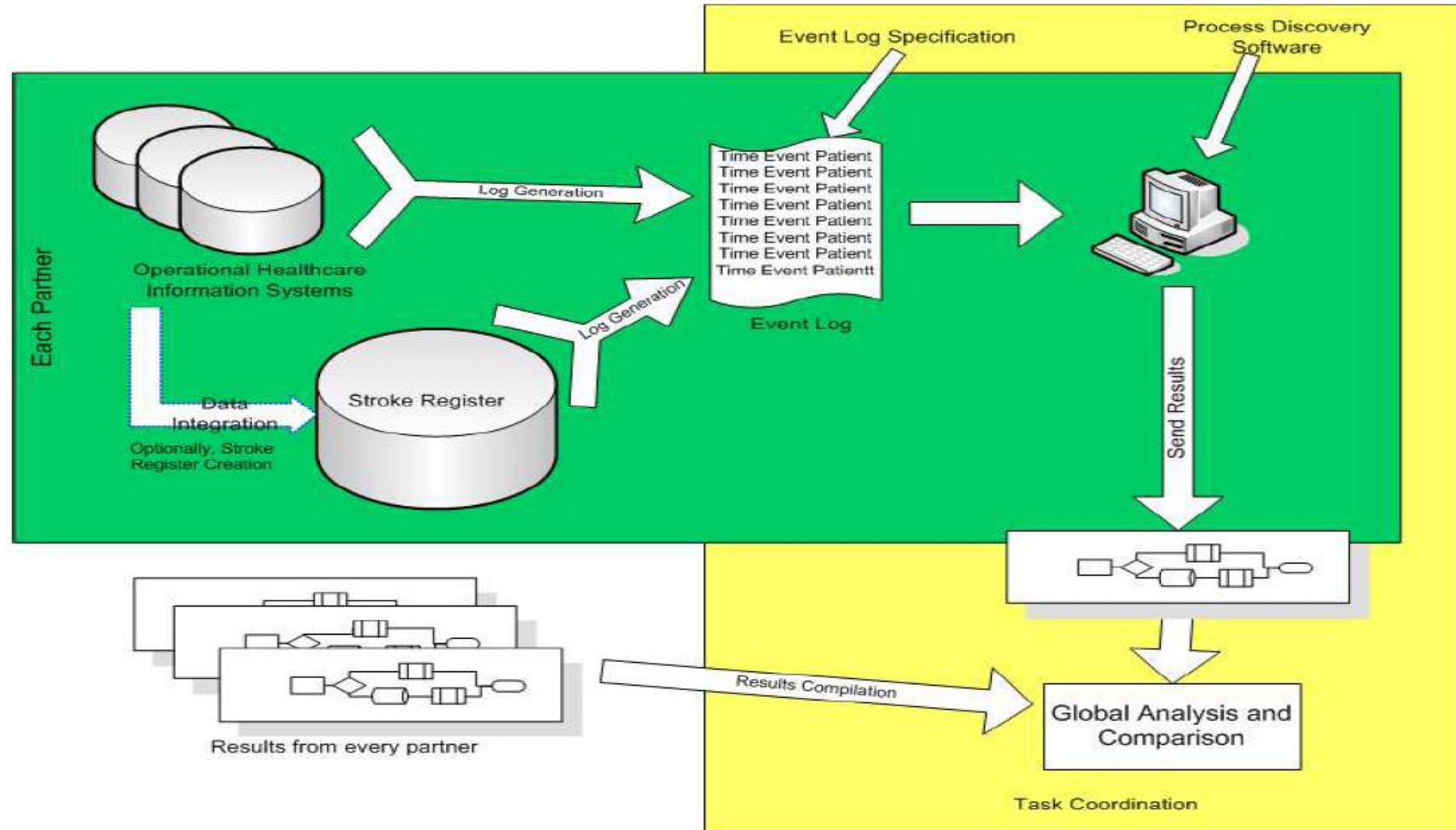
List of traces that cover 95% of the total episode count in the event logs



Process map (Frequency)



# Descentralized network



# Urgent Care Information

Variable Name	Semantics	Data type	Required
event_id	Internal identifier of the event	Numeric	Y
patient_id	Patient identifier	Character	Y
admission_time	Administrative admission time	Date and time	N*
first_attention_time	Time of first contact with a doctor	Date and time	N*
ct_time	Time of CT scan	Date and time	N*
fibrinolysis_time	Time of fibrinolysis procedure	Date and time	N*
observation_room	Starting time in an observation room	Date and time	N*
discharge_time	Administrative discharge time	Date and time	N*
exit_time	Physical discharge from ER	Date and time	N*

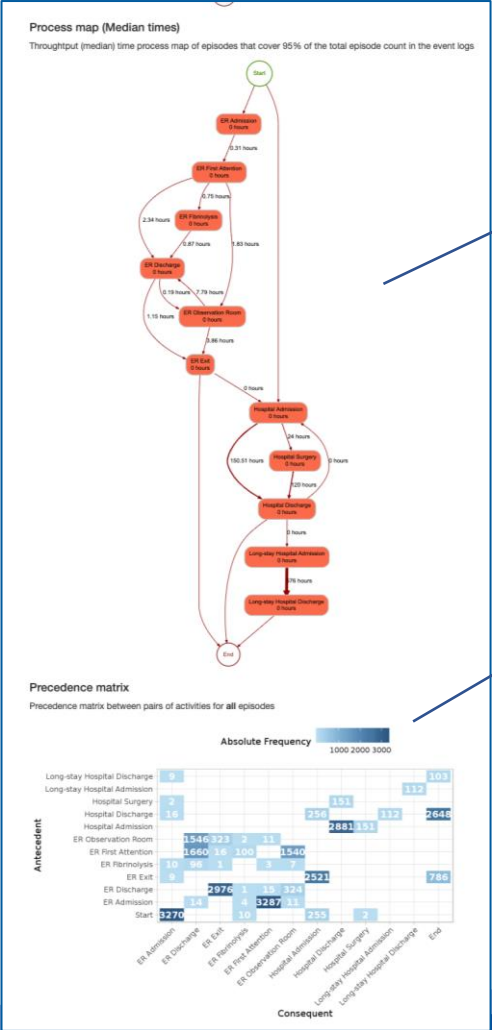
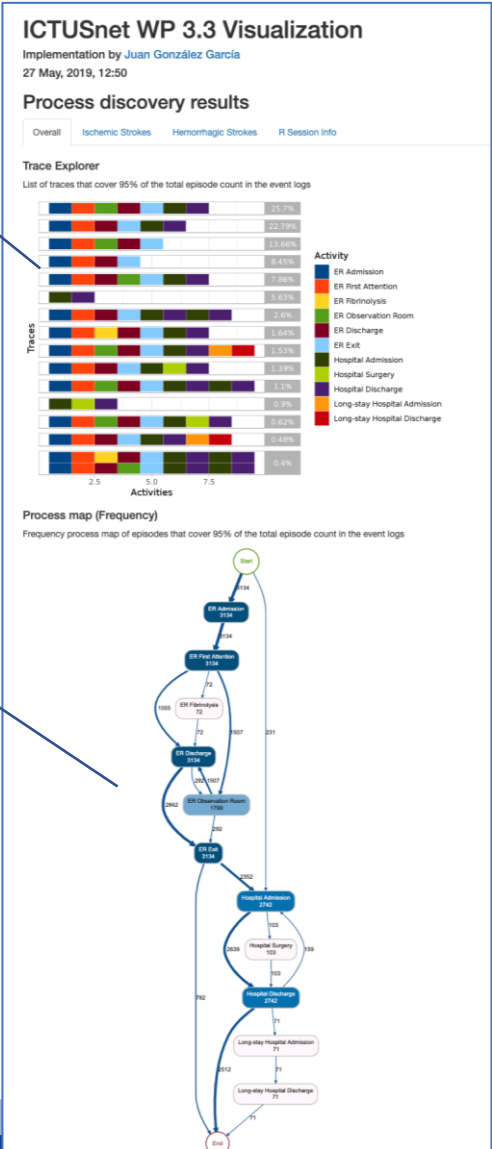
# Hospitalisation Information

Variable Name	Semantics	Data type	Required
event_id	Internal identifier of the event	Numeric	Y
patient_id	Patient identifier	Character	Y
admission_time	Administrative admission time	Date (and Time)	Y
surgery_time	Time of first surgery, if happened	Date (and Time)	N
discharge_time	Administrative discharge time	Date (and Time)	Y
hospital_code	Hospital identifier	Character	Y
admission_type	Type of admission	Numeric	Y
discharge_code	Discharge status	Numeric	Y
diagnosis_code	Main diagnosis of the event (ICD-9/ICD-10 code)	Character	Y

# Analysis Dashboard

Process Traces

Process Map (Frequency)



Process Map (Median Duration)

Precedence Matrix

# Què vam detectar a Catalunya?

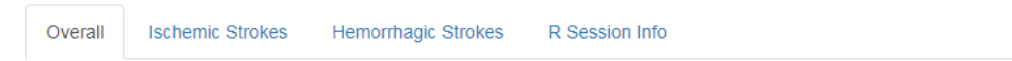
- Ingressat a hospital abans que donat d'alta a urgències?
- Errors en els temps dels procediments: fibrinòlisi i tractament endovascular
- No codificar bé els procediments endovasculares

## Acute Stroke Care Analysis Dashboard

Implementation by [Juan González García](#)

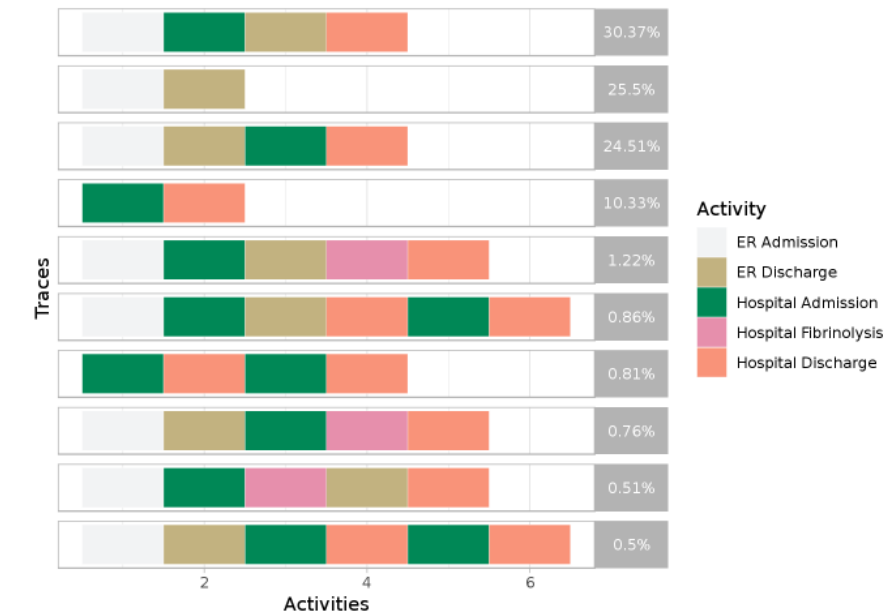
12 February, 2020, 11:15

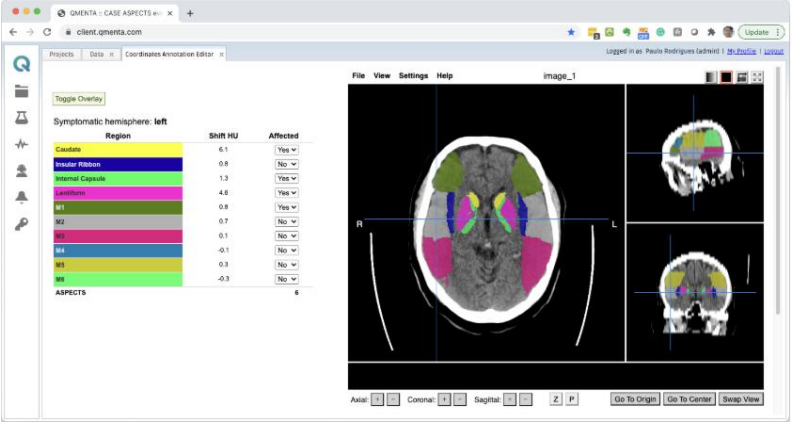
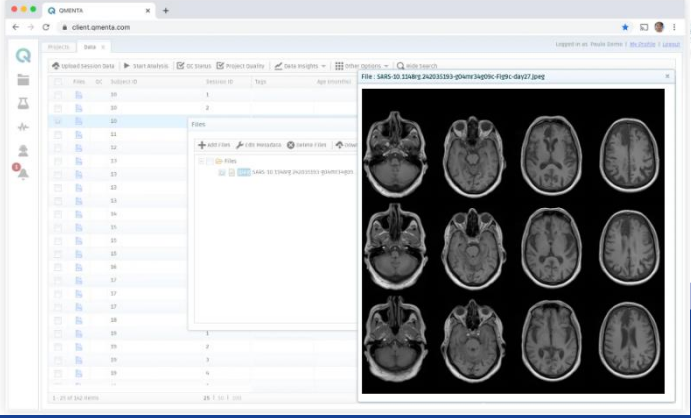
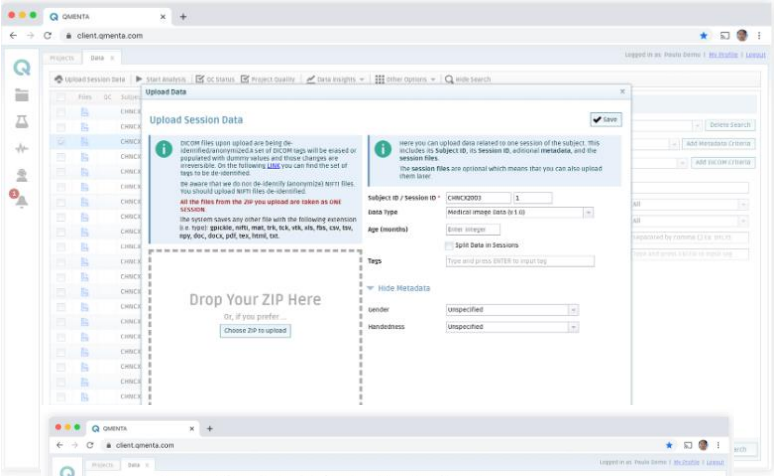
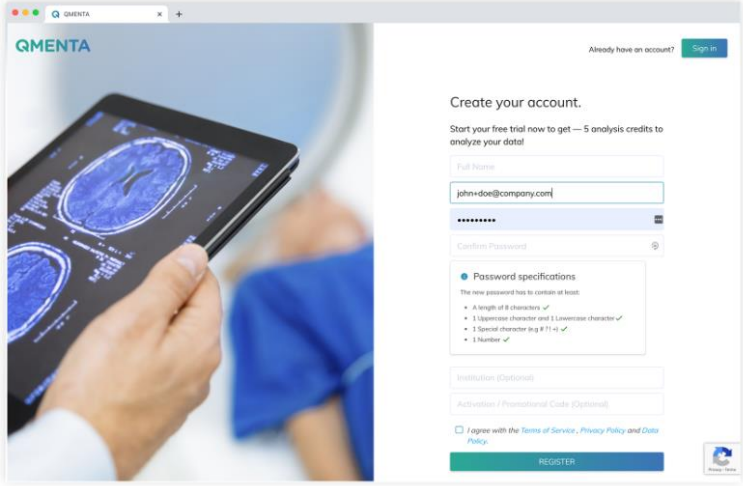
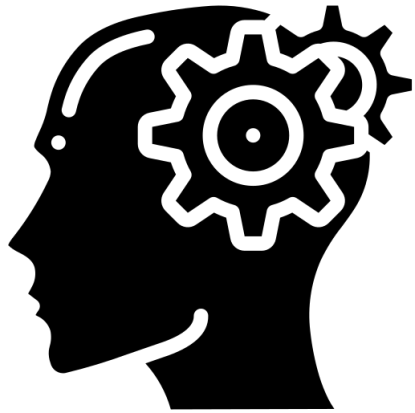
### Process discovery results



#### Trace Explorer

List of traces that cover 95% of the total episode count in the event logs





# ICTUSnet



Portal Web with integrated data





# Millorar el procés assistencial de l'ictus i els beneficis del projecte ICTUSnet



#ICTUSnetBCN2020



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Moltes gràcies



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