

Implementing integrated value-based care solutions in the Catalan health IT ecosystem: Integrated PROM Solution



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Catalan Healthcare model



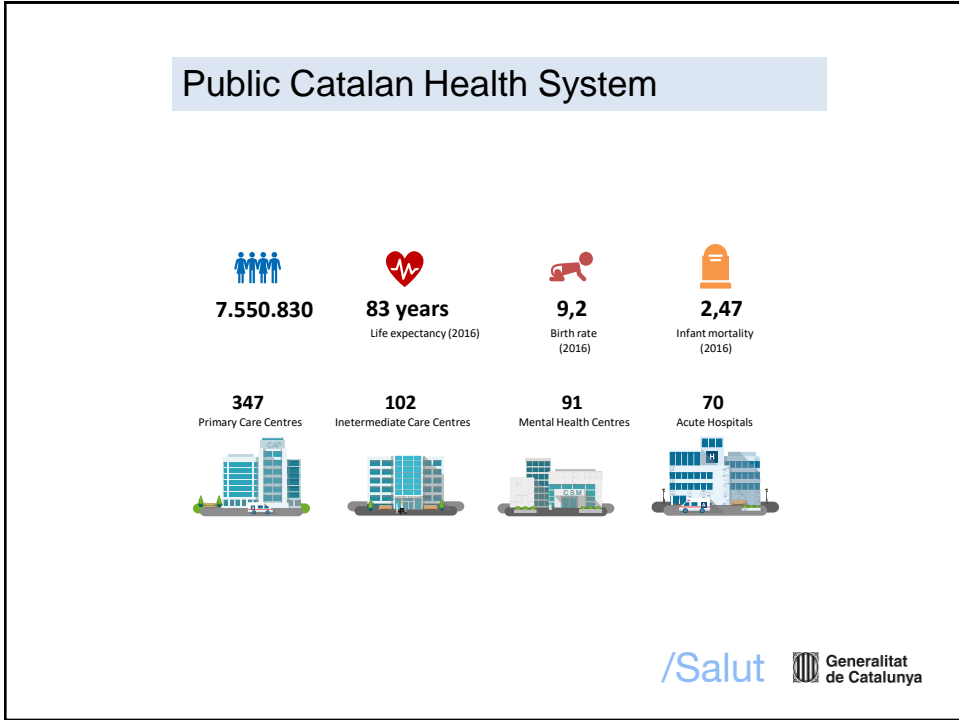
Sistema de Salut de Catalunya

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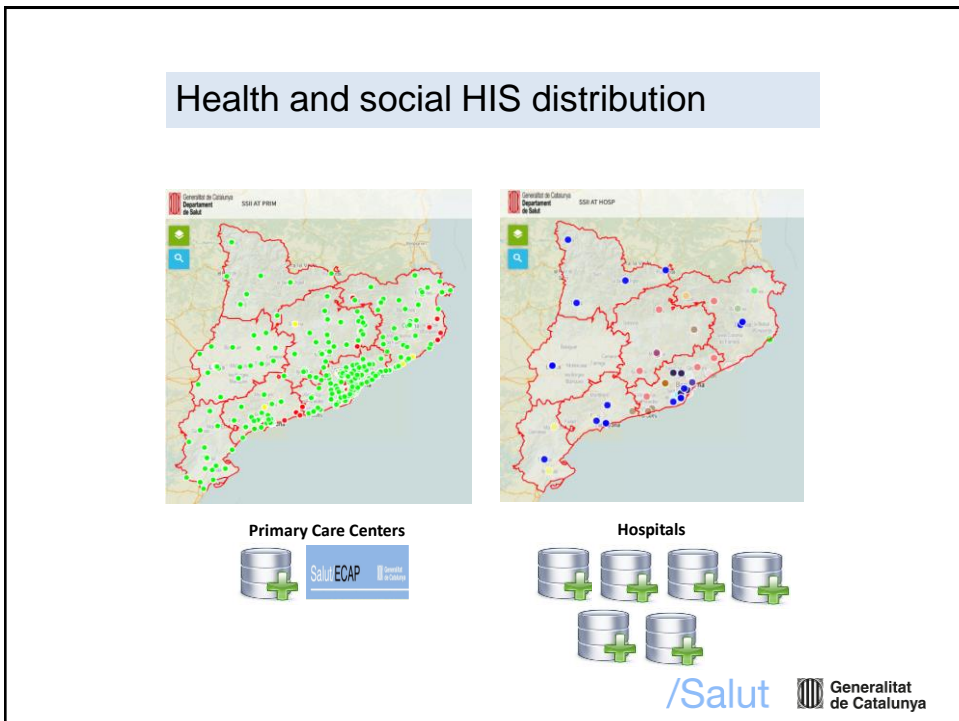
Funded by taxes, co-payment in pharmaceutical products
Universal coverage, free access
Extensive range of publicly covered services
Services provided mainly in public facilities
Multi-provider model (>160 providers with >28 HIS)
integrated into a single public network

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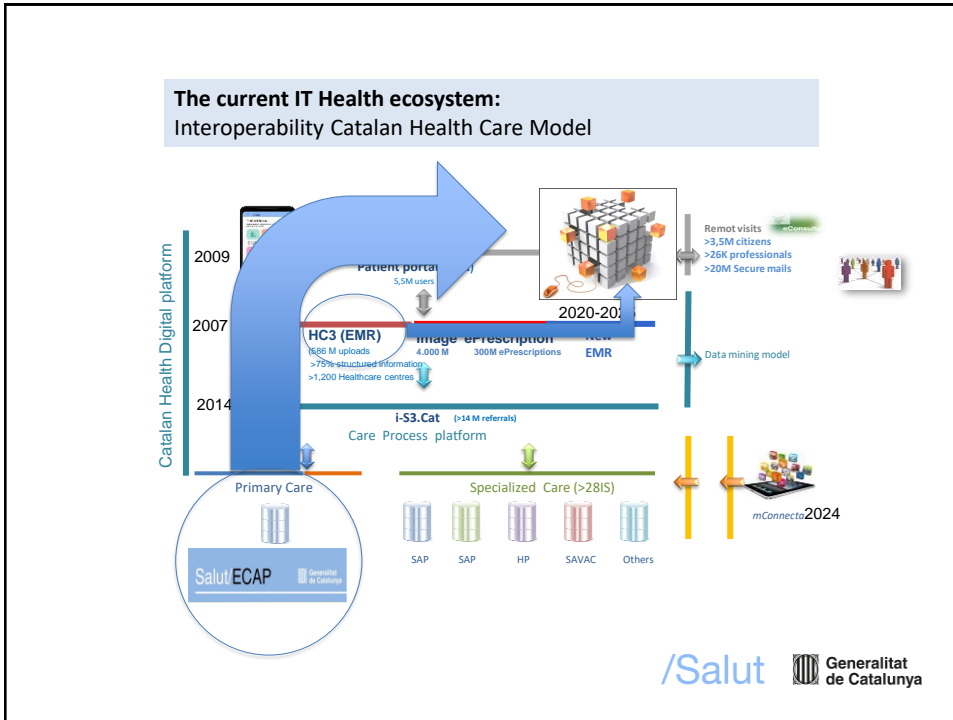
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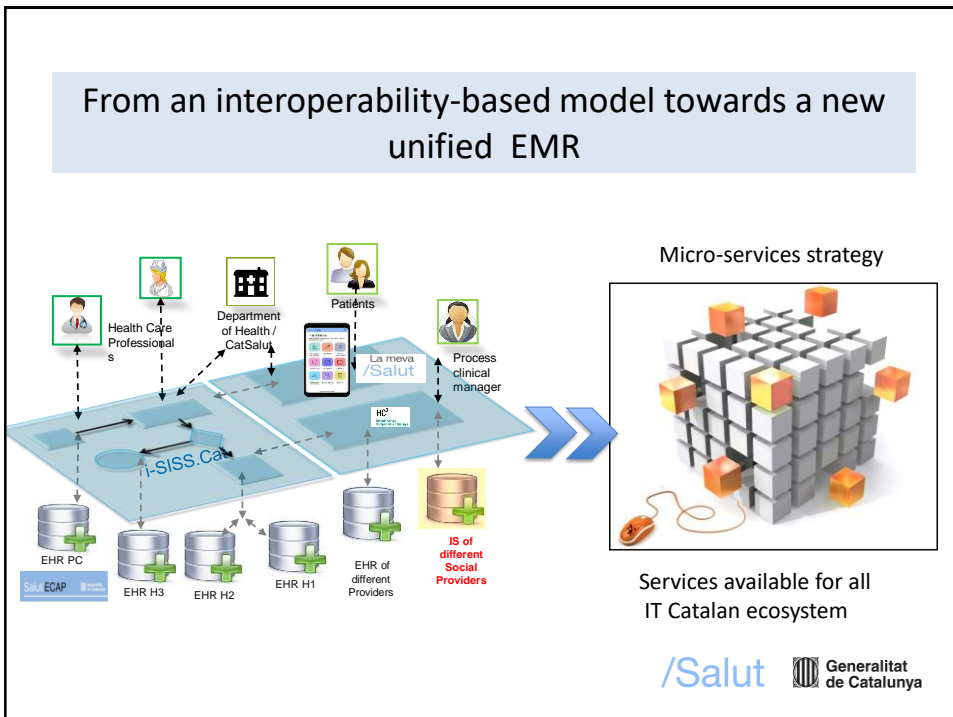
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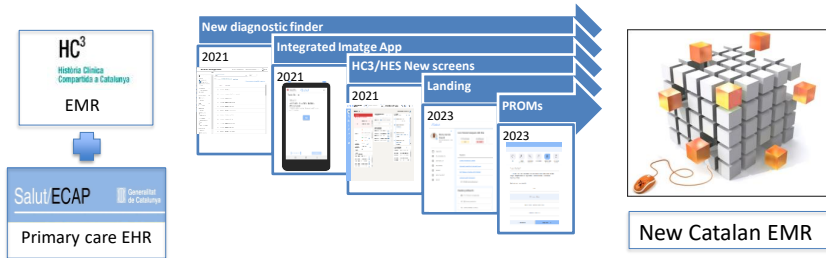
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A strategy based on micro-services

We started construction of non-nuclear services to gradually build new EMR technical enablers



From legacy information system to the new Electronic Medical Record of Catalonia (EMR)



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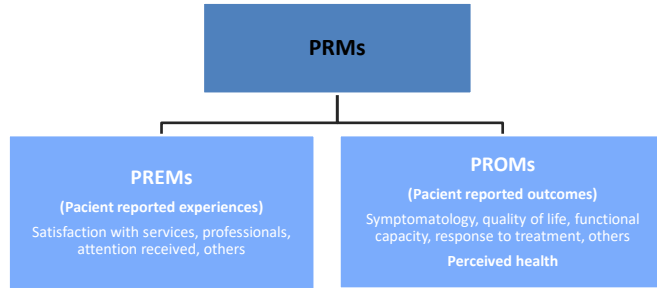
New EMR-Landing page

Pacient	Nom qüestionari	Resultats	Data de resposta	Revisat
CIUDADAN	PURE-4. Avaluació de cribatge simplificada de l'antiròs piroclàsic	0	2023-05-02	✓
EDUVEGE	EuroQol 5D-5L. Escala de qualitat de vida	6 resultats	2023-04-27	✓
CIUDADAN	PHQ-9. Escala de depressió	▲ 24	2023-04-25	✓
ANA.SOBA	EuroQol 5D-5L. Escala de qualitat de vida	6 resultats	2023-04-25	✓
CECILIAN	IPSS. Escala internacional de símptomes prostàtics	2 resultats	2023-04-18	✓
CIUDADAN	PHQ-9. Escala de depressió	▲ 8	2023-04-18	✓
DAVID LOPE	GAD-7. Escala ansietat generalitzada	3	2023-04-18	✓
CECILIAN	EuroQol 5D-5L. Escala de qualitat de vida	6 resultats	2023-04-18	✓



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PRMS: Pacient Reported Mesures



[Patient Reported Measures Framework - Value based healthcare \(nsw.gov.au\)](https://www.nsw.gov.au/patient-reported-measures-framework)

In recent years, there has been an increased focus on placing patients at the center of health care in order to improve their experience.

PROMs are health questionnaires that are often self-completed by patients to obtain **health outcomes, measuring the perceived health of the patient without needing to be present at the doctor's office**



PROMS Standard sets ICHOM



International organization dedicated to promoting the use of standardized PROMs forms at the international level

ICHOM's primary goal is to drive value-based healthcare by measuring and reporting outcomes that are meaningful to patients

STROKE

Collecting Patient-Reported Outcome Measures

Survey Used	Licensing Information	Scoring Guide
Patient Reported Outcomes Measurement Information System Short Form version 1.1 Global Health PROMIS v4 - Patient Proxy	Free to use for non-commercial purposes and in clinical practice without a license. Information on available translations can be found at: https://www.improvement.science.org/patient-reported-outcomes-measurement-system/	The scoring guide may be found on www.improvement.science.org , and at the link to the left.
Simplified Modified Rankin Scale Questionnaire - Clinician	Licensing information to be determined. Please contact the corresponding author at strokemsg@spahs.de	To facilitate the use of the mRS, instructions are provided in the Appendix on www.improvement.science.org
National Institute of Health Stroke Scale - Clinician	Free to use without a license. It may be found at: https://www.ninds.nih.gov/disorders/stroke/patient-education/essentials/essentials-Stroke-Stroke-SSAS-2005-English-Information.pdf . The completion of a free online training course and accredited certification for the mRS is available at: https://www.improvement.science.org	Scoring instructions can be found at https://www.improvement.science.org/patient-reported-outcomes-measurement-system/

Follow-Up Timeline

The following timeline illustrates when the Set variables should be collected from patients, clinicians, and administrative sources:



Previous context in Catalonia

PROMs

- Increasingly demanded need in healthcare services

PROMs filled out by the professional or with the patient

- Not autonomously by the patient (professional subjectivity, patient self-consciousness, etc.).

Paper questionnaires

- recorded manually on the HIS

Requires time at the professional's office

- that could be devoted to other tasks of greater value



Solutions based on external applications

- NOT integrated into information systems
- NOT integrated into patient portals
- NOT integrated in the workflow
- NOT integrated in care processes

Using new apps, software...

- Requires learning curve
- Not available on all platforms

Multiple users, passwords...

- For patients and professionals



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The main features of the EMR-PROM solution

EMR
PROMs

1. It allows us to deploy a technological solution as an EMR microservice integrated into any HIS of the Catalan Health System.
2. access with single sign-on
3. two ways to use the PROM service:
 - Sending and receiving the results integrated into professional workstations (HIS)
 - through the screens that offer the EMR-PROMs tool itself (HC3-EMR)
4. Integrated into the PHR (a validated and secure environment).
5. Integrating PROMs into normal workflows.
6. Monitoring the response status of PROMs: receiving response notifications, sending reminders automatically, and consulting the evolution of patients' results.

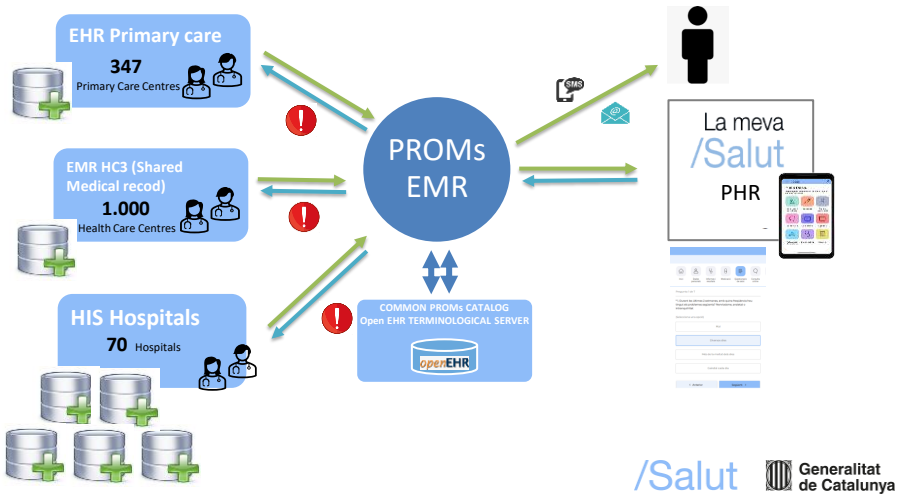
EMR PROMS: Promoting **value-based care**.

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EMR-PROMs enables integration with the entire Catalan health system.



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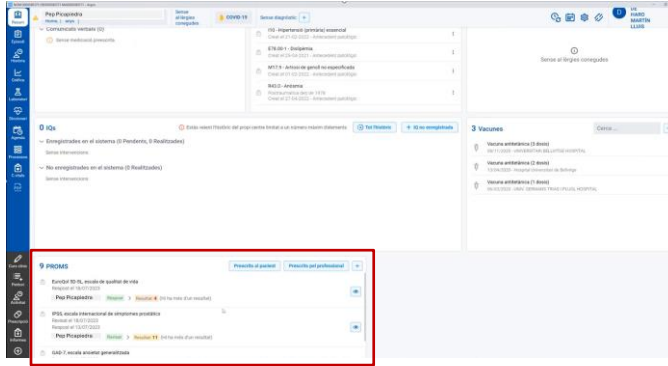
Example of EMR-PROMs integration with ECAP (Primary Care EHR)

The image shows two screenshots illustrating the integration of a legacy ECAP system into the new EMR-PROM solution. The left screenshot is a legacy ECAP interface showing a table with columns for dates (e.g., 20110211, 2011022, 171002, 101002, 20110202) and various medical codes (e.g., 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200). The right screenshot is the 'Consulta gestions PROMs' interface, showing a table with columns for 'Estat', 'Resultat', 'Data real', and 'Professió'. Red arrows indicate the flow of data from the legacy ECAP system to the new EMR-PROM solution.

Legacy system integrated into the new EMR-PROM solution using the screens of the PROM tool

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Example: PROMs integration with Hospitals HIS (SAP) Integration

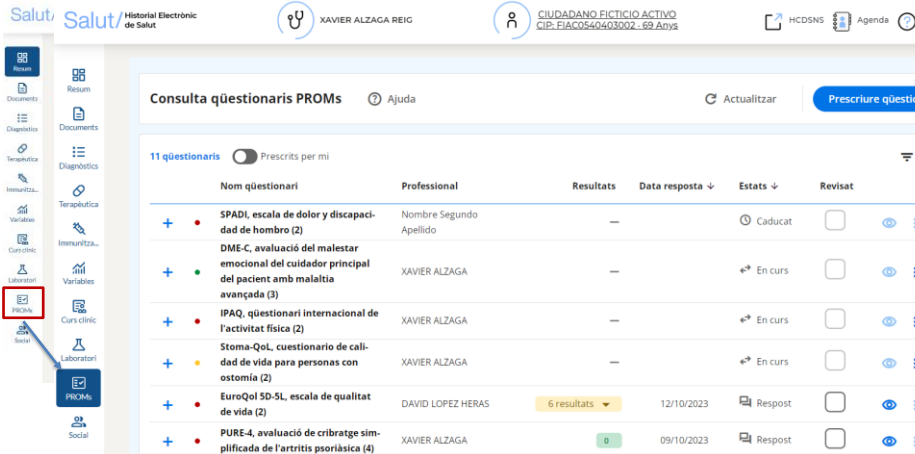


HIS integrated into the new EMR-PROM solution



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PROMs Integration with HC3 (Catalan EMR)



EMR-PROM integrated into the EMR or Shared clinical record of Catalonia

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PROMs tool screens

The screenshot displays the 'Consulta qüestionaris PROMs' interface. It features a table of questionnaires with columns for 'Nom qüestionari', 'Estat', 'Resultat', 'Data estat', and 'Professional'. A central diagram highlights 'PROMs HES' with three surrounding nodes: 'Patient PROMs' (red), 'Professional PROMs' (green), and 'Prescription of new PROM' (green). Below the main table, there is a 'Prescriure nou qüestionari' section with a search bar and a list of questionnaires by specialty and number of professionals.

Nom qüestionari	Estat	Resultat	Data estat	Professional
PHQ-9 Escala de depressió (Patient Health Questionnaire)	En curs	21	31/01/2023	DAVID LOPEZ HERAS
PHQ-9 Escala de depressió (Patient Health Questionnaire)	Revisat	12	31/01/2023	Nombre-proves0712 Apellido-proves0712 Segundo-proves-0712
PHQ-9 Escala de depressió (Patient Health Questionnaire)	Revisat	10	14/12/2022	DAVID LOPEZ HERAS
PHQ-9 Escala de depressió (Patient Health Questionnaire)	Revisat	7	07/12/2022	DAVID LOPEZ HERAS
Escala Internacional de símptomes prostàtics (IPSS)	Respost	2 resultats	31/01/2023	DAVID LOPEZ HERAS
Escala ansietat generalitzada GAD-7	Revisat	10	27/01/2023	DAVID LOPEZ HERAS
Escala de qualitat de vida EuroQol 5D-5L	En curs	-	12/01/2023	Nombre-proves0712 Apellido-proves0712 Segundo-proves-0712

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PROM prescription screen

The screenshot shows the 'Consulta qüestionaris PROMs' interface with a focus on the 'Prescriure qüestionari' button. The table below lists the available questionnaires for prescription.

Nom qüestionari	Estat	Resultats	Data estat	Professional
PHQ-9 Escala de depressió (Patient Health Questionnaire)	En curs	21	31/01/2023	DAVID LOPEZ HERAS
PHQ-9 Escala de depressió (Patient Health Questionnaire)	Revisat	12	31/01/2023	Nombre-proves0712 Apellido-proves0712 Segundo-proves-0712
PHQ-9 Escala de depressió (Patient Health Questionnaire)	Revisat	10	14/12/2022	DAVID LOPEZ HERAS
PHQ-9 Escala de depressió (Patient Health Questionnaire)	Revisat	7	07/12/2022	DAVID LOPEZ HERAS
Escala Internacional de símptomes prostàtics (IPSS)	Respost	2 resultats	31/01/2023	DAVID LOPEZ HERAS
Escala ansietat generalitzada GAD-7	Revisat	10	27/01/2023	DAVID LOPEZ HERAS
Escala de qualitat de vida EuroQol 5D-5L	En curs	-	12/01/2023	Nombre-proves0712 Apellido-proves0712 Segundo-proves-0712

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Patient notification

Patient alerts that he has a PROM to fill out (SMS or email)

LMS.salut@gencat.cat para mi mar, 15 nov, 8:26 (hace 12 días) ☆ ↶ ⋮

catalán > español Traducir mensaje Desactivar para: catalán x

Hola DAVID,

Tens disponible a La Meva Salut un nou qüestionari pendent de respondre. Respon el qüestionari a <https://pre.lamevasalut.gencat.cat/web/cps/login?dFrom=b3757e9-0d95-4db4-99c2-fc1520b6303>

CAP DR. LLUIS SAYE

Generalitat de Catalunya

Si us plau, no responguis aquest missatge. Ha estat emès des d'un servei automàtic. Per a qualsevol dubte, pots trucar al 061 Salut Respon.

- Automated reminders at 7, 14 days after the first mailing if you have not replied
- 3 days prior to expiration (30 days)

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Patient filling PROM on PHR

Escala d'Ansietat Generalitzada (GAD-7)

Actualitzat: Questionari de salut dissenyat per mesurar els símptomes d'ansietat. Per saber més o com obrir el nostre portal de salut, si us plau, visiteu la pàgina que esmenta més a la caixa d'informació en cada pregunta.

Comença el qüestionari

Resposta a la qüestió?

*1. Durant les últimes 2 setmanes, quants dies he tingut els problemes següents? (normalment, ansietat o irritabilitat)

(Selecciona una opció)

mai

1 o més dies

Més de la meitat dels dies

Casi tots els dies

< Anterior Següent >

Questionari de salut

Actualitzat: Respon el qüestionari de salut i pren part del teu perfil de salut.

Escala d'ansietat generalitzada

Professional: CAP DR. LLUIS SAYE
Data: 15/11/2023


Respon el qüestionari

PROMs multi-language → language selected by the patient in PHR

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Patient results screen



Consulta qüestionaris Proms Prescriure nou qüestionari


26 qüestionaris Prescrits per mi Filtres

Nom qüestionari	Estat	Resultat	Data estat ↓	Professional
4 (BA) Escala d'Ansietat de Beck	Respost	25,7 (DE 11,4)	01/02/2022	Dra. Maria Angela Fontanela
(BA) Escala d'Ansietat de Beck	Revisat	15,8 (DE 11,8)	31/12/2021	Dra. Maria Angela Fontanela
(BA) Escala d'Ansietat de Beck	Revisat	15,8 (DE 11,8)	31/12/2021	Dra. Maria Angela Fontanela
(BA) Escala d'Ansietat de Beck	Revisat	15,8 (DE 11,8)	03/10/2021	Dra. Maria Angela Fontanela
6 (PHQ-9) Escala de depressió	Respost	20-27	15/01/2021	Dra. Yara Regina Holetz
2 Qüestionari de Salut EuroQol	Revisat	15,8 (DE 14,9)	01/01/2021	Dra. Maria Angela Fontanela
Qüestionari de Salut EuroQol	Prescrit	Sense resultat	05/02/2020	Dra. Maria Angela Fontanela
Escala Internacional de símptomes...	En curs	Sense resultat	05/02/2020	Dra. Yara Regina Holetz
Prom Ictus: Seguiment	Respost	6 (DE 14,9)	13/02/2020	Dr. Omar Saldaña Díaz
Prom Ictus: Seguiment	Respost	6 (DE 14,9)	01/07/2019	Dr. Xavier Xercavins Contreras

26 qüestionaris Mostrar 10 < 1/1 >

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Patient result screen (with alerts)



PHQ-9, Escala de depressió Respost 25/04/2023 24 25/04/2023 DAVID LOPEZ HERAS

Dates

Data prescrició: 19/04/2023

Data d'enviament a pacient: 19/04/2023

Data resposta: 25/04/2023

Data revisió: -

Resultat

Alarma:

- Idració buïcada
- Depressió severa

Interpretació clínica:

- Interpretació puntuació total PHQ-9: Depressió greu

Origen del PROM


Nom del centre: CAP MANISO

Professional prescrició: DAVID LOPEZ HERAS

Professional revisió:


PHQ-9, Escala de depressió Respost 19/04/2023 8 19/04/2023 DAVID LOPEZ HERAS

PHQ-9, Escala de depressió Revisat 19/01/2023 1 19/01/2023 Dr. BFC



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PROM professional screen



Data to display PROM

- Patient's name
- Expiration



Filters

Actions

Consultar PROMS del profesional

Patient	Nom qüestionari	Estat	Resultats	Data estat	Calcular	
CIDADANO FICTICIO ACTIVO	Escala Internacional de símptomes protístics (PSS)	En curs	21	31/10/2023	Calcular	🔍 ⌂ ⋮
CIDADANO FICTICIO ACTIVO	PHQ-9 Escala de depressió (Patient Health Questionnaire)	Respost	2	31/10/2023		🔍 ⌂ ⋮
CIDADANO FICTICIO ACTIVO	Escala Internacional de símptomes protístics (PSS)	Respost	2	25/10/2023		🔍 ⌂ ⋮
CIDADANO FICTICIO ACTIVO	Escala Internacional de símptomes protístics (PSS)	Respost	2	25/10/2023		🔍 ⌂ ⋮
DAVID LOPEZ	Escala ansietat generalitzada GAD-7	Respost	5	27/01/2023		🔍 ⌂ ⋮
CIDADANO FICTICIO ACTIVO	Escala ansietat generalitzada GAD-7	Respost	15	27/01/2023		🔍 ⌂ ⋮
DAVID LOPEZ	Escala de qualitat de vida EuroQol 5D-5L	Respost	5	27/01/2023		🔍 ⌂ ⋮
CIDADANO FICTICIO ACTIVO	Escala ansietat generalitzada GAD-7	Respost	2	25/01/2023		🔍 ⌂ ⋮
CIDADANO FICTICIO ACTIVO	Escala ansietat generalitzada GAD-7	Respost	4	25/01/2023		🔍 ⌂ ⋮
DAVID LOPEZ	Escala de qualitat de vida EuroQol 5D-5L	Respost	5	25/01/2023		🔍 ⌂ ⋮

Professional screen where the results of different patients are collected.






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PROMs currently available

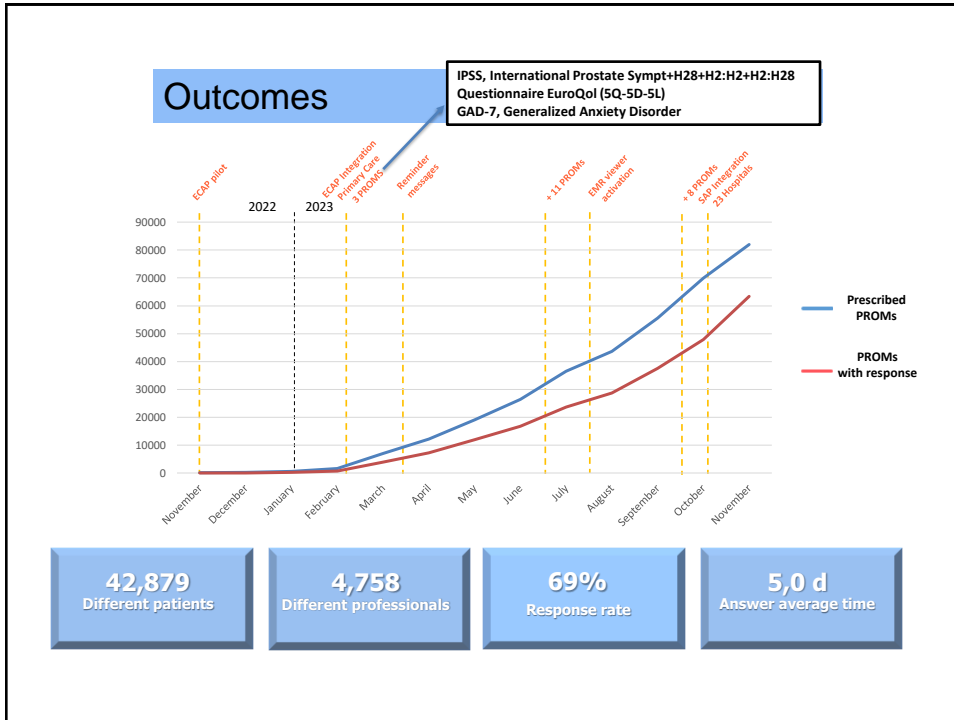
27 PROMs

- IPSS, International Prostate Symp+H2B+H2;H2+H2;H2B
- PHQ-9, Patient Health Questionnaire
- GAD-7, Generalized Anxiety Disorder
- IIEF-5, International Index Erectile Function
- DDS17, Diabètes Distress Scale
- PURE-4, Psoriatic Arthritis Uncluttered screening Evaluation
- IPAQ, International Physical Activity Questionnaire
- WOMAC, questionnaire for osteoarthritis of the knee and hip
- SPADI, Shoulder Pain and Disability Index
- NPQ, Northwick Park Neck Pain Questionnaire
- WEMWBS, Warwick-Edinburgh Mental Well-being scale
- The Roland-Morris Disability Questionnaire
- AUDIT, Alcohol Use Disorders Identification Test (pregnancy)
- SAS-R, Edmonton Symptom Assessment System
- DME-E, detecció de malestar emocional
- "DME-C, evaluació del malestar emocional del cuidador principal del pacient con enfermedad avanzada"
- AUDIT, Alcohol Use Disorders Identification Test
- SF-MPQ, questionnaire of pain McGill
- Edinburgh Pregnancy Depression Scale
- Edinburgh Postnatal Depression Scale
- DHI, Dizziness Handicap Inventory
- HFS, cuestionario de miedo a la hipoglucemia
- Stoma-QoL, A Quality of Life Questionnaire For People with Ostomy
- ICIQ-UI Short Form
- PREMIMED, cuestionario de adherencia a la dieta mediterránea
- ARMS-e, Adherence to Refills and Medications Scale
- Questionnaire EuroQoL (5Q-5D-5L)

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Key points

- e-PROMs make it easier for patients to fill out, reducing time to professionals [1] and avoiding recording the results in the health records.
- PROMs must be **integrated into the HIS and the usual flows of professionals**, including prescriptions, follow-up, notifications, alerts, and results.
- PROMs are **shared by different levels of care** allowing better ongoing attention
- It is crucial to **standardize the delivery and type of PROM** (ICHOM or others) used for each care process to make comparisons.
- PROMs foster **new healthcare models** and new patterns to follow up different care processes

[1] Yu JY. Electronic forms for patient reported outcome measures (PROMs) are an effective, time-efficient, and cost-minimizing alternative to paper forms. *Pediatr Rheumatol Online J*. 2021 May 3;19(1):67

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Next steps

- ❑ **Integration of the PROM solution in the rest of Hospitals**
- ❑ **Include new PROMS**
- ❑ **Benchmarking strategies** between Health care centres in some care processes
- ❑ **Initiate different lines of research**
- ❑ **Screen to show the evolution of the patient's results** in HIS and PHR.
- ❑ **Include PROMS automation in digital telemonitoring processes.** Combining telemonitoring of clinical variables, PROMs, prevention advices and the use of televisits in a single clinical process

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Thanks!!

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