Sessions conjuntes de Pediatrid

de l'Atenció Primària i l'Hospital del Mar

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Vall d'Hebron Barcelona Campus Hospitalari

QUAN SOSPITAR UNA IMMUNODEFICIÈNCIA PRIMÀRIA?

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Barcelona, 12 de març de 2018

ÍNDICE

- ¿Cuándo empezamos a pensar en las IDP?
- Las IDP: clasificación. Un nuevo paradigma
- Clasificación de las IDP: 9 grupos a recordar
- La importancia del diagnóstico precoz. Signos de alarma
  - Proyecto ID-Signal: las IDP para otros especialistas
  - Cribado de las IDCG: una realidad en nuestro país
  - PIDCAP: el complemento perfecto
- Recursos disponibles en Cataluña

¿CUÁNDO EMPEZAMOS A PENSAR EN LAS IDP?

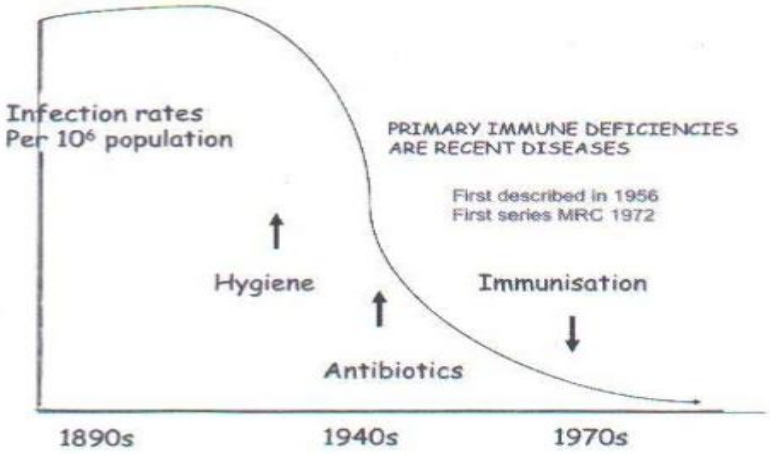
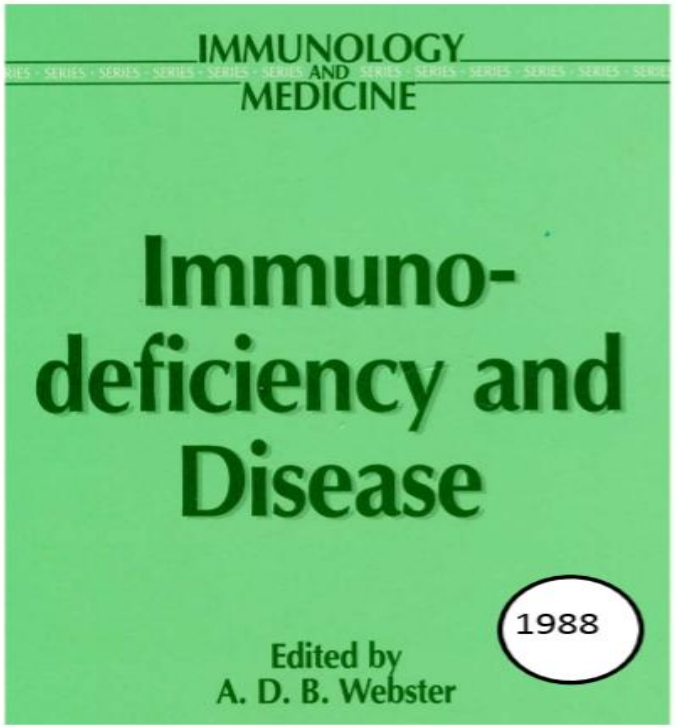


Fig. 2. Recognition of PID diseases in relation to medical advances. (Colours are visible in the online version of the article; http://dx.doi.org/10.3233/PPL-2011-0325)



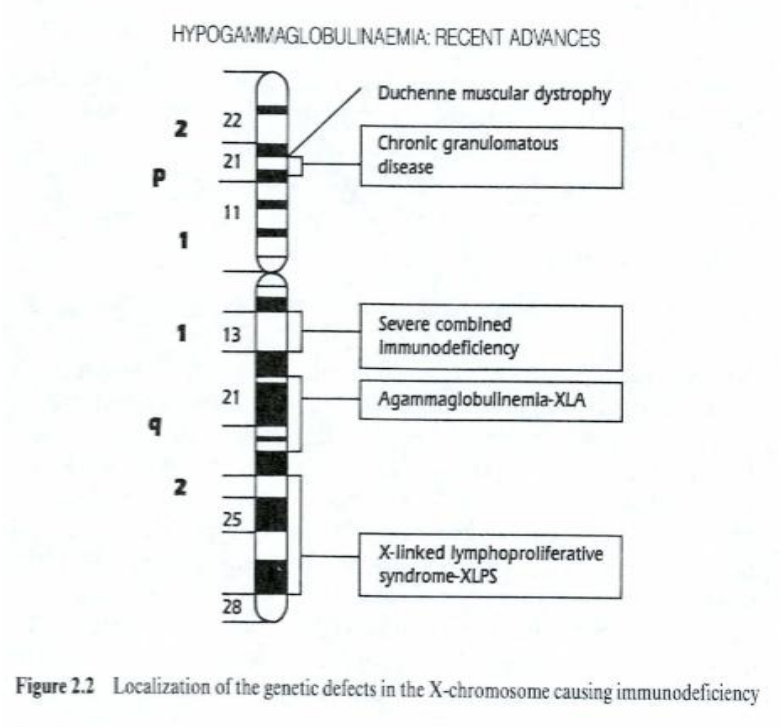
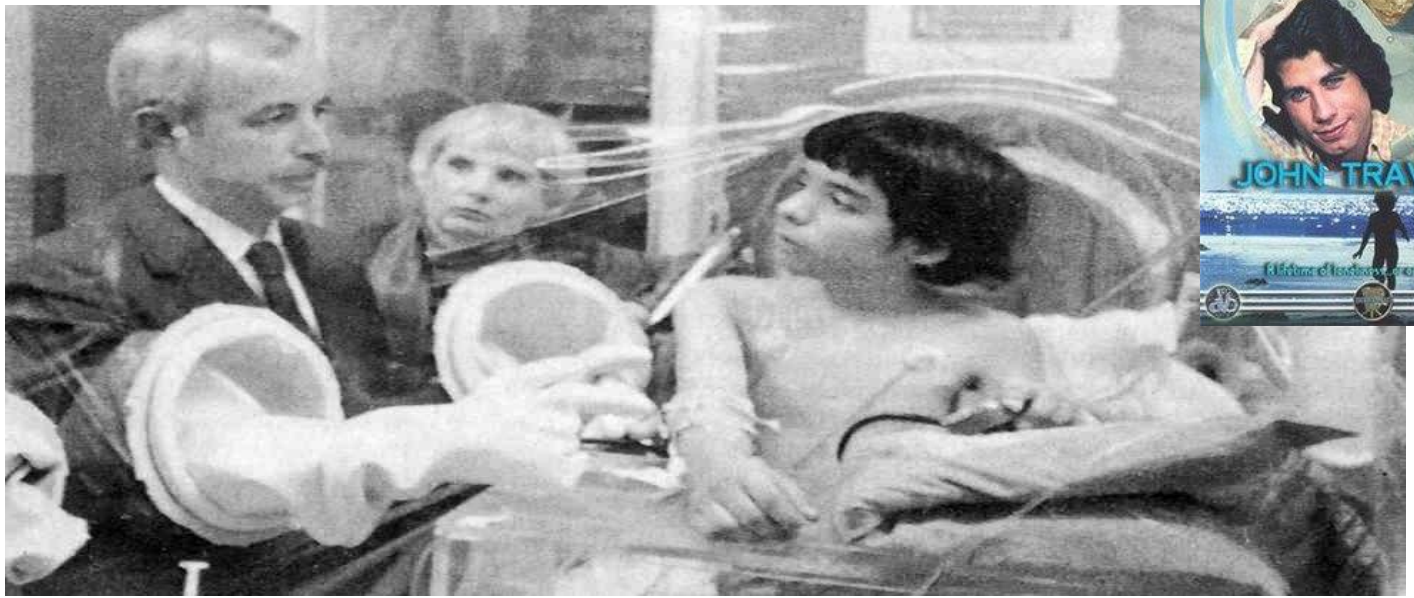
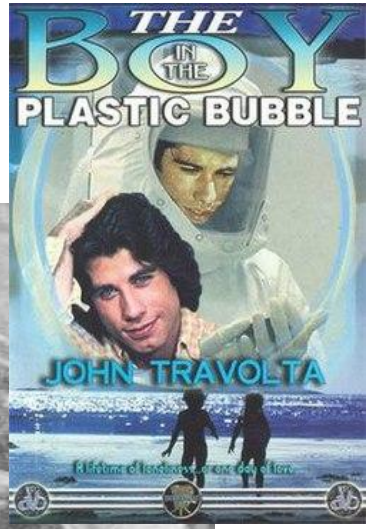


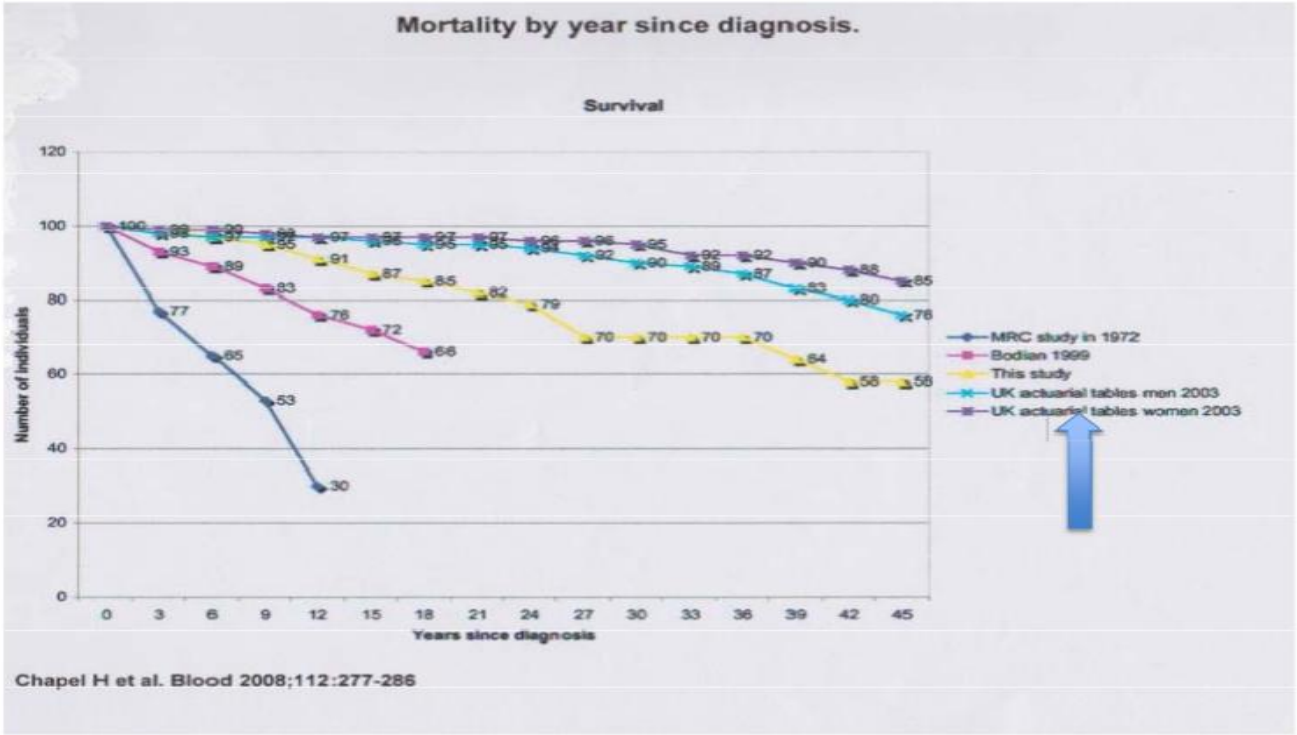
Figure 2.2 Localization of the genetic defects in the X-chromosome causing immunodeficiency

The first genetic defect causing PID (XLA) was described in 1993



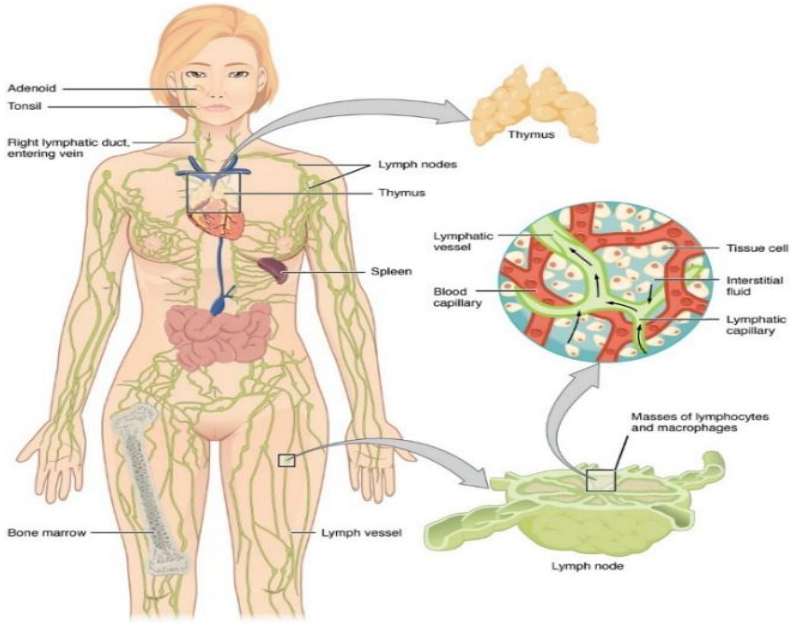


David Vetter, SCID (1971-1984)


Mortality by year since diagnosis.
Survival
Number of individuals
Years since diagnosis
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
20
40
60
80
100
120
MRC study in 1972
Bodian 1999
This study
UK actuarial tables men 2003
UK actuarial tables women 2003
Chapel H et al. Blood 2008;112:277-286

LAS INMUNODEFICIENCIAS PRIMARIAS

- Conjunto de enfermedades minoritarias.
- > 400 enfermedades genéticas.
- Alteración cuantitativa y/o funcional de lo diferentes mecanismos implicados en la respuesta inmunitaria.



- Pathogenesis → Gene mutation in different parts of the immune system
- Usually hereditary (AR > X linked)
- Nowadays >200 gene defects causing PID
- 1 : 1200-2000 babies born alive
- Predominantly antibody disorders > 50% PID

Prevalence of PI

A 2007 survey of 10,000 households by the Immune Deficiency Foundation (IDF) showed the prevalence of PI to be 1 in 1200, or 83 per 100,000 people in the U.S.[1]

Multiple Sclerosis - 85
Primary Immunodeficiency - 83*
Systemic Lupus Erythematosus - 43
Alpha-1 Antitrypsin Deficiency - 35
Cystic Fibrosis - 33

* Selective Immunoglobulin A (IgA) deficiency is one of the most common PI diseases.[6] According to a survey conducted by the IDF, the prevalence of selective IgA deficiency is 22 out of 100,000.[1,7] Excluding selective IgA deficiency, the prevalence of PI is 61 per 100,000.[1,7]

- Clinical features: **<u>INFECTIONS (but not only infections)</u>**
  Autoimmunity/Inflammation
  Allergy
  Cancer

UN NUEVO PARADIGMA

Table 1. Multiple paradigm shifts in primary immunodeficiencies.

Primary immunodeficiencies	Conventional	Novel
Patient and population levels		
Frequency	Rare	Common
Occurrence	Familial	Sporadic
Age at onset	Childhood	Adulthood
Prognosis	Spontaneously worsening	Spontaneously improving
Phenotype level		
Disease-defining clinical phenotypes	Opportunistic infections*	Other infections and phenotypes†
Number of phenotypes per patient‡	High	Low (even single)
Number of episodes per patient§	High	Low (even single)
Disease-causing cellular phenotypes	Hematopoietic	Nonhematopoietic
Genotype level		
Disease-causing genes per patient	One (monogenic, Mendelian)	A few (oligogenic, major genes)
Mode of Mendelian inheritance	Autosomal and X-linked recessive	Autosomal dominant
Clinical penetrance	Complete	Incomplete
Mutations	Inherited from the parental genome	Germ line de novo or somatic

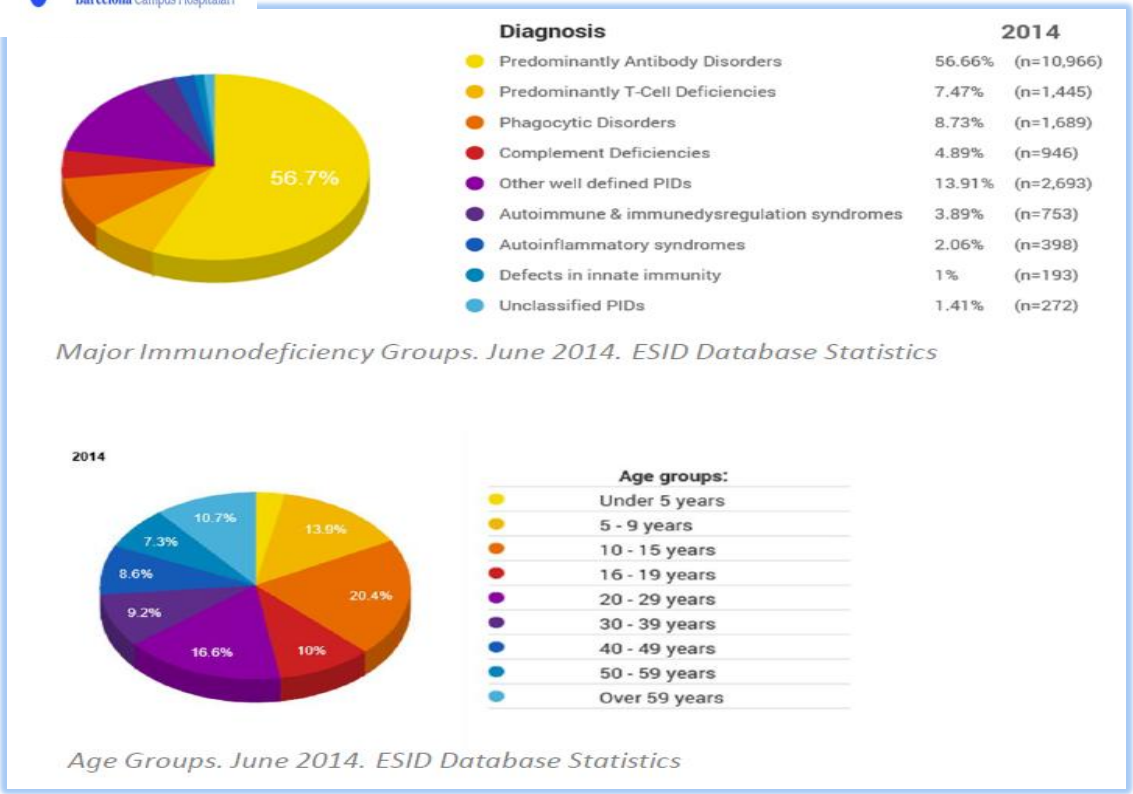
*Infections occurring in patients with overt immunological abnormalities. †Autoimmunity, allergy, virus-induced cancer, angioedema, granulomas, hemophagocytosis, autoinflammation, thrombotic microangiopathy. ‡For example, infectious agents. §For example, infectious phenotypes.

Primary Immunodeficiencies: a field in its infancy.
Science ;317:617-619.

CLASIFICACIÓN DE LAS IDP

- Predominantly antibody deficiencies
- Predominantly T-cell deficiencies
- Phagocytic disorders
- Complement disorders
- Defects in innate immunity
- Autoinflammatory syndromes
- Autoimmune & immunedysregulation syndromes
- Other well-defined PIDs
- PID phenocopies

> 400 IDP



- Divididas en 9 grandes grupos según los componentes del sistema inmunitario que no funciona.
- >90% no se detectan mediante el cribado neonatal.
- 60% se pueden diagnosticar durante la edad pediátrica. No preferencias de género.

Primary immunodeficiency diseases: an update on the classification from the International Union of Immunological Societies Expert Committee for Primary Immunodeficiency

Waleed Al-Herz[1,2], Aziz Bousfiha[3], Jean-Laurent Casanova[4,5], Helen Chapel[6], Mary Ellen Conley[7,8]*, Charlotte Cunningham-Rundles[9], Amos Etzioni[10], Alain Fischer[11], Jose Luis Franco[12], Raif S. Geha[13], Lennart Hammarström[14], Shigeaki Nonoyama[15], Luigi Daniele Notarangelo[13,16]*, Hans Dieter Ochs[17], Jennifer M. Puck[18], Chaim M. Roifman[19], Reinhard Seger[20] and Mimi L. K. Tang[21,22,23]

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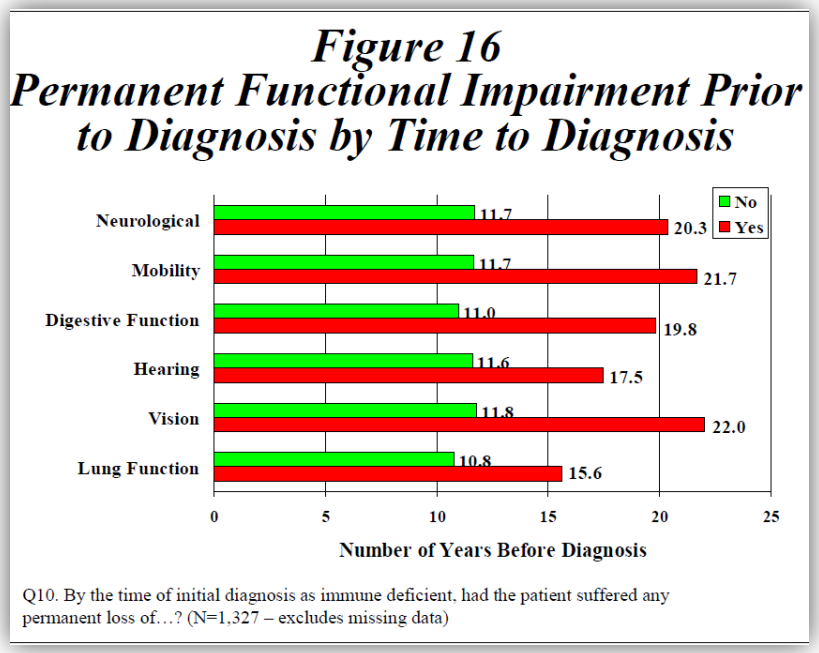
LA IMPORTANCIA DEL DIAGNÓSTICO PRECOZ



- El tiempo es vida.
- El tiempo es función.
- 49% de los pacientes tienen una pérdida de función permanente previa al diagnóstico.

Immune Deficiency Foundation. Primary immune deficiency diseases in America: 2007. The third national survey of patients. http://primaryimmune.org/idf-survey-research-center/idf-surveys?aid=1264&sa=1. Published May 1, 2009.

Table 2 Costs of the most frequent conditions affecting patients with PI

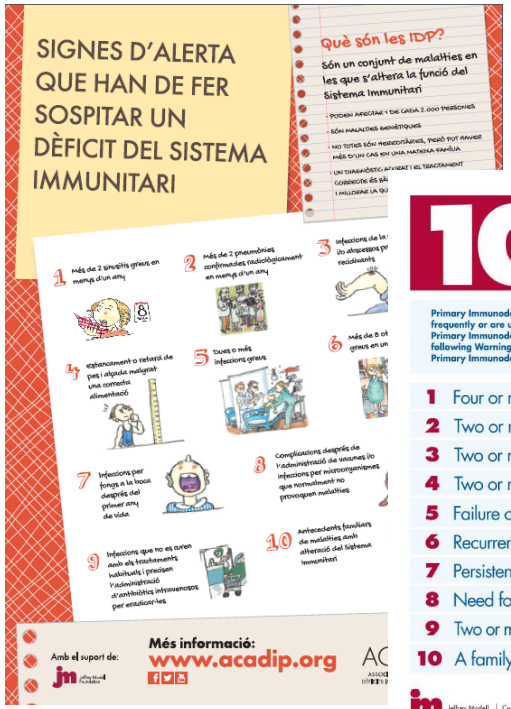
Condition	Pre-Dx average no. of episodes	Pre-Dx cost per episode	Pre-Dx annual cost	Post-Dx average no. of episodes	Post-Dx cost per episode	Post-Dx annual cost	Post-Dx average annual savings
Persistent otitis media	4.2	$528	$2217	1.6	$528	$845	
Serious sinus and upper respiratory infections	4.6	$1125	$5175	2.1	$1125	$2362	
Viral infections	3.7	$1275	$4717	1.4	$1275	$1785	
Acute bronchitis	3.1	$1700	$5270	0.8	$1700	$1360	
Bacterial pneumonias	2.8	$3552	$9945	0.6	$3552	$2131	
Chronic obstructive pulmonary disease and bronchiectasis	4.3	$3165	$13,609	1.4	$3165	$4431	
Hospitalization days	19.8	$2480	$49,104	3.1	$2480	$7688	
Physician/ER visits	70.8	$180	$12,744	11.7	$180	$2106	
Days on antibiotics	166.2	$10	$1662	72.8	$10	$728	
School/work days missed	33.9	$195	$6610	8.9	$195	$1735	
Total cost annually per patient without IgG			$111,053			$25,171	$85,882 Annual savings per patient per year without IgG
Average annual cost of IgG						$30,000	
Total cost savings annually including 100% on IgG (actual total 25.6%)							$55,882 Annual savings per patient per year with IgG

The cost of the most frequent conditions affecting patients with PI pre- and post-diagnosis, and the post-diagnosis average annual savings

- El tiempo también es ahorro

Modell, Vicki, et al. "Modeling strategy to identify patients with primary immunodeficiency utilizing risk management and outcome measurement." Immunologic Research (2017): 1-8.

SIGNOS DE ALARMA



- Importancia de la combinación de más de un signo de alarma.
- Conocimientos básicos para sospecharlo.

KEY POINTS

- PID can present with diverse clinical features, including cutaneous, gastrointestinal and autoimmune manifestations.
- Early identification and management of PID are vital to minimize complications and improve outcomes.
- The existing 10 Warning Signs of PID do not identify some patients with PID.
- Targeted warning signs for different groups may

Table 1. The 10 Warning Signs of primary immunodeficiency

10 Warning Signs of PID for children	10 Warning Signs of PID for adults
Four or more new ear infections within 1 year	Two or more new ear infections within 1 year
Two or more serious sinus infections within 1 year	Two or more new sinus infections within 1 year in the absence of allergy
Two or more months on antibiotics with little effect	One pneumonia per year for more than 1 year
Two or more pneumonias within 1 year	Chronic diarrhoea with weight loss
Failure of an infant to gain weight or grow normally	Recurrent viral infections (colds, herpes, warts and condyloma)
Recurrent, deep skin or organ abscesses	Recurrent need for intravenous antibiotics to clear infections
Persistent thrush in mouth or fungal infection on skin	Recurrent, deep abscesses of the skin or internal organs
Need for intravenous antibiotics to clear infections	Persistent thrush or fungal infection on skin or elsewhere
Two or more deep-seated infections including septicemia	Infection with normally harmless tuberculosis-like bacteria
A family history of PID	A family history of PID

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CURRENT OPINION

The 10 warning signs: a time for a change?

Michael D. O'Sullivan[a] *and Andrew J. Cant*[b]

Ann. N.Y. Acad. Sci. ISSN 0077-8

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
Issue: *The Year in Human and Medical Genetics: Inborn Errors of Immunity*

Ten warning signs of primary immunodeficiency: a new paradigm is needed for the 21st century

Peter D. Arkwright[1] and Andrew R. Gennery[2]

Clinical Features That Identify Children With Primary Immunodeficiency Diseases

WHAT'S KNOWN ON THIS SUBJECT: Children with severe, recurrent, or unusual infections may have an underlying primary immunodeficiency disease (PID). Ten warning signs have been promoted by patient support groups to help identify children with PID, but the signs have never been tested in a rigorous scientific study.

WHAT THIS STUDY ADDS: Family history, intravenous antibiotics for sepsis, and failure to thrive predict at least 89% of children with T-lymphocyte, complement, and neutrophil PID. B-lymphocyte PID are more difficult to diagnose from the clinical features, and a lower threshold is required for assessing antibody levels.

AUTHORS: Anbezhil Subbarayan, MBBS,[a] Gloria Colarusso, MB BS,[b] Stephen M. Hughes, MB, PhD,[a] Andrew R. Gennery, MD,[b] Mary Slatter, MBBS,[b] Andrew J.

J Clin Immunol (2014) 34:10–22
DOI 10.1007/s10875-013-9954-6

KEY REVIEW ARTICLE

Attending to Warning Signs of Primary Immunodeficiency Diseases Across the Range of Clinical Practice

Beatriz Tavares Costa-Carvalho · Anete Sevciovic Grumach · José Luis Franco · Francisco Javier Espinosa-Rosales · Lily E. Leiva · Alejandra King · Oscar Porras · Liliana Bezrodnik · Mathias Oleastro · Ricardo U. Sorensen · Antonio Condino-Neto

ific Warning Signs That Most Strongly Correlate With Risk of PID Compared With no PID

	Definable PID	Neutrophil PID	B Lymphocyte	Complement	T Lymphocyte
Positive family history	18 (8–45)	66 (16–281)	8 (3–22)	142 (20–999)	20 (7–57)
≥2 deep seated infections	NS	NS	NS	NS	0.2 (0.1–0.6)
≥2 episodes of pneumonia	NS	NS	NS	NS	0.4 (0.2–0.9)
Abscesses (deep skin or organ)	NS	15 (4–52)	NS	NS	NS
Multiple acute otitis media	0.5 (0.3–0.8)	NS	NS	NS	0.3 (0.1–0.6)
≥2 sinus infections	0.3 (0.1–0.7)	NS	NS	NS	0.0 (0.0–0.2)
Persistent thrush	NS	NS	NS	NS	3 (1.1–10)
Intravenous antibiotics	NS	5 (1.4–15)	NS	NS	NS
≥2 mo of oral antibiotics with little effect	14 (4–23)	16 (2–125)	11 (2–48)	NS	NS
Failure to thrive	9 (4–23)	13 (3–53)	NS	NS	22 (8–60)

Shown is the relative risk (95% confidence interval) compared with the group of children with no definable PID (logistic regression analysis) ($P < .01$ for all relative risk ratios shown). NS indicates not significant.

Table 2. Frequency (percentage) of ≥2 warning signs in children with and without PID

	<2 Warning signs	≥2 Warning signs	Relative risk (95% CI) compared with no PID
No PID	70 (52%)	63 (48%)	–
Any PID	163 (38%)	267 (62%)*	1.8 (1.2–2.7)
Neutrophil PID	10 (14%)	63 (86%)*	7.0 (3.5–14)
Complement PID	9 (41%)	13 (59%)	1.6 (0.6–4.0)
B cell PID	42 (40%)	63 (60%)	1.7 (1.0–2.8)
T cell PID	102 (44%)	128 (56%)	1.4 (0.9–2.1)

*Significant at $P < 0.01$ by Chi-square, compared with the group that did not have a PID.

Dermatology

Table VI Warning signs of PIDD for dermatologists

Clinical occurrences	PIDD	
Eczema	Wiskott-Aldrich syndrome (WAS)	CBC including platelet number and size (small sized platelets); CMI, AMI
	Hyper IgE syndrome (HIES)	Serum IgE, eosinophilia

Gastroenterology

Table V Warning signs of PIDD for gastroenterologists

Clinical occurrences	PIDD	
Chronic diarrhea	Antibody deficiencies	AMI
Inflammatory bowel disease		
Chronic giardiasis		
Autoimmune enteropathy + severe intr diarrhea. Other diagnoses associated hypothyroidism, eczema, thrombocy autoimmune hemolytic anemia, neo		
Persistent candidiasis		
Severe abdominal pain emulating an a		
Liver abscess mainly due to *S aureus*		
Hepatobiliary infection due to *C parvi*		
Inflammatory bowel disease in infants		

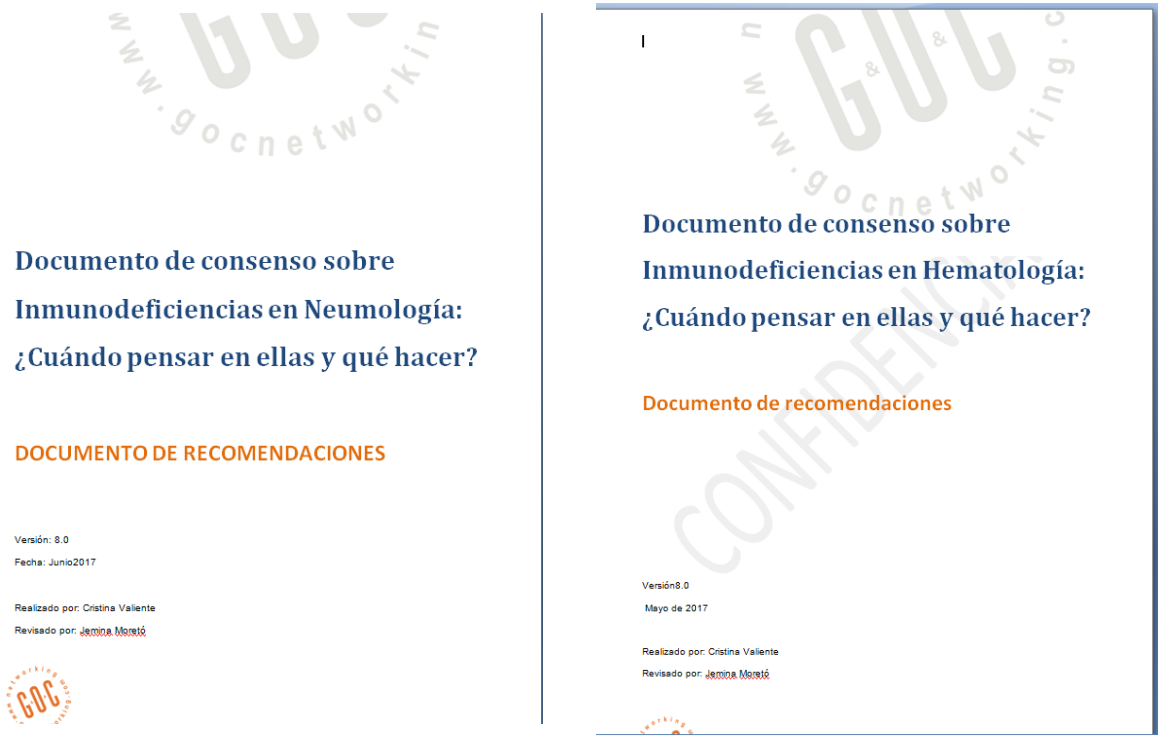
Pulmonology

Table IV Warning signs of PIDD for pulmonologists

Clinical occurrences	PIDD	atory tests
Pneumonias due to extracellular bacteria + otitis and sinusitis	Antibody deficiencies	AMI
	Complement deficiencies	C, ANA
Pulmonary abscess Pneumatocele	Hyper IgE syndrome (HIES) Features: pneumonia by *S aureus*, eczema, fungal infection, joint hypermobility, coarse facial features	Serum IgE, eosinophilia Specific Score[a]
Pneumonias due to *Staphylococcus* or fungi	Chronic granulomatous disease (CGD): susceptibility to infections by catalase positive microorganisms. Other infections: adenitis, liver abscess, osteomyelitis	P
	Glucose-6-phosphate dehydrogenase (G6PD) deficiency	G6PD activity
	Myeloperoxidase deficiency (common in diabetes)	Peroxidase level
	HIES	Serum IgE, eosinophilia Specific Score[a]
Pneumonia due to *P jiroveci*	T cell deficiencies/CD4$^+$ lymphopenia	CMI, AMI Lymphoproliferation assay
	CD40 ligand (L) deficiency	AMI, CMI
	Wiskott-Aldrich syndrome (WAS), eczema + thrombocytopenia	CBC including platelet number and size (small sized platelets); CMI, AMI
Pneumonia due to *Mycobacteria tuberculosis* or atypical mycobacteria	T cell deficiencies/CD40L deficiency	CMI, AMI
	Mendelian susceptibility to mycobacterial diseases	II

PROYECTO ID-SIGNAL

- Proyecto multidisciplinar.
- Adecuación de los signos de alarma a las diferentes especialidades.
- Año 2017: **hematooncología y neumología** (niños y adultos).
- Validación Delphi a nivel estatal.
- Año 2018: redacción manuscrito y presentación. Acreditación y validación sociedades científicas.
- Nuevas especialidades: reumatología y dermatología?



Soler-Palacín et al. Respiratory Research (2018) 19:219
https://doi.org/10.1186/s12931-018-0923-8

Respiratory Research

RESEARCH Open Access

Primary immunodeficiency diseases in lung disease: warning signs, diagnosis and management

Pere Soler-Palacín[1*], Javier de Gracia[1,6], Luis Ignacio González-Granado[2], Carlos Martín[3], Carlos Rodríguez-Gallego[4], Silvia Sánchez-Ramón[5] and Lung ID-Signal Group

Abstract

Background: Pulmonary complications are common in primary immunodeficiency diseases (PID) and contribute to morbidity and mortality in these patients. However, their varied presentation and a general lack of awareness of PID in this setting make early diagnosis and treatment difficult. The aim of this study was to define the warning signs of PID in patients with respiratory manifestations, the necessary diagnostic tests, and the therapeutic management of both children and adults.

Methods: A review of the literature was performed, and 43 PID interdisciplinary specialists were consulted.

Results: This document identifies the pulmonary and extrapulmonary manifestations that should prompt a suspicion of PID, the immunological and respiratory tests that should be included in the diagnostic process according to the level of care, recommendations regarding the use of immunoglobulin replacement therapy according to the specific immunodeficiency, and the minimum recommended immunological and pulmonary monitoring in these patients.

Conclusions: This document is the first to combine scientific evidence with the opinion of a broad panel of experts specializing in the treatment of patients with immunodeficiencies. It aims to provide a useful tool for all practitioners who are regularly involved in the management of these patients.

Keywords: "Immunoglobulins/deficiency"[mesh], "Antibodies/deficiency"[mesh], "Immunoglobulins/administration and dosage"[mesh], "Respiratory Tract Infections"[mesh], "Immunologic Deficiency Syndromes"[mesh]

CRIBADO NEONATAL DE LAS IDCG

- The incidence of SCID is approximately 1 in 58,000 births in the US where newborn screening (NBS) is implemented since 2008. Pai SY et all. N Engl J Med 2014; 371:434
- Only about 20 percent of infants with SCID have a family history that prompts early testing. PucK JM et all. Hum Genet 1997; 99:628
- NBS for SCID has demonstrated to improve survival by means of early stem cell transplantation. Borte S et all. Hematol 2013; 20:48.
- The **TRECs assay** proved to be a sensitive and specific as well as cost effective method for SCID NBS. Chan K et all. J Allergy Clin Immunol 2005; 115:391.

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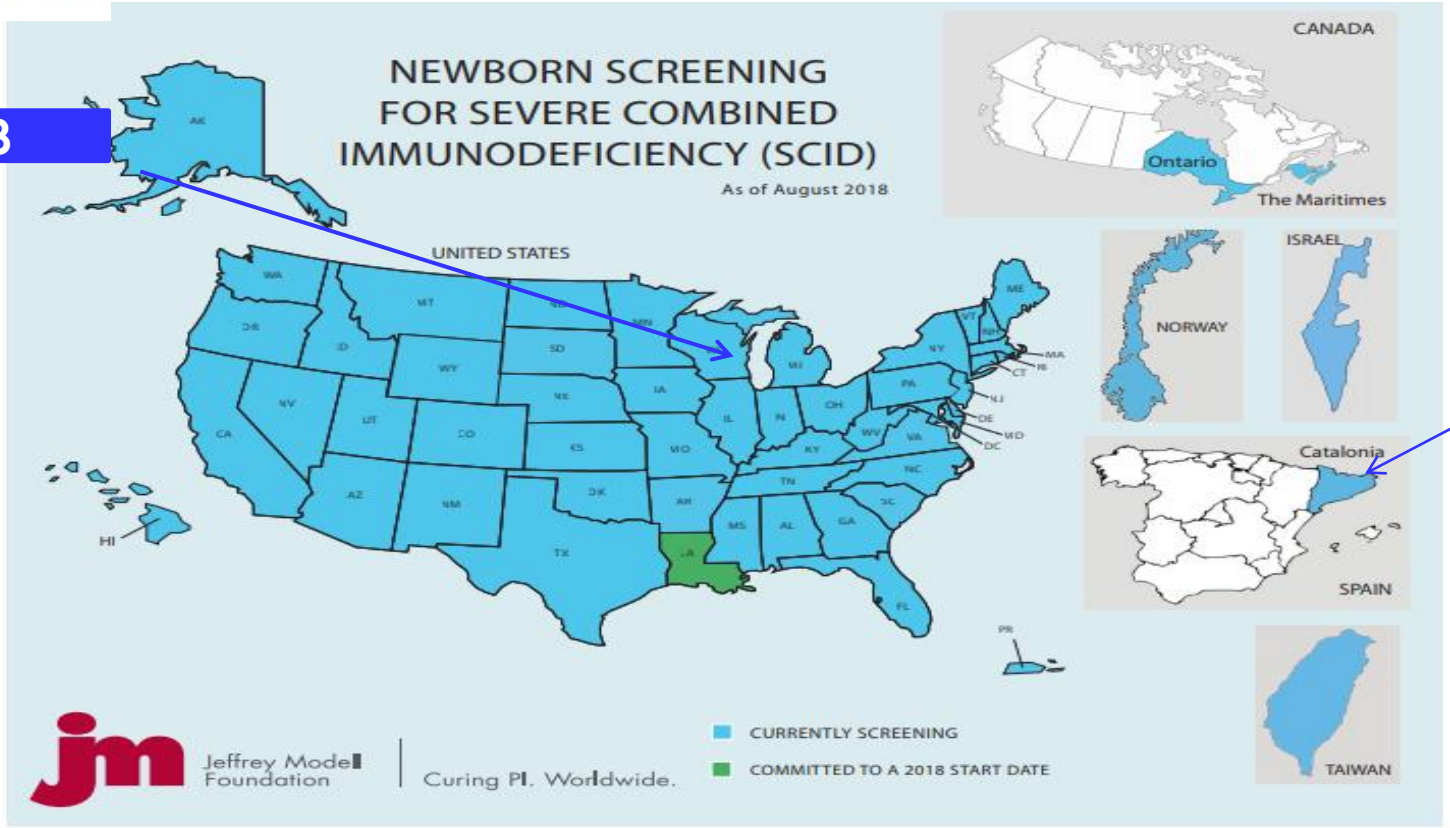
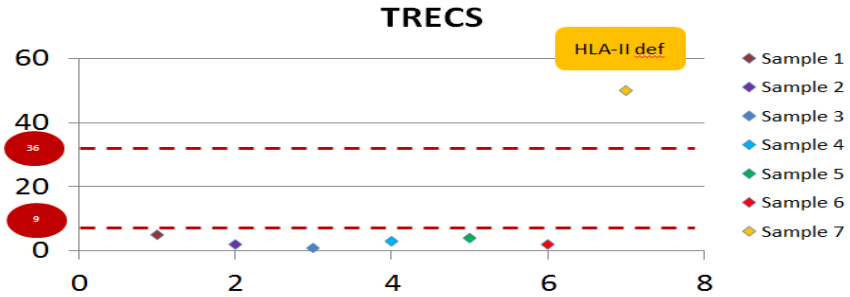
2008



2017

LAST UPDATE – AUGUST 2018

- January 2010 to December 2014= 7 patients
- **Incidence 1/56.000 alive newborns**
- Family history: 2/7



EnLite™ Neonatal TREC kit

TREC Testing – Good, but Not Perfect

TREC newborn screening followed by lymphocyte subset measurement has now been proven to have clinical utility in several states. Many infants with otherwise unsuspected SCID or related T-cell disorders have been referred for prompt evaluation and treatment, and reports of successful outcomes are emerging. As more experience accumulates and more states add newborn TREC screening, it will be important to document outcomes of the current programs. Not only the total incidence but also the severity spectrum and relative incidence of these rare conditions in different population subgroups remain to be defined.

Newborn screening for severe combined immunodeficiency does not identify bare lymphocyte syndrome

To the Editor:

Severe combined immunodeficiency (SCID) is a primary immunodeficiency characterized by profound impairment in antibody synthesis and cellular immune function, often leading to overwhelming infection within the first year of life. In May 2010, SCID was recommended to be added to the panel of genetic disorders in the national uniform newborn screening (NBS) program.[1] SCID screening involves the measurement of T-cell receptor excision circles (TRECs), by-products of T-cell receptor rearrangement that reflect the robustness of T-cell production in the thymus; low blood levels of TRECs suggest profound T lymphopenia and are used to identify newborns for further evaluation.

TREC analysis has allowed prompt diagnosis and treatment of patients with SCID before the onset of infections and is now being performed in at least 10 states. In California, where it was implemented in August 2010, TREC analysis has been reportedly effective in detecting all SCID cases born in the state to date.[1] Despite this success, there are other types of early onset life-threatening immunodeficiencies that are missed by the current NBS.[2]

Although not classified as a form of SCID, MHC class II deficiency (bare lymphocyte syndrome) follows a course similar to SCID and thus should be reclassified as an SCID-related disorder. T-cell lymphopenia restricted to the CD4 subset is a characteristic of MHC class II deficiency, yet the number of TRECs in this condition has not been reported. We report 2 infants with MHC class II deficiency who were missed by TREC analysis because their TREC levels of 142 and 97 were well above the current cutoff levels of 40 copies.[3] Other patients with this immune defect may also be missed with current screening approaches.

The patients presented at age 3 and 6 months with failure to thrive, intractable diarrhea, and severe respiratory infections. The immune workup was comparatively similar with profound hypogammaglobulinemia, $CD4^+$ lymphopenia with an inverted CD4/CD8 ratio, abnormal lymphocyte proliferation assays to antigens, and reduced HLA-DR expression on peripheral blood lymphocytes. Molecular analysis identified mutations implicated as a cause of MHC class II deficiency (Table I).

Patient 1 was admitted at age 9 months with intractable diarrhea, failure to thrive, thrush, and extensive candidal diaper rash. He was a term infant (birth weight 3 kg) and was in excellent health until age 6 months when he was briefly hospitalized for a Coxsackie/echovirus respiratory infection. The family history was

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SALUT

Diagnòstic precoç per als nens bombolla

Demanen incloure les immunodeficiències en la prova del taló per millorar la supervivència dels nadons afectats

LARA BONILLA Barcelona. ACTUALITZADA EL 24/04/2014 00:00

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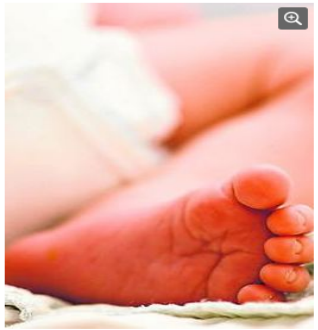

A Catalunya es detecten fins a 22 malalties amb l'anomenada prova del taló. / GETTY

El cribatge neonatal serveix per detectar precoçment malalties poc freqüents, com la fibrosi quística o algunes malalties metabòliques hereditàries, i així començar de seguida el tractament adequat per evitar seqüeles i garantir una millor qualitat de vida al nen afectat. A Catalunya ja es detecten fins a 22 malalties mitjançant l'anomenada *prova del taló*, que es fa a tots els nadons acabats de néixer. Però metges i familiars de nens afectats per immunodeficiències greus (IDP) -els casos més greus són els coneguts com a *nens bombolla* - demanen que la prova del taló també inclogui la detecció de les formes més greus d'IDP. De fet, l'Associació Catalana de Dèficits Immunitaris Primaris (Acadip) ja ha iniciat converses amb el departament de Salut.

January 2017

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es

Inici | Temes | Tràmits | Generalitat | Actualitat | Contacte

Inici > Actualitat > Ampliació de malalties al ...

Torna

Ampliació de malalties al cribratge neonatal

Amb aquesta patologia seran 24 les malalties que es detectaran amb la prova de sang del taló que es fa als nounats

20/09/2016 | 10:09

Catalunya és el primer sistema sanitari públic europeu que incorpora la detecció de la Immunodeficiència Combinada Greu

Més informació

- Salut maternoinfantil
- La prova del taló
- Dossier de premsa [284,99 KB]

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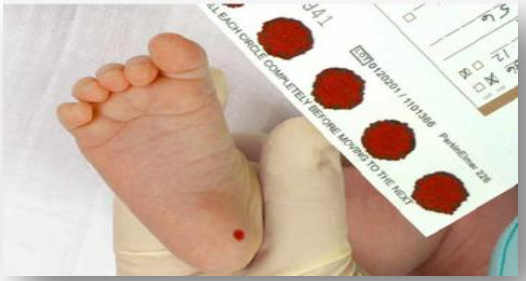
Barcelona Campus Hospitalari


Vall d'Hebron
Hospital

Protocol per a l'atenció dels pacients amb cribratge neonatal d'immunodeficiència combinada greu positiu

Unitat de Patologia Infecciosa i Immunodeficiències de Pediatria
(Servei de Pediatria)
Servei d'Hematologia i Oncologia Pediàtriques
Servei d´Immunologia

Institut Català de la Salut
Hospital Universitari Vall d'Hebron
Universitat Autònoma de Barcelona
Generalitat de Catalunya
Departament de Salut



Study protocol for these patients in our hospital

RESULTS = 23 PATIENTS

STUDY PERIOD	01.01.2017→**31.08.2018**
Confirmed SCID babies	**1**
Idiopathic lymphopenia	1
22q11 babies	**5**
Chylothorax	1
Preterm babies	2
Down syndrome	1
Under study	3
False positive results	9

SCID incidence 1:82.641

Initial normal lymphocyte count with normalization of TRECs between 3 and 6 months of life

2018

Cut off = **24 copies/µL** decreasing the retest rate from 3.34% to 0.69%.

STUDY PERIOD	01.01.2017→**28.02.2018**
Analyzed samples	**81.040**
Re study 1ª sample	2,76%
Request 2ª sample	0,14%
Positive result	0,03% (n=19)
"Non SCID babies"	89% (n=17)

103.971

NB screened (31/07/18)

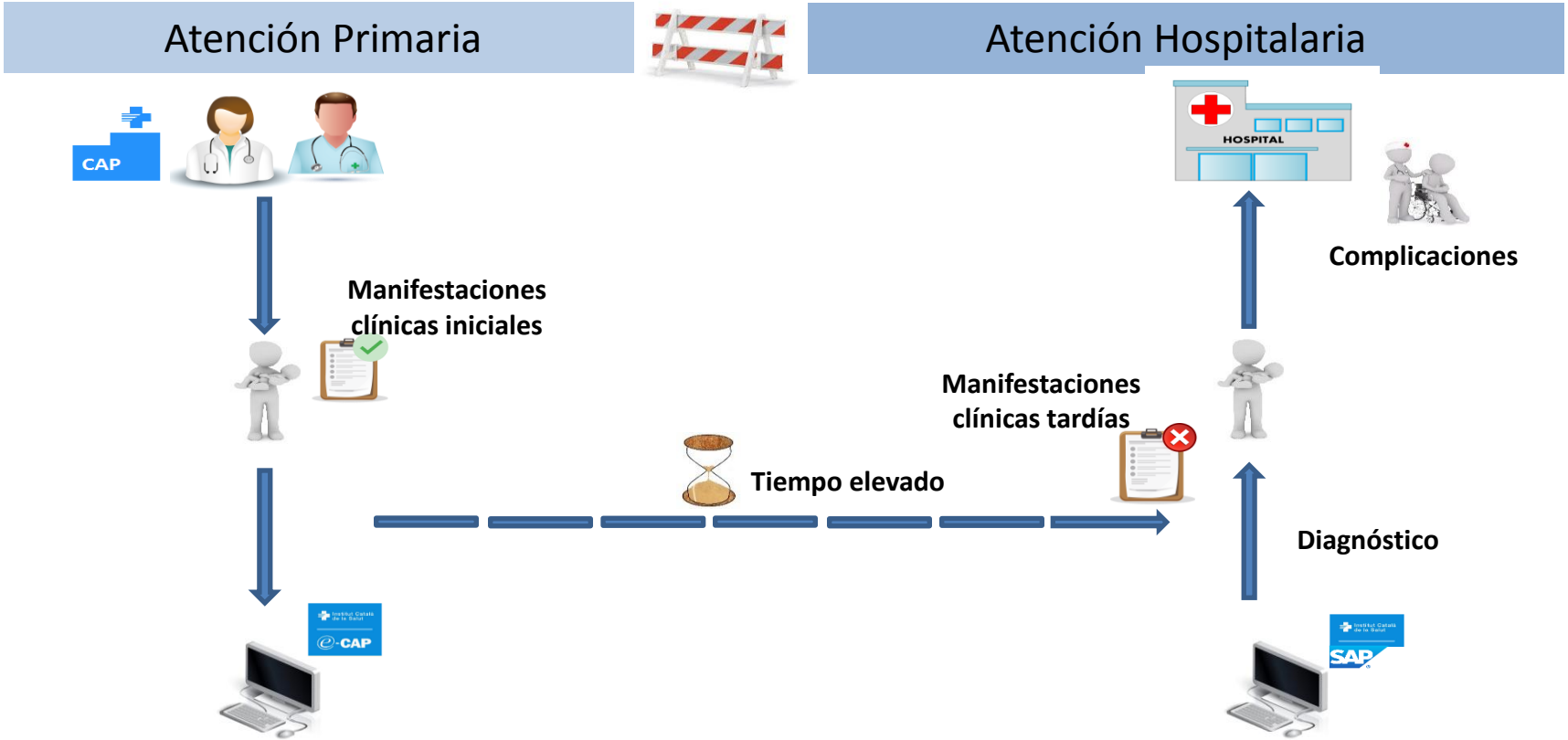
- **One SCID patient was diagnosed = 1:82.641 births in Catalonia**
- Diagnoses were similar to those described in larger NBS SCID programs
- Close collaboration between clinicians and the screening laboratory is crucial
- NBS using TREC assay allows early diagnosis of patients with **22q11 DS**
- Clinical significance of idiopathic T cell lymphopenia remains uncertain

PIDCAP

- Utilización de la red de Centros de Atención Primaria por un cribado integral de las IDP: Incorporación de un algoritmo informático en el E-CAP
  - Detección según el cumplimiento de unos determinados signos de alarma validados internacionalmente (Jeffrey Modell Foundation) → necesidad de realizar un estudio de inmunodeficiencia primaria (IDP) y/o derivar a centro de referencia.
  - Adeqcuado a nuestro ámbito territorial.
  - Adecuació del tipo de estudio según la patología sospechada.
  - El médico asistido por ordenador.
  - Valores de normalidad
  - Automatización/protocolización y aumento del rendimiento.
  - Mejora del pronóstico y costes.

- Plan de formación en IDP para los médicos de familia, pediatras de atenció primària y personal de enfermería implicado en el proyecto.
- Valoración de los resultados pre y post-implantación PIDCAP.

Sin algoritmo

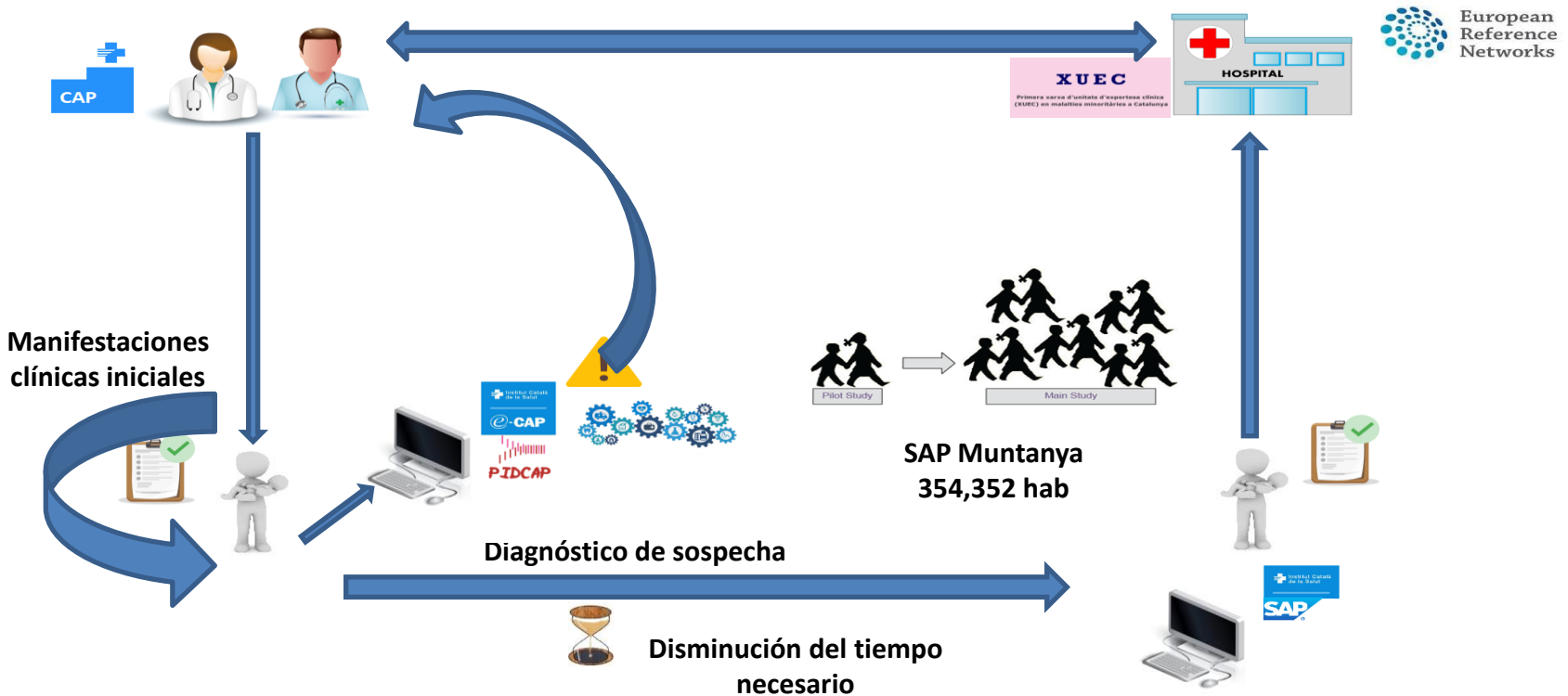


Atención Primaria

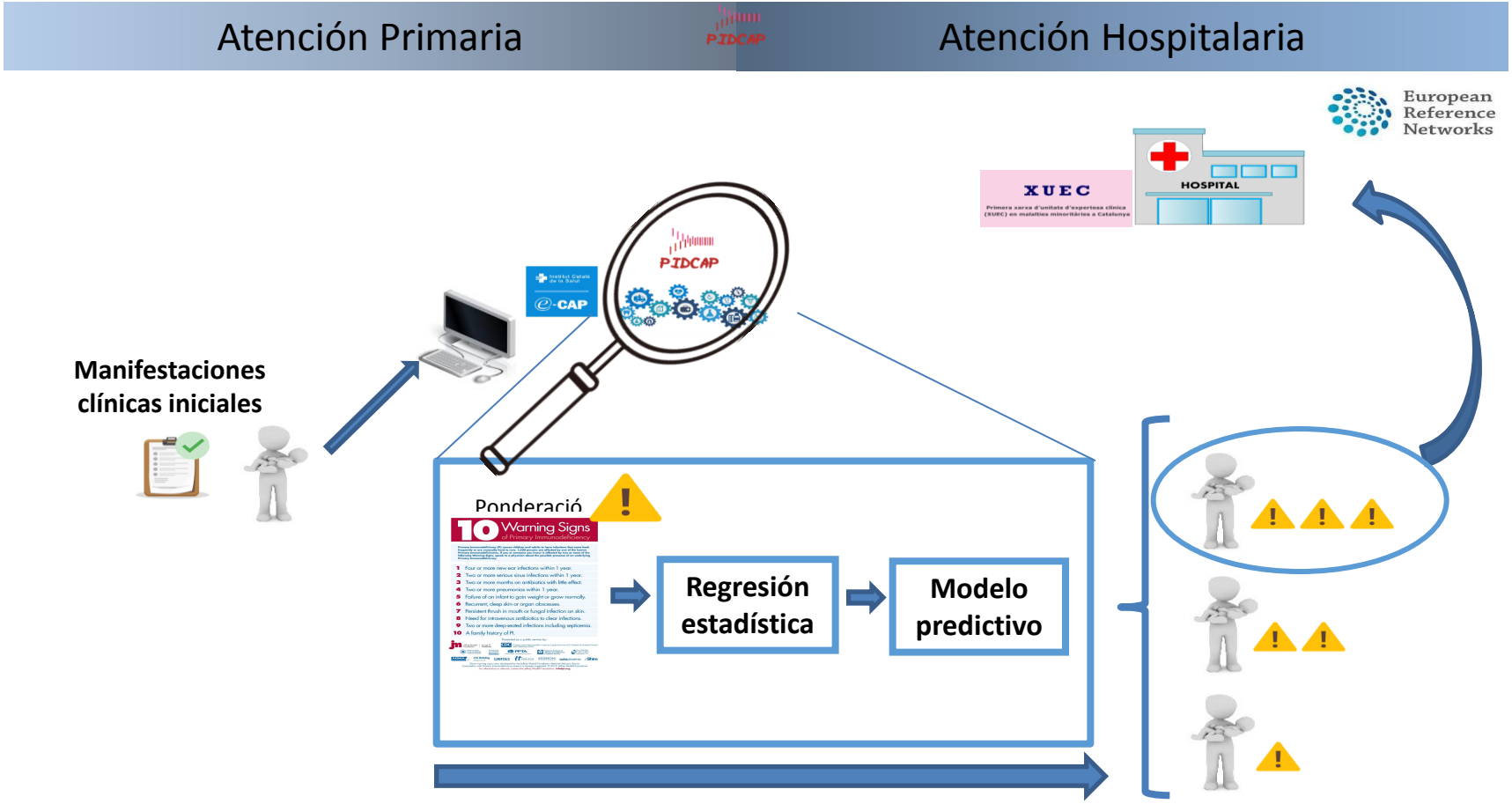
PIDCAP

Atención Hospitalaria

Con algoritmo



Dentro del algoritmo



El algoritmo PIDCAP: niños

6 o més OMA/any en pacient menor de 3 anys; 4 o més en majors de 3 anys; o 10 o més totals.	Candidiasis mucocutània (orofaringea, cutània o vaginal) en majors de 6m o en menors de 6m: 2 o més episodis.	Presencia de bronquièctasis sense FQ	Anomalies dentals/palatines
2 o més sinusitis /any, cel·lulitis orbitaria	2 o més infeccions sistèmiques inclosa septicèmia	Presència de citopènia (sense especificar si autoimmune)	Diarrea crònica o 4 o més codificació de diarrees en un any
2 o més pneumònies/any o 3 pneumònies en 2 anys	Ingrés hospitalari 3 o més ingressos hospitalaris/any	Malalties autoimmunes sistèmiques (celiaquia, artritis, anèmia hemolítica autoimmune, etc)	Infeccions cutànies virals més de 3/any o crònic;
2 o més mesos de tractament antibiòtic/any	Infeccions greus úniques per si soles indiquen estudi IDP (Meningitis per VHS, etc)	Intolerància/Al·lèrgia alimentaria	Presència d'èczema crònic
Retard pondoestatural	Antecedents familiars compatibles amb manifestacions IDP (neoplàsies hematològiques, infeccions greus, etc)	Endocrinopatologia: Hipotiroïdisme, hiperparatiroïdisme, diabetis, etc. (No descrit com autoimmune)	Malaltia inflamatòria intestinal en pacient de 2 anys o més.
Abscessos profunds en òrgans	Consanguinitat	Neoplàsia hematològica	Malaltia inflamatòria intestinal en menors de 2anys
Abscessos ganglis o més superficials	Febre recurrent	Neoplàsia òrgan sòlid	Reacció a vacunes vives

El algoritmo PIDCAP: adultos

2 o més Otitis mitges agudes /any	Infeccions greus úniques per si soles indiquen estudi IDP	Antecedents familiars compatibles amb manifestacions IDP	Malaltia inflamatòria intestinal
2 o més sinusitis greus/any	Necessitat d'ATB EV per curar infeccions	Consanguinitat	Febre recurrent
2 o més pneumònies en 10 anys	2 o més infeccions sistèmiques inclosa septicèmia	Presència de citopènia (no esp si autoimmune)	Ingrés hospitalari 3 o mes ingressos hospitalaris/any
Diarrea crònica amb pèrdua de pes	Ingrés hospitalari 3 o mes ingressos hospitalaris/any	Presència de bronquièctasis sense FQ	Malaltia inflamatòria intestinal
Abscessos profund en òrgans i ganglis	Infeccions virals recurrents (refredats, herpes, berrugues, condilomes, etc) més de 6 episodis/any	Malalties autoimmune sistèmiques (artritis, LES, anèmia hemolítica autoimmune, etc)	Infeccions per bacteris de la família de la TBC però poc virulents
Abscés cutanis de repetició més de 2	Neoplàsia òrgan sòlid	Neoplàsia hematològica	Candidiasis orofaríngia o cutània (exclosa candidiasi vaginal)

Grupo de IDP sospechada

	1. Combinadas	2. Síndromes asociados a IDP	3. Defecto de anticuerpos	4. Desregulación inmunitaria	5. Defectos de fagocitos	6. Defectos en la inmunidad innata	7. Defectos del complemento	8. Enfermedades Autoinflamator
Bronquitis de repetición	X	X	X	X			X	
Bronquiectasias idiopáticas	X	X	X	X			X	
Neumonías de repetición	X	X	X		X	X	X	
Neumonías de repetición en niño	X	X	X				X	
Infección bronquial crónica	X	X	X	X			X	
Tratamiento con antibiótico prolongado con escasa respuesta	X	X	X		X			
Neumonía por bacterias encapsuladas	X	X	X	X		X	X	
Absceso y neumatocele		X			X	X		
Infecciones por microorganismos poco comunes	X				X	X		
Neumonitis o bronquitis con ingreso en lactantes	X	X						
Neumonitis intersticial	X	X	X	X				
Bronquiolitis obliterante	X	X	X					
Linfoma pulmonar			X					

Codificación diagnóstica

Actius

		Descripció
☐		*TRASTORN DE L'APRENENTATGE*
☐		MALALTIA DE PÀNCREES
☐		PEU PLA (PES PLANUS) (ADQUIRIT)
☐		RINITIS AL·LÈRGICA
☐		DERMATITIS ATÒPICA
☐		**DOLOR ABDOMINAL LOCALITZAT EN LA PART SUPERIOR**
☐		HELICOBACTER PYLORI
☐		DISMENORREA
☐		CARIES DENTAL
☐		ACNE VULGAR
☐		CONTROL DE SALUT DE RUTINA DEL NEN
☐		ANOMALIES DENTOFACIALS (INCLOSA LA MALOCLUSIÓ)
☐		BUFS CARDÍACS BENIGNES O INNOCENTS
☐		EXAMEN DE LABORATORI
☐		CONSULTA PER ATENCIÓ I SUPERVISIÓ DE LA SALUT D'ALTRES NENS
☐		CONDUCTES GENERADORES DE SALUT (ESPECIFICAR)
☐		PROBLEMES RELACIONATS AMB EL MALTRACTAMENT FÍSIC DEL NEN
☐		PROBLEMES RELACIONATS AMB L'ADAPTACIÓ CULTURAL

Inactius

		Descripció
☐		ICTERÍCIA INESPECÍFICA
☐		VARICEL·LA
☐		EXANTEMA SOBTAT (SISENA MALALTIA)
☐		LEUCOPÈNIA
☐		ANÈMIA PER DEFICIÈNCIA DE FERRO
☐		ÈCZEMA
☐		FLEGMÓ DENTAL
☐		EPIGASTRALGIA
☐		DOLOR ABDOMINAL

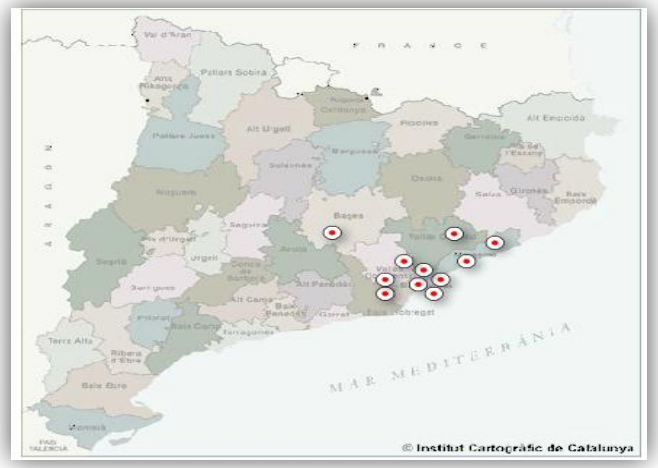
E-CAP

Pruebas complementarias

Primer nivel	Segundo nivel	Tercer nivel	Cuarto nivel
IDP combinadas			
Hemograma + Concentraciones de IgA, IgG, IgM e IgE + Análisis bioquímico	Poblaciones linfocitarias	Fenotipo ampliado y función linfocitaria	Expresión de proteínas, estudios funcionales y genéticos
Defecto de producción de anticuerpos			
Hemograma + Concentraciones de IgA, IgG, IgM e IgE + Análisis bioquímico	Estudio inicial de producción de anticuerpos (ASLO, isohemaglutininas, respuesta tétanos)	Subclases IgG, respuesta vacunal ampliada, poblaciones linfocitarias con fenotipo B ampliado	Expresión de proteínas, estudios funcionales y genéticos

RECURSOS DISPONIBLES EN CATALUNYA

- **Grupo multidisciplinario SCP-SCI**
- Reuniones trimestrales
- Curso anual para residentes y enfermeras anual
- Red de centros de diagnóstico



- **ACADIP** es **la Associació Catalana de Dèficits Immunitaris Primaris**, fundada el 28 de junio de 2008.
- Principales **objectivos**:
  - **Ayudar a pacientes y familiares**: Información en la web, facilitando ayudas públicas...
  - **Concienciar a la sociedad** mediante la **comunicación y difusión.**
  - **Fomentar la formación** en IDPs de los **profesionales sanitarios.**
  - **Hacer crecer la asociación**: Ampliar la red de colaboradores y voluntarios.
  - **Recaptar fondos y fomentar la investigación** en nuevas tècnicas de diagnóstico y tratamiento.
  - **Diagnóstico precoz** de las IDP más graves → inclusión en el cribado neonatal.

The Barcelona PID Foundation

The Barcelona PID Foundation (BCN PID Foundation) is a non-profit organization founded in 2014 by a group of health professionals dedicated to treating patients with PID and associated infectious complications and family members of PID patients.

It is registered in the Registre de Fundacions de la Generalitat de Catalunya with the number 2859. The geographic scope of the BCN PID Foundation is primarily Catalonia. However, its work can spread to the rest of Spain and internationally.

Unique foundation in Spain dedicated to PID


Vall
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