

Hospital Universitario de Getafe

EL ROL DE LAS NUEVAS TECNOLOGÍAS EN LA ATENCIÓN AL PACIENTE FRÁGIL O EN RIESGO DE SERLO

Dra. Cristina Alonso Bouzón
Geriatra

ALMA
ACADEMIA LATINOAMERICANA DE MEDICINA DEL ADULTO MAYOR

XVIII CURSO ALMA
RIO DE JANEIRO
GERONTOTECNOLOGÍA
31 de octubre-3 de noviembre 2019

Índice

- Fragilidad: de qué estamos hablando.
- Ideas clave en el abordaje de la fragilidad.
- Retos en el abordaje de la fragilidad.
- Posibilidades de uso de las nuevas tecnologías para abordar la fragilidad.

Fragilidad: de qué estamos hablando

Journal of Gerontology: MEDICAL SCIENCES
2001, Vol. 56A, No. 3, M146–M156

Copyright 2001 by The Gerontological Society of America

Frailty in Older Adults: Evidence for a Phenotype

Linda P. Fried,[1] Catherine M. Tangen,[2] Jeremy Walston,[1] Anne B. Newman,[3] Calvin Hirsch,[4] John Gottdiener,[5] Teresa Seeman,[6] Russell Tracy,[7] Willem J. Kop,[8] Gregory Burke,[9] and Mary Ann McBurnie[2] for the Cardiovascular Health Study Collaborative Research Group

Short Communication
TheScientificWorldJOURNAL (2002) 2, 1816–1822
ISSN 1537-744X; DOI 10.1100/tsw.2002.861

TheScientificWorld
www.thescientificworld.com

The Accumulation of Deficits with Age and Possible Invariants of Aging

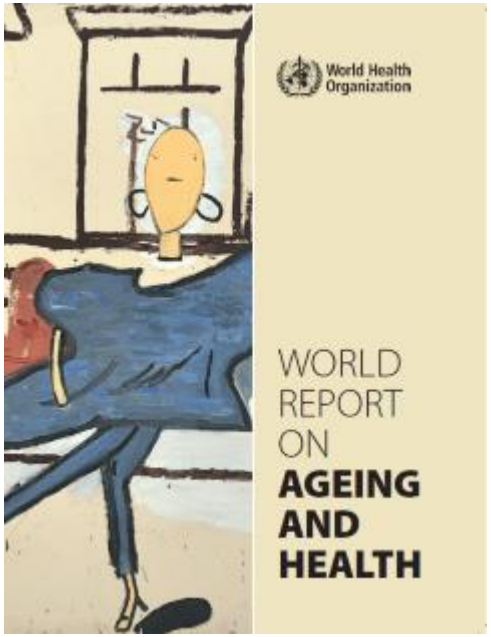
Arnold B. Mitnitski[1,*], Alexander J. Mogilner, Chris MacKnight[1], and Kenneth Rockwood[1]

Fragilidad: de qué estamos hablando

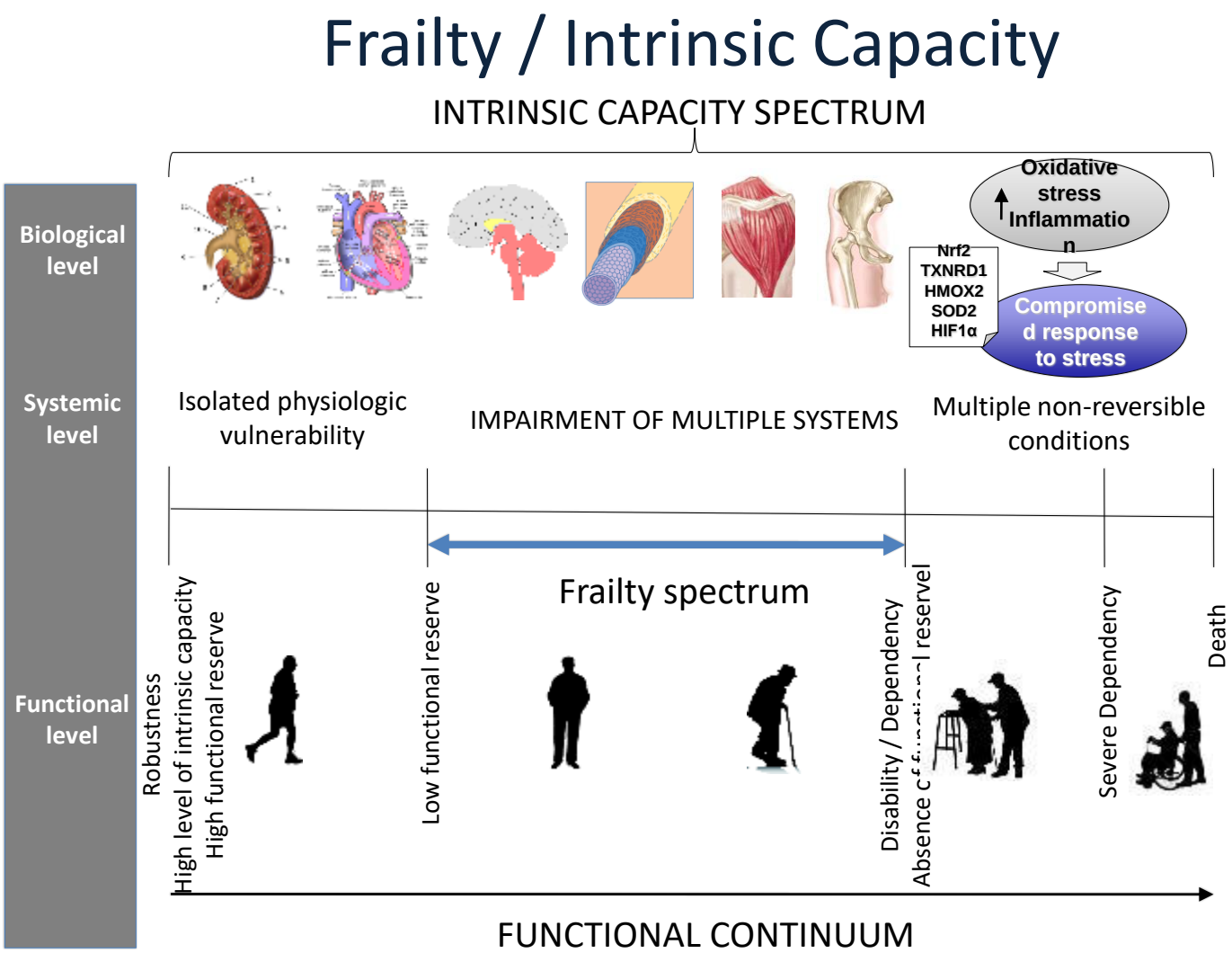
Síndrome **asociado a la edad**, secundario a un **deterioro progresivo de diferentes órganos y sistemas**, lo que confiere **vulnerabilidad** frente a diferentes estresores y por lo tanto predispone a sufrir **resultados adversos de salud** (OMS, 2015).

JAMDA 2018; 19 (4): 287-295

Age Groups, y (n)	65–69	70–74	75–79	80+	All Ages
Cuba	n = 760	n = 789	n = 638	n = 748	n = 2935
Female (n = 1908)	7.6 (5.2–10.0)	12.5 (9.5–15.4)	16.4 (12.8–20.0)	26.2 (22.4–30.0)	15.8 (14.2–17.5)
Male (n = 1027)	5.9 (3.1–8.6)	9.2 (5.9–12.6)	12.2 (8.0–16.5)	27.0 (21.3–32.7)	13.0 (10.9–15.1)
Both sexes (n = 2935)	7.0 (5.2–8.8)	11.3 (9.1–13.5)	14.9 (12.2–17.6)	26.5 (23.3–29.6)	14.9 (13.5–16.2)
Dominican Republic	n = 532	n = 519	n = 397	n = 557	n = 2005
Female (n = 1321)	16.0 (12.1–19.9)	21.9 (17.4–26.4)	29.1 (23.6–34.5)	31.4 (26.8–36.1)	24.6 (22.3–27.0)
Male (n = 684)	12.2 (7.5–16.9)	8.7 (4.8–12.7)	17.4 (11.0–23.9)	25.4 (18.9–32.0)	15.5 (12.8–18.2)
Both sexes (n = 2005)	14.6 (11.6–17.6)	17.0 (13.7–20.2)	25.2 (21.0–29.4)	29.6 (25.8–33.4)	21.5 (19.7–23.3)
Puerto Rico	n = 406	n = 448	n = 475	n = 606	n = 1935
Female (n = 1347)	10.4 (7.0–13.8)	8.4 (5.3–11.6)	16.5 (12.4–20.6)	25.3 (21.0–29.6)	15.9 (13.9–17.9)
Male (n = 655)	11.2 (5.2–17.2)	7.9 (3.6–12.2)	12.5 (7.4–17.6)	19.5 (14.2–24.8)	13.6 (10.9–16.2)
Both sexes (n = 2002)	10.5 (7.5–13.5)	8.3 (5.7–10.9)	15.2 (11.9–18.4)	23.2 (19.9–26.6)	15.1 (13.5–16.7)
Peru (urban)	n = 375	n = 332	n = 297	n = 374	n = 1378
Female (n = 885)	14.1 (9.9–18.3)	17.7 (12.7–22.8)	23.3 (17.3–29.3)	35.7 (29.3–42.1)	22.1 (19.4–24.8)
Male (n = 493)	9.8 (4.4–15.3)	12.1 (6.6–17.7)	12.0 (5.9–18.2)	29.1 (21.6–36.5)	16.4 (13.2–19.7)
Both sexes (n = 1378)	12.8 (9.4–16.2)	15.6 (11.9–19.4)	19.2 (14.8–23.6)	33.1 (28.2–37.9)	20.1 (18.0–22.2)
Peru (rural)	n = 179	n = 141	n = 101	n = 131	n = 552
Female (n = 295)	12.0 (5.6–18.4)	10.8 (4.1–17.6)	32.1 (19.5–44.6)	20.3 (10.1–30.6)	16.9 (12.7–21.2)
Male (n = 257)	16.5 (8.3–24.6)	17.2 (7.5–27.0)	10.4 (1.8–19.1)	20.8 (11.5–30.2)	16.7 (12.1–21.4)
Both sexes (n = 552)	14.0 (8.9–19.0)	13.5 (7.9–19.1)	21.8 (13.8–29.8)	20.6 (13.5–27.7)	16.8 (13.6–20.1)
Venezuela	n = 830	n = 465	n = 341	n = 292	n = 1928
Female (n = 1224)	8.9 (6.5–11.4)	9.7 (6.3–13.1)	18.5 (13.3–23.7)	28.9 (22.7–35.1)	14.3 (12.3–16.2)
Male (n = 704)	5.1 (2.6–7.5)	9.1 (4.9–13.4)	11.2 (5.7–16.7)	25.0 (15.9–34.1)	9.7 (7.5–11.8)
Both sexes (n = 1928)	7.5 (5.7–9.2)	9.5 (6.7–12.2)	15.8 (11.9–19.8)	27.7 (22.6–32.9)	12.6 (11.1–14.1)
Mexico (urban)	n = 245	n = 328	n = 204	n = 221	n = 998
Female (n = 666)	9.7 (5.5–14.0)	13.3 (8.7–17.9)	19.2 (12.3–26.1)	22.7 (15.8–29.6)	15.6 (12.8–18.3)
Male (n = 337)	16.7 (7.2–26.1)	13.6 (7.4–19.7)	16.5 (8.3–24.6)	18.8 (10.2–27.3)	16.0 (12.1–20.0)
Both sexes (n = 1003)	11.4 (7.5–15.4)	13.4 (9.7–17.2)	18.1 (12.9–23.4)	21.3 (15.8–26.8)	15.7 (13.4–18.0)
Mexico (rural)	n = 298	n = 251	n = 217	n = 226	n = 992
Female (n = 602)	9.7 (5.5–13.8)	12.1 (6.8–17.3)	15.4 (9.2–21.6)	26.4 (18.6–34.3)	14.9 (12.1–17.8)
Male (n = 398)	4.9 (7.1–9.1)	14.7 (7.8–21.6)	18.4 (10.2–26.5)	29.5 (20.8–38.2)	16.9 (13.2–20.6)
Both sexes (n = 1000)	8.1 (5.0–11.1)	13.1 (9.0–17.3)	16.6 (11.6–21.6)	27.9 (22.1–33.6)	15.7 (13.5–18.0)
China (urban)	n = 316	n = 362	n = 254	n = 228	n = 1160



Fragilidad: de qué estamos hablando



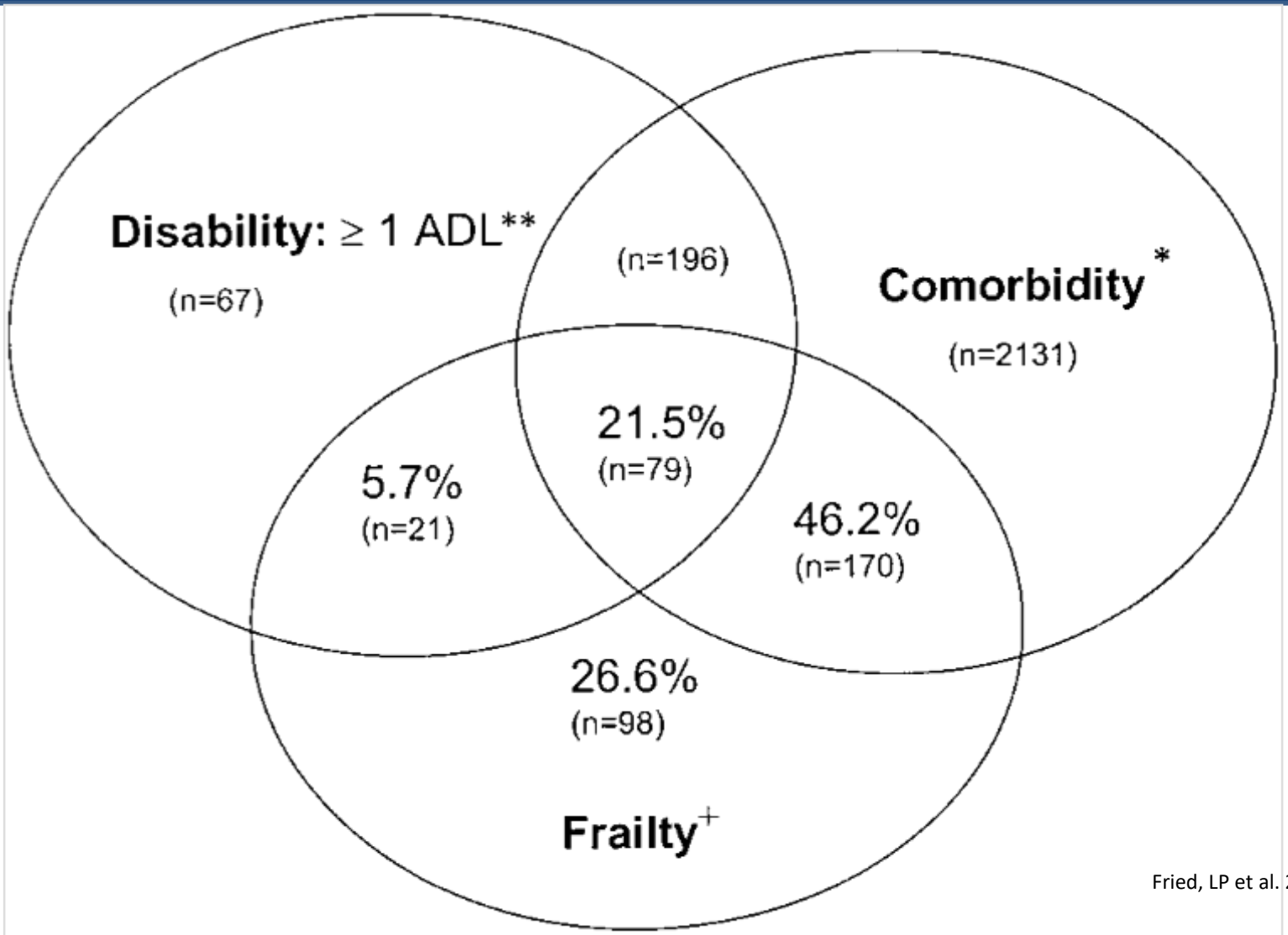
Cortesía del Dr. Rodriguez Mañas

Fragilidad: de qué estamos hablando

- Discapacidad y dependencia
- Hospitalización
- Institucionalización
- Caídas y fracturas
- Mal pronóstico en:
  - Transplante renal
  - Cirugía general
  - Intervenciones cardíacas
- Muerte

JAGS 2005; 53: 1321.
J Am Coll Sur 2010; 210: 901.
Arch Surg 2012; 147: 190.
Ann Intern Med 2016; 165: 650.
CMAJ 2018; 190: E184.
JAMA New Open 2019; 2: e194330.

Fragilidad: de qué estamos hablando



Fried, LP et al. 2001

La fragilidad no es inevitable

JAMDA 2018; 19 (4): 287-295

Age Groups, y (n)	65–69	70–74	75–79	80+	All Ages
Cuba	n = 760	n = 789	n = 638	n = 748	n = 2935
Female (n = 1908)	7.6 (5.2–10.0)	12.5 (9.5–15.4)	16.4 (12.8–20.0)	26.2 (22.4–30.0)	15.8 (14.2–17.5)
Male (n = 1027)	5.9 (3.1–8.6)	9.2 (5.9–12.6)	12.2 (8.0–16.5)	22.0 ([illegible]–32.7)	13.0 (10.9–15.1)
Both sexes (n = 2935)	7.0 (5.2–8.8)	11.3 (9.1–13.5)	14.9 (12.2–17.6)	26.5 (23.[illegible]–29.6)	14.9 (13.5–16.2)
Dominican Republic	n = 532	n = 519	n = 397	n = [illegible]	n = 2005
Female (n = 1321)	16.0 (12.1–19.9)	21.9 (17.4–26.4)	29.1 (23.6–34.5)	31.4 (26.8–36.1)	24.6 (22.3–27.0)
Male (n = 684)	12.2 (7.5–16.9)	8.7 (4.8–12.7)	17.4 (11.0–23.9)	25.4 (18.9–32.0)	15.5 (12.8–18.2)
Both sexes (n = 2005)	14.6 (11.6–17.6)	17.0 (13.7–20.2)	25.2 (21.0–29.4)	29.6 (25.[illegible]–33.4)	21.5 (19.7–23.3)
Puerto Rico	n = 406	n = 448	n = 475	n = 606	n = 1935
Female (n = 1347)	10.4 (7.0–13.8)	8.4 (5.3–11.6)	16.5 (12.4–20.6)	25.3 (21.0–29.6)	15.9 (13.9–17.9)
Male (n = 655)	11.2 (5.2–17.2)	7.9 (3.6–12.2)	12.5 (7.4–17.6)	19.5 (14.2–24.8)	13.6 (10.9–16.2)
Both sexes (n = 2002)	10.5 (7.5–13.5)	8.3 (5.7–10.9)	15.2 (11.9–18.4)	23.2 (19.[illegible]–26.6)	15.1 (13.5–16.7)
Peru (urban)	n = 375	n = 352	n = 297	n = [illegible]	n = 1378
Female (n = 885)	14.1 (9.9–18.3)	17.7 (12.7–22.8)	23.3 (17.3–29.3)	35.7 (29.3–42.1)	22.1 (19.4–24.8)
Male (n = 493)	9.8 (4.4–15.3)	12.1 (6.6–17.7)	12.0 (5.9–18.2)	28.1 (21.[illegible]–36.5)	16.4 (13.2–19.7)
Both sexes (n = 1378)	12.8 (9.4–16.2)	15.6 (11.9–19.4)	19.2 (14.8–23.6)	33.1 (28.[illegible]–37.9)	20.1 (18.0–22.2)
Peru (rural)	n = 179	n = 141	n = 101	n = [illegible]	n = 552
Female (n = 295)	12.0 (5.6–18.4)	10.8 (4.1–17.6)	32.1 (19.5–44.6)	20.3 (10.1–30.6)	16.9 (12.7–21.2)
Male (n = 257)	16.5 (8.3–24.6)	17.2 (7.5–27.0)	10.4 (1.8–19.1)	28.8 ([illegible]–30.2)	16.7 (12.1–21.4)
Both sexes (n = 552)	14.0 (8.9–19.0)	13.5 (7.9–19.1)	21.8 (13.8–29.8)	20.6 (13.[illegible]–27.7)	16.8 (13.6–20.1)
Venezuela	n = 830	n = 465	n = 341	n = [illegible]	n = 1928
Female (n = 1224)	8.9 (6.5–11.4)	9.7 (6.3–13.1)	18.5 (13.3–23.7)	28.9 (22.7–35.1)	14.3 (12.3–16.2)
Male (n = 704)	5.1 (2.6–7.5)	9.1 (4.9–13.4)	11.2 (5.7–16.7)	25.0 (15.9–34.1)	9.7 (7.5–11.8)
Both sexes (n = 1928)	7.5 (5.7–9.2)	9.5 (6.7–12.2)	15.8 (11.9–19.8)	27.7 (22.[illegible]–32.9)	12.6 (11.1–14.1)
Mexico (urban)	n = 245	n = 328	n = 204	n = [illegible]	n = 998
Female (n = 666)	9.7 (5.5–14.0)	13.3 (8.7–17.9)	19.2 (12.3–26.1)	22.7 (15.8–29.6)	15.6 (12.8–18.3)
Male (n = 337)	16.7 (7.2–26.1)	13.6 (7.4–19.7)	16.5 (8.3–24.6)	18.8 (10.[illegible]–27.3)	16.0 (12.1–20.0)
Both sexes (n = 1003)	11.4 (7.5–15.4)	13.4 (9.7–17.2)	18.1 (12.9–23.4)	21.3 (15.[illegible]–26.8)	15.7 (13.4–18.0)
Mexico (rural)	n = 298	n = 251	n = 217	n = [illegible]	n = 992
Female (n = 602)	9.7 (5.5–13.8)	12.1 (6.8–17.3)	15.4 (9.2–21.6)	26.4 (18.6–34.3)	14.9 (12.1–17.8)
Male (n = 398)	4.9 (7.1–9.1)	14.7 (7.8–21.6)	18.4 (10.2–26.5)	28.8 (20.[illegible]–38.2)	16.9 (13.2–20.6)
Both sexes (n = 1000)	8.1 (5.0–11.1)	13.1 (9.0–17.3)	16.6 (11.6–21.6)	27.9 (22.[illegible]–33.6)	15.7 (13.5–18.0)
China (urban)	n = 316	n = 362	n = 254	n = [illegible]	n = 1160
Female (n = 661)	4.9 (1.9–7.9)	7.0 (3.4–10.5)	8.8 (4.0–13.5)	26.9 (18.9–34.9)	10.3 (8.0–12.6)
Male (n = 449)	2.7 (0.0–5.7)	6.2 (2.5–9.9)	6.8 (2.3–11.4)	14.7 (8.0–21.3)	7.4 (5.1–9.7)
Both sexes (n = 1160)	4.1 (1.8–6.4)	6.6 (4.0–9.3)	7.9 (4.6–11.2)	21.1 (15.8–26.3)	9.1 (7.4–10.7)

La fragilidad es reversible y dinámica

ORIGINAL INVESTIGATION

Transitions Between Frailty States Among Community-Living Older Persons

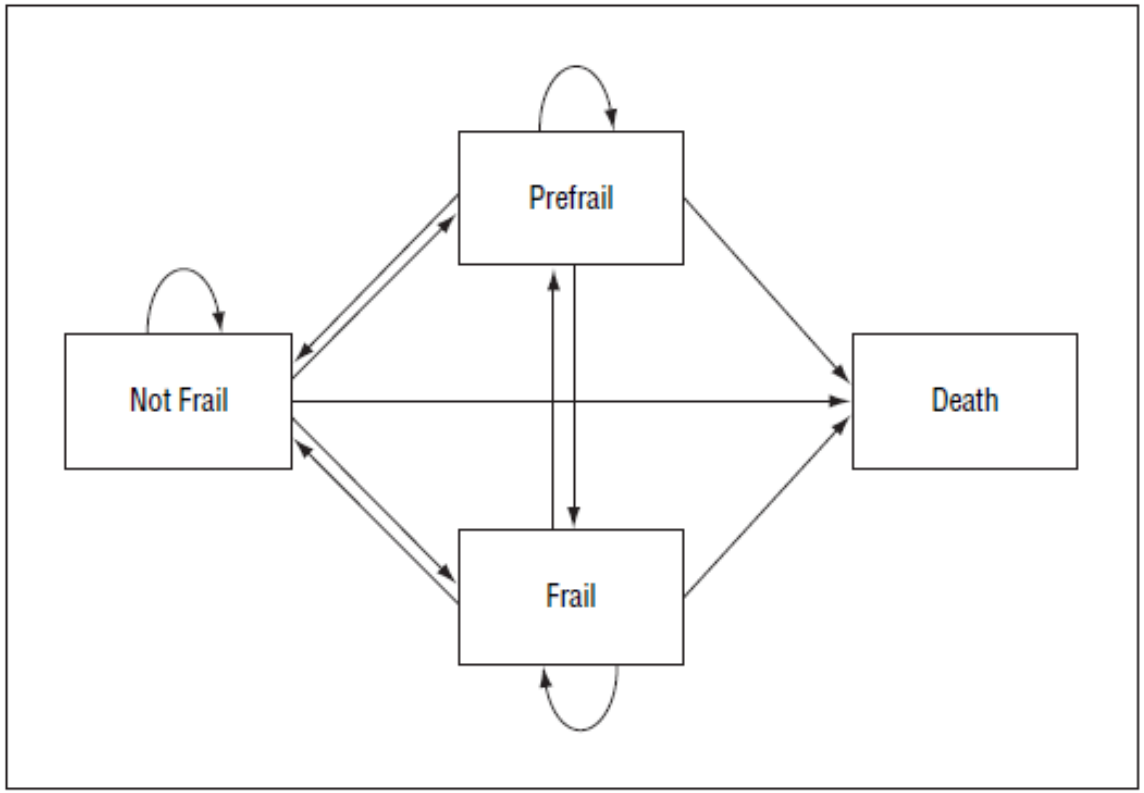
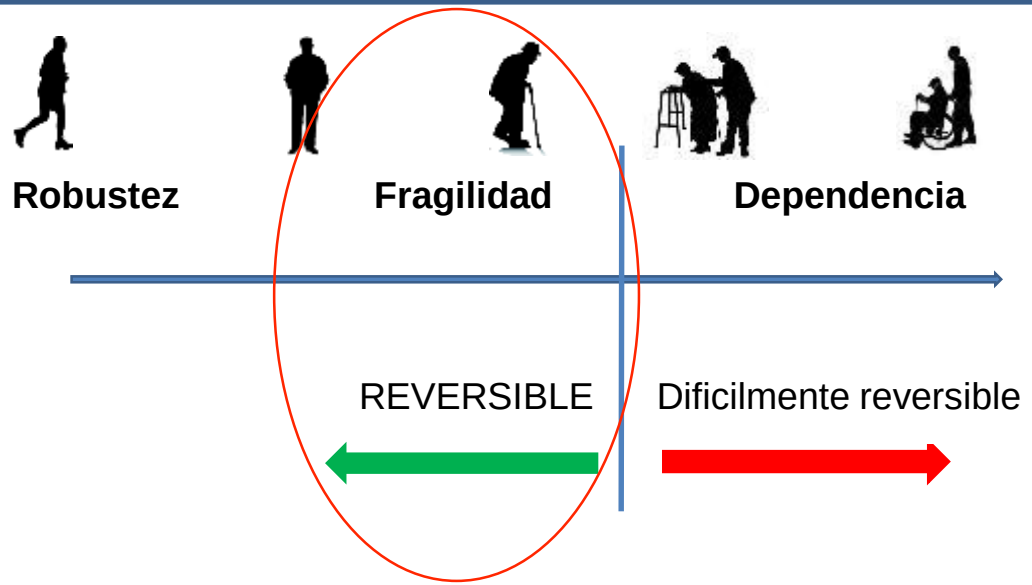


Figure 1. Multistate model depicting possible transitions between frailty states and death.

%)	Number	Rate (%)
	72–90 mo	
	N = 129	
	58	45.0
	2	1.6
	3	2.3
	N = 130	
	85	65.4
	15	11.5
	8	6.2
	N = 28	
	0	0
	13	46.4
	5	17.9

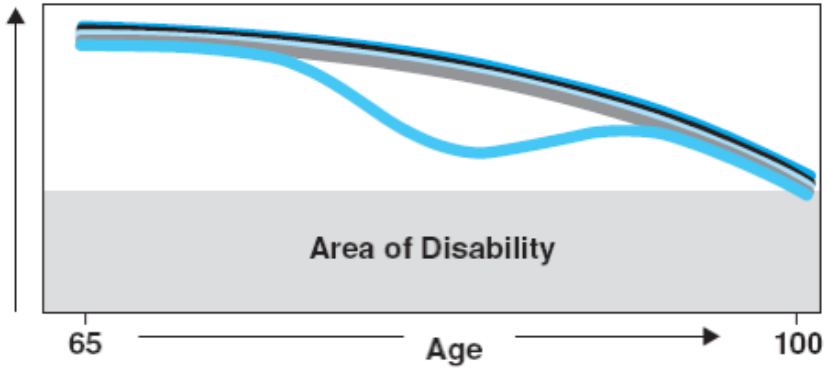
Gill, TM et al. Arch Intern Med 2006.

La fragilidad es REVERSIBLE

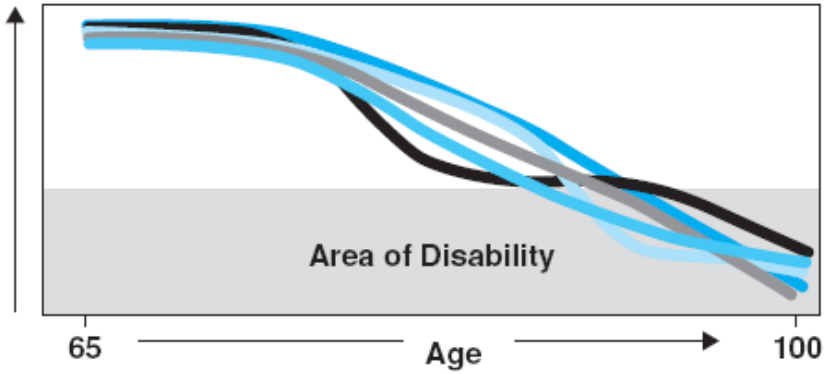


Cortesía del Dr. Rodriguez Mañas

Fried LP



Rockwood K



Fried et al. J Gerontol Med Sci. 2001;56A:M146-M156

Rockwood K. J Am Geriat Soc. 2006;54:975-979

La fragilidad es identificable

	Components	Frailty classification	Setting		
			Primary care	Hospital	Long-term care facility
Frailty phenotype[8]	Five items: weight loss, low physical activity, exhaustion, slowness, weakness	Frailty: ≥3 items; pre-frailty: 1–2 items; robust: 0 items	Yes	Yes	Yes
Frailty Index[7,13]	30 or more accumulated health deficits: scores range from 0 (no deficits) to 1 (all deficits)	Continuous score; suggested cutoff score for frailty >0·25[14]	Yes	Yes	Yes
Electronic Frailty Index[15]	As for the Frailty Index, with variables derived from routine electronic health records in primary care; also considered to be a case-finding instrument	Severe frailty: score >0·36; frailty: score >0·24–0·36; mild frailty: score >0·12–0·24; fit: score ≤0·12	Yes	No	No
Clinical Frailty Scale[16]	Visual and written chart for frailty with nine graded pictures: 1=very fit; 9=terminally ill	Frailty: score ≥5	Yes	Yes	Yes
FRAIL scale[17]	Five items: fatigue, resistance, ambulation, illness, loss of weight	Frailty: ≥3 items; pre-frailty: 1–2 items; robust: 0 items	Yes	Yes	Yes
Study of Osteoporotic Fractures frailty criteria[17]	Three items: weight loss, exhaustion, unable to rise from a chair five times	Frailty: ≥2 items; pre-frailty: 1 items; robust: 0 items	Yes	Yes	No
PRISMA-7[18]	Seven self-reported items: age (>85 years), male, social support, and ADLs	Frailty: score ≥3	Yes	No	No
Tilburg Frailty Indicator[19]	15 self-reported items in three domains: physical, psychological, and social	Frailty: score ≥5	Yes	No	No
Geriatric 8 frailty questionnaire for oncology (G8)[20]	Eight items: function (ADL and IADL), mobility, nutrition, comorbidity, cognition, depression, social support	Frailty: score ≤14	No	Yes	No
Groningen Frailty Indicator[21]	15 self-reported items in four domains: physical, cognitive, social, psychological	Frailty: score ≥4	Yes	No	No
Short Physical Performance Battery[22]	Three measured items: gait speed, standing balance, and repeated chair stands; each item scored from 0–4, maximum score of 12	Frailty: score ≤9	Yes	No	No
Edmonton Frailty Scale[23]	Nine items: cognition, health (2 ×), hospitalisation, social support, nutrition, mood, function, continence	Frailty: score ≥7	No	Yes	No
Multidimensional Prognostic Index[24]	Eight items: comorbidity, nutrition, cognition, polypharmacy, pressure sore risk, living status, ADL, IADL	Frailty: score >0·66; pre-frailty: score 0·34–0·66; robust: score <0·34	Yes	Yes	No
Kihon Checklist[25]	25 dichotomous items in seven categories: physical strength, nutrition, eating, socialisation, memory, mood, and lifestyle; scoring as per the Frailty Index	Continuous score; suggested frailty cutoff score >0·25	Yes	Yes	No
Frailty Risk Score[26]	Formula: age (per 10 years) × 4 + male sex × 10 + no partner × 5 + body mass index <18·5 kg/m^2 × 12 + cardiovascular disease × 4 + diabetes × 4 + number of drugs ≥2 × 5, EMS<20 × 5 + ADL motor deficit × 4 + ADL process deficit × 7. Also considered to be a case finding instrument.	Very good: score <45; good: score 45–50; moderate: score 51–55; poor: score 56–61; very poor: score >61	No	Yes	No
Hospital Frailty Risk Score[27]	109 summed items from ICD-10 frailty-relevant codes from administrative hospital data. Also considered to be a case finding instrument.	Low risk: score <5; intermediate risk: score 5–15; high risk: score >15	No	Yes	No

EMS=Elderly Mobility Scale. ADL=activities of daily living. IADL=instrumental activities of daily living. ICD-10=International Statistical Classification of Diseases and Related Health Problems, 10th revision. Derived and modified from Dent and colleagues, 2016.[13]

Table 1: Commonly used frailty instruments

Dent E et al. Lancet 2019; 394: 1376-86.

La fragilidad es identificable

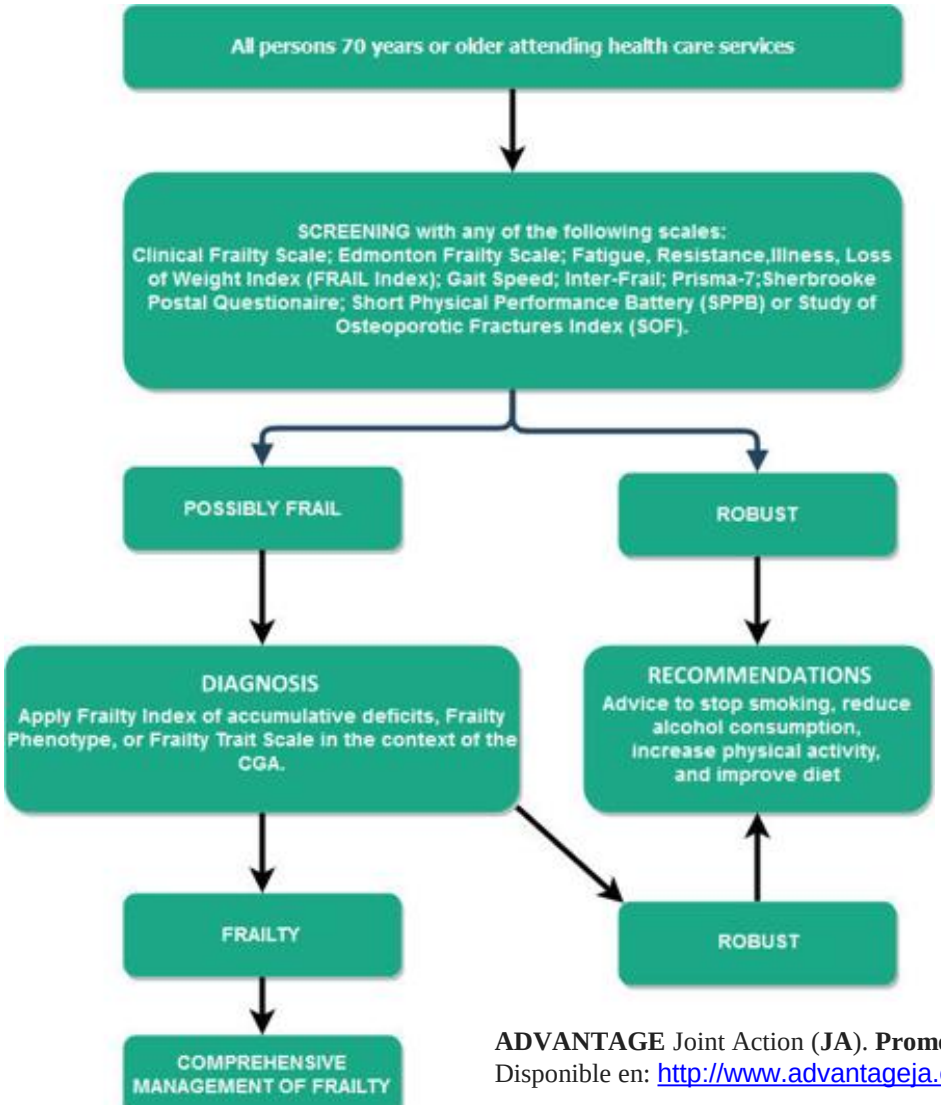
The Standardization of Frailty Phenotype Criteria Improves Its Predictive Ability: The Toledo Study for Healthy Aging

Cristina Alonso Bouzón MD [a,*], Jose Antonio Carnicero PhD [b], Jimmy Gonzáles Turín MD [c], Francisco J. García-García MD, PhD [b], Andrés Esteban MD, PhD [d], Leocadio Rodríguez-Mañas MD, PhD [a,c]

Criterios Convencionales de L.P Fried	Criterios adaptados a la población española
1.Pérdida de peso involuntaria ¿Ha perdido más de 4 kilos y medio de peso de forma involuntaria en el último año?	
2.Estado del ánimo decaido a) En la última semana ¿cuantos días ha sentido que todo lo que hacia era un esfuerzo? b) En la última semana ¿Cuantas veces no ha tenido ganas de hacer nada?	
3.Velocidad de la Marcha Según la altura y sexo ¿el paciente tarda igual o mas de lo indicado en caminar 4,5mts? Altura Tiempo **Varón:** ≤173cm..... ≥ 7s >173cm..... ≥ 6s **Mujer:** <159cm.....>7s >159cm.....≥6s	**3.Velocidad de la Marcha** Según la altura y sexo ¿el paciente tarda igual o más de lo indicado en caminar 4,6mts? Altura Tiempo **Varón:** ≤ 164cm..... >7s >164cm.....>6s **Mujer:** < 152 cm ..... 8 3 s >152cm.....7s
4.Actividad física ¿El paciente realiza semanalmente menos o igual de la actividad física indicada? **Varón:** <383 kcal/semana (pasear ≤ 2 30hrs / semana) **Mujer:** <270 kcal/semana (pasear ≤ 2 horas /semana)	**4.Actividad física** Utilizando la escala PASE , estratificada por sexo: **Varón:** ≤ 25,7. **Mujer:** ≤ 50.
5.Debilidad muscular Según el IMC y sexo ¿ la fuerza de prensión de la mano es menor o igual a la indicada? **Varón:** IMC<24.....≤20Kg IMC 24.1-26.....≤30Kg IMC 26.1-28.....≤30Kg IMC >28.....≤32Kg **Mujer:** IMC <23.....≤17 Kg IMC 23.1-26.....≤17.3Kg IMC 26.1-29.....≤18Kg IMC >29.....<21kG	**5.Debilidad muscular** Según el IMC y sexo ¿ la fuerza de prensión de la mano es menor o igual a la indicada? **Varón:** IMC < 25,5..... < 19 Kg IMC >25,5..... < 22 Kg **Mujer:** IMC ≤ 26,4..... ≤ 11Kg IMC > 26,4..... ≤ 12 Kg

JAMDA 18 (2017) 402—408

Cómo se maneja la fragilidad influye en el pronóstico



Box 1: **Comprehensive management of frailty**

-**Comprehensive Geriatric Assessment** to develop a personalised care plan and carry out a personalized multi-dimensional intervention.

-Take into account the frailty stage to tailor the correct treatment of concomitant diseases.

-Provide structured **multicomponent exercise programs** (consisting of endurance, flexibility, balance, and resistance training) performed with low to moderate intensity, in 30 to 45-minute sessions, three times a week. Followed or substituted by exercise programs of strength training: minimum of 8 weeks and medium to high exercise load (from 8 to 12 repetitions, from 30% - 60-70% of maximum intensity).

-Assess and optimize **nutrition** (Mini Nutritional Assessment).

-Apply tools to minimise risk from i**nappropriate drugs and polypharmacy** (Beers criteria, STOPP/START or Laroche criteria).

-When weight loss is of benefit, in BMI ≥30 kg/m2, and age 65 to 80 years, advise a moderate weight loss of 8-10% of body weight over 6 months always combined with exercise (resistive training to maintain muscle mass).

-Considerer **Vitamin D** supplementation for frail older patients who are at high risk of falls or fracture and with a 25-OH vitamin D level < 30 ng/ml with doses of 20 to 25 µg/day (800 a 1000 IU/day).

-ICT solutions should also be considered and advised to enable self-management and promote independence.

ADVANTAGE Joint Action (**JA**). **Promoting Healthy Ageing through a frailty prevention approach**. 2019. Disponible en: http://www.advantageja.eu/

El sistema de atención juega un rol central

Componentes clave de un modelo efectivo

Un punto de entrada: atención primaria

Uso de herramientas de cribado de fragilidad

VGI y planes individualizados de cuidado.

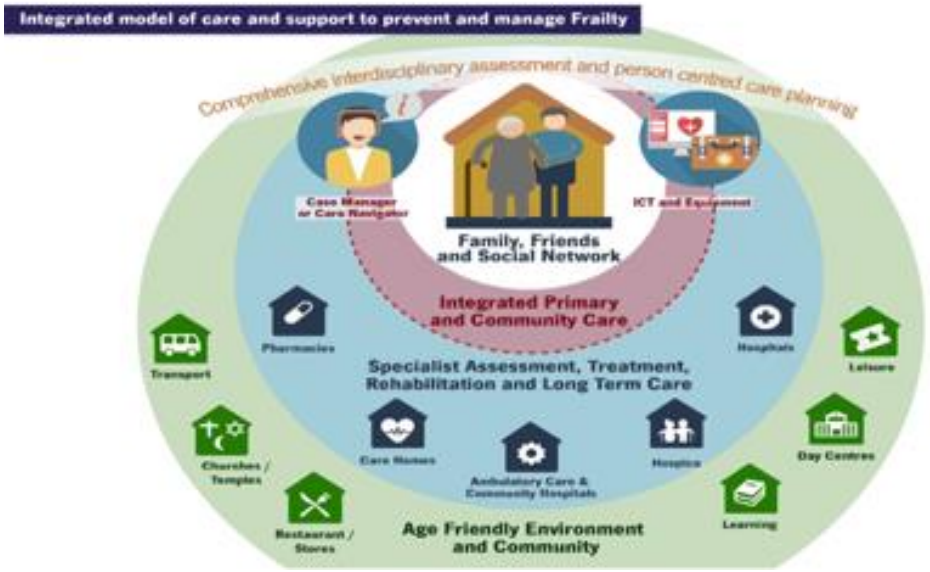
Intervenciones individualizadas y adaptadas realizadas por un equipo interdisciplinario.

Manejo de casos y coordinación de apoyo entre TODOS los proveedores

Manejo efectivo entre todas las transiciones

Información compartida
con apoyo de nuevas tecnologías

Claridad en políticas y procedimientos



ADVANTAGE Joint Action (**JA**). **Promoting Healthy Ageing through a frailty prevention approach**. 2019. Disponible en: http://www.advantageja.eu/

Retos del abordaje de la fragilidad

	CÓMO ESTABAMOS 1950,s	CÓMO ESTAMOS O VAMOS A SXXI
Los pacientes eran…	Niños y jóvenes	Personas mayores
Tipo de enfermedades	Transmisibles	E. crónicas y sdr. geriátricos
Evolución	Cura o muerte	Complicaciones Discapacidad y dependencia
Ser saludable	Ausencia de enfermedad	Ser capaz de… (calidad de vida)
Servicios de atención	Hospitales	Hospitales, centros de atención primaria pero también otros….
Actores de salud	Médicos y enfermeras	➢ PACIENTE ➢ Familia/cuidadores ➢ Comunidad (múltiples sectores) ➢ Múltiples disciplinas ➢ Servicios sociales

Retos del abordaje de la fragilidad

	Evidence	Outcomes analysed	Certainty of evidence
All community-dwelling older adults (primary care)			
Identify frailty or pre-frailty through screening and case identification in primary care	Four systematic reviews[39–42]	Accurate identification of frailty or pre-frailty	Low
Community-dwelling older adults living with frailty (interventions targeting the management of frailty in home or community settings)			
Prescribe physical activity programmes (resistance-based training, aerobic training, or balance or coordination training)	Three systematic reviews[43–44] (excluded: reviews on frailty prevention or with merged frailty and pre-frailty groups[45–47])	Physical performance (SPPB); gait speed; muscle strength; mobility	Very low for all four outcomes
Prescribe multicomponent physical activity programmes	Three systematic reviews[43–44] (excluded: reviews on frailty prevention or with merged frailty and pre-frailty groups[45–47])	Disability; falls; balance; muscle strength	Very low for all four outcomes
Provide community-based group physical activity classes	Systematic review of six trials of mild frailty or pre-frailty,[48] and one systematic overview with one relevant trial[49]	Physical function; muscle strength; balance	Very low for all three outcomes
Protein or protein-energy, micronutrient supplementation	Systematic review of three nutritional trials,[50–52] and one systematic overview with one relevant trial[53]	Frailty; physical performance; strength (leg or grip); gait speed; physical activity	Low for all five outcomes
Provide individually tailored management of clinical conditions	Systematic review of three trials of frailty[49]	Frailty; ADL	Low for both outcomes
Provide advice on health behaviour improvement	Systematic review of six education trials[54]	Physical function	Low
Ensure practical social support	Systematic review of 13 trials on enabling health-behaviour change[55]	Physical function	Very low
Modify home environment for health behaviour change	Systematic review of five trials[56]	Physical function; health behaviour	Very low for both outcomes
Older adults with frailty in hospital (hospital care)			
Ensure targeted care delivery through CGA intervention (CGA done in emergency department, short stay unit, or clinical decision unit)	Systematic mapping review of eight studies covering CGA intervention for older people with frailty[57*]	Physical function; readmission; emergency department readmission	Very low for all outcomes
Review medications using implicit criteria	One systematic mapping review[57*]	Prevention of emergency department readmission	Very low
Ensure patient is placed on a frailty-specific care pathway	One systematic mapping review[57*]	Prevention of emergency department readmission	Low

All intervention strategies listed in this table have been reviewed for effectiveness in recent systematic and structured reviews; intervention strategies without systematic review appraisal were not included. Reviews were only listed if their included studies defined frailty using objective measurement, regardless of whether they had the word frail in their title. All strategies and outcomes listed have been found to be superior to usual care; strategies and outcomes not showing consistent or substantial evidence of benefits compared with usual care have not been included. Certainty of evidence was defined according to GRADE criteria[13] as applied by the authors: high (further research is very unlikely to change our confidence in the estimate of effect and there are no suspected biases); moderate (further research will likely change our confidence in the estimate of effect and may change the estimate); low (further research is very likely to have an important impact on confidence in the estimate of effect, and is likely to change the estimate); very low (any estimate of effect is uncertain). The search for relevant reviews was based on a quasi-systematic review, and thus the list of interventions might not be exhaustive. CGA=Comprehensive Geriatric Assessment. ADL=activities of daily living. IADL=instrumental activities of daily living. SPPB=Short Physical Performance Battery test. *Although these systematic reviews combined results from older adults in general and those with frailty, this table shows trial results for those with frailty only.

Table 2: Single strategies superior to usual care for management of frailty, by target population

Lancet 2019; 394: 1298.

Hoogendijk EO et al. Lancet 2019; 394: 1365-75.

Dent E et al. Lancet 2019; 394: 1376-86

Retos del abordaje de la fragilidad







Los profesionales deben/necesitan estar formados en envejecimiento y fragilidad.
nico sino tambien en la práctica interprofesional, colaboración interorganizacional, gestión y orgar

ADVANTAGE Joint Action (**JA**). **Promoting Healthy Ageing through a frailty prevention approach**. 2019.
Disponible en: http://www.advantageja.eu/

Conclusiones I

1-. La fragilidad no es un síndrome inevitable.

2-. Es identificable, reversible y modulable.

3-. El cómo se maneja influye en el pronóstico: el gold standard es la valoración geriátrica integral seguida de una intervención adaptada a las necesidades de cada persona.

4-. El dónde se maneja influye en el pronóstico: los servicios deben ofrecer una atención integrada y continuada.

5-. Existen muchas lagunas de conocimiento: la investigación es una prioridad.

6-. La formación de profesionales es un gran reto

Posibles roles de las nuevas tecnologías para abordar la fragilidad

1-. Prevención de la fragilidad.

2-. Diagnóstico temprano de la fragilidad.

3-. Manejo de los pacientes frágiles.

4-. Contribución a una atención integrada y continua.

5-. Apoyo a la investigación.

6-. Apoyo a la docencia, la formación continuada y concienciación.

Prevención de la fragilidad

Journal of Alzheimer's Disease 62 (2018) 649–663
DOI 10.3233/JAD-170858
IOS Press

Designing an Internet-Based Multidomain Intervention for the Prevention of Cardiovascular Disease and Cognitive Impairment in Older Adults: The HATICE Trial

Estudio aleatorizado no ciego a 18m.
Plataforma interactiva para personas mayores, que favorece el automanejo de 7 FRCV:
- HTA, dislipemia, DM, sobrepeso, fumar, inactividad física, dieta inadecuada.

2725 mayores de 65a
Como outcomes secundarios: fitness, humor, discapacidad y la función cognitiva.

Diagnóstico temprano de la fragilidad

sensors

MDPI

Article

A Low-Cost Indoor Activity Monitoring System for Detecting Frailty in Older Adults

Thomas Tegou *, Ilias Kalamaras, Markos Tsipouras, Nikolaos Giannakeas, Kostantinos Votis and Dimitrios Tzovaras



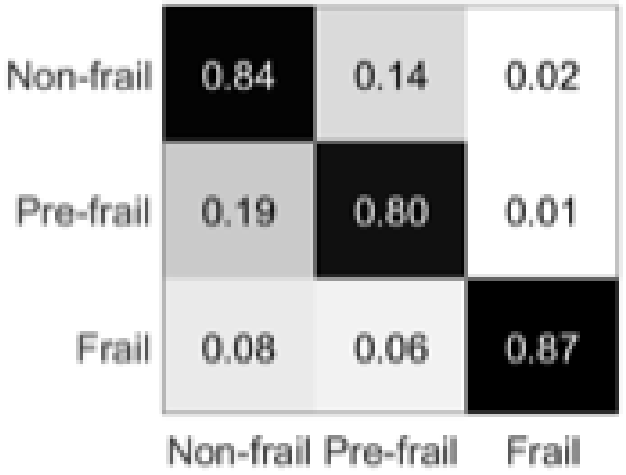


(a) (b)

Figure 3. (**a**): Example of a beacon topology in a house. (**b**): Example of a beacon topology in the KRIPIS Smart Home [40] at CERTH/ITI, were the system was evaluated. With different colors are the areas where the user, performing beacon setup procedure, should walk for half a minute in order to create the signal fingerprint for each room.

Diagnóstico temprano de la fragilidad

		Classified		
		Non-Frail	**Pre-Frail**	**Frail**
Dataset	**Non-Frail**	206	36	7
	Pre-Frail	34	156	5
	Frail	4	2	78



Diagnóstico temprano de la fragilidad

Translational Medicine @ UniSa-ISSN 2239-9747 2019, 19(6): 36-41

A STUDY PROTOCOL FOR DEVELOPMENT AND VALIDATION OF A CLINICAL PREDICTION MODEL FOR FRAILTY (MODULEN): A NEW EUROPEAN COMMITMENT TO TACKLING FRAILTY

Apóstolo J[1,2], Bobrowicz-Campos E[2], Moreno-Casbas T[3,4]; Teixeira-Santos L[2], Sánchez de Madariaga R[5], Casado-Ramírez E[3,4], Couto F[2], Coelho A[1,2], Parola V[1,2], Gil I[1,2], Pascual-Carrasco M[5], Almeida M de L[1,2] and ModulEn consortium*

Modelo predictivo de fragilidad
-Salud circadiana
-Actividad física
-Hábitos de comida y sueño
-Temperatura corporal periférica
-Luminosidad

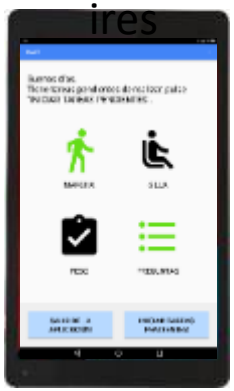


Diagnóstico temprano de la fragilidad

Smart Weight Scale



Frailty-related Questionnaires

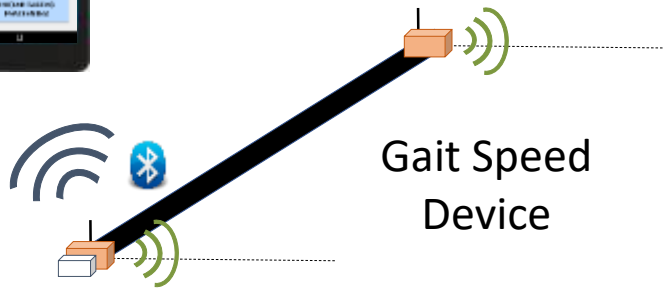




30s Chair Stand Device







Gait Speed Device

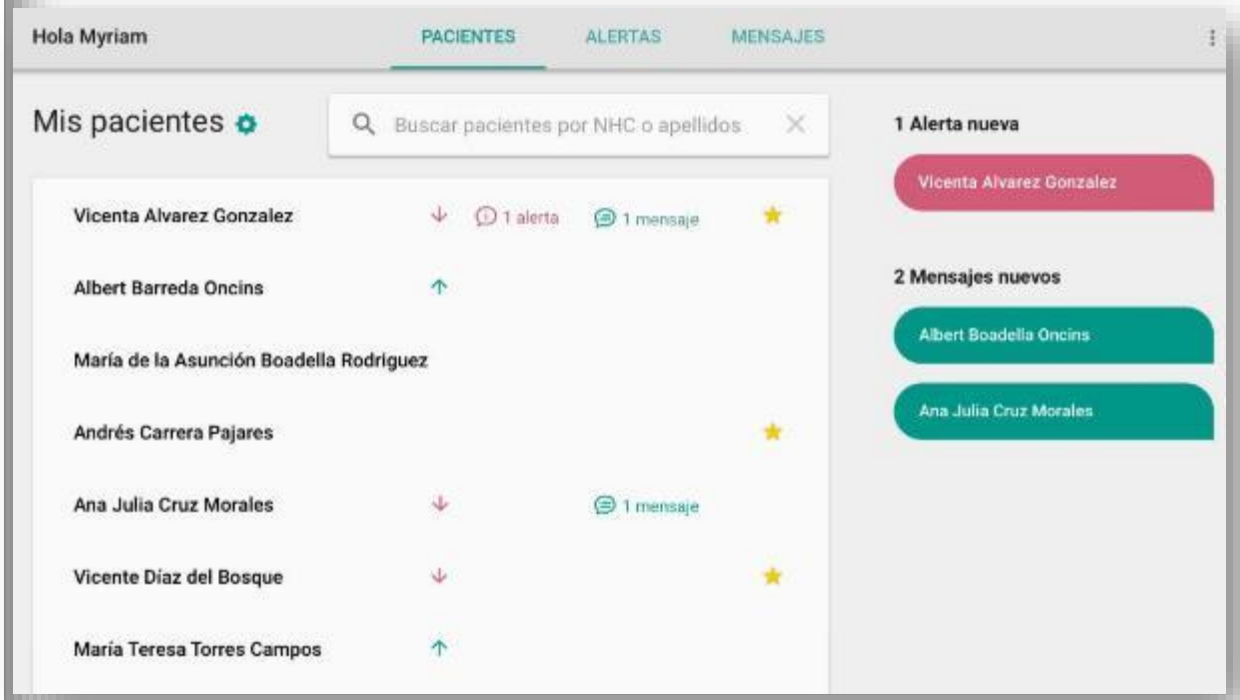
Cortesía del Dr. Rodrigo Pérez Rodríguez

Manejo de los pacientes frágiles

Lo que ve el paciente

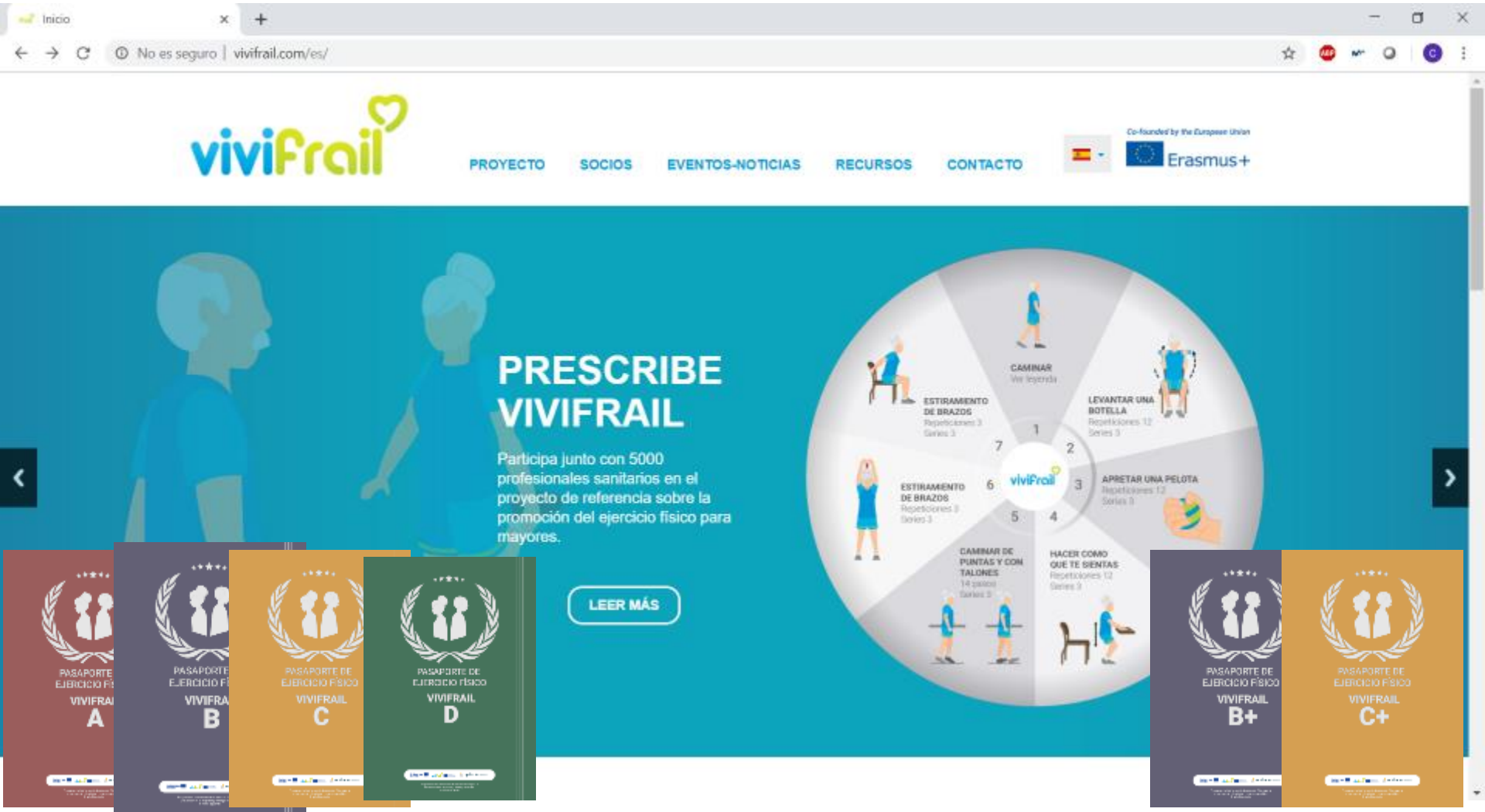


Lo que ve el profesional de salud

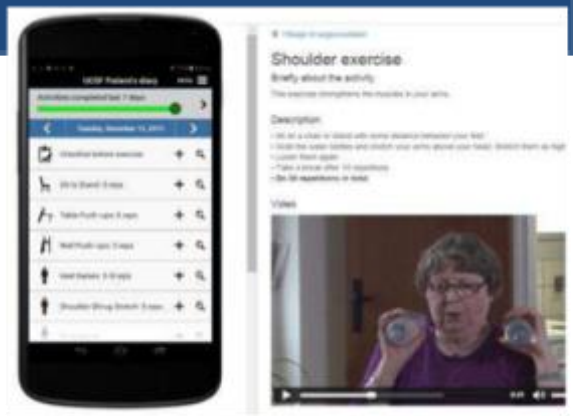


Cortesía del Dr. Rodrigo Pérez Rodríguez

Manejo de los pacientes frágiles



Manejo de los pacientes frágiles



Clin Transplant. 2018 June ; 32(6): e13274. doi:10.1111/ctr.13274.

A mobile health technology enabled home-based intervention to treat frailty in adult lung transplant candidates: a pilot study

Jonathan P Singer, MD, MS[1], Allison Soong, MPH[1], Alan Bruun, BA[2], Ayana Bracha, MS, RD[3], Greg Chin, RD, CNSC[3], Steven R Hays, MD[1], Kukreja Jasleen, MD[4], Julia Rigler, RT[1], Jeff A Golden, MD[1], John R Greenland, MD, PhD[1], and Chris F Garvey, NP[1]

	Short Physical Performance Battery (Frailty Defined as Score ≤ 9)				Fried Frailty Phenotype (Frailty Defined as Score ≥ 3)			
Participant	Baseline	Intervention end	Frailty resolved*	Change in score (positive score = improved frailty)	Baseline	Intervention end	Frailty resolved*	Change in score (negative score = improved frailty)
1	Not frail (10)	Not frail (10)		0	*Frail* (3)	Not frail (2)	*Yes*	−1
2	*Frail* (9)	Not frail (12)	Yes	+3	Not frail (2)	Not frail (1)		−1
3	*Frail* (9)	Frail (9)	No	0	Not frail (2)	Not frail (1)		−1
4	Not frail (10)	Not frail (12)		+2	*Frail* (3)	Not frail (2)	*Yes*	−1
5	Not frail (11)	Frail (8)		− 3	*Frail* (3)	*Frail* (5)	No	2
6	Not frail (10)	Not frail (12)		+2	Not frail (1)	Not frail (0)		−1
7	Not frail (11)	Not frail (12)		+1	Not frail (1)	Not frail (1)		0
8	*Frail* (9)	*Frail* (9)	No	0	Not frail (1)	Not frail (2)		1
9	Not frail (11)	Not frail (10)		− 1	Not frail (1)	Not frail (1)		0
10	Not frail (11)	Not frail (11)		0	Not frail (1)	Not frail (0)		−1
11	Frail (9)	Not frail (12)	Yes	+3	*Frail* (3)	*Frail* (3)	No	0
12	Not frail (10)	Not frail (12)		+2	*Frail* (3)	Not frail (1)	Yes	−2
13	Frail (8)	Not frail (12)	Yes	+4	*Frail* 4	*Frail* (3)	No	−1

*Cells populated only if participant was frail at baseline assessment.

Manejo de los pacientes frágiles

Outcome measures (n = 13 subjects who completed the intervention)

	Baseline	8 week	Within-person change from baseline to 8 week	P-value[1]	Improved 1× MCID	Improved 2× MCID	Improved 3× MCID
SPPB	9.7 ± 1.0	10.8 ± 1.5	1.0 ± 1.9	0.08	1 (7.7%)	3 (23.1%)	3 (23.1%)
FFP	2.4 ± 1.1	1.7 ± 1.4	−0.6 ± 1.0	0.07	7 (58.3%)	1 (8.3%)	0 (0%)
6MWD (m)	287.5 ± 83.8	279.7 ± 74.8	−7.8 ± 77.7	0.73	2 (16.7%)[2]	–	–
Grip strength	32.8 ± 10.6	33.7 ± 11.9	1.5 ± 7.3	0.48	–	–	–
LT-VLA	1.1 ± 0.7	1.1 ± 0.7	0.1 ± 0.4	0.26	–	–	–
DASI	19.1 ± 13.2	21.5 ± 12.3	−0.1 ± 5.8	0.94	–	–	–

Data presented as N (%) and mean ± SD. MCID = minimally clinically important difference)

[1] P-value by paired t test.

[2] Defined as six-minute walk distance increase ≥ 30 meters.

SPPB = Short Physical Performance Battery (range 0–12, lower scores denote worse frailty; MCID = 1); FFP = Fried Frailty Phenotype (range 0 – 5; higher scores denote worse frailty; MCID = 1)

FUNCTIONAL POST-ACUTE TELEMONITORING REDUCES READMISSIONS IN PEOPLE 75+ WITH HEART FAILURE

Hospital Stay

Geriatric Acute Care Unit

Hospital admission due to HF exacerbation

Control

ROUTINE POST ACUTE CARE

- Regular outpatient visits
- Scheduled home visits
- Primary care

Intervention

Data Capture Mobile App

Every 48h

VITAL SIGNS

- Weight
- Blood Pressure
- Heart and Respiratory Rate
- Oxygen Saturation

FUNCTIONAL STATUS

- Gait Speed
- One Sit to Stand Test

8 HF QUESTIONNAIRE

-Do your feel worse than the last time?
-Do you feel worse than the day of the hospital discharge?
-Do you feel shorten of breath?
-Do you feel your legs swollen?
-Have you waken up during the night feeling fatigue?
-Have you needed more pillows to sleep than last time?
- Have your taken all your drugs?
- Have you followed the food and drinks indications of your physician?

Outcomes

Data Analysis
Logistic Regression

Readmission rate
Readmission length of stay
Emergency visit rate
Worsening

Assessment



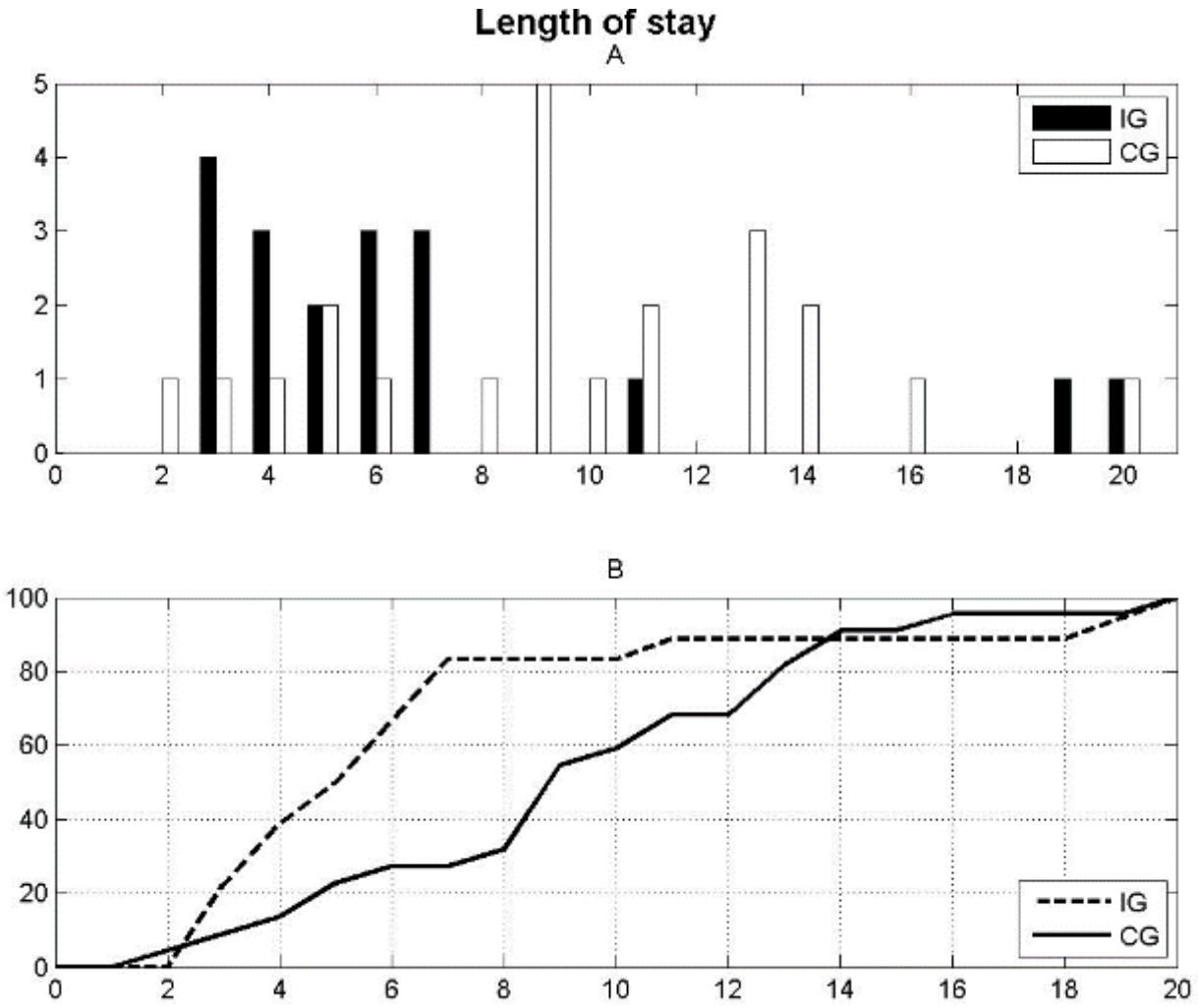
Web Portal

BASED ON COLLECTED DATA

- Phone call for advising
- Home Visits
- Emergency room

Pte ser enviado

Reducción riesgo de reingreso del 62% en el grupo intervención (OR: 0.38; 0.16-0.93; p-value 0.03)
La mediana en la estancia media del grupo intervención fué 5.5 días
La mediana en la estancia media del grupo control fué de 9 días.
Hubo una diferencia en la estancia de 3.5 days (p-value 0.02).



Pte ser enviado

Tabla 3. Logistic regression model using as outcome the readmissions rate.

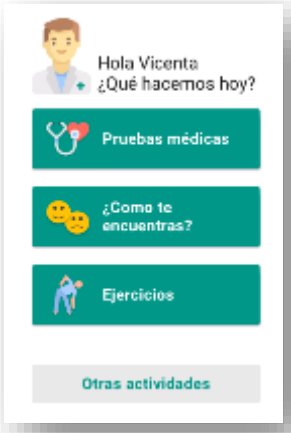
			QUESTIONNAIRE		
VITAL SIGNS	**OR (LL-UL)**	**p**	Do your feel worse than the last time?	1.05 (1.01-1.09)	0.03
Weight	1.04 (0.99-1.09)	0.15	Age	1.10 (0.87-1.38)	0.37
Age	0.97 (0.84-1.12)	0.69	Sex	1.90 (0.25-14.76)	0.54
Sex	1.17 (0.31-4.42)	0.82	Do you feel worse than the day of the hospital discharge?	0.97 (0.92-1.02)	0.22
Blood pressure	0.99 (0.96-1.03)	0.82	Age	1.08 (0.88-1.02)	0.06
Age	0.96 (0.83-1.10)	0.54	Sex	4.44 (0.39-50.04)	0.22
Sex	1.05 (0.26-4.25)	0.94	Do you feel shorten of breath?	1.08 (0.99-1.17)	0.83
Heart rate	1.00 (0.99-1.01)	0.68	Age	1.08 (0.88-1.33)	0.43
Age	0.96 (0.84-1.11)	0.60	Sex	3.38 (0.39-29.18)	0.27
Sex	1.02 (0.28-3.79)	0.97	Do you feel your legs swollen?	1.03 (0.99-1.06)	0.18
Respiratory rate	1.03 (0.94-1.13)	0.48	Age	1.09 (0.89-1.33)	0.40
Age	0.94 (0.82-1.09)	0.42	Sex	1.58 (0.26-9.61)	0.62
Sex	0.89 (0.24-3.33)	0.87	Have you waken up during the night feeling fatigue?	1.03 (0.98-1.08)	0.26
Oxigen saturation	0.73 (0.56-0.96)	0.03	Age	1.12 (0.92-1.37)	0.25
Age	0.96 (0.83-1.11)	0.06	Sex	2.13 (0.34-13.33)	0.42
Sex	0.84 (0.21-3.38)	0.81	Have you needed more pillows to sleep than last time?	0.94 (0.83-1.07)	0.34
			Age	1.10 (0.90-1.33)	0.33
FUNCTIONAL MEASURES	**OR (LL-UL)**	**p**	Sex	1.80 (0.30-10.77)	0.51
Gait variability	1.37 (1.06-1.78)	0.02	Have your taken all your drugs?	0.98 (0.93-1.03)	0.42
Age	0.95 (0.82-1.01)	0.50	Age	1.11 (0.91-1.35)	0.31
Sex	1.35 (0.32-5.63)	0.68	Sex	1.62 (0.27-9.50)	0.60
One sit to stand test	0.80 (0.57-1.11)	0.19	Have you followed the indications of your physician?	1.06 (0.93-1.19)	0.38
Age	1.00 (0.86-1.17)	0.95	Age	1.05 (0.87-1.28)	0.59
Sex	1.07 (0.28-4.03)	0.92	Sex	1.05 (0.16-6.70)	0.96

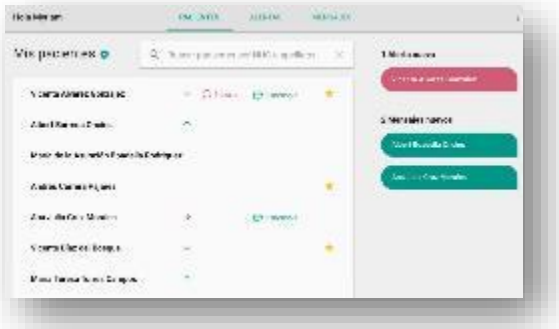
OR: Odds Ratio. LL: Lower Limit. UL: Upper Limit. P: p-value.

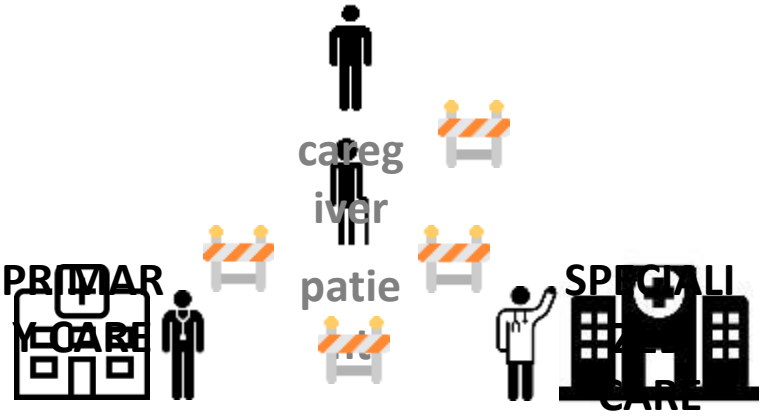
Pte ser enviado

Contribución una atención integrada y continua.









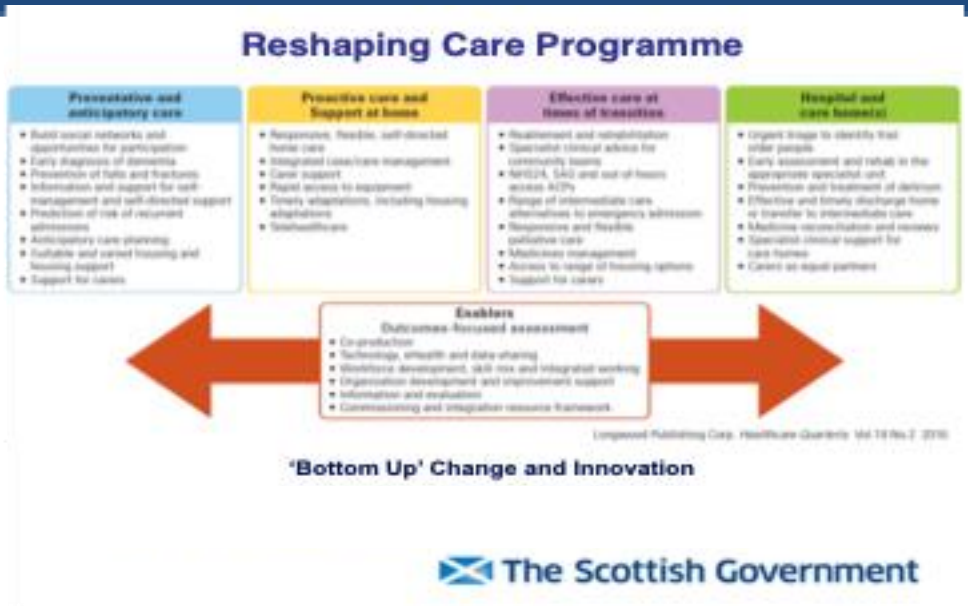
1-. Favorece la atención continua e integrada

2-. Monitoriza (eficacia y costo-eficacia)

3-. Investigación

4-. Manejo de grandes cantidades de datos: big-data

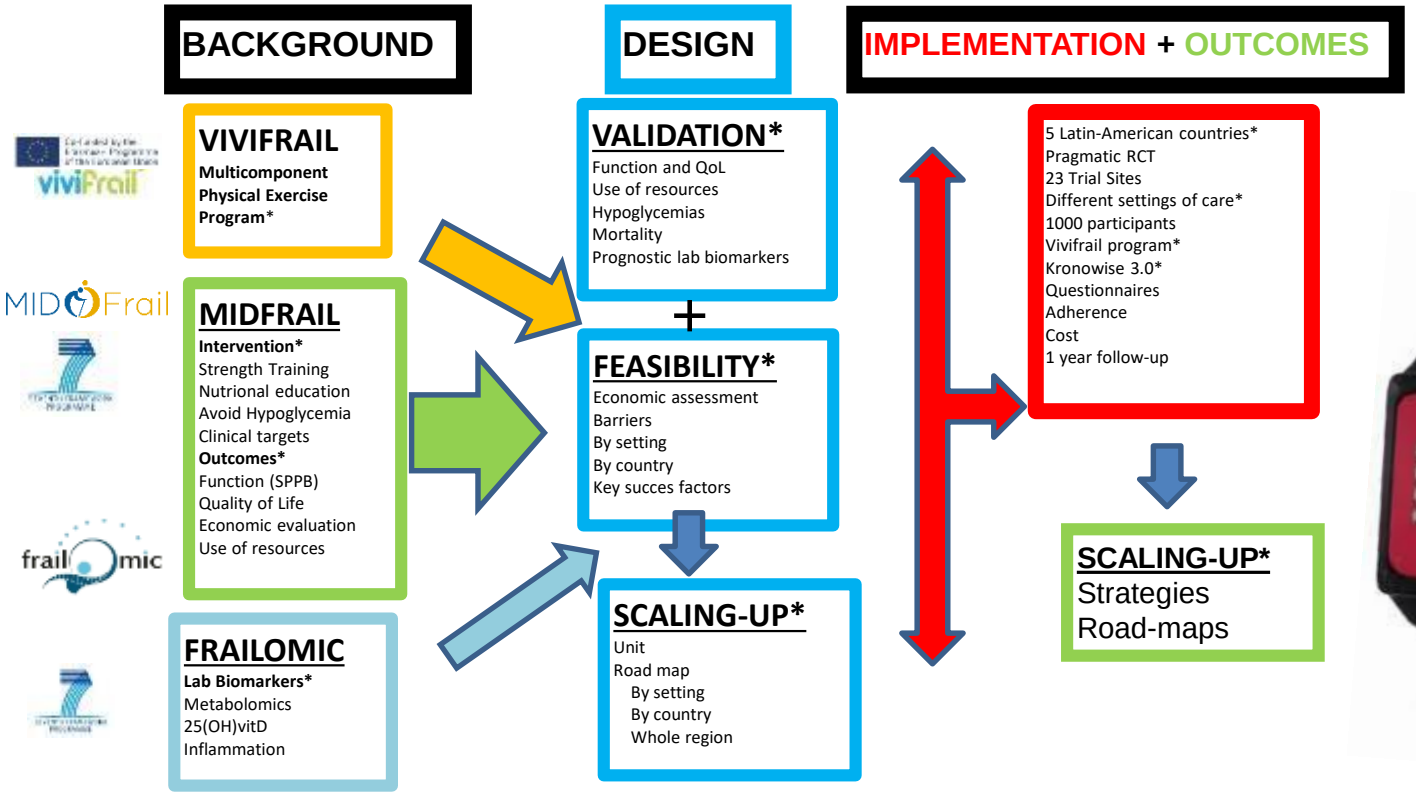
Contribución una atención integrada y continua.



- 100% frailty assessment: eFI
- 83% of older people receiving support at home benefit from telecare.

- Bed days in hospital for people aged 75+ following an emergency admission reduced by 10% from 2009/10 to 2015/16.
- Each day in 2016/17, people aged 65+ used around 1533 fewer emergency hospital beds than 'expected' had the 2008/09 rate at continued in line with population ageing
- In 2017, there were around 7,213 fewer older people in care homes than projected based on the 2009 rate and demographic trends.
- Estimated institutional costs avoided (based on daily rate for care home and emergency hospital beds) was approximately £480 million in 2016/17 (around £1.3 million per day).

Apoyo a la investigación.





*Issues beyond the state of the art along the project

Apoyo a la docencia, la formación continuada y la concienciación.

Formación mediante realidad virtual



Formación mediante plataformas digitales



Apoyo a la docencia, la formación continuada y la concienciación.



www.advantageja.eu
https://www.facebook.com/advantageJA/
https://www.linkedin.com/company/advantage-joint-action/
https://twitter.com/Advantage_JA

Conclusiones II

- La nuevas tecnologías pueden aportar beneficios en el abordaje de la fragilidad de muy diferentes maneras.
- La complejidad de las nuevas tecnologías es altamente variable.
- La usabilidad de las NT en el abordaje de la fragilidad, está en su gran mayoría por desarrollar.



Muchas gracias!!

Cristina Alonso Bouzón, MD, PhD.
calonsob@salud.madrid.org