Fragilidad: una preocupación

**Encuentro México y el Mundo,
Envejecimiento y vejez, nuevos retos**

Presentado por:

**J. Alberto ÁVILA FUNES, MD, PhD
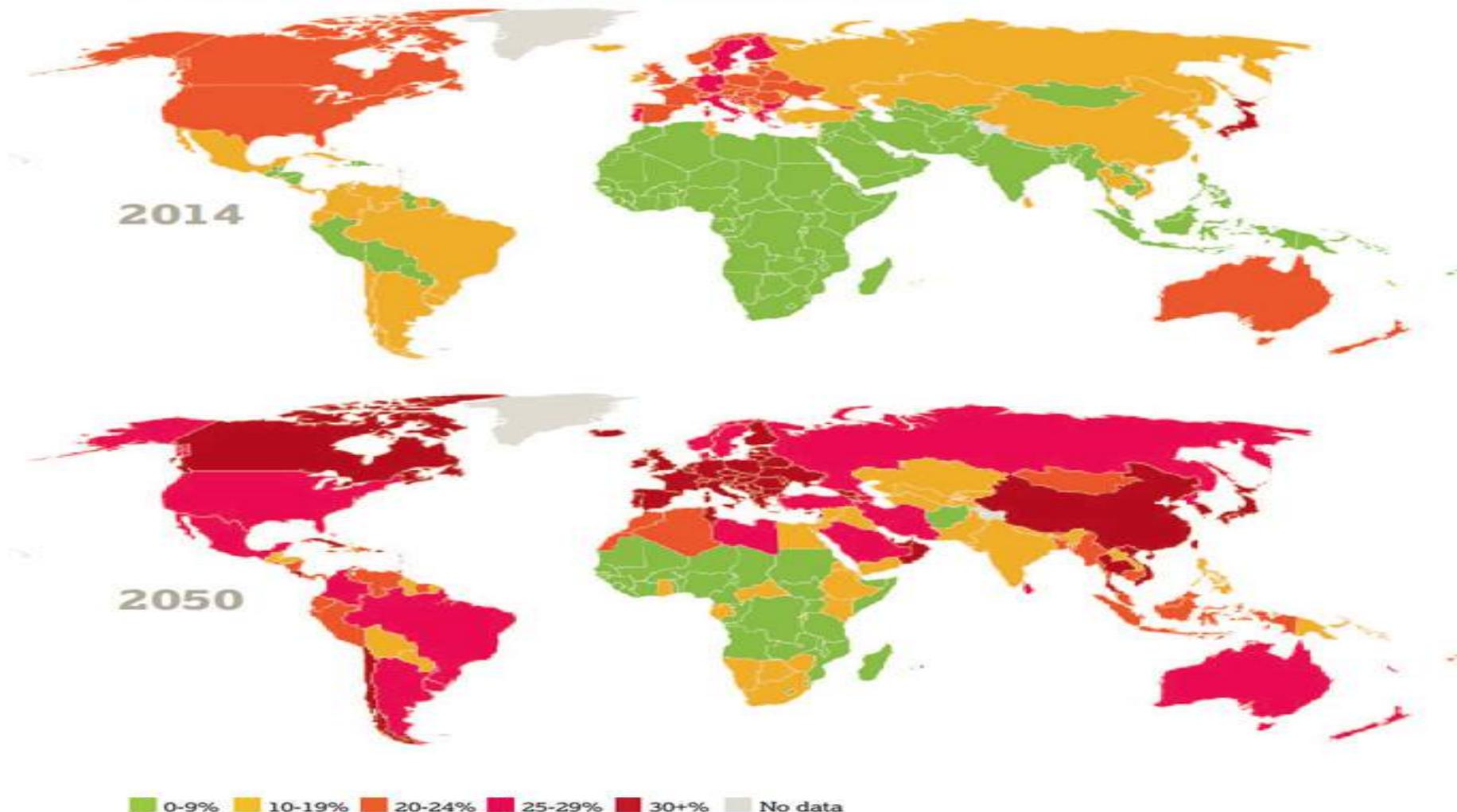Jefe de Geriatría**

Ciudad de México, a 23 de noviembre de 2016

Plan de presentación

— El problema del envejecimiento humano

— Implicaciones de la fragilidad

— Fragilidad en el mundo: algunos ejemplos

— Fragilidad en México

— Conclusiones

Fragilidad: una preocupación

Proportion of population aged 60 or over in 2014 and 2050

2014

2050

0-9% 10-19% 20-24% 25-29% 30+% No data

Source: UNDESA Population Division, *World population prospects:
the 2012 revision*, DVD edition, 2013

Note: The boundaries shown on this map do not imply official endorsement
or acceptance by the United Nations

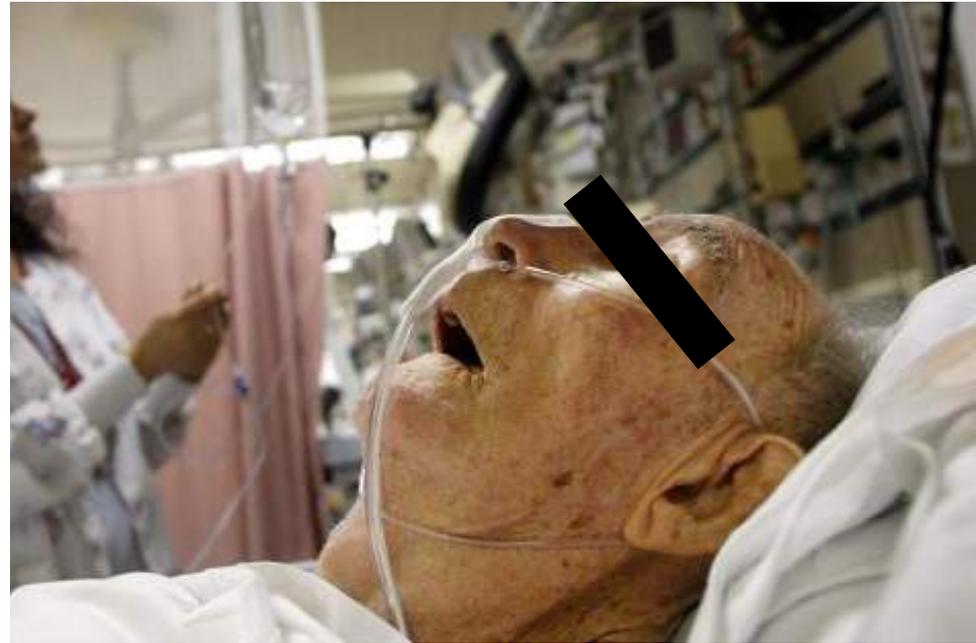# Envejecimiento

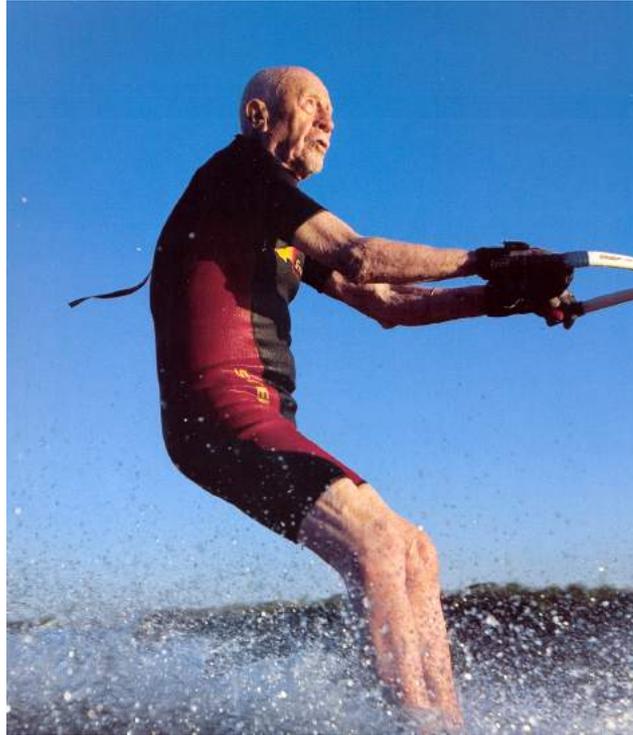Proceso caracterizado por la pérdida de múltiples capacidades físicas y cognoscitivas

— Fenómeno complejo y multifactorial

— Proceso gradual, persistente e irreversible

— ¿Sinónimo de decadencia?

Fragilidad: una preocupación

Fragilidad: una preocupación

Fragilidad: una preocupación

¿Qué es la fragilidad?

¿Quién es el Adulto Mayor frágil?

Fragilidad

- Fragilidad:

Antónimo de robustez
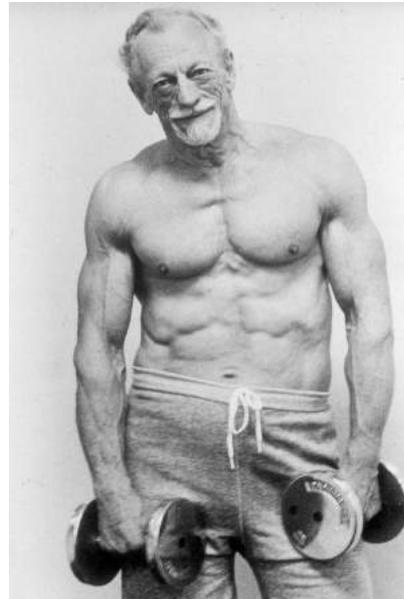
Fragilidad

— Concepto controvertido

— Síndrome clínicamente reconocible

— Distinto de envejecimiento, comorbilidad y discapacidad

— Estado de riesgo y desequilibrio

— Múltiples hallazgos descritos:

Desnutrición, dependencia, inmovilidad, reposo prolongado en cama, úlceras de presión, problemas de la marcha, debilidad, edad extrema, pérdida de peso, anorexia, miedo a caerse, demencia, fractura de cadera, *delirium*, confusión, aislamiento y polifarmacia

J Gerontol A Biol Sci Med Sci 2001;56:M146-56

Am J Geriatr Psychiatry 2004;12:1-6

J Am Geriatr Soc 2005;53:1069-70

J Endocrinol Invest 2002;25:10-5

Geriatr Today. 2003;6:26–31

Continuo funcional

Vulnerabilidad
Fisiológica
Aislada

Afección
Funcional Total

INDEPENDENCIA

"Disminución"

Espectro
de la
Fragilidad

DISCAPACIDAD

PRE-MUERTE

MUERTE

¿Por qué estudiar la fragilidad?

- Los adultos de 80 años y más: sector con rápido crecimiento

- La fragilidad y la discapacidad: problemas de salud graves

- Potencial marcador pronóstico

- Susceptible de alguna intervención

- Útil para la toma de decisiones difíciles

Problemas para determinar su frecuencia

- Falta de definición universal

- Potencial participación de diferentes dimensiones

- Uso de "proxy" en su contrucción

- Uso de fenotipo incompleto

- Uso de la evaluación geriátrica integral
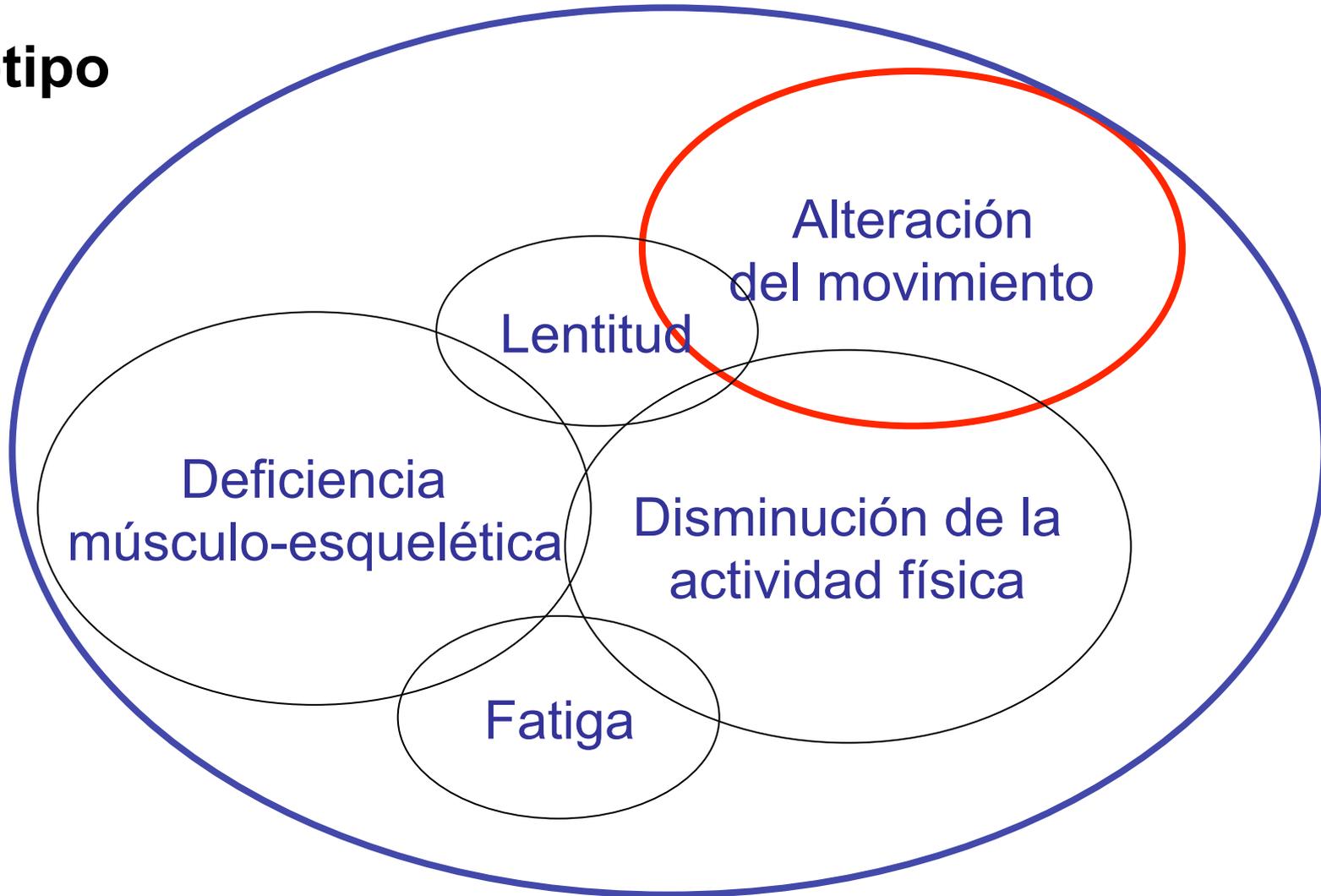
Síndrome complejo

- Cuatro niveles:

    - Auto-reporte del estado funcional
    - Evaluación cognitiva
    - Escala de fragilidad basada en la Escala del Estado Geriátrico (GSS)

Rockwood K.1999
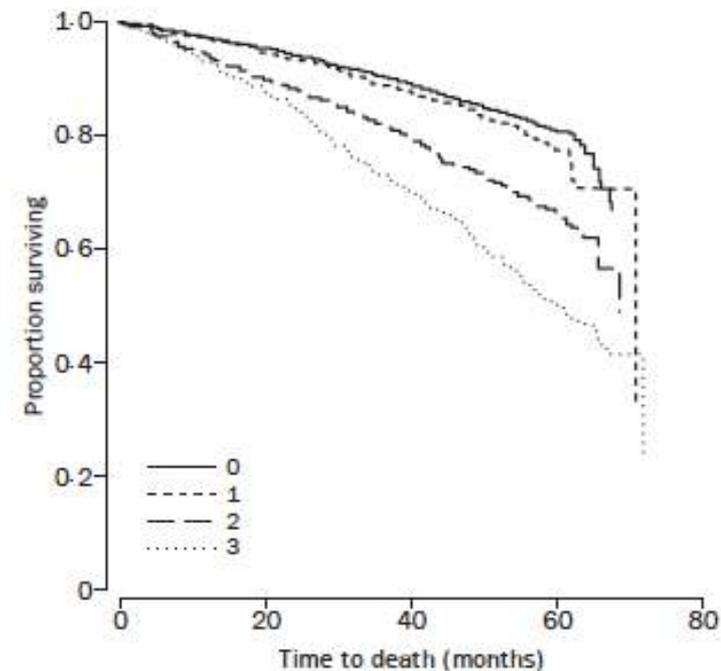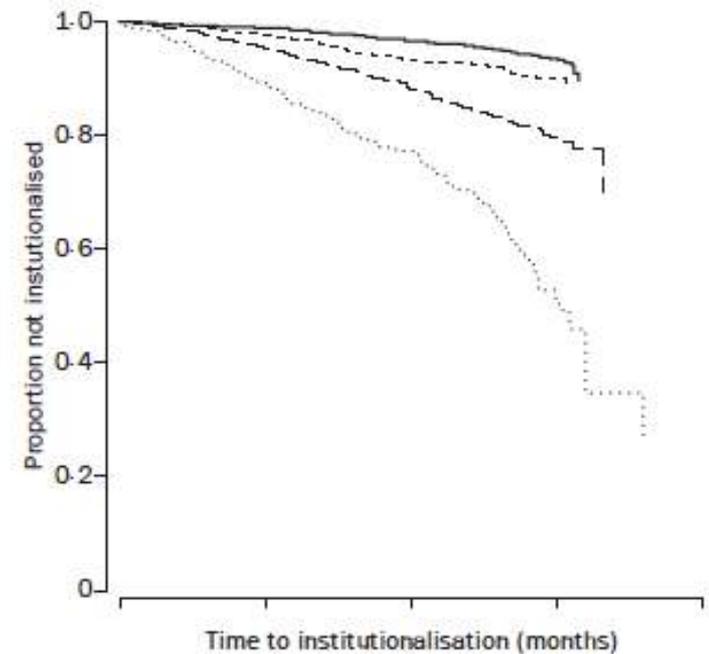
1	CLOUDING	clouding/delirium
2*	SLEEPCH	sleep changes
3*	MOBILITY	mobility impairment
4*	MEMORY	difficulty with memory
5	MOOD	difficulty with mood
6*	GOUOUT	difficulty with going out
7*	COOKING	difficulty with cooking
8*	GETDRES	difficulty with getting dressed
9*	GROOM	difficulty with grooming
10*	BATH	difficulty with bath
11*	TOILET	difficulty with toileting
12	URINE	incontinence of urine
13	STOOL	incontinence of stool
14	ONSET	onset of symptoms (gradual or abrupt)
15	SAD	feel sad, blue or depressed
16	REST	resting tremor
17	ACTION	action tremor
18	CHOREA	dyskinesias/chorea
19	AKINESIA	akinesia
20	HXSTROKE	history of stroke
21	HEADACHE	headaches of recent onset
22*	LOSSVISI	chronic visual loss
23*	LOSSHEAR	difficulties with hearing
24*	ARTERIAL	arterial hypertension
25	CARDIAC	cardiac symptoms
26	RESPIRAT	respiratory complaints
27	MALIGNAN	history of malignancy
28*	GASTRO	gastro-intestinal complaints
29*	URINARY	urinary complaints
30	HISTHYRO	history of thyroid disease
31*	HXDM	history of diabetes mellitus
32	NECH	physical exam: head and neck (normal, abnormal)
33	THYROID	physical exam: thyroid
34	BREAST	physical exam: breast
35	LUNG	physical exam: lungs
36*	VASCULAR	physical exam: cardiovascular
37	CAROTIDS	physical exam: peripheral pulses
38	ABDOMEN	physical exam: abdomen
39	RECTUM	physical exam: rectum
40*	SKINCLIN	physical exam: skin
41	SUCKING	neur exam: sucking, release sign
42	SNOUT	neur exam: snout, release sign
43	PALMOMR	neur exam: palmomentals R, release sign
44	BULK	neur exam: bulk
45	TONENECK	neur exam: tone/neck
46	TONELIMB	neur exam: tone limb
47	TREMORRE	neur exam: tremor/rest
48*	TREMORAC	neur exam: tremor/action
49	MYOCLONM	neur exam: diskinesia
50	BRAADFACE	bradykinesia/face
51	BRADLIMB	bradykinesia/limb
52	COLIMB	coordination/limb
53	COTRUNK	coordination/trunk
54	POSTURE	posture/standing
55*	GAIT	gait, motor system
56*	VIBRAT	vibration, sensory system
57	ONSETAGE	onset between ages 40 and 90
58	GLUCOSE	lab: glucose
59	SODIUM lab:	sodium
60	POTASSIU	lab: potassium
61	BUN	lab: BUN
62	CREATINI	lab: creatinine
63	CALCIUM	lab: calcium
64	ALKPHOSP	lab: phosp.
65	TSH	lab: TSH
66	B12	lab: B12
67	FOLATE	lab: serum folate
68	VDRL	lab: VDRL
69	PROTEINlab:	total protein
70	ALBUMIN	lab: albumin
71	PHOSPHOR	lab: inorganic phosphate
72	RBC	lab: RBC folate
73	FABSTRUC	impaired abstract thinking
74	FJUDGEME	impaired judgement
75	FAPHASIA	aphasia
76	FAPRAXIA	apraxia
77	FAGNOSIA	agnosia
78	ADL	
79	IADL	
80	HBP	high blood pressure
81	HEART	heart and circulation problems
82	STROKE	stroke or effect of stroke
83	EYETROUB	eye trouble
84	EARTROUB	ear trouble
85	CHEST	chest problems
86	BLADDER	lose control of bladder
87	BOWELS	lose control of bowels
88	DIABETES	diabetes
89	KIDNEY	kidney trouble
90	PARKINSO	Parkinson's disease
91	RELEASE	release signs
92	SINCE	years since onset

Mitnitski et al. 2001

Fragilidad: una preocupación

Fenotipo

Alteración
del movimiento

Lentitud

Deficiencia
músculo-esquelética

Disminución de la
actividad física

Fatiga

Fried et al., 2001

Clinical Frailty Scale

1. **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. **Well** – People who have no active disease symptoms but are less fit than Category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. **Managing Well** – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. **Vulnerable** – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being 'slowed up', and/or being tired during the day.

5. **Mildly Frail** – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. **Moderately Frail** – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7. **Severely Frail** – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~6 months).

8. **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** – Approaching the end of life. This category applies to people with a life expectancy < 6 months, who are not otherwise evidently frail.

Where dementia is present, the degree of frailty usually corresponds to the degree of dementia:

- **Mild dementia** – includes forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

- **Moderate dementia** – recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

- **Severe dementia** – they cannot do personal care without help.

K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489–495

Fig. 1. Clinical Frailty Scale. Scoring is based on clinical judgment. Reprinted with permission from Rockwood et al.[41]

Rockwood et al., 2005

Fragilidad: implicaciones clínicas

Gérontopôle Frailty Screening Tool[48]

Frailty Screening

Older patients, 65 y and older, not dependent (activities of daily living $\geq 5/6$)

	Yes	No	Unknown
Is your patient living alone?	☐	☐	☐
Involuntary weight loss in the past 3 months?	☐	☐	☐
Fatigability from the past 3 months?	☐	☐	☐
Have some mobility difficulties for the past 3 months?	☐	☐	☐
Memory complaints?	☐	☐	☐
Slow gait speed (+4 s for 4 meters)?	☐	☐	☐

If yes to at least one of these questions:
Do you feel in your own clinical opinion that your patient is frail and at an increased risk for further disabilities?
☐ Yes   ☐ No
If yes, propose to the patient an evaluation of the causes of frailty and prevention of disabilities in a day hospital.

Subra et al., 2012

Fragilidad: una preocupación

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

[1]The John Hopkins Medical Institutions, Baltimore, Maryland.
[2]The University of Washington, Seattle.
[3]The University of Pittsburgh, Pennsylvania.
[4]The University of California at Davis, Sacramento.
[5]St. Francis Hospital, Roslyn, New York.
[6]The University of California at Los Angeles.
[7]The University of Vermont, Burlington.
[8]Uniformed Services University of the Health Sciences, Bethesda, Maryland.
[9]Wake Forest University School of Medicine, Winston-Salem, North Carolina.

— El progreso más sobresaliente

Fragilidad (1)

Fenotipo de fragilidad

Presencia de 3 o más de los siguientes criterios:

— Pérdida de peso

— Extenuación

— Debilidad

— Disminución de la actividad física

— Enlentecimiento de la marcha

Fried et al., 2001

Fragilidad: una preocupación

Group	n	Deaths
No Frailty	2469	260
Intermediate	2480	474
Frail	368	130

Months After Study Entry

Fried LP et al., 2001

Fragilidad: una preocupación

Whitson HE et al., 2007
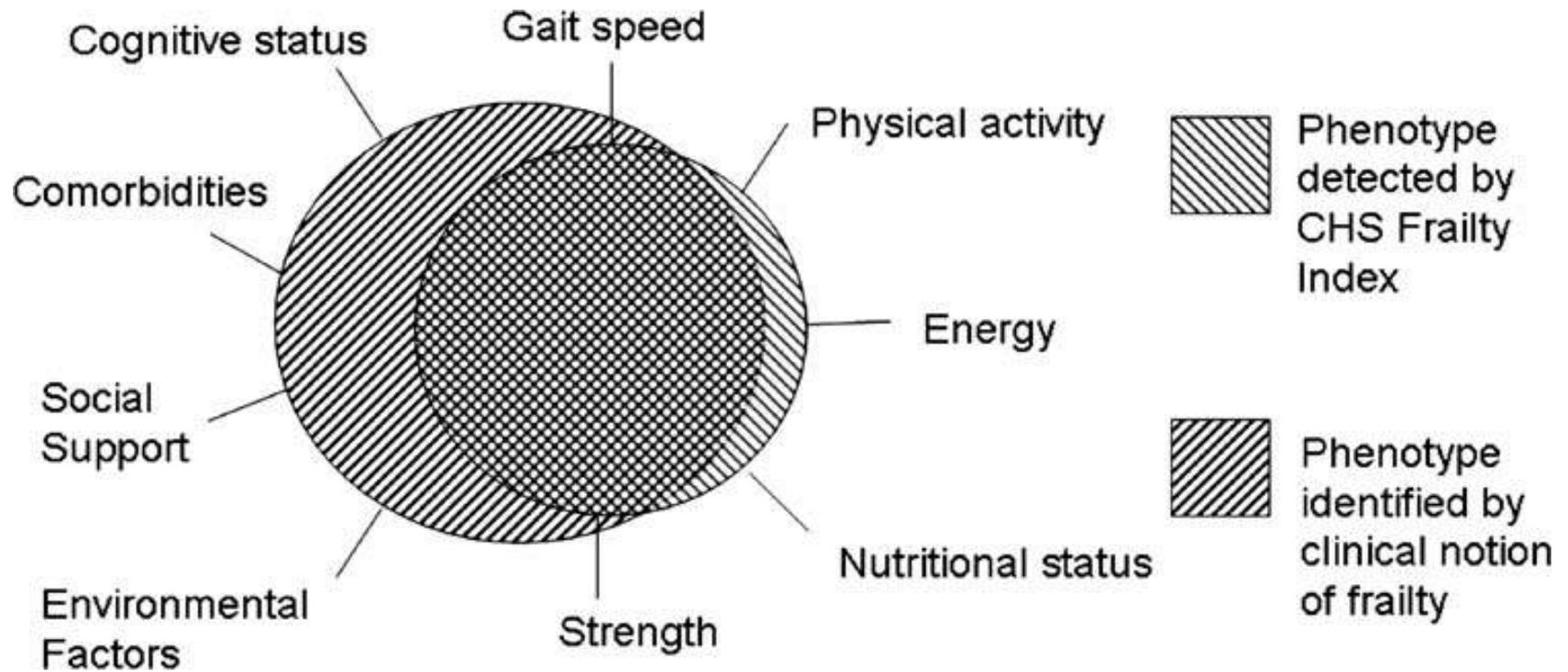
Realidad (1)

— Dimensiones consideradas:

Capacidades físicas

Función cognitiva

Factores psicoafectivos

Factores sociales

Factores ambientales

Fragilidad: una preocupación

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Fried et al., 2001

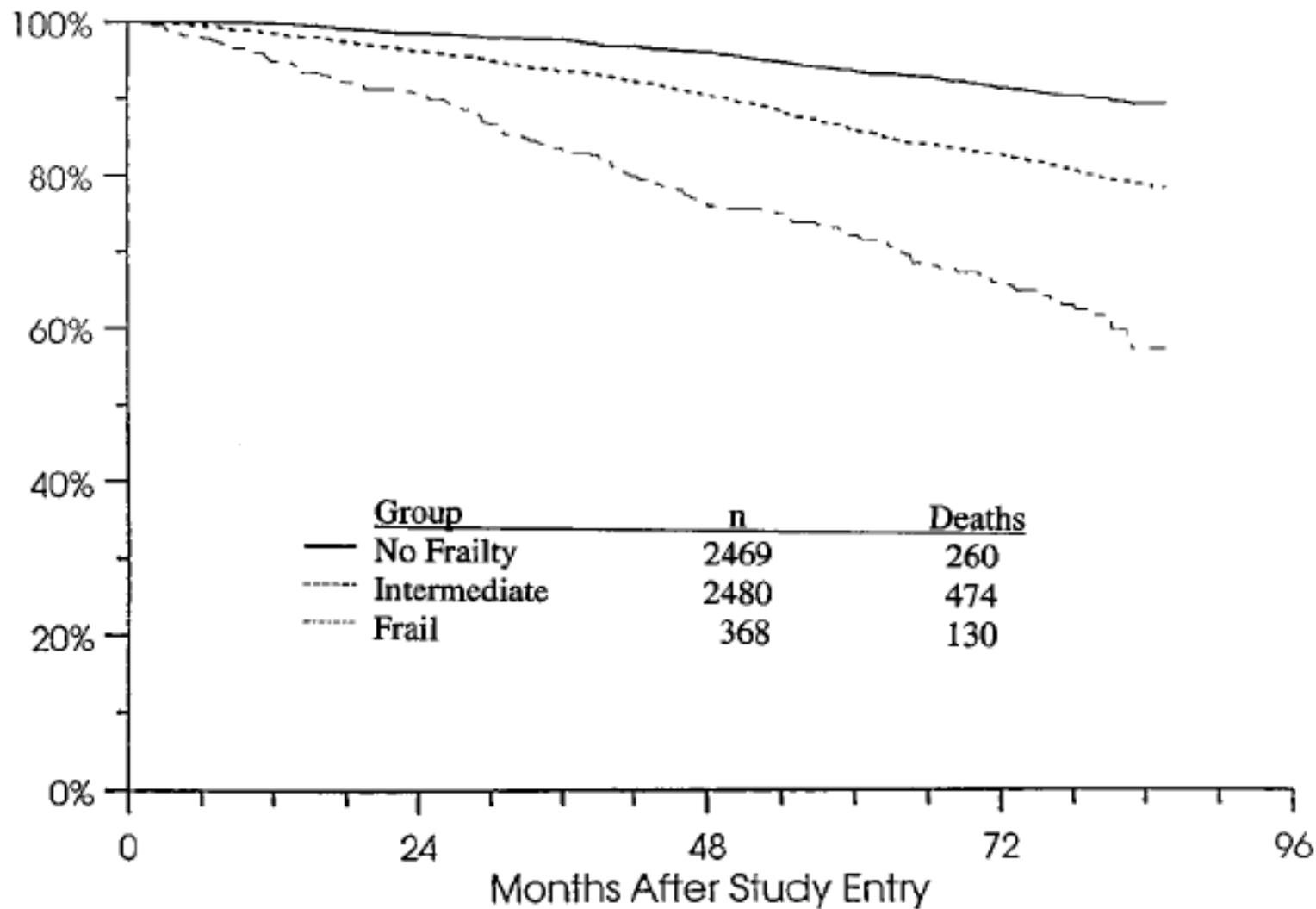Table 2. Baseline Association of Demographic and Health Characteristics With Frailty, in Percentages: the Cardiovascular Health Study

Factor	A Total (5317)	B Not Frail (n = 2469)	C Intermediate (n = 2480)	D Frail (n = 368)	E Trend p Value	F Age Adjusted Trend p Value
Age						
65–74	67.3%	76.1%	62.9%	38.0%	<.001	—
75–84	29.1	22.6	32.7	48.9		
85+	3.6	1.3	4.5	13.0		
Sex						
Female	57.9	56.4	57.7	68.5	<.001	<.001
Male	42.1	43.6	42.3	31.5		

6.9%

Fried et al., 2001
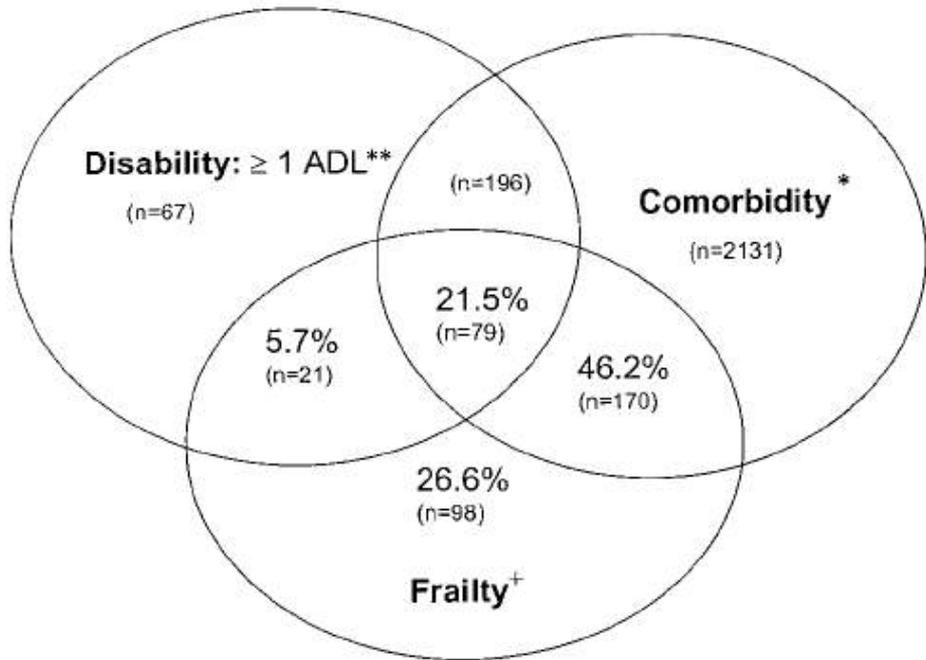
Fragilidad: una preocupación

Table 6. Incidence of Adverse Outcomes Associated With Frailty: Kaplan-Meier Estimates at 3 Years and 7 Years* After Study Entry for Both of the Cohorts† (N = 5317)

Frailty Status at Baseline	(n)	Died		First Hospitalization		First Fall		Worsening ADL Disability		Worsening Mobility Disability	
		3 yr %	7 yr %	3 yr %	7 yr %	3 yr %	7 yr %	3 yr %	7 yr %	3 yr %	7 yr %
Not Frail	(2469)	3	12	33	79	15	27	8	23	23	41
Intermediate	(2480)	7	23	43	83	19	33	20	41	40	58
Frail	(368)	18	43	59	96	28	41	39	63	51	71
p‡		<.0001		<.0001		<.0001		<.0001		<.0001	

*7-year estimates are only available for the first cohort.
†Only those evaluable for frailty are included.
‡p value is based on the 2 degree of freedom log rank test using all available follow-up.

Fried et al., 2001

Fragilidad: una preocupación

Frailty in Relation to the Accumulation of Deficits

Kenneth Rockwood[1,2] and Arnold Mitnitski[2]

[1]Division of Geriatric Medicine, [2]Department of Medicine, Dalhousie University, Halifax, Nova Scotia, Canada.

Rockwood et al., 2007

Fragilidad: una preocupación

Rockwood et al., 2007
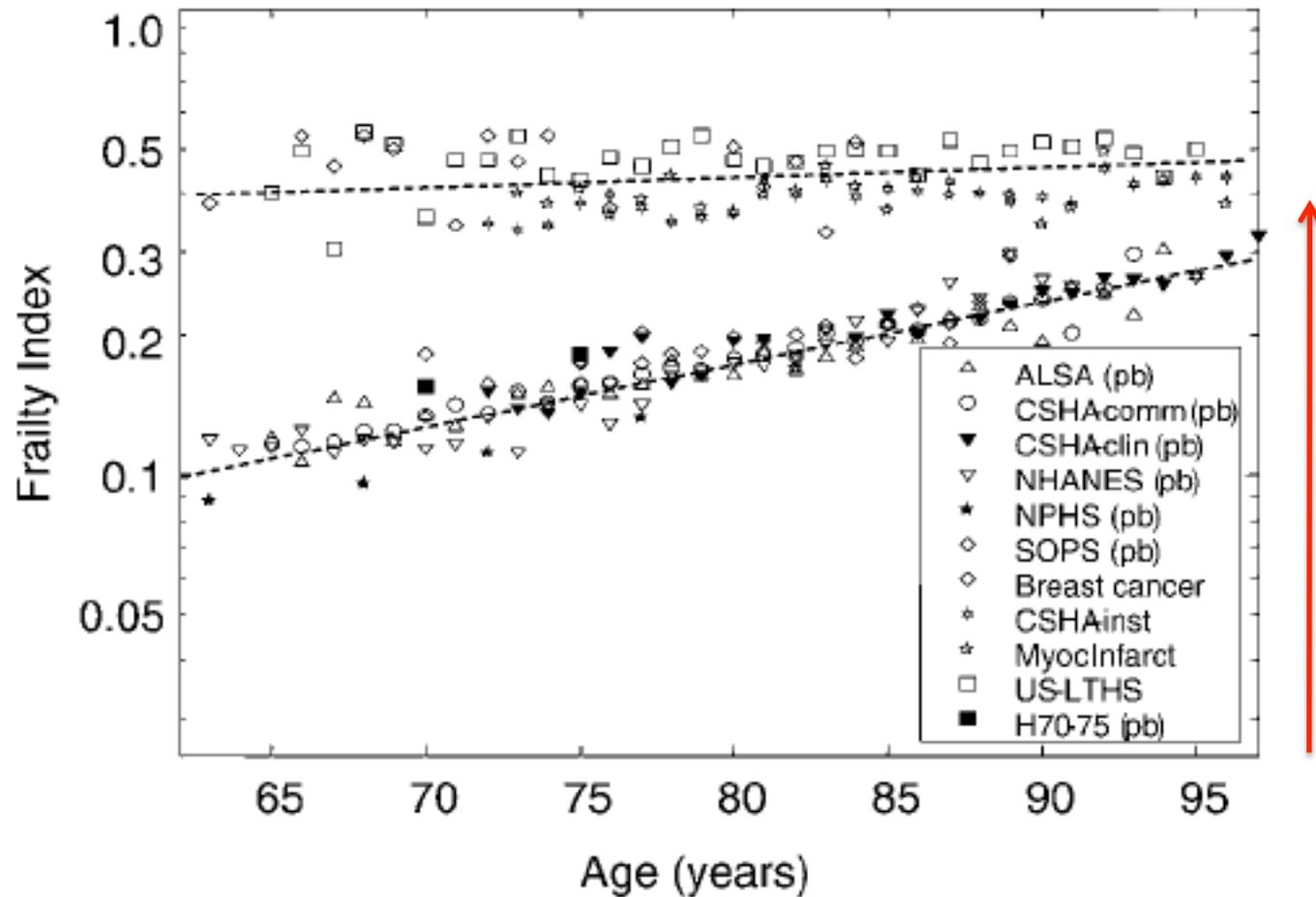
¿Cuál es la situación en México?

Fragilidad: una preocupación

Frailty in Older Mexican Americans

Kenneth J. Ottenbacher, PhD,[*†] Glenn V. Ostir, PhD,[†‡] M. Kristen Peek, PhD,[†§]
Soham Al Snih, MD, PhD,[†] Mukaila A. Raji, MD,[†‡] and Kyriakos S. Markides, PhD[†§]

- – Estudio longitudinal (H-EPESE)
- – N= 621 participantes de la comunidad
- – 70 años y más
- – Cuatro componentes del fenotipo de Fried

Ottenbacher KJ et al., 2007

Fragilidad: una preocupación

Table 1. Subject Characteristics and Demographic Variables for Older Mexican Americans Included in the Sample (N = 621)

Variable	Female n = 369 (59%)	Male n = 252 (41%)	Total
Age, mean ± SD	78.1 ± 5.1	78.0 ± 5.2	78.1 ± 5.1
Education, years, mean ± SD	5.1 ± 3.9	5.1 ± 3.8	5.1 ± 3.6
Number of family members in household, mean ± SD	2.1 ± 1.1	2.3 ± 1.0	2.2 ± 1.1
Lower extremity strength, kg, mean ± SD*†	24.6 ± 8.5	34.9 ± 11.7	28.9 ± 11.1
Upper extremity strength, kg, mean ± SD*‡	12.6 ± 5.1	19.9 ± 7.4	15.6 ± 7.2
Number of comorbid conditions, mean ± SD§	2.4 ± 1.2	2.1 ± 1.2	2.3 ± 1.2
Mini-Mental State Examination score, mean ± SD‖	23.2 (5.3)	23.4 (5.4)	23.3 (5.2)
Married, n (%)*	128 (35)	189 (75)	317
Disability, n (%)*			
None	166 (45)	159 (63)	325
Instrumental activities of daily living¶	138 (38)	68 (27)	206
Activities of daily living#	64 (17)	26 (10)	90
Body mass index, kg/m², mean ± SD	28.2 (5.7)	28.0 (5.0)	28.1 (5.5)
Frailty score, mean ± SD	1.9 ± 0.9	1.7 ± 0.9	1.8 ± 0.9
Frailty category, n (%)*			
Not frail	148 (40)	125 (50)	273 (44)
Prefail	141 (38)	83 (33)	224 (36)
Frail	80 (22)	44 (17)	124 (20)

Ottenbacher KJ et al., 2007

Table 2. Variables in Logistic Regression Model to Predict Frailty at 1-Year Follow-Up in Older Mexican Americans

Variable	β	Standard Error	Wald	P-value
Men				
Age	− 0.04	0.04	1.32	.25
Disability*	1.28	0.30	17.86	< .01
Comorbidity[†]	0.28	0.14	3.94	.04
Lower extremity strength[‡]	0.06	0.02	2.91	.08
Upper extremity strength[§]	− 0.07	0.03	4.51	.03
MMSE score	− 0.53	0.03	3.78	.05
BMI, kg/m^2	0.01	0.03	0.16	.81
Women				
Age	0.06	0.03	3.53	.06
Disability*	1.18	0.23	26.50	< .01
Comorbidity	0.05	0.12	0.15	.74
Lower extremity strength[‡]	0.08	0.04	3.95	.04
Upper extremity strength[§]	0.05	0.02	0.18	.71
MMSE score	− 0.05	0.03	2.86	.09
BMI, kg/m^2	− 0.06	0.03	5.39	.02

Ottenbacher KJ et al., 2007

Fragilidad: una preocupación

Life Course Social and Health Conditions Linked to Frailty in Latin American Older Men and Women

Beatriz E. Alvarado,[1] Maria-Victoria Zunzunegui,[2] Francois Béland,[3,4] and Jean-Marie Bamvita[2]

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[2]Département de Médecine Sociale et Préventive, Université de Montréal, Canada.
[3]Département de l'Administration de la Santé, Université de Montréal, Canada.
[4]SOLIDAGE, Lady Davis Institute, Jewish General Hospital of Montreal, Canada.

– Estudio transversal (SABE)
– N= 1247 participantes de la comunidad
– 60 años y más
– Cinco componentes del fenotipo de Fried (proxy)

Alvarado et al., 2008

Table 2. Distribution of Frailty Categories by Sex in
Five Latin American Cities

City	Nonfrail (%)	Prefrail (%)	Frail (%)	Frailty Score*
Bridgetown				
Women	138 (15.6)	481 (54.4)	265 (30.0)	1.82 (1.25)
Men	135 (24.0)	306 (54.4)	121 (21.53)	1.50 (1.19)
Total	273 (18.9)	787 (54.4)	386 (26.7)	1.69 (1.24)
Havana				
Women	58 (5.3)	519 (47.9)	505 (46.7)	2.42 (1.22)
Men	103 (15.9)	372 (57.8)	169 (26.2)	1.73 (1.21)
Total	161 (9.3)	891 (51.6)	674 (39.0)	2.16 (1.26)
Mexico, DC				
Women	54 (8.4)	296 (46.1)	292 (45.5)	2.29 (1.28)
Men	68 (16.2)	225 (53.4)	128 (30.4)	1.82 (1.26)
Total	122 (11.5)	521 (49.0)	420 (39.5)	2.10 (1.29)
Santiago				
Women	25 (3.1)	393 (48.7)	389 (48.2)	2.46 (1.20)
Men	51 (12.3)	231 (55.9)	131 (31.7)	1.94 (1.24)
Total	76 (6.2)	624 (51.4)	520 (42.6)	2.28 (1.24)
Sao Paulo				
Women	107 (9.6)	516 (46.3)	491 (44.1)	2.22 (1.24)
Men	93 (12.1)	401 (52.4)	271 (35.4)	2.01 (1.24)
Total	200 (10.6)	917 (48.8)	762 (40.6)	2.13 (1.24)

	Mexico, DC (Mexico)	
Exposures and Frailty Components	Women $N = 740$	Men $N = 507$
Childhood social and health circumstances		
Economic situation (average/poor), %	74.9*	81.3
Health first 15 y (good/poor), %	53.8	50.5
Hunger (yes), %	25.5*	34.8
Adult socioeconomic status		
Level of education (no schooling), %	27.9*	19.4
Occupation, %		
White-collar workers	29.5*	37.4
Blue-collar workers and farmers	45.8	62.6
Housewives	24.8	
Current social and material circumstances		
Perception of income (insufficient), %	49.2	47.1
Marital status (no partner), %	61.1*	23.1
Health factors		
Chronic conditions (>2), %	37.7*	25.5
Body mass index, mean (SD)	28.6 (5.0)*	26.9 (3.9)
Frailty components		
Weight loss, %	16.3	12.9
Weakness, %	55.5	50.6
Low endurance, %	36.4*	30.8
Mobility limitations, %	47.9*	32.0
Poor physical activity, %	75.8*	57.7

Alvarado et al., 2008

Mexico, DC

Multivariate Adjusted Odds for Frailty * by Life-Course Social and Health Conditions

Gender	
Women vs men	2.28 (1.66–3.15) ←
Childhood conditions	
Economic situation	
Average vs good	—
Poor vs good	—
Health	
Good vs excellent	1.18 (0.89–1.58)
Poor vs excellent	1.30 (0.65–2.60)
Experience of hunger	
Yes vs No	—
Adult conditions	
Education, y	
No schooling vs postsecondary	1.39 (0.69–2.81)
Primary vs postsecondary	1.00 (0.52–1.94)
Some secondary vs postsecondary	0.64 (0.33–1.24)
Lifetime occupation	
Housewives vs HWC	1.58 (0.81–3.09)
Farmers vs HWC	1.78 (0.51–6.18)
Skilled/Unskilled workers vs HWC	1.90 (1.06–3.41) ←
LWC vs HWC	1.57 (0.88–2.78)
Current conditions	
Perception of income	
Insufficient vs sufficient	1.74 (1.32–2.31) ←
Marital status	
Without partner vs with partner	1.04 (0.76–1.41)
Comorbidity	
2 or more conditions vs 0–1	2.14 (1.58–2.89) ←
BMI	1.04 (1.01–1.07) ←

Alvarado et al., 2008

Fragilidad: una preocupación

THE PHENOTYPE OF FRAILTY PREDICTS DISABILITY AND MORTALITY AMONG MEXICAN COMMUNITY-DWELLING ELDERLY

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– Estudio longitudinal (ENASEM)
– N= 5644 participantes de la comunidad
– 60 años y más
– Cinco componentes del fenotipo de Fried (proxy)
– Asociación con discapacidad y muerte

Aguilar-Navarro et al., 2012

Fragilidad: una preocupación

Table 1
Frailty Components Proportions by Sex in the Mexican Health and Aging Study 2001-2003

	All n = 5,644	Men n = 2,618	Women n = 3,026
Frequency of Frailty Components (%)			
Weight loss	32.5	30.9	33.8
Exhaustion	27.6	23.7	31.0
Slowness	50.4	41.4	58.2
Weakness	31.4	20.3	41.0
Low physical activity	69.8	61.4	77.1
Number of Frailty Components (%)			
Nonfrail	11.6	16.6	7.1
PreFrail	51.2	56.7	46.6
Frail	37.2	26.7	46.3

Table 2

Socio-demographic Characteristics and Health Status of Participants with Frailty at Baseline. Mexican Health and Aging Study 2001-2003 (n = 5,644)

Variable	Nonfrail n = 649 (11.5%)	Prefrail n = 2,893 (51.3%)	Frail n = 2,102 (37.2%)	P
Age, mean (SD)	66.5 (5.5)[a]	67.8 (6.4)[b]	70.5 (7.6)[c]	< .001
Female gender (%)	33.1	48.7	66.7	< .001
Educational level ≥ 7 years (%)	20.8	18.5	11.7	< .001
Don't have a companion (%)	28.7	34.2	45.8	< .001
Poor self-reported health (%)	45.8	58.3	84.0	< .001
Poor self-perceived financial situation (%)	78.0	77.9	85.6	< .001
High blood pressure (%)	28.7	36.1	52.5	< .001
Diabetes (%)	9.9	13.5	23.7	< .001
Cancer (%)	0.8	1.2	2.5	.001
Ischemic cardiopathy (%)	1.4	2.3	6.3	< .001
Chronic obstructive pulmonary disease (%)	3.9	5.2	10.6	< .001
Fractures after age 50 years (%)	12.6	13.6	19.8	< .001
Arthrosis (%)	12.3	19.8	34.0	< .001
Chronic diseases*, mean (SD)	0.7 (0.8)[a]	0.9 (0.9)[b]	1.5 (1.1)[c]	< .001
Smoker (%)	37.2	36.0	30.1	.008
Drinker (%)	42.7	30.7	18.5	< .001
Cognitive impairment (%)	21.4	25.5	27.9	.004
Depressive symptoms (%)	15.3	26.2	58.8	< .001
Visual impairment (%)	35.3	40.5	57.3	< .001
Hearing impairment (%)	20.2	26.3	38.9	< .001
Disability for mobility (%)	11.9	32.5	85.8	< .001
Disability ≥ 1 IADL task (%)	4.5	4.8	19.2	< .001
Disability ≥ 1 ADL task (%)	0.1	0.6	7.1	< .001

Aguilar-Navarro et al., 2012

Incident 2-year Disability by Frailty Status at Baseline in the Mexican Health and Aging Study 2001-2003

	Mobility disability n = 2405				IADL disability n = 4293				ADL disability n = 4683			
	Odds Ratio	95% CI	P	P global	Odds Ratio	95% CI	P	P global	Odds Ratio	95% CI	P	P global
Unadjusted												
Frailty:				< .001				< .001				< .001
Nonfrail (reference)	1	-	-		1	-	-		1	-	-	
Prefrail	1.52	1.21-1.92	<.001		1.13	0.79-1.61	.113		3.05	1.22-7.62	.017	
Frail	3.00	2.21-4.10	<.001		2.55	1.79-3.62	<.001		12.98	5.31-31.76	<.001	
Adjusted												
Frailty:				.001				<.001				< .001
Nonfrail (reference)	1	-	-		1	-	-		1	-	-	
Prefrail	1.30	1.02-1.66	.129		1.01	0.70-1.46	.957		3.05	1.10-8.46	.032	
Frail	1.91	1.29-2.62	.001		1.81	1.23-2.68	.003		9.33	3.37-25.82	< .001	

*Adjusted by age, sex, educational level, smoking status, alcohol drinking status, chronic diseases number, self-reported health, , depressive symptoms, and cognitive impairment. For incident IADL disability, odds ratios were also adjusted for baseline mobility disability. For incident ADL disability odds ratios were adjusted for baseline mobility and IADL disability.

Two-year mortality risk according to Frailty Status at Baseline

	Mortality n = 5152			
	Odds Ratio	95% CI†	P	P global
Unadjusted				
Frailty:				< .001
Nonfrail (reference)	1	-	-	
Prefrail	2.13	1.11- 4.12	.024	
Frail	4.71	2.47- 9.00	< .001	
Adjusted				
Frailty:				.003
Nonfrail (reference)	1	-	-	
Prefrail	1.86	0.96-3.61	.068	
Frail	2.76	1.39-5.48	.004	

Aguilar-Navarro et al., 2012

Fragilidad: una preocupación

Fragilidad y su asociación con mortalidad, hospitalizaciones y dependencia funcional en mexicanos de 60 años o más

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- Estudio longitudinal (ENASEM)
- N= 4774 participantes de la comunidad
- 60 años y más
- Tres componentes del fenotipo de Fried (proxy)
- Asociación con muerte, discapacidad y caídas

Díaz de León-González et al., 2012

Variables demográficas y de salud de los entrevistados en el Estudio Nacional sobre Salud y Envejecimiento en México, según la variable fragilidad

32.7%

Variable	Estatus de fragilidad						p
	Frágil, N = 1.563		Prefrágil, N = 2.065		Robusto, N = 1.146		
Variables demográficas							
Edad en años	69,41	± 7,22	68,08	± 6,55	67,50	± 6,42	< 0,001
Grupos de edad							
60 a 69 años	877	56,1%	1.333	64,6%	765	66,8%	< 0,001
70 a 79 años	530	33,9%	599	29,0%	316	27,6%	
80 o más años	156	10,0%	133	6,4%	65	5,7%	
Sexo							
Varón	619	39,6%	990	47,9%	615	53,7%	< 0,001
Variables geriátricas							
Autopercepción de salud							
Excelente, buena o regular	259	16,6%	729	35,3%	581	50,7%	< 0,001
Mala o muy mala	1.304	83,4%	1.336	64,7%	565	49,3%	
Puntuación depresión[a]	4,27	± 2,41	2,85	± 2,29	1,85	± 2,00	< 0,001
Puntuación cognición	30,43	± 14,97	33,07	± 15,64	35,99	± 15,79	< 0,001
Número de ABVD en que requiere ayuda	0,13	± 0,63	0,04	± 0,30	0,01	± 0,09	< 0,001
Número de AIVD en que requiere ayuda	0,22	± 0,66	0,07	± 0,36	0,03	± 0,25	< 0,001
Calidad de la visión							
Excelente	29	1,9%	59	2,9%	40	3,5%	< 0,001
Muy buena	102	6,5%	178	8,7%	143	12,6%	
Calidad de la audición							
Excelente	55	3,6%	90	4,4%	72	6,4%	< 0,001
Muy buena	154	10,0%	257	12,6%	189	16,7%	
Variables médicas							
Cantidad de enfermedades crónicas[b]	1,40	± 1,15	1,02	± 1,04	0,80	± 0,90	< 0,001
Hipertensión	760	48,6%	823	39,9%	408	35,6%	< 0,001
Diabetes	373	23,9%	328	15,9%	118	10,3%	< 0,001
Cáncer	30	1,9%	36	1,7%	12	1,0%	0,183
Enfermedad respiratoria	144	9,2%	141	6,8%	52	4,5%	< 0,001
IAM	85	5,4%	68	3,3%	30	2,6%	< 0,001
EVC	59	3,8%	54	2,6%	13	1,1%	< 0,001
Artritis o reumatismo	510	32,6%	453	21,9%	187	16,3%	< 0,001
Enfermedad renal o hepática	190	12,2%	177	8,6%	80	7,0%	< 0,001
Tuberculosis	4	0,3%	7	0,3%	3	0,3%	0,878
Neumonía	39	2,5%	26	1,3%	14	1,2%	0,006
Historial de caídas	780	49,9%	759	36,8%	381	33,2%	< 0,001
Consume bebidas alcohólicas							
Sí	339	21,7%	562	27,2%	430	37,5%	< 0,001
No	1.086	69,5%	1.309	63,4%	583	50,9%	
Nunca	138	8,8%	194	9,4%	133	11,6%	

Díaz de León-González et al., 2012

Fragilidad: una preocupación

Estado de fragilidad de los entrevistados en el Estudio Nacional sobre Salud y Envejecimiento en México, su asociación con muerte, hospitalizaciones, dependencia en actividades básicas de la vida diaria y caídas a los dos años en el análisis multivariante, México, 2001-2003

	Muerte[a], N=4.774			Hospitalización[b], N=4.068			Dependencia en al menos una ABVD[c], N=2.537			Caídas[d], N=2.721		
	p	RR[a]	IC 95%	p	RR[a]	IC 95%	p	RR[a]	IC 95%	p	RR[a]	IC 95%
Frágil	0,01	1,94	1,20-3,13	0,01	1,53	1,13-2,07	0,00	3,07	1,76-5,34	0,37	1,12	0,87-1,44
Prefrágil	0,04	1,61	1,01-2,55	0,07	1,29	0,98-1,71	0,07	1,67	0,95-2,91	0,60	1,06	0,85-1,31
Robusto		1			1			1			1	

IC 95%: intervalo de confianza del 95%; RR: riesgo relativo.

[a] Ajustado para número de enfermedades crónicas, puntaje en cognición y depresión, tabaquismo, número de ayudas que requiere en actividades básicas (ABVD) e instrumentadas de la vida diaria, sexo, caídas, edad, consumo de alcohol y autopercepción de salud.

[b] Ajustado para número de enfermedades crónicas, puntaje en cognición y depresión, tabaquismo, número de ayudas que requiere en actividades básicas e instrumentadas de la vida diaria, sexo, edad, consumo de alcohol y autopercepción de salud.

[c] Ajustado para número de enfermedades crónicas, puntaje en cognición y depresión, tabaquismo, número de ayudas que requiere en actividades instrumentadas de la vida diaria, sexo, edad, consumo de alcohol y autopercepción de salud.

[d] Ajustado para número de enfermedades crónicas, puntaje en cognición y depresión, tabaquismo, número de ayudas que requiere en actividades básicas e instrumentadas de la vida diaria, sexo, edad y autopercepción de salud.

Fragilidad: una preocupación

FRAILTY IS ASSOCIATED WITH DISABILITY AND RECENT HOSPITALIZATION IN COMMUNITY-DWELLING ELDERLY: THE COYOACAN COHORT

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– Estudio transversal
– N= 1124 participantes de la comunidad
– 70 años y más
– Cinco componentes del fenotipo de Fried (proxy)
– Asociación con discapacidad y hopsitalización

Avila-Funes et al., 2014

Fragilidad: una preocupación

Logistic regression analysis relating each frailty category to adverse health-related outcomes

	Disability ADL			Disability IADL			Recent hospitalization		
	OR	95%CI	P	OR	95%CI	P	OR	95%CI	P
Unadjusted Models									
	Global P <0.001			Global P <0.001			Global P <0.001		
Non-frail	1	–	–	1	–	–	1	–	–
Prefrail	2.28	1.63-3.20	<0.001	2.57	1.92-3.44	<0.001	1.62	0.97-2.71	0.06
Frail	10.80	6.85-17.01	<0.001	22.35	11.94-41.82	<0.001	5.08	2.95-8.73	<0.001
Adjusted Models*									
	Global P=0.007			Global P=0.007			Global P=0.04		
Non-frail	1	–	–	1	–	–	1	–	–
Pre-frail	1.31	0.81-2.14	0.27	1.92	1.25-2.93	0.003	1.66	0.84-3.29	0.14
Frail	3.06	1.52-6.17	0.002	17.02	6.16-47.01	<0.001	3.21	1.31-7.88	0.01

*Adjusted by age, sex, self-report of health status, accumulated number of self-reported diseases, number of medications, Geriatric Depression Scale score, Mini-Mental State Examination score, and Mini-Nutritional Assessment score. For the outcome of Disability in ADL, adjustment additionally included IADL.

Avila-Funes et al., 2014

Frailty among community-dwelling elderly Mexican people: Prevalence and association with sociodemographic characteristics, health state and the use of health services

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- Estudio transversal (SADEM)
- N= 1993 participantes de la comunidad
- 60 años y más
- Cuatro componentes del fenotipo de Fried

Table 3 Prevalence of frailty phenotype components by sex and age

Frequency of frailty components	Women % (95% CI)	Men % (95% CI)	P*
Weight loss	15.8 (15.6–16.0)	16.3 (16.0–16.6)	0.002
Exhaustion	26.6 (26.3–26.9)	26.9 (26.6–27.2)	0.102
Walking speed	6.6 (6.5–6.7)	3.6 (3.5–3.7)	<0.001
Grip strength	20.1 (19.9–20.3)	21.8 (21.5–22.1)	<0.001
No. frailty components present			
0	52.2 (51.9–52.5)	49.4 (49.1–49.7)	<0.001
1	31.4 (31.1–31.7)	35.8 (35.5–36.1)	
2	12.0 (11.8–12.2)	11.8 (11.6–12.0)	
3	3.8 (3.7–3.9)	2.8 (2.7–2.9)	
4	0.6 (0.6–0.6)	0.2 (0.2–0.2)	
Age group (years)			
85+			
Not frail (0 points)	14.6 (14.4–14.8)	28.2 (27.9–28.5)	<0.001
Pre-frail (1 points)	25.7 (25.4–26.0)	36.7 (36.4–37.0)	
Frail (2–4 points)	59.7 (59.4–60.0)	35.1 (34.8–35.4)	
75–84			
Not frail (0 points)	46.1 (45.8–46.4)	44.2 (43.9–44.5)	<0.001
Pre-frail (1 points)	34.1 (33.8–34.4)	36.4 (36.1–36.7)	
Frail (2–4 points)	19.8 (19.6–20.0)	19.5 (19.2–19.8)	
60–74			
Not frail (0 points)	56.4 (56.1–56.7)	53.6 (53.3–53.9)	<0.001
Pre-frail (1 points)	30.9 (30.6–31.2)	35.5 (35.2–35.8)	
Frail (2–4 points)	12.7 (12.5–12.9)	11.0 (10.8–11.2)	
Total			
Not frail (0 points)	52.2 (51.9–52.5)	49.4 (49.1–49.7)	<0.001
Pre-frail (1 points)	31.4 (31.1–31.7)	35.8 (35.5–36.1)	
Frail (2–4 points)	16.4 (16.2–16.6)	14.8 (14.6–15.0)	

*P-values refer to the χ^2-test of frequencies. CI, confidence interval.

Sánchez-García et al., 2014

Fragilidad: una preocupación

Frailty among Mexican community-dwelling elderly: a story told 11 years later. The Mexican Health and Aging Study

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– Estudio longitudinal (ENASEM)
– N= 5644 participantes de la comunidad
– 60 años y más
– Cinco componentes del fenotipo de Fried (proxy)
– Asociación con discapacidad y muerte

Fragilidad: una preocupación

	All n = 5 644	Men n = 2 618	Women n = 3 026
Frequency of frailty components (%)			
Shrinking	32.5	30.9	33.8
Weakness	31.4	20.3	41.0
Exhaustion	27.6	23.7	31.0
Slowness	50.4	41.4	58.2
Low physical activity	69.8	61.4	77.1
Nonfrail%	11.6	16.6	7.1
Prefrail%	51.2	56.7	46.6
Total frail (≥3 points)%	37.2	26.7	46.3

Frailt: ▬▬ Robust ─── Prefrail ▬▬ Frail

Aguilar-Navarro et al., 2015

Fragilidad: una preocupación
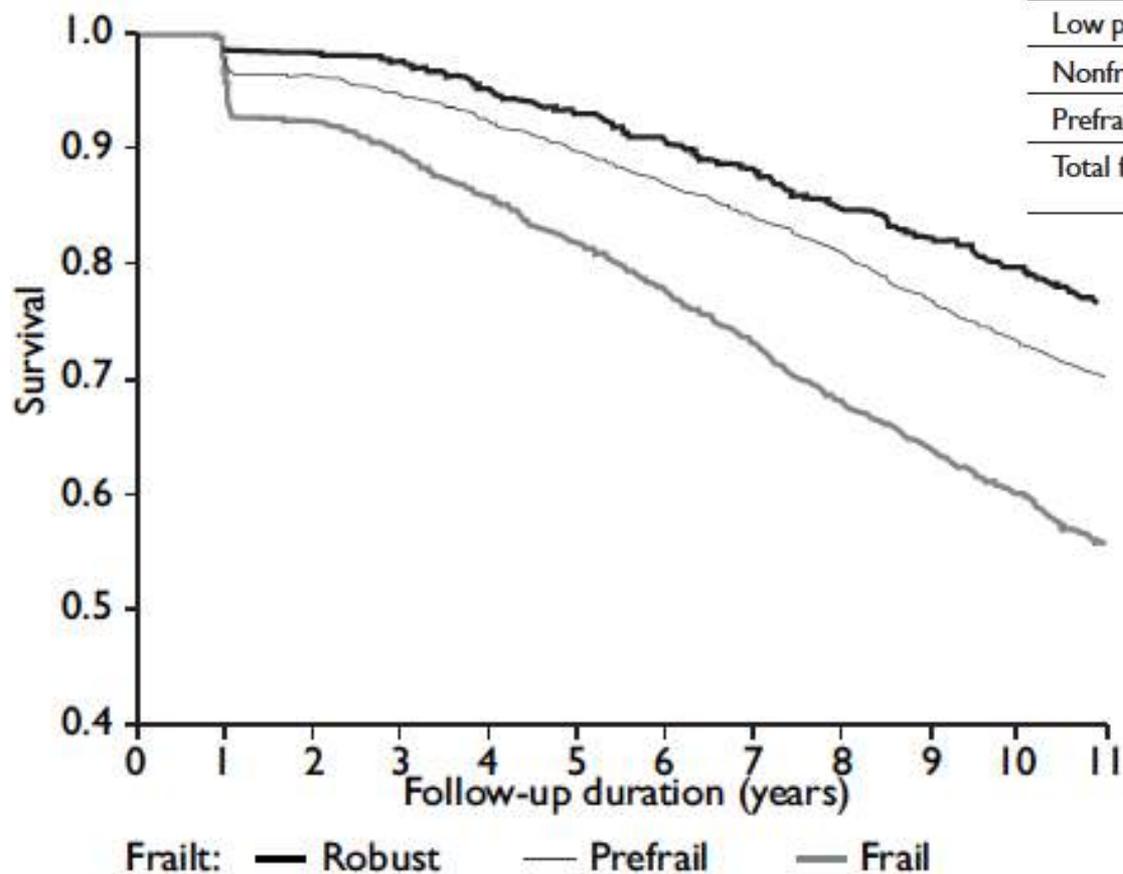
Frailty and the prediction of dependence and mortality in low- and middle-income countries: a 10/66 population-based cohort study

CrossMark

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- Estudio longitudinal (10/66)
- N= 13924 participantes de la comunidad
- 60 años y más
- Siete componentes para fragilidad (proxy) y los cinco componentes de Fried (proxy)
- Asociación con discapacidad y muerte

Jotheeswaran et al., 2015

Fragilidad: una preocupación

Table 1 Cohort characteristics

	Cuba	Dominican Republic	Peru (urban)	Peru (rural)	Venezuela	Mexico (urban)	Mexico (rural)	China (urban)	China (rural)	India (urban)	All centres combined
MORTALITY COHORT											
Fried frailty model	554 (21.0 %)	591 (34.6 %)	323 (25.9 %)	87 (17.2 %)	187 (11.0 %)	92 (10.1 %)	79 (8.5 %)	77 (7.8 %)	87 (8.7 %)	85 (11.4 %)	2162 (17.5 %)
Multidimensional frailty model	889 (33.7 %)	816 (47.8 %)	351 (28.2 %)	130 (25.6 %)	340 (20.0 %)	208 (22.9 %)	338 (36.2 %)	112 (11.3 %)	225 (22.5 %)	195 (26.1 %)	3604 (29.1 %)
DEPENDENCE COHORT											
Fried frailty model	258 (15.5 %)	347 (30.3 %)	185 (22.3 %)	58 (14.5 %)	89 (7.7 %)	57 (8.3 %)	37 (5.6 %)	5 (0.7 %)	33 (4.7 %)	–	1069 (13.5 %)
Multidimensional frailty model	397 (23.9 %)	457 (39.9 %)	181 (21.8 %)	84 (21.1 %)	182 (15.8 %)	121 (17.6 %)	221 (33.3 %)	23 (3.4 %)	115 (16.5 %)	–	1781 (22.5 %)

Jotheeswaran et al., 2015

Fragilidad: una preocupación

A frailty index to predict the mortality risk in a population of senior mexican adults

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- Estudio longitudinal (ENASEM)
- N= 4082 participantes de la comunidad
- 65 años y más
- Uso de 34 variables del índice fragilidad
- Asociación con discapacidad y muerte

García-González et al., 2009

Fragilidad: una preocupación

Table 2: Mortality hazard ratios (and 95% CIs) for different level of the frailty index, adjusted for covariates and stratified by gender.

	All (n = 4082)	Men (n = 1932)	Women (n = 2150)
Frailty index			
.00-.14	I	I	I
.07-.14	0.93 (0.58-1.50)	0.99 (0.56-1.76)	0.83 (0.35-1.95)
.14-.21	1.56 (1.00-2.44)	1.30 (0.73-2.32)	1.84 (0.85-3.96)
.21-.35	2.20 (1.42-3.41)	2.69 (1.59-4.57)	1.73 (0.80-3.77)
.35-.65	6.45 (4.10-10.14)	5.96 (3.32-10.72)	6.63 (3.07-14.35)
Age (years)	1.05 (1.04-1.07)	1.05 (1.02-1.07)	1.06 (1.04-1.09)
Gender			
Men	I		
Women	0.66 (0.52-0.84)		

% dying — Months after first interview

García-González et al., 2009
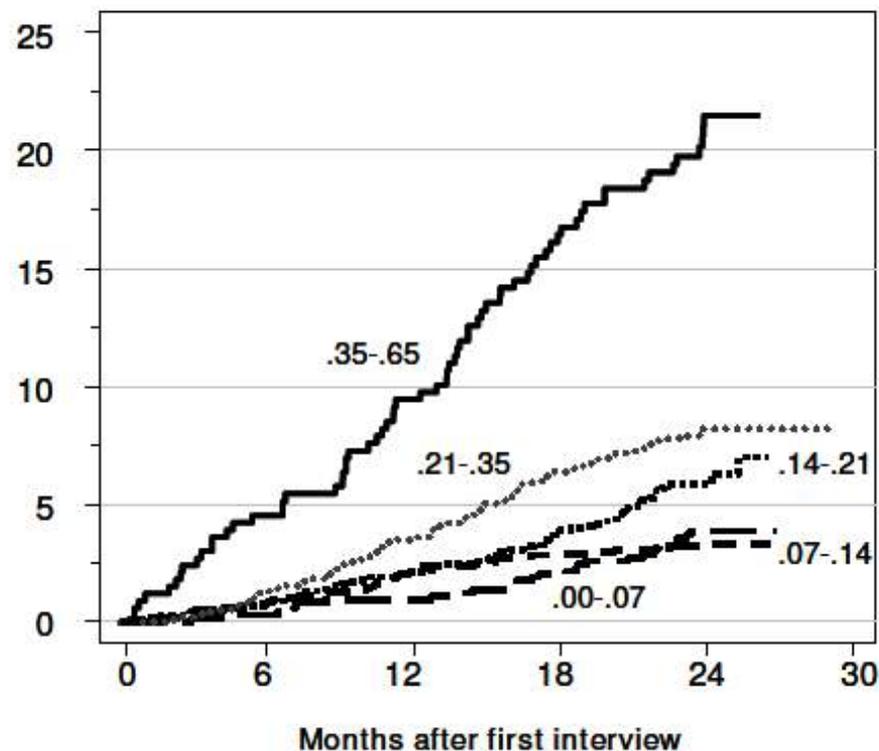
Fragilidad: una preocupación

Frailty prevalence and associated factors in the Mexican health and aging study: A comparison of the frailty index and the phenotype

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– Estudio transversal (ENASEM, 3ª ronda)
– N= 1108 participantes de la comunidad
– 60 años y más
– Uso del Fenotipo y del índice de fragilidad
– Prevalencia de fragilidad y concordancia de los métodos

Fragilidad: una preocupación

Logistic regression for each tool with frailty as dependent variable and adjusted for all variables in respective models.[a]

Variable	Frailty phenotype		Frailty index	
	OR (95% CI)	P	OR (95% CI)	P
Age	1.05 (1.03–1.07)	<0.001	1.04 (1.02–1.07)	<0.001
Women	1.36 (.94–1.95)	0.2	2.77 (1.88–4)	<0.001
Number of inhabitants in current location				
> 100,000	Reference		Reference	
5000–99,999	0.98 (0.6–1.6)	0.618	1.27 (0.78–2.08)	0.326
2500–4,999	1.53 (0.94–2.51)	0.086	1.92 (1.21–3.07)	0.006
< 2500	1.94 (1.28–2.96)	0.002	1.31 (0.86–2)	0.195
Married	0.71 (0.47–1.06)	0.101	0.84 (0.59–1.25)	0.448
Years in school	0.91 (0.86–0.95)	<0.001	0.92 (0.88–0.96)	0.001
Social support	0.99 (0.97–1.01)	0.746	1.01 (0.98–1.03)	0.446
Negative event	1.16 (0.85–1.58)	0.337	1.72 (1.26–2.35)	0.001
Days in bed sick	1.02 (1.01–1.03)	0.032	1.01 (1.01–1.02)	0.005
Times consulting a physician	1.06 (1.03–1.08)	<0.001	1.03 (1.01–1.06)	0.004
Smoking status				
Never smoked	Reference		Reference	
Smoked in the past	1.63 (1.43–1.92)	0.019	1.4 (1.01–2.18)	0.04
Smokes currently	0.74 (0.43–1.25)	0.26	1.18 (0.68–2.04)	0.545
Life satisfaction score	0.86 (0.81–0.91)	<0.001	0.81 (0.76–0.86)	<0.001
Locus of control	0.99 (0.95–1.03)	0.733	0.95 (0.91–0.99)	0.041
Poor self-rated financial status	0.81 (0.53–1.25)	0.36	1.73 (1.08–2.77)	0.02

OR = odds ratio; CI = confidence interval.
[a] Adjusted models were fitted with all the other variables present, reporting the estimate for the specific variable in the row.

Conclusiones (1)

— El frágil es susceptible a desenlaces adversos

— No es sinónimo de multicomorbilidad

—Al establecer un estado "frágil" es necesario un abordaje holístico

— Necesidad de una definición universal

— Valorar contribución de estudios epidemiológicos

— Necesidad de fomentar su investigación

Conclusiones (2)

— Frecuencia elevada en México-Americanos (H-EPESE)

— Muy frecuente en ciudad de México (SABE)

— Aplicación válida del índice de fragilidad (ENASEM)

— Fenotipo válido en la población mexicana (ENASEM, SADEM y Coyoacán)

— Potencial establecimiento de medidas de prevención

Gracias

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