

# Fragilité chez le PvVIH vieillissant

DR Frédérique Retornaz  
Marseille



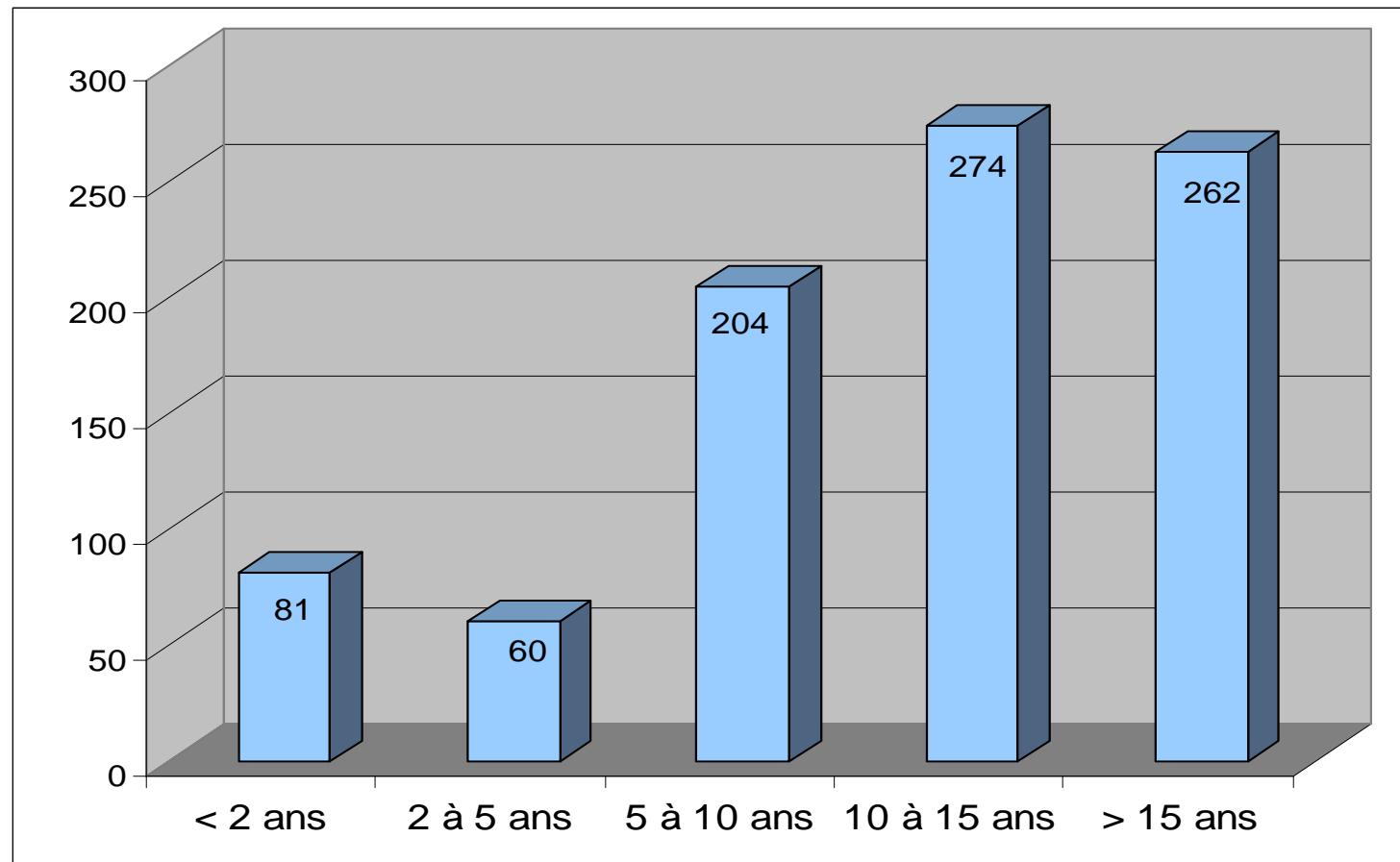
# Conflits d'intérêts

## Honoraires :

- Symposium : Rencontre Infirmières Gilead, juin 2016, Marseille ;
  - Symposium Gilead : « Très bien vieillir, malgré le temps qui passe, sa maladie et ses traitements » Novembre 2015, Marseille.

# Ancienneté de la séropositivité

*n= 912 patients VIH+ ≥ 50 ans*



*Diapositive du Dr Patricia Enel*



# Vieillissement Pathologique

JAMA®

Online article and related content  
current as of June 20, 2008.

Metabolic and Skeletal Complications of HIV Infection:  
The Price of Success

Caryn G. Morse; Joseph A. Kovacs

JAMA. 2006;296(7):844-854 (doi:10.1001/jama.296.7.844)

- Maladies les plus fréquentes :
  - Neurologiques
    - Démences, ....
  - Appareil locomoteur
    - Ostéoporose, .....
  - Cardiovasculaire
    - Athérosclérose...
    - Insuffisance cardiaque
  - Troubles métaboliques
    - Syndrome métabolique
    - Diabète
    - Dyslipidémie

**Box. Metabolic and Skeletal Disorders Associated With HIV Infection and Antiretroviral Therapy**

Body composition changes

Lipoatrophy

Fat accumulation

Dyslipidemia

Hypertriglyceridemia

Hypercholesterolemia

Low high-density lipoprotein cholesterol levels

Abnormal glucose metabolism

Insulin resistance

Impaired glucose tolerance

Diabetes mellitus

Cardiovascular disease

Lactic acidosis/hyperlactatemia

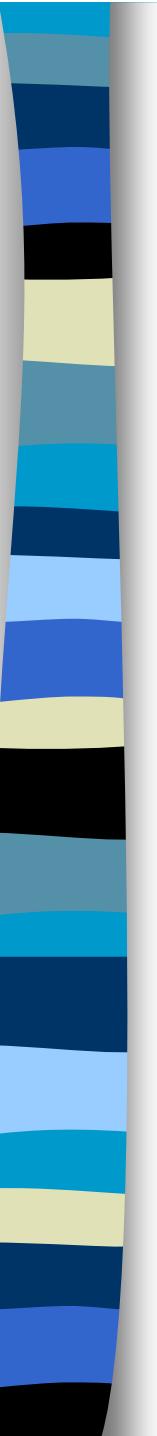
Hepatic steatosis

Bone disorders

Osteopenia

Osteoporosis

Osteonecrosis



# ■ Fragilité?

# ConceptS de Fragilité

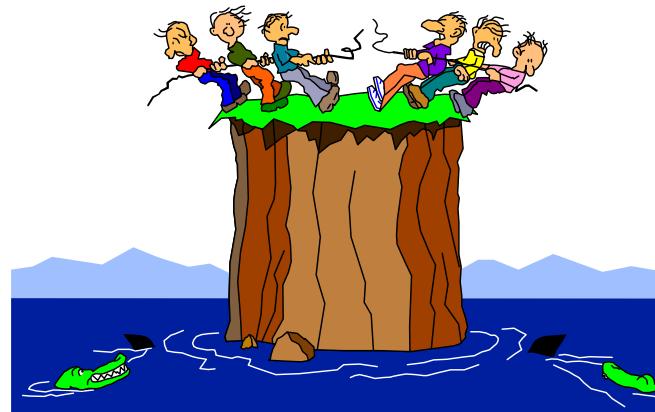
*Caractéristiques communes* : vulnérabilité liée à l'âge et aux facteurs de stress, identifiable cliniquement, et déficiences de plusieurs systèmes

## Phénotype de la fragilité

- Démarche hypothétique
- Nombre limité de composantes
- Trajectoire définie biologique / physiologique
- Syndrome médical : ensemble de signes et de symptômes constituant le portrait clinique d'un seul processus morbide

## Index de fragilité

- Approche fondée sur les facteurs de risque
- Nombre illimité de déficits
- Trajectoire et pathophysiologie variable
- Syndrome gériatrique : effets cumulatifs de déficiences dans de multiples domaines se traduisant par un effet néfaste particulier



*S. Karunananthan et al. La Revue de médecine interne 2008*

## **Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index**

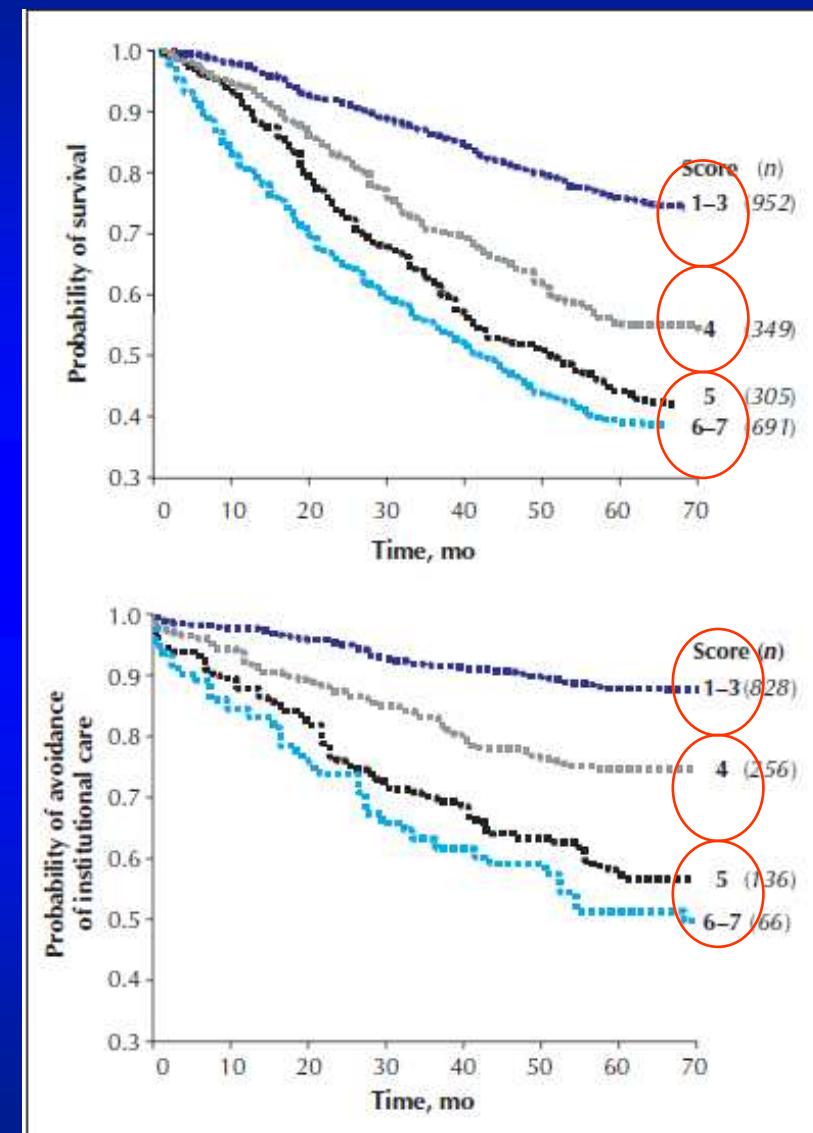
- Changes in everyday activities
- Head and neck problems
- Poor muscle tone in neck
- Bradykinesia, facial
- Problems getting dressed
- Problems with bathing
- Problems carrying out personal grooming
- Urinary incontinence
- Toileting problems
- Bulk difficulties
- Rectal problems
- Gastrointestinal problems
- Problems cooking
- Sucking problems
- Problems going out alone
- Impaired mobility
- Musculoskeletal problems
- Bradykinesia of the limbs
- Poor muscle tone in limbs
- Poor limb coordination
- Poor coordination, trunk
- Poor standing posture
- Irregular gait pattern
- Falls
- Mood problems
- Feeling sad, blue, depressed
- History of depressed mood
- Tiredness all the time
- Depression (clinical impression)
- Sleep changes
- Restlessness
- Memory changes
- Short-term memory impairment
- Long-term memory impairment
- Changes in general mental functioning
- Onset of cognitive symptoms
- Clouding or delirium
- Paranoid features
- History relevant to cognitive impairment or loss
- Family history relevant to cognitive impairment or loss
- Impaired vibration
- Tremor at rest
- Postural tremor
- Intention tremor
- History of Parkinson's disease
- Family history of degenerative disease
- Seizures, partial complex
- Seizures, generalized
- Syncope or blackouts
- Headache
- Cerebrovascular problems
- History of stroke
- History of diabetes mellitus
- Arterial hypertension
- Peripheral pulses
- Cardiac problems
- Myocardial infarction
- Arrhythmia
- Congestive heart failure
- Lung problems
- Respiratory problems
- History of thyroid disease
- Thyroid problems
- Skin problems
- Malignant disease
- Breast problems
- Abdominal problems
- Presence of snout reflex
- Presence of the palmomental reflex
- Other medical history

# CSHA Clinical Frailty Scale

## Box 1: The CSHA Clinical Frailty Scale

- 1 *Very fit*— robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age
- 2 *Well*— without active disease, but less fit than people in category 1
- 3 *Well, with treated comorbid disease*— disease symptoms are well controlled compared with those in category 4
- 4 *Apparently vulnerable*— although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms
- 5 *Mildly frail*— with limited dependence on others for instrumental activities of daily living
- 6 *Moderately frail*— help is needed with both instrumental and non-instrumental activities of daily living
- 7 *Severely frail*— completely dependent on others for the activities of daily living, or terminally ill

Note: CSHA = Canadian Study of Health and Aging.



# Phénotype de Fragilité (Fried 2001)

Fragilité : Syndrome physiologique caractérisé par une diminution des réserves et de la résistance face aux agents stressants, qui résulte de l'addition des déficiences de divers systèmes physiologiques et qui augmente la vulnérabilité aux effets néfastes (Fried 2003)

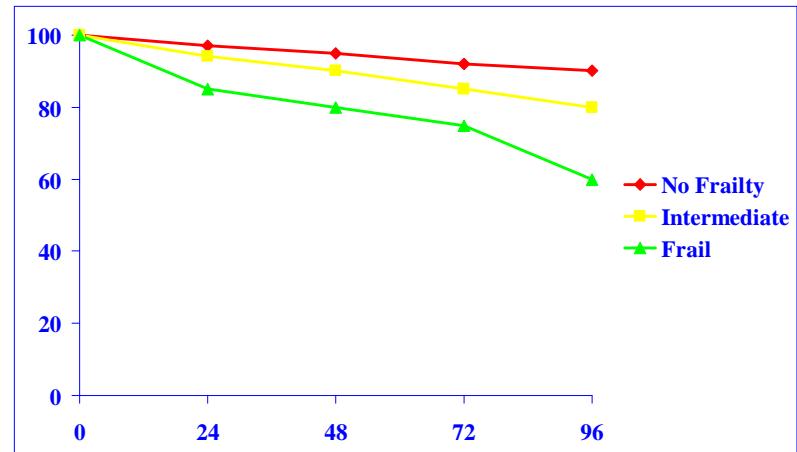
## 5 Critères :

1. perte de poids involontaire / 1 an
2. faiblesse (force de préhension)
3. vitesse de marche lente
4. faible endurance/énergie
5. activité physique réduite

## Prédiction à 3 ans et à 7 ans

- Apparition/aggravation d'incapacités,
- Apparition/aggravation de la mobilité
- Morbidité
- Chutes
- Hospitalisation, institutionalisation

## Mortalité



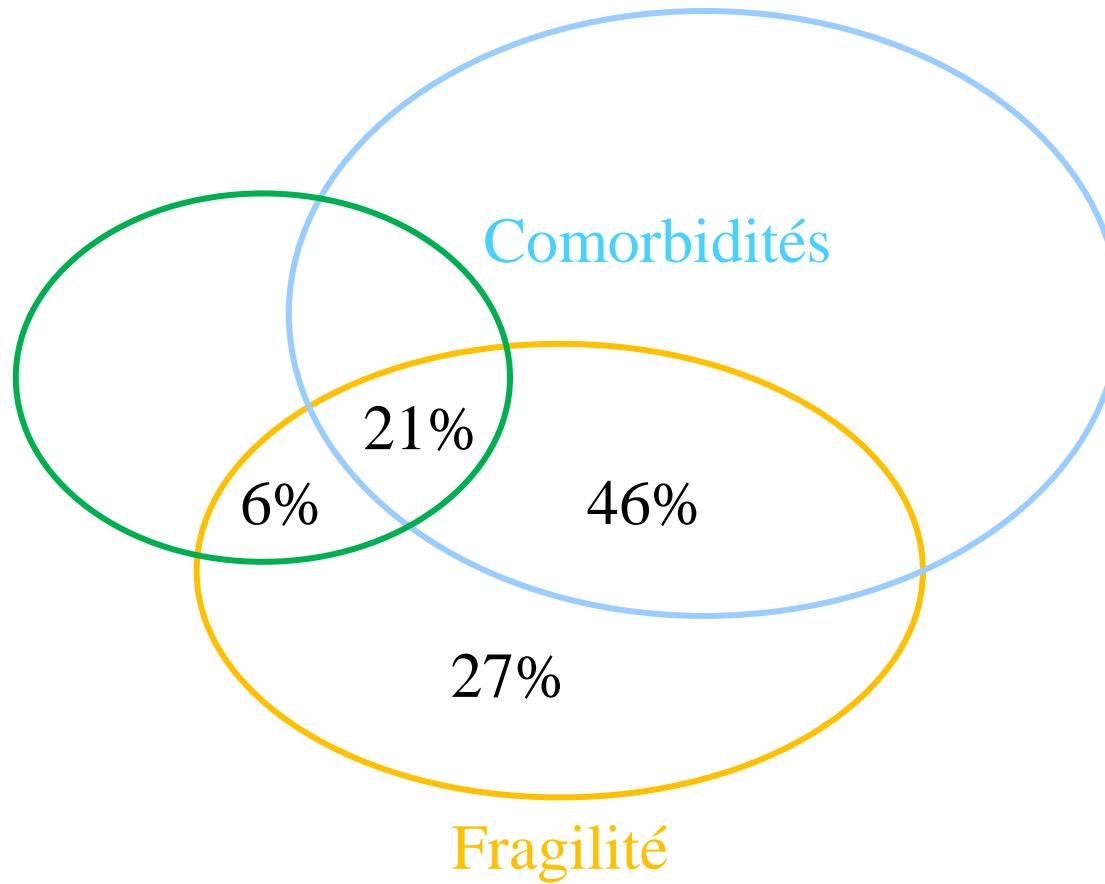
Frail = 3 ou + critères

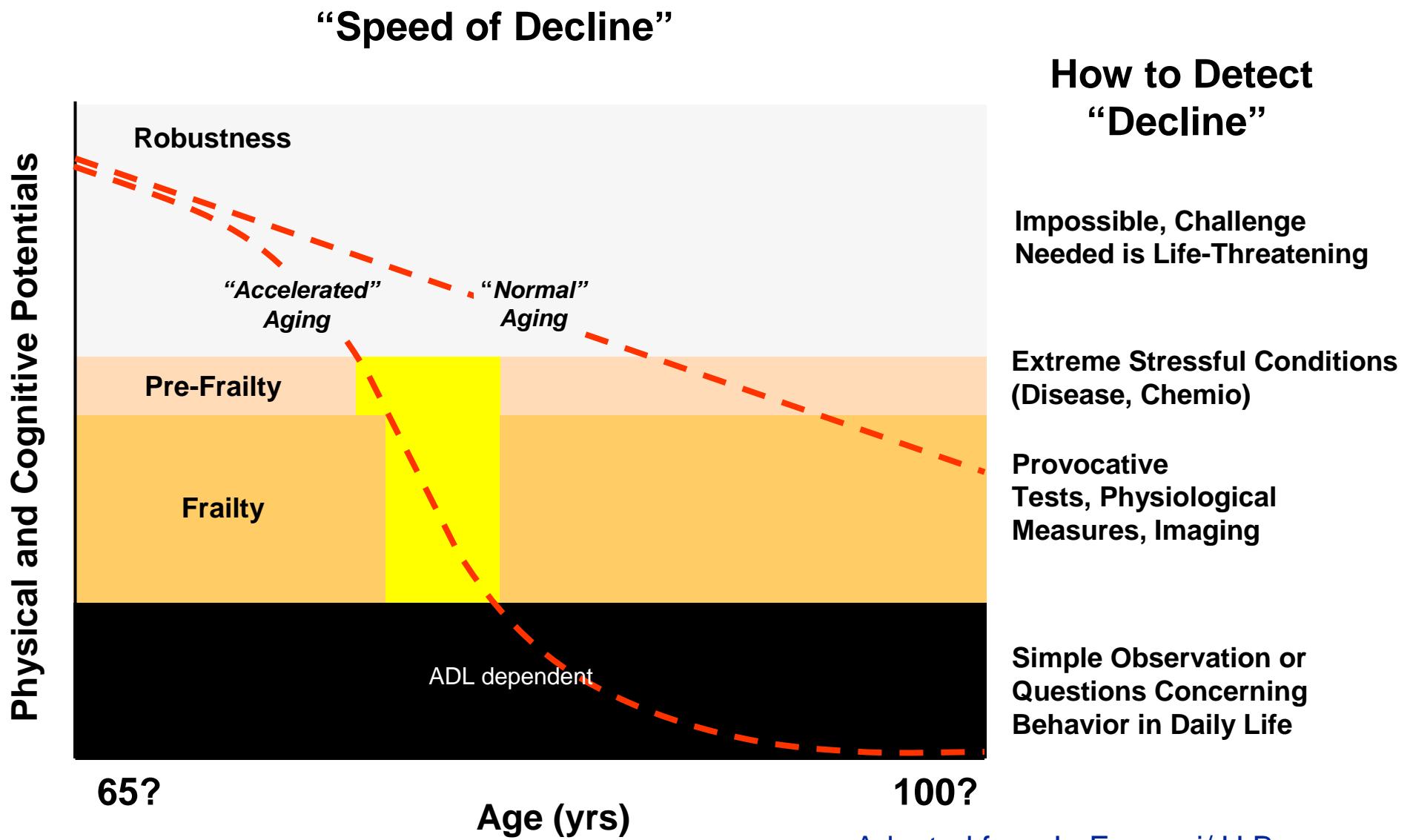
Intermédiaire = 1-2 critères

Not Frail = 0 critère

# Concept de fragilité (Fried 2001)

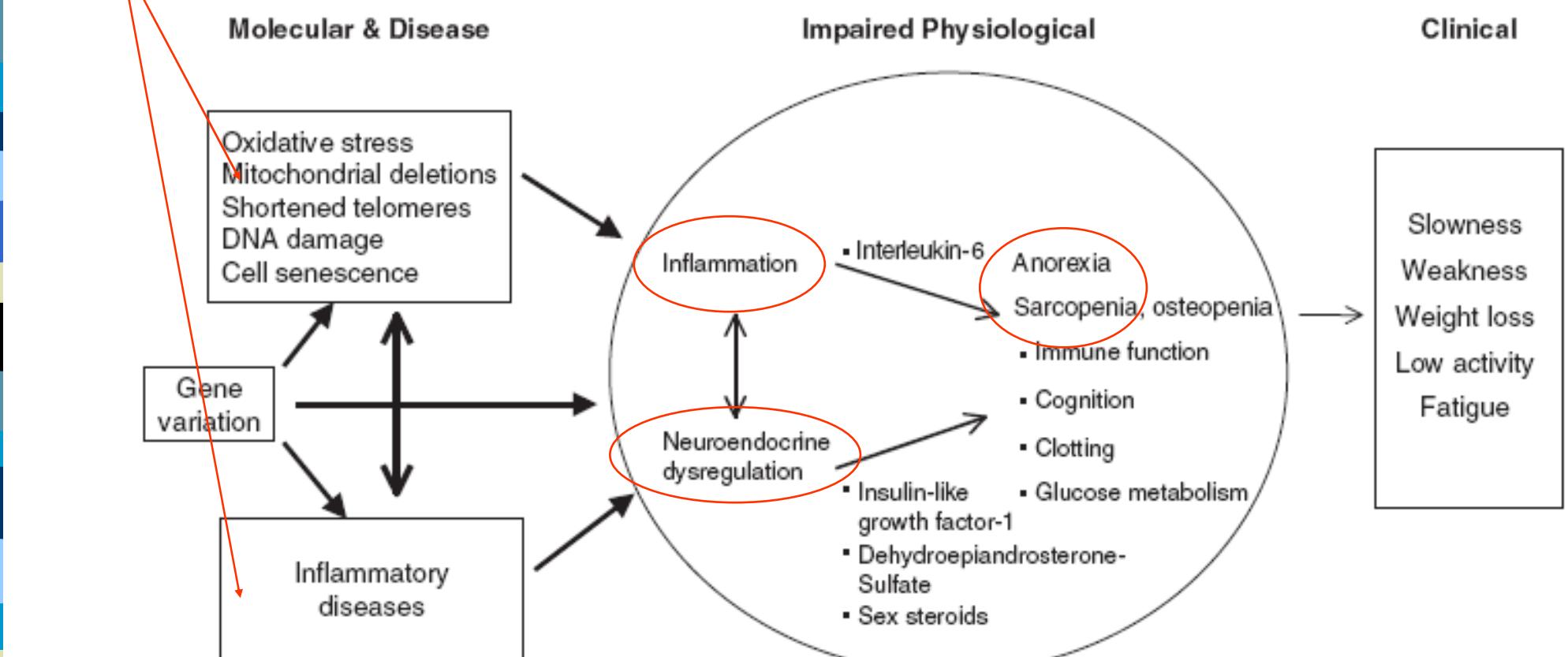
Dépendance





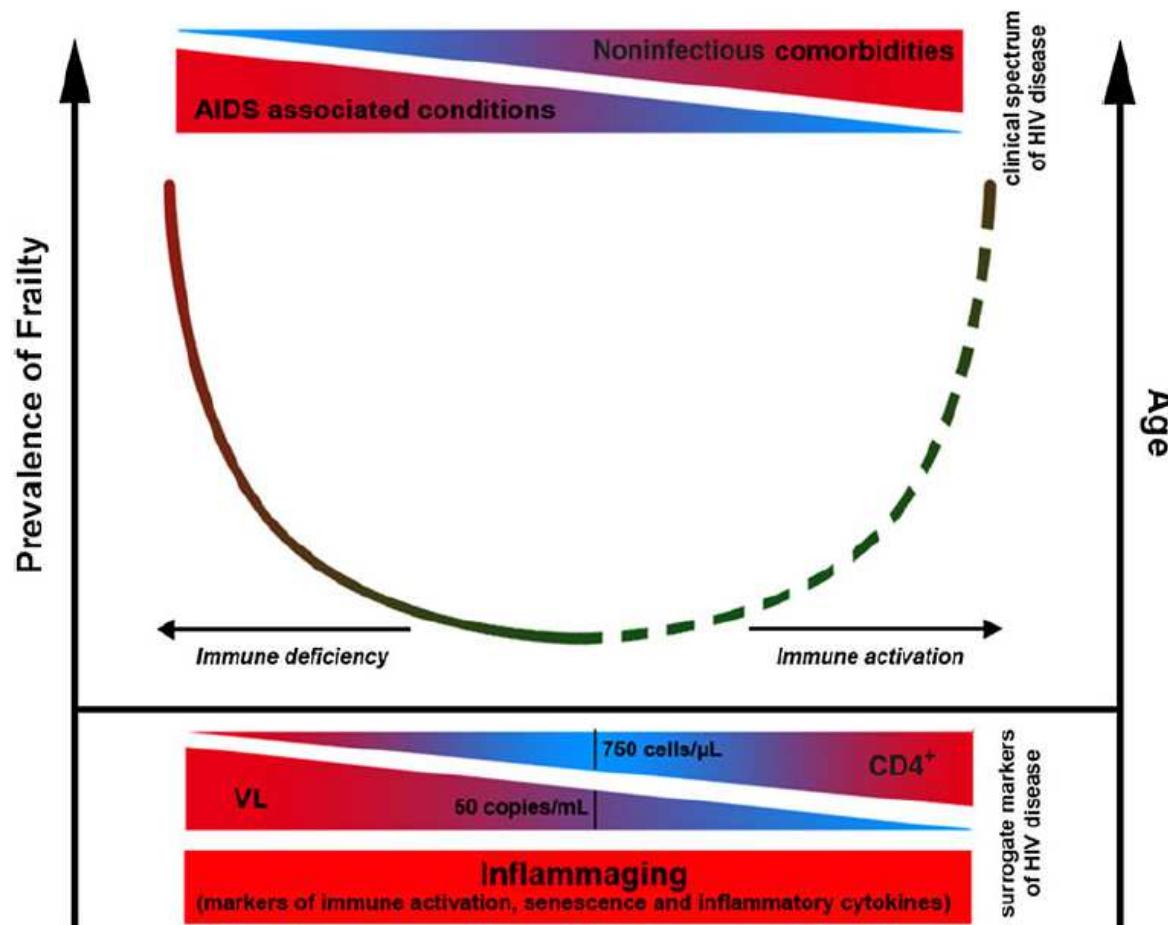
Adapted from L. Ferrucci/ H Bergman

VIH

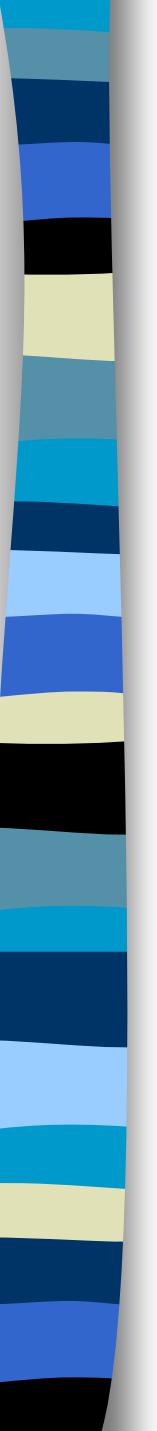


# Frailty in People Aging With Human Immunodeficiency Virus (HIV) Infection

JID 2014;210 (15 October) • Brothers et al



**Figure 1.** Hypothetical association between frailty prevalence, HANA conditions, and immune system dysregulation. Presented at 4th International Workshop on HIV and Aging, 30–31 October Baltimore, MD [18]. Abbreviations: HANA, HIV-associated non-AIDS; HIV, human immunodeficiency virus.



- Fragilité et VIH :
  - Les études

**TABLE 2.** Description of Person-Visits by Era

Variables	Characteristics According to Calendar Period			Overall (N = 12,530)
	1994–1995 (n = 2459)	1996–1999 (n = 4891)	2000–2005 (n = 5180)	
<b>Overall person-visits % (n)</b>				
FRP	7.6 (186)	5.2 (255)	4.5 (232)	5.4 (673)
Current age*	41 (37–46)	43 (39–48)	48 (43–52)	45 (40–50)
Clinical AIDS person-visits†	20.7 (509)	20.2 (986)	21.7 (1126)	20.9 (2621)
Current CD4 T-cell count (cells/mm <sup>3</sup> )*	323 (140–503)	415 (262–609)	494 (329–704)	431 (268–632)
Current viral load (log <sub>10</sub> copies/mL)	NA	3.2 (<1.6–4.3)	<1.6 (<1.6–3.6)	3.0 (<1.6–4.3)
<b>Type of current treatment % (n)</b>				
Not treated	57.7 (1403)	25.5 (1226)	19.8 (1014)	29.4 (3643)
Monotherapy	26.1 (634)	3.4 (181)	0.9 (47)	7.0 (862)
Combination therapy	16.2 (393)	18.8 (904)	10.6 (545)	14.9 (1842)
HAART	<0.1 (2)	52.0 (2526)	68.7 (3520)	48.7 (6028)
<b>Person-visits without clinical AIDS % (n)</b>				
FRP	3.3 (64)	2.4 (95)	2.9 (118)	2.8 (277)
Current age*	41 (36–46)	43 (39–48)	48 (43–52)	45 (40–50)
Current CD4 T-cell count (cells/mm <sup>3</sup> )*	390 (237–551)	457 (306–650)	521 (361–739)	467 (314–667)
<b>Person-visits with clinical AIDS % (n)</b>				
FRP	24.0 (122)	16.2 (160)	10.1 (114)	15.1 (396)
Time from AIDS diagnosis (yrs)*	0.9 (0.2–2.3)	2.6 (1.2–4.3)	6.5 (4.3–8.8)	3.6 (1.4–6.6)
Current age*	41 (37–45)	43 (40–48)	48 (44–52)	45 (41–50)
Current CD4 T-cell count (cells/mm <sup>3</sup> )*	51 (16–173)	251 (126–395)	378 (235–582)	265 (108–451)

## HIV-1 Infection Is Associated With an Earlier Occurrence of a Phenotype Related to Frailty

Frail : 6.9 % > 65 ans

Loic Desquillet,<sup>1</sup> Lisa P. Jacobson,<sup>1</sup> Linda P. Fried,<sup>2,3</sup> John P. Phair,<sup>4</sup> Beth D. Jamieson,<sup>5</sup> Marcy Holloway,<sup>6</sup> and Joseph B. Margolick,<sup>7</sup> for the Multicenter AIDS Cohort Study

**TABLE 3.** ORs of Having the FRP Among HIV-Seropositive Men Followed in the MACS Cohort Between January 1, 1996 and April 30, 2005

Exposures	OR [95% CI]			
	Unadjusted Models	Adjusted Model A	Adjusted Model B	Adjusted Model C
<College versus ≥college	1.54 (1.09 to 2.17)*	1.75 (1.22 to 2.51)†	1.74 (1.21 to 2.51)†	1.73 (1.19 to 2.50)†
White non-Hispanic versus other	1.62 (1.06 to 2.49)*	1.29 (0.83 to 2.00)	1.28 (0.81 to 2.01)	1.30 (0.82 to 2.06)
AIDS visit versus AIDS-free visits‡	4.83 (3.51 to 6.65)†	3.63 (2.55 to 5.16)†	4.97 (3.53 to 7.01)†	3.62 (2.50 to 5.24)†
Age ( $\times 10$ yrs)	1.44 (1.19 to 1.75)†	1.48 (1.21 to 1.80)†	1.54 (1.25 to 1.90)†	1.52 (1.24 to 1.87)†
Plasma viral load (in copies/mL)				
≤400	1	—	1	1
401–50,000	1.03 (0.78 to 1.37)	—	1.21 (0.89 to 1.64)	0.98 (0.71 to 1.35)
>50,000	1.72 (1.26 to 2.34)†	—	1.90 (1.37 to 2.63)†	1.09 (0.74 to 1.61)
CD4 T-cell count (in cells/mm <sup>3</sup> )				
100	3.65 (2.79 to 4.77)†	2.84 (2.11 to 3.83)†	—	2.80 (1.97 to 3.98)†
200	2.36 (1.98 to 2.83)†	2.00 (1.64 to 2.44)†	—	1.98 (1.57 to 2.50)†
350	1.47 (1.35 to 1.59)†	1.36 (1.25 to 1.49)†	—	1.36 (1.22 to 1.50)†
500	1	1	—	1
750	0.59 (0.53 to 0.66)†	0.65 (0.58 to 0.74)†	—	0.66 (0.57 to 0.76)†

OR, odds ratio.

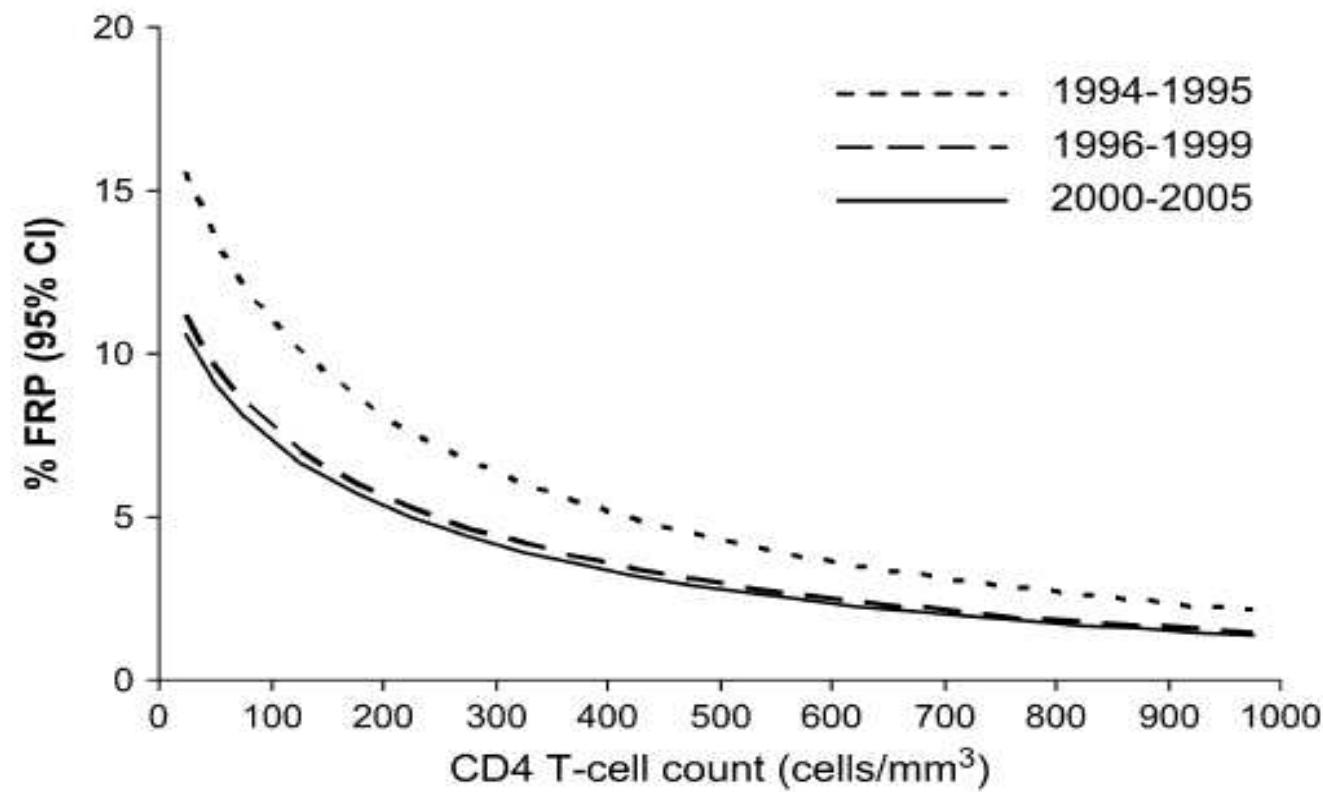
\* $P \leq 0.05$ .

† $P \leq 0.01$ .

‡AIDS visit = visit occurring later than 6 months before the first AIDS-defining illness.

# Relationship Between a Frailty-Related Phenotype and Progressive Deterioration of the Immune System in HIV-Infected Men

Loic Desquilbet, PhD,\* Joseph B. Margolick, MD, PhD,† Linda P. Fried, MD, MPH,‡  
John P. Phair, MD,§ Beth D. Jamieson, PhD,|| Marcy Holloway, MPAS,¶ and  
Lisa P. Jacobson, ScD\* for the Multicenter AIDS Cohort Study



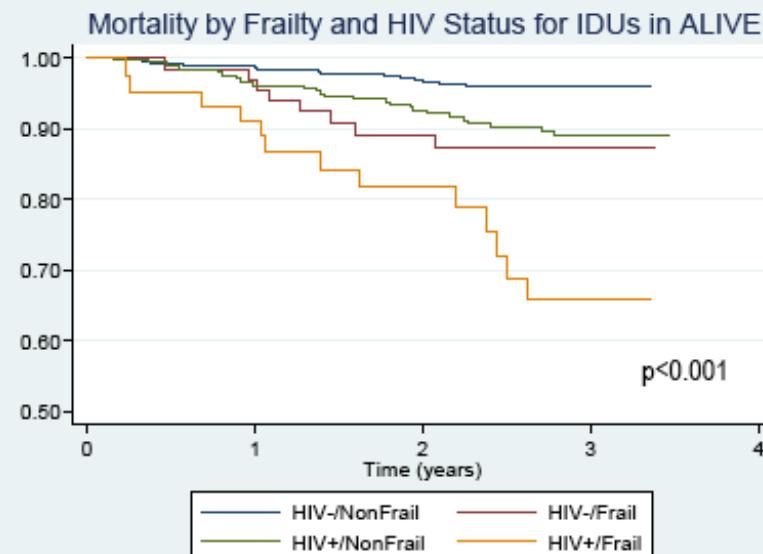
# Frailty Predicts Mortality in a Cohort of HIV-Infected and At-Risk Injection Drug Users

Cohorte ALIVE

Damani Piggott\*, A Muzaale, S Mehta, T Brown, S Leng, and G Kirk

*Johns Hopkins Univ, Baltimore, MD, US*

## MORTALITY BY FRAILTY AND HIV STATUS IN ALIVE



	Adjusted HR (95% CI)
<b>HIV Negative</b>	
Robust	Ref
Prefrail	1.17 (0.50, 2.73)
<b>Frail+</b>	<b>2.99 (1.09, 8.18)</b>
<b>HIV Positive</b>	
Robust	Ref
Prefrail	1.40 (0.56, 3.47)
<b>Frail+</b>	<b>3.75 (1.39, 10.2)</b>
<b>HIV Negative/NonFrail</b>	
<b>HIV Negative/Frail</b>	<b>2.82 (1.25, 6.36)</b>
<b>HIV Positive/NonFrail</b>	<b>2.82 (1.63, 4.88)</b>
<b>HIV Positive/Frail</b>	<b>8.14 (4.09, 16.2)</b>

†Adjusted for age, gender, race, and education

# Frailty and Cause-Specific Hospitalization Among Persons Aging With HIV Infection and Injection Drug Use

Damani A. Piggott,<sup>1,2</sup> Abimereki D. Muzaale,<sup>3</sup> Ravi Varadhan,<sup>4,5</sup> Shruti H. Mehta,<sup>2</sup> Ryan P. Westergaard,<sup>6</sup> Todd T. Brown,<sup>1,2</sup> Kushang V. Patel,<sup>7</sup> Jeremy D. Walston,<sup>1</sup> Sean X. Leng,<sup>1</sup> and Gregory D. Kirk<sup>1,2</sup>

**Results:** Among 1,303 subjects, mean age was 48 years; 32% were HIV-infected. Adjusting for sociodemographics, comorbidity, substance use, and HIV disease stage, time-updated frailty status was associated with risk for all hospitalization classes. Baseline frailty was significantly associated with all-cause (hazards ratio [HR] 1.41; 95% confidence interval [CI], 1.06, 1.87), chronic (HR 2.13; 95% CI, 1.46, 3.11), and infectious disease hospitalization (HR 2.51; 95% CI, 1.60, 3.91) but not with nonchronic, noninfectious hospitalization risk (HR 1.09; 95% CI, 0.74, 1.61).

# FRAILTY AND PRE-FRAILTY IN A CONTEMPORARY COHORT OF HIV-INFECTED INDIVIDUALS IN THE SUN STUDY

Nur F. Önen<sup>1</sup>, et al . for the SUN Study Investigators.

FIGURE 1. NUMBER OF NON-FRAIL, PRE-FRAIL AND FRAIL PARTICIPANTS BY AGE.

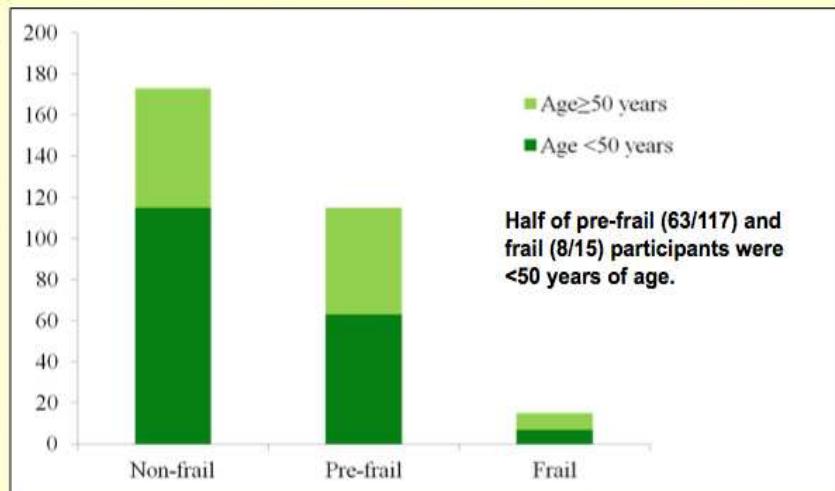
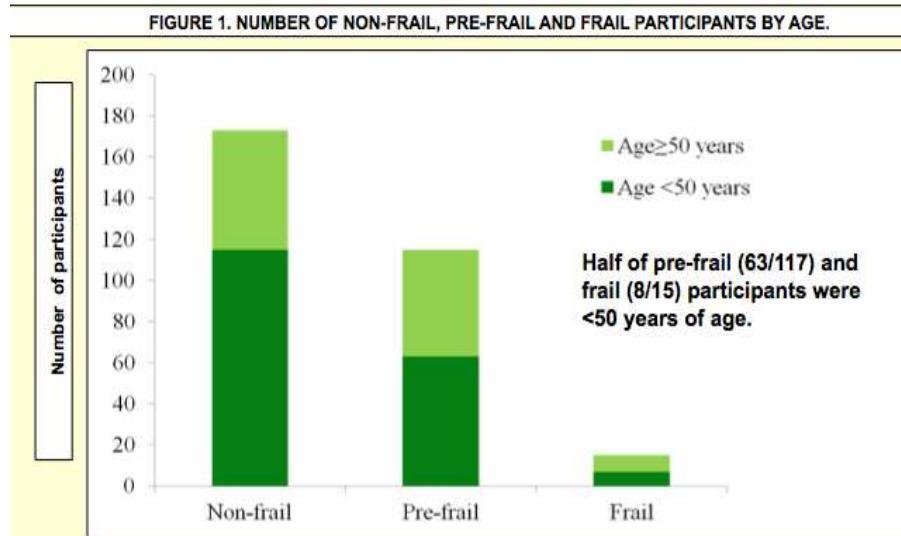


TABLE 2. PREVALENCE OF INDIVIDUAL FRAILTY CRITERIA

Frailty criteria, n(%)	Pre-frail (n=117)	Frail (n=15)
Unintentional weight loss	13 (11%)	1 (7%)
Physical Inactivity	35 (30%)	15 (100%)
Exhaustion	73 (62%)	11 (73%)
Weak Grip Strength	9 (8%)	11 (73%)
Strength, kg <sup>a</sup>	36 (29-44)	29 (23-39)
Slow Walk	20 (17%)	7 (47%)
Time, seconds <sup>a</sup>	4 (3-5)	8 (4-9)

# Frailty and pre-frailty in a contemporary cohort of HIV-infected individuals in the sun study



- Prévalence du phénotype de fragilité dans cette cohorte = non HIV âgé de 70 ans ;
- ½ des fragiles et des pré- fragiles < 50 ans ;
- Marqueurs de fragilité les plus fréquents ≠ cohortes Non HIV :
  - Faible activité physique dans les 2 ;
  - Fatigue +++ versus préhension et vitesse de marche.

**Table 2. Summary of Factors Associated With Frailty Among HIV-positive Individuals on Antiretroviral Therapy**

Age [12, 13, 17, 32–34]
HIV-related measures
Longer time since diagnosis [12]
Lower current CD4 count [12, 13, 31–34, 44]
Lower nadir CD4 count [12]
Low CD4/CD8 ratio [31]
Detectable viral load [13, 32]
Longer duration of HAART [13]
Protease inhibitor-containing HAART regimen [12]
Comorbidities
Hepatitis C coinfection [33]
Low BMI [12, 34]
High BMI [38]
Lipodystrophy [38]
Diabetes [13]
Kidney disease [13]
Depressive symptoms [12, 13, 32]
Cognitive impairment [12, 45]
Inflammation [6]
Weak upper and lower extremities [42]
History of falls [36]
Social factors
Lower education [12, 13, 32]
Current unemployment [12, 35]
Low income in past year [12]

6th HIV & Aging Workshop 2015, Washington, 5 & 6 october 2015



## Are frailty, precariousness and comorbidity related in HIV-infected aging patient?

P. Enel, F. Retornaz, N. Petit, A. Darque, S. Brégigeon,  
I. Ravaux, K. Baumstarck and the VISAGE study group



# VISAGE 3 Study

## Methodology

- **What?** Prospective, cross sectional study
- **Where?** East South France, 12 centers
- **Who?** HIV infected patients  $\geq 50$  years, follow up in hospitals
- **Data collection:**
  - Demographic data
  - HIV data: HIV lifetime, AIDS stage, undetectable last viral load, nadir CD4, last CD4
  - Frailty markers (5)



Comorbidities		Precariousness
Cancer	Pulmonary diseases	French EPICES Score
Hepatitis B/C	Chronical renal d.	11 items questionnaire exploring socio-economics status
Diabetes	Cardio-vascular d.	
Dyslipidemia	Psychiatric d.	
Hypertension	Osteo-articular d.	
Lipodystrophy		<i>C. Sass: Le score Epices : un score individuel de précarité. Construction du score et mesure des relations avec des données de santé, dans une population de 197 389 personnes, BEH, 2006, 14</i>

# Results (1): patients characteristics

	Total n=509	
Male	370	73%
Median age (year) IQR	57 (53-64)	
Normal BMI	303	60%
Median HIV lifetime	20 (13-25)	
AIDS stage	113	24%
Last indetect. VL	445	87%
Median nadir CD4	207 (100-332)	
Last median CD4	596 (425-813)	

	Frailty phenotype		Total n=509
<b>Frailty: ≥ 3 markers</b>		32	6.4%
Pre-frailty: 1-2 markers		291	58.0%
No-frailty: 0 markers		179	35.7%
Low activity		248	51%
Weakness		100	20%
Weight loss		66	13%
Poor energy		36	7%
Slowness		26	5%

## Precariousness

Precariousness	242	49%
----------------	-----	-----

## Comorbidities

≥2 Comorbidities	307	60%
≥3 Comorbidities	196	39%

# Results (2): associations with *Frailty*

	<b>Frailty n=32 (6.4%)</b>	<b>Pre-frailty n=291 (58.0%)</b>	<b>No-frailty n=179 (35.7%)</b>	<b>p value*</b>
Age ≥ 70 years	<b>12.9%</b>	8.7%	7.3%	ns
Sex female	<b>37.5%</b>	28.5%	23.0%	ns
Normal BMI	<b>40.6%</b>	58.8%	66.1%	<b>.005</b>
HIV infection < 1996	50.0%	63.0%	57.8%	ns
AIDS stage	<b>33.3%</b>	24.1%	21.3%	ns
Indetectable last viral load	87.5%	87.5%	88.2%	ns
Nadir CD4 < 200/mm3	33.3%	50.0%	45.7%	ns
Last CD4 < 350/mm3	15.6%	11.7%	13.7%	ns
Precariousness	<b>68.8%</b>	50.2%	43.4%	<b>.03</b>
≥2 Comorbidities**	<b>78.1%</b>	63.2%	52.5%	<b>.007</b>

\* Univariate analysis

# Results (3): association with *Precariousness*

	Precariousness n=242 (48.9%)	No precariousness n=253 (51.1%)	p value **
Mean age	59 years	60 years	ns
Sex female	<b>32.0%</b>	<b>22.1%</b>	.02
Mean Body Mass Index	24.1	24.2	ns
HIV lifetime ≥ 25 years	<b>29.3%</b>	<b>21.1%</b>	.04
AIDS stage	24.7%	23.6%	ns
Undetectable last viral load	86.3%	88.9%	ns
Nadir CD4 < 200/mm <sup>3</sup>	51.1%	44.9%	ns
Last CD4 < 350/mm <sup>3</sup>	<b>16.3%</b>	<b>9.6%</b>	.03
Frailty	<b>9.2%</b>	<b>4.0%</b>	.03
≥2 Comorbidities	<b>66.1%</b>	<b>50.6%</b>	<10-3

\*\* Multivariate analysis:

Precariousness is related to: sex female, last CD4 < 350, frailty, ≥2 comorbidities

% without missing values



# Prévention de la fragilité.....

Des super héros fatigués

**Box. Metabolic and Skeletal Disorders Associated With HIV Infection and Antiretroviral Therapy**

- Body composition changes
  - Lipoatrophy
  - Fat accumulation
- Dyslipidemia
  - Hypertriglyceridemia
  - Hypercholesterolemia
  - Low high-density lipoprotein cholesterol levels
- Abnormal glucose metabolism
  - Insulin resistance
  - Impaired glucose tolerance
  - Diabetes mellitus
- Cardiovascular disease
- Lactic acidosis/hyperlactatemia
- Hepatic steatosis
- Bone disorders
  - Osteopenia
  - Osteoporosis
  - Osteonecrosis

**Nutrition**

**Activité physique adaptée**

# A systematic review of the effects of different types of therapeutic exercise on physiologic and functional measurements in patients with HIV/AIDS



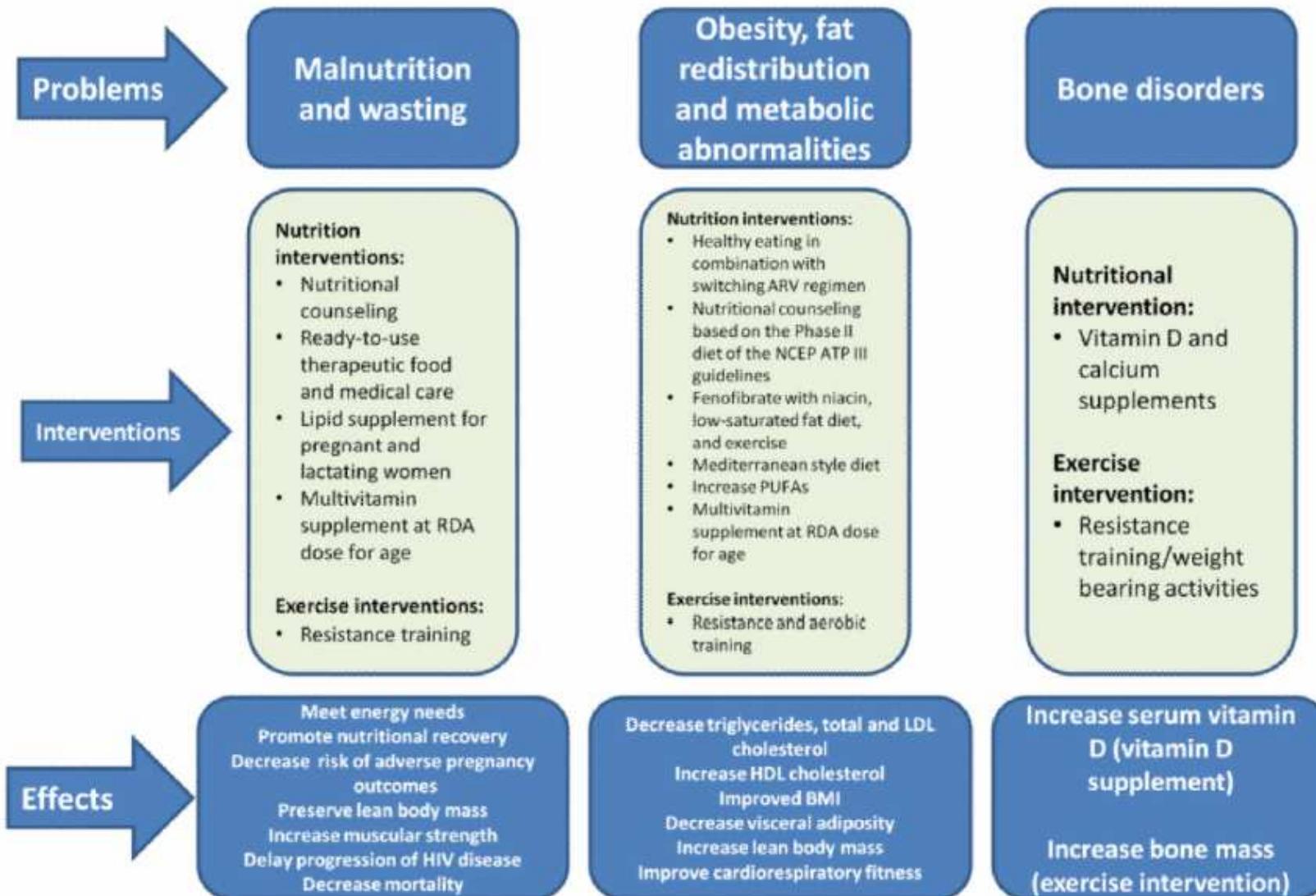
→ 11 études sur la réhabilitation à l'effort

Table 5 - Characteristics of the experimental intervention (concurrent training)

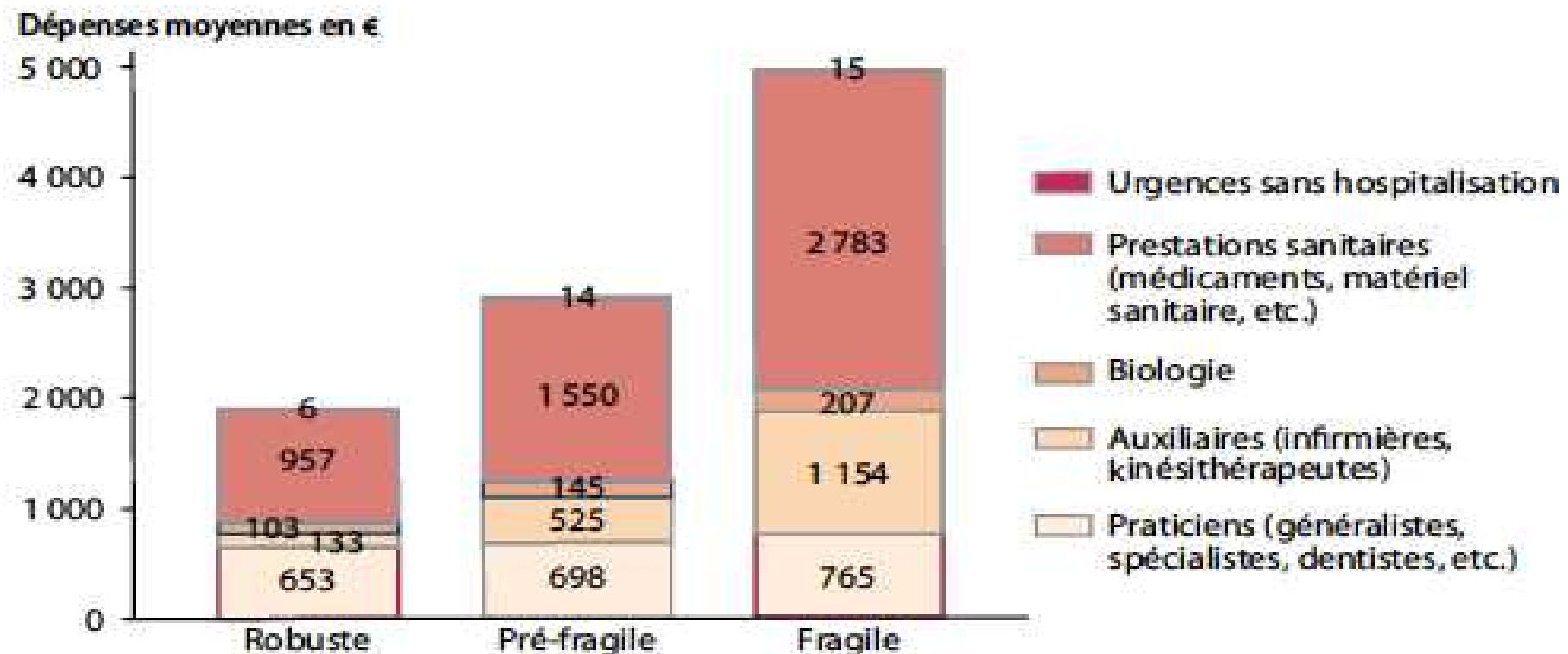
N	Study	Type exercise	Intensity/duration (wk)	Volume	Fréquence (x par semaine)	Temps (min)	Supervision
1	Yarasheski et al. 2010	Aerobic exercise cycling/treadmill Resistance exercise	50-85% Hres 12 RM	NI 1-2 sets 12 reps	3 3	90-120 90-120	16 Yes
2	Mutimura et al. 2008	Aerobic exercise Resistance exercise	45% HRmax/3 60% HRmax/6 75% HRmax/15 NI	15 min warm-up 60 min exercise 15 min cool-down	3	90	24 Yes
3	Hand et al. 2008	Aerobic exercise	50-70% HRmax	5 min warm-up 30 min exercise 5 min cool-down	2	40	24 NI
4	Pérez-Moreno et al. 2007	Resistance exercise Aerobic exercise Cycle ergometer	12 RM 70-80% HRmax	1 set, 12 reps 10 min warm-up 20 min exercise 10 min cool-down	2 3	20 20-40	6 16 Yes
5	Filipas et al. 2006	Resistance exercise Aerobic exercise	60% HRmax/3 75% HRmax/3	5 min warm-up 20 min exercise 5 min cool-down	2	30	6 Yes
6	Dolan et al. 2006	Resistive exercise Aerobic exercise	60% RM 80% RM 60% HRmax/2 75% HRmax/14	3 sets 10 reps 5 min warm-up 20-30 min exercise	2 3	30 35	6 16 Yes
7	Driscoll et al. 2004	Aerobic exercise stationary bicycle Resistive exercise	60% HRmax/2 75% HRmax/14 60-70% RM/4 80% RM/12	5 min warm-up 20-30 min exercise 5 min cool-down 3-4 sets 8-10 reps	3 3	35 25	12 Yes
8	Driscoll et al. 2004	Aerobic exercise stationary bicycle Resistive exercise	60-75% HRmax	5 min warm-up 20-30 min exercise 5 min cool-down	3	36	12 Yes
9	Rojas et al. 2003	Aerobic exercise Resistive exercise	NI 60-80% HRmax 60-70% RM/4 80% RM/12	10 min warm-up 25 min exercise 10 min cool-down 2-3 sets 8 reps	3 3	24 50	12 NI
10	Grispoon et al. 2000	Aerobic exercise stationary bicycle Resistive exercise dynamic	60-70% HRmax 60-70% RM/6 80% RM/6	30 min exercise 15 min cool-down 2 sets, 8 reps 2 sets, 8 reps	3	30	12 Yes
11	Rigsby et al. 1992	Aerobic exercise Resistive exercise	60-80% HRmax NI	2 min warm-up 30 min exercise 3 min cool-down 1-3 sets 6-18 reps	3	36 24	12 NI

HRmax = heart rate maximum; HRres = heart rate reserve; RM = repetition maximum; reps = repetitions; NI = no information.

# Interventions to Address Chronic Disease and HIV: Strategies to Promote Exercise and Nutrition Among HIV-Infected Individuals



# Dépenses par type de soins ambulatoires



**Note :** Échantillon des 65 ans et plus vivant en ménage ordinaire. Statistiques pondérées.

**Lecture :** Parmi les 65 ans et plus vivant en ménage ordinaire, les individus fragiles ont dépensé en moyenne 5 000 € en soins ambulatoires en 2012, dont près de 3 000 € en prestations sanitaires (médicaments, matériel sanitaire, etc.). Ces statistiques sont représentatives de la population vivant en ménage ordinaire en France métropolitaine, mais ne sont pas ajustées des caractéristiques démographiques, socio-économiques, ou de santé des individus.

**Source :** Irdes, ESPS et Assurance maladie.

Nicolas Sirven, IRDES. Vieillissement ,fragilité et dépenses de santé. Disponible sur le site :  
<http://www.irdes.fr/recherche/questions-d-economie-de-la-sante/216-vieillissement-fragilite-et-depenses-de-sante.pdf>



# Conclusion

- Que du bon sens.....
- Et pourtant si difficile à observer !
- Programmes personnalisés/multidisciplinaires
- Mieux connaître le vieillissement sous des aspects différents de la maladie
- Agir en amont
  - Lutte précarité
  - Lutter contre la malnutrition
  - Lutter contre la sédentarité

# Remerciements

- All patients participants
- VISAGE Study Group
- AP-HM & AMU:



Assistance Publique  
Hôpitaux de Marseille



- CGD13:



- S. Bregigeon, *MD*
- A. Darque, *MD*
- P. Enel, *MD*
- N. Petit, *MD*
- I. Ravaux, *MD*
- K. Baumstark, *MD*

- General Hospital:
  - Aix: T. Allègre, *MD*
  - Avignon: G. Pichancourt, *MD*
  - Digne: P. Granet, *MD*
  - Gap: L. Pelissier, *MD*
  - Hyères: S. Chadapaud, *MD*
  - Marseille, Hop. Européen: P. Philibert, *MD*
  - Marseille, Hop. Saint-Joseph: F. Tollinchi, *MD*
  - Martigues: R. Cohen-Valensi, *MD*
  - Toulon: J.P. De Jaureguiberry, *MD*
- COREVIH HIV Network:
  - Clinical research engineers
- Funding:
  - GILEAD
  - Aging research's tender AP-HM & CGD13, 2012



Contact : [docteur.olipet@wanadoo.fr](mailto:docteur.olipet@wanadoo.fr) & [fretornaz.cgd13@e-santepaca.fr](mailto:fretornaz.cgd13@e-santepaca.fr)