



Frailty in Late Life: attempted working definition and dynamics between Independence and ADL Dependence

- Results from Swilsoo -

Edith Guilley, Franca Armi, Paolo Ghisletta, & Christian Lalive d'Épinay

Center for Interdisciplinary Gerontology,
University of Geneva, Switzerland

57th Annual Scientific Meeting - GSA, Washington, Nov. 2004

Objectives

1. To propose a multi-dimensional definition of frailty (*adapted from the literature*) and estimate its predictive validity
2. To study individual health transitions (*reversibility of frailty, decline towards ADL dependence*)

Participants to Swilsoo

(Swiss Interdisciplinary Longitudinal Study on the Oldest-Old)

- Primary Investigator: Prof. Christian Lalive d'Épinay
- Supported by the Swiss National Science Foundation and the Cantons of Geneva and Valais
- 1994: 340 individuals between 80 and 84 years of age (born between 1910 and 1914)
- 1999: 376 individuals between 80 and 84 years of age (born between 1915 and 1919)
- Residing at home at study inception
- Sample stratified by gender (~50% F) and region (~50% urban and ~50% semi-rural)

Participants to Swilsoo

Wave/year	1 st cohort (N)	2 nd cohort (N)	Interval in months
1994	340	-	18
1995	267	-	12
1996	237	-	12
1997	209	-	18
1999	172	376	18
2000	128	289	12
2001	100	247	12
2002	80	212	18
2004	59	173	

Attempted working definition of frailty and its predictive validity

Frailty dimensions in the literature

Frailty: not restricted to a single domain

- manifests itself in different ways according to the person
- presents itself as a constellation of many conditions

(Hamerman 1999; Rockwood et al. 2000)

Dimensions of frailty

- **physical**
- **nutritional**
- **cognitive**
- **sensory**

(Lundin-Olsson et al. 1998; Strawbridge et al. 1998; Chin A Paw et al. 1999; Lebel et al. 1999; Fried et al. 2001; Mitnitski et al. 2002)

- **specific illnesses** (diabetes, hypertension, depression, dementia)

(Lundin-Olsson et al. 1998; Mitnitski et al. 2002)

Frailty markers : self reports of problems

adapted from Strawbridge et al. (1998), J of Gerontol: Soc. Sc., 53B, 9-16

Mobility

- « Can you ... alone »
- 1/ go up and down stairs
- 2/ move around outside
- 3/ walk 200 meters

2/ yes, but with difficulty
3/ no

Sensory

- « Can you ... »
- 1/ read a newspaper
- 2/ hear a conversation with two peoples
- 3/ hear a conversation with many peoples

2/ yes, but with difficulty
3/ no

Physical ailment

- « Which part of body may cause suffering »
- 1/ lower limbs
- 2/ upper limbs
- 3/ head, face
- 4/ back
- 5/ heart
- 6/ respiratory organs
- 7/ stomach, abdomen
- 8/ genital, urinary organs
- 9/ chest
- 10/ fever

3/ yes, a lot

Frail : at least two deficiencies across the five dimensions

Energy

- 1/ I'm tired
- 2/ I'm not hungry

2/ often or always

Memory

Have you some problems with your memory?

3/ often
4/ always

ADL dependence

Activities of Daily Living (Katz et al. 1963)

« Can you ... alone »

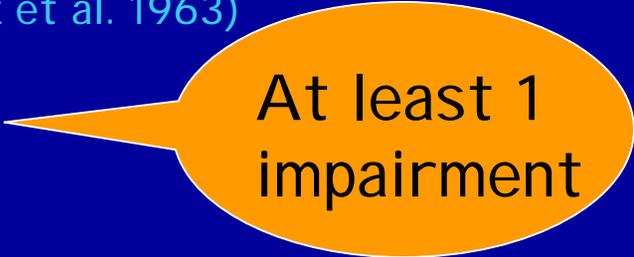
1/ wash

2/ dress

3/ eat

4/ rise and go to bed

5/ move around indoors



At least 1
impairment

Beckett et al., 1996; Boult et al., 1994; Mendes de Leon et al., 1999;
Seeman, Bruce, & McAvay, 1996

- ADL dependence is more and more considered as a possible consequence of frailty

Are frailty and ADL dependence distinct conditions?

Frailty and ADL dependence

		Frailty	
		Yes	No
ADL dependence	Yes	36	4
	No	170	129



Frailty and ADL dependence are distinct conditions

Health status in 3 categories

Independent

Not frail, not
ADL
dependent

Frail

Frail but not
ADL
dependent

Dependent

ADL
dependent
and frail

Predictive validity of health status

Frailty



Loss of reserves and
resilience by the old person



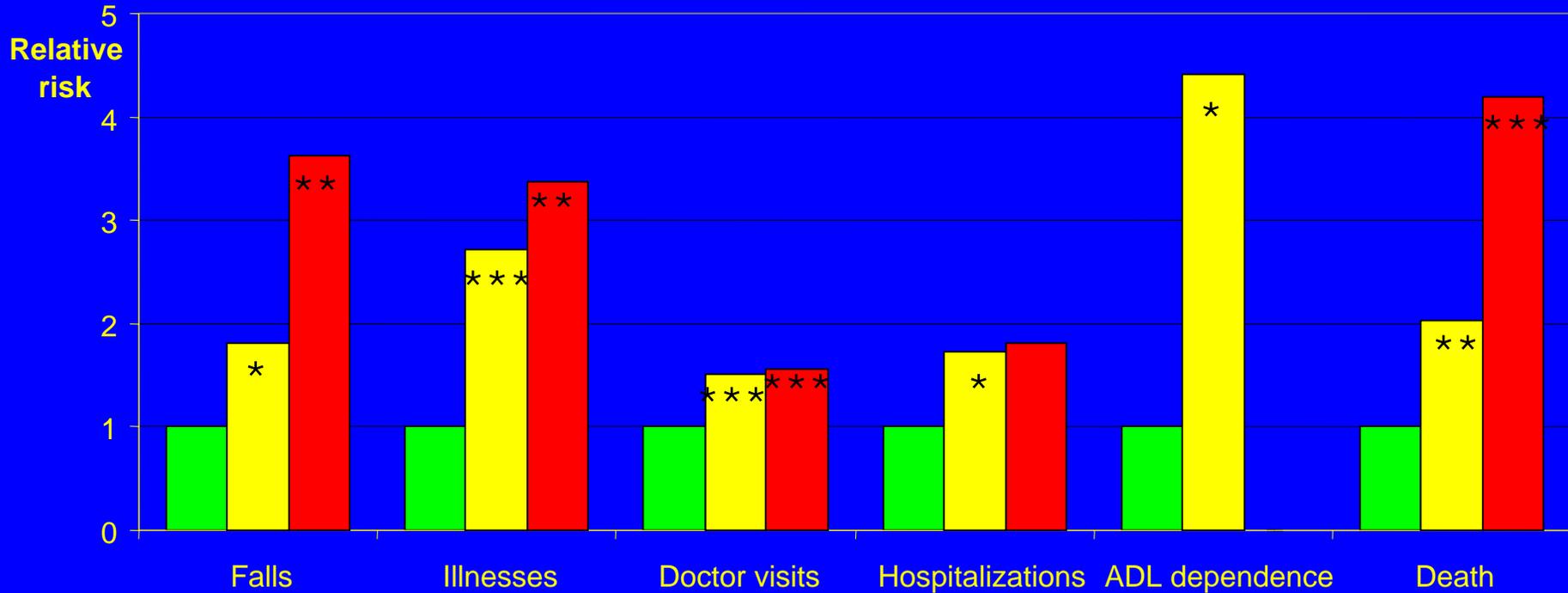
Risk situation

Frail people are at increased risk of **falls** and **successive illnesses**, which may lead to **hospitalization**, **dependence** and **death**

Health Status:

Should be able to **predict these adverse outcomes**

Predictive validity of health status



1 wave after baseline evaluation of health status

n=267

5 years after

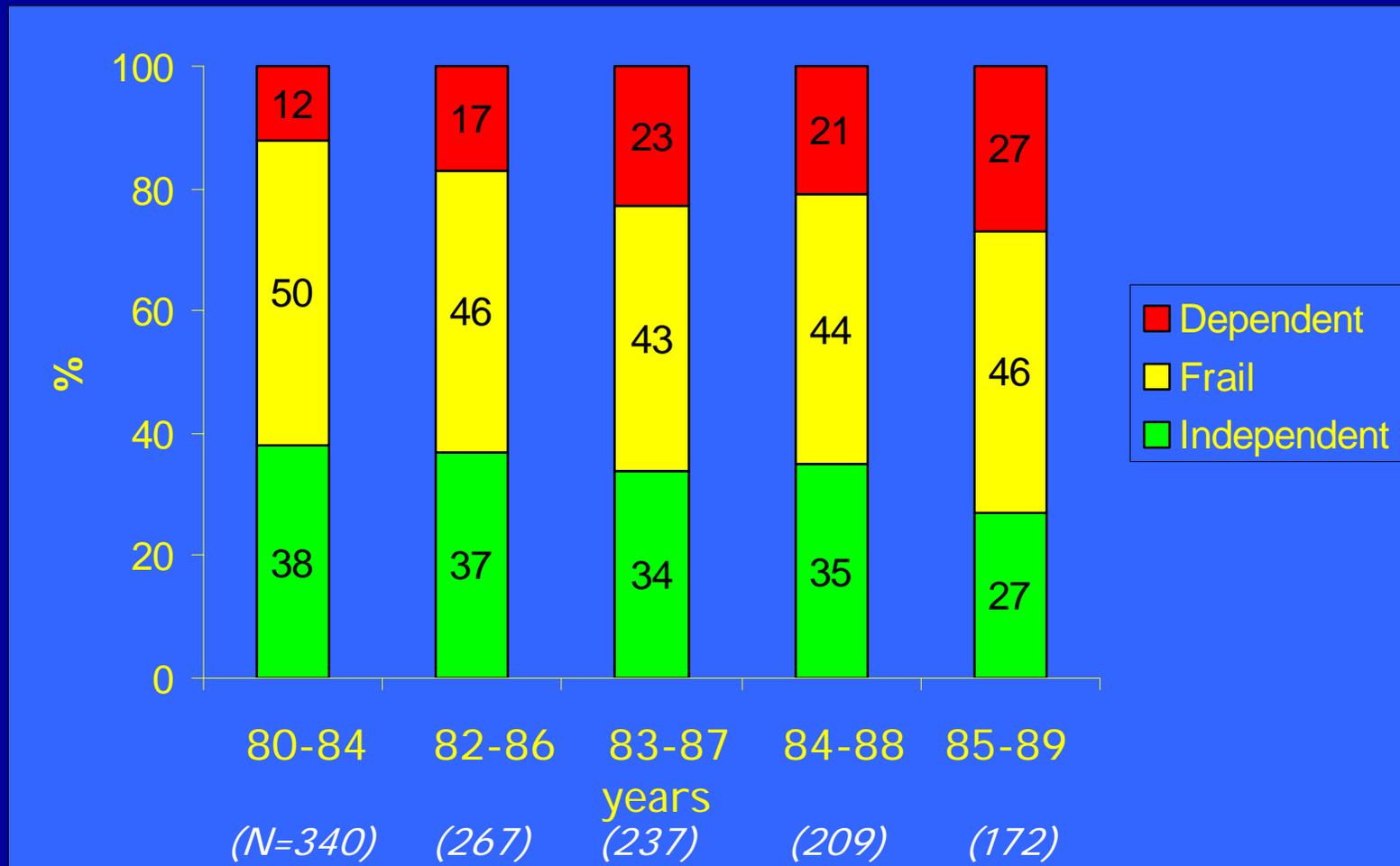
n = 340

- Independent
- Frail
- ADL dependent



Frailty: a high-risk state predictive of a range of adverse health outcomes.

5-wave evolution of health status



Frailty - not dependence - is a leading situation among octogenarians

Relative risk of frailty and ADL dependence by socio-demographic variables *(at baseline)*.

	Frail <i>versus</i> independent (n=299)	Dependent <i>versus</i> independent (n=169)
Gender (<i>female</i>)	1.44	0.77
Area (<i>urban</i>)	1.26	0.34*
Socioeconomic status (<i>medium/upper</i>)	0.50**	0.38*
Marital status (<i>married</i>)	1.18	0.76
Age	1.14	1.26

The prevalence of frailty is lower among medium/upper socioeconomic status but does not depend on gender.

Individual health transitions between frailty and dependence

Three questions:

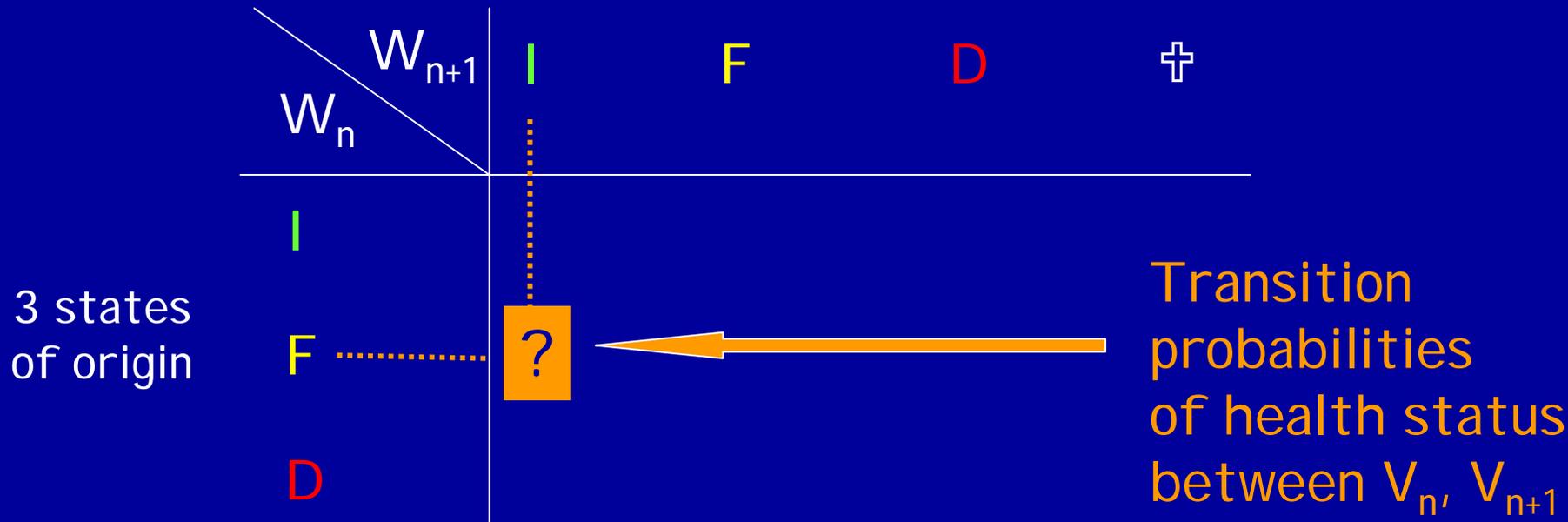
- ① Does frailty lead to a rapid decline towards dependence?
- ② Is frailty always a precursor of dependence?
- ③ Is it possible to recover from frailty?

Markov chain model

With the collaboration of A. BERCHTOLD, Institute of Applied Mathematics, Uni. Lausanne, Switzerland

- 1st order – any 2 successive waves

4 destination states



- 2nd order – any 3 successive waves

Complementary information but less precise estimation

Does frailty lead to a rapid decline towards dependence?

$n = 965$ trajectories

12 or 18 months

4 destination states

3 states of origin

W_n \ W_{n+1}	I	F	D	+
I	0.62	0.30	0.03	0.04
F	0.17	0.59	0.16	0.08
D	0.03	0.14	0.60	0.23



Stability is the predominant pattern

Does frailty lead to a rapid decline towards dependence?

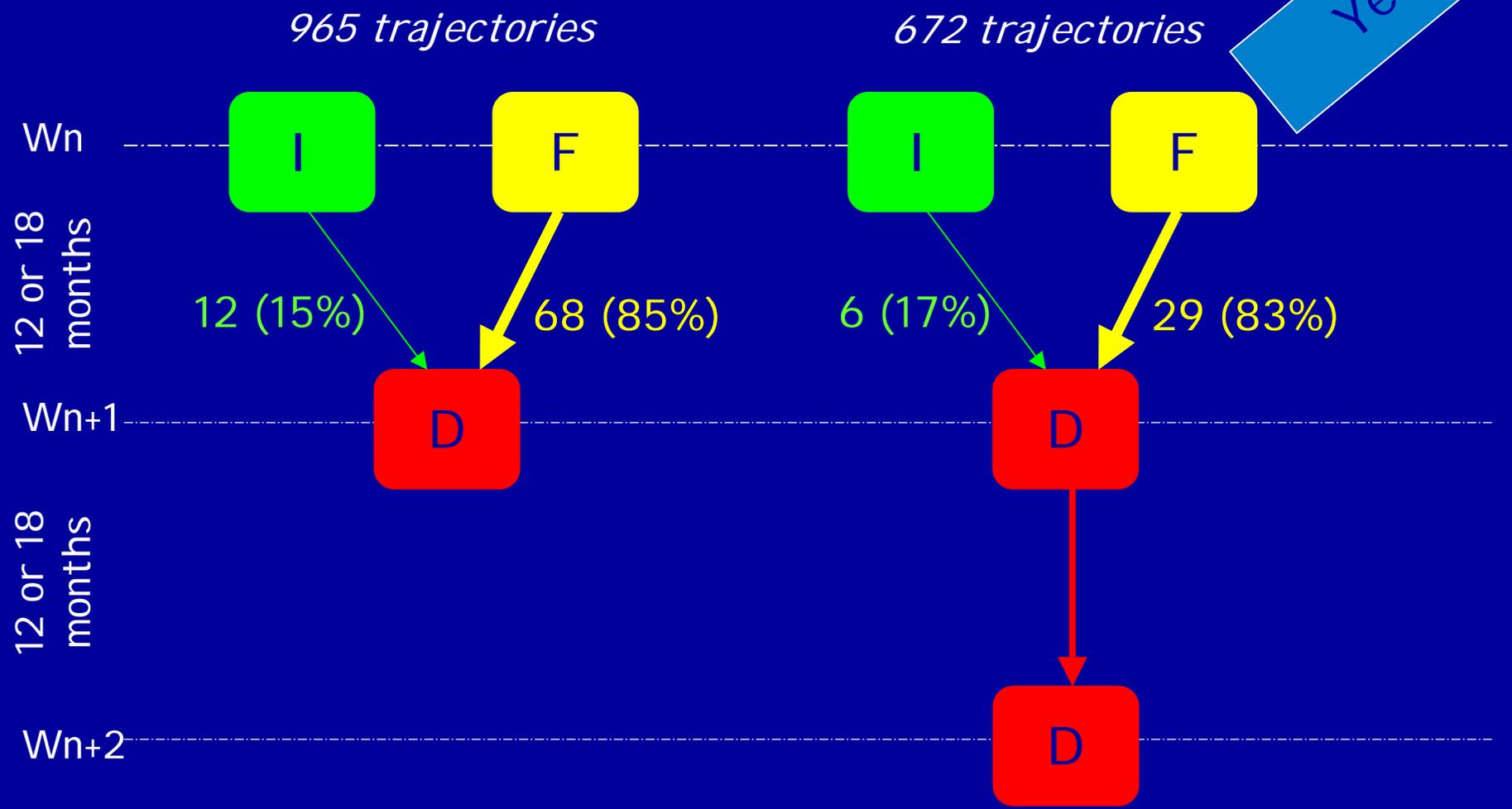
NO

	3 successive waves (~3 years)		4 successive waves (~4 years)		5 successive waves (5 years)	
		N		N		N
The 3 most frequent trajectories	F - F - F	134	I - I - I - I	69	I - I - I - I - I	28
	I - I - I	127	F - F - F - F	61	F - F - F - F - F	16
	D - D - D	84	I - F - F - F	25	I - F - F - F - F	14

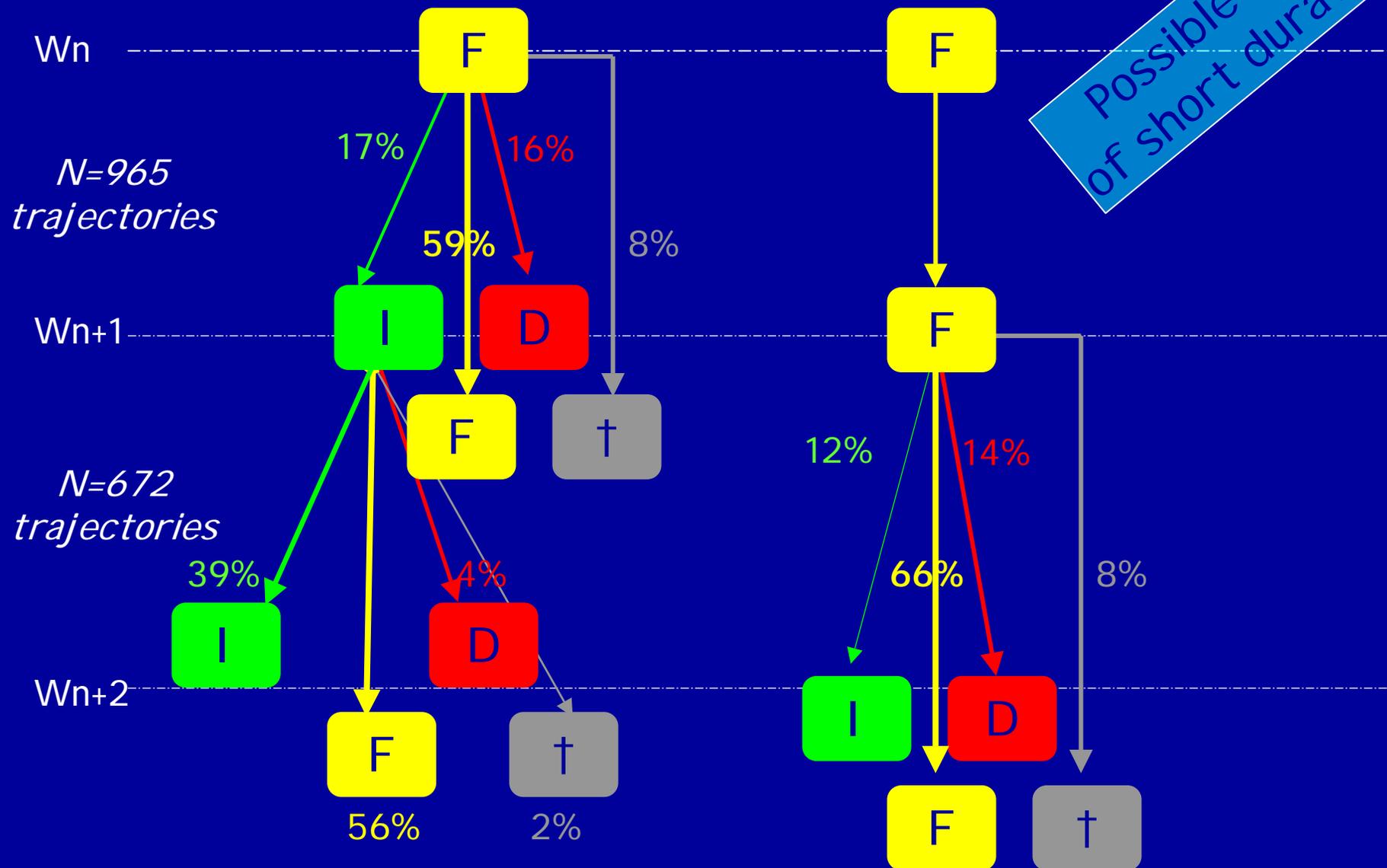


Frailty is a lasting situation

Is frailty a precursor of dependence?



Is it possible to recover from frailty?



Summary

1. We proposed a multi-dimensional definition of frailty and estimated its predictive validity.
2. Frailty and ADL dependence are distinct conditions.
3. Frailty is a leading and a lasting situation among octogenarians, from which ameliorations are possible but most often of short duration.

The next presentation: identify the consequences of frailty with respect to social networks and activities.

Thank You

edith.guilley@cig.unige.ch

franca.armi@cig.unige.ch

paolo.ghisletta@cig.unige.ch

christian.lalive@socio.unige.ch

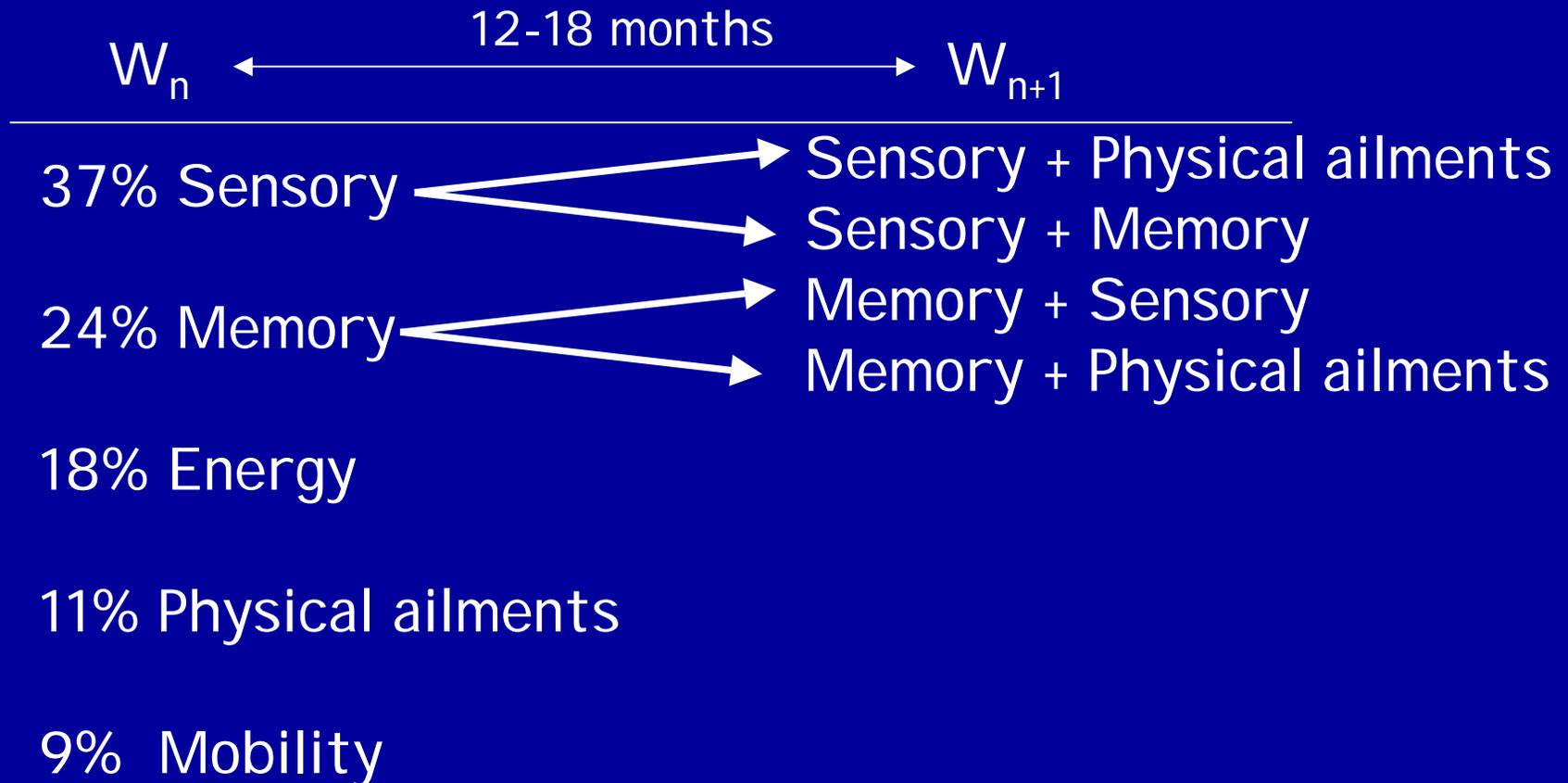
For additional information:

Poster session : 11/22/04 3:15PM-4:45PM

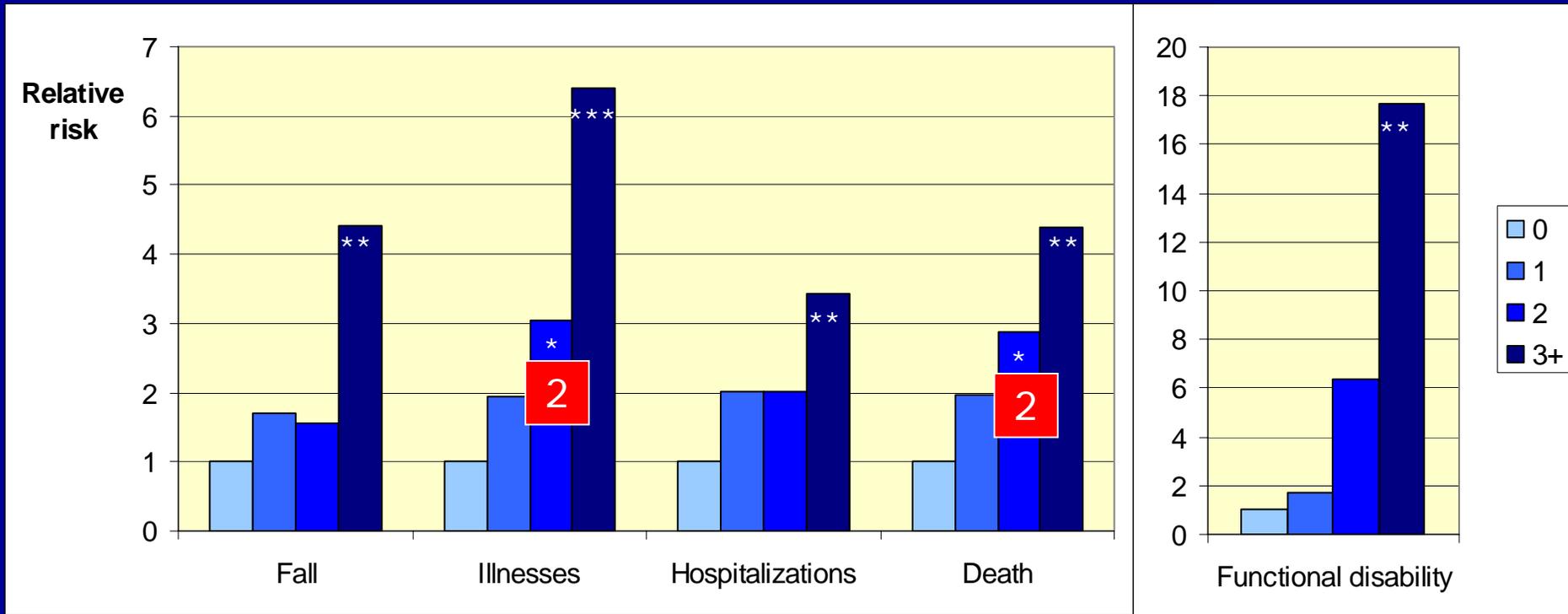
Marriott Balcony A

**"Individual Health Transitions between Frailty
and Dependence in Late Life"**

Series of affected dimensions



Predictive validity by number of affected dimensions



Dynamic of frailty

Wilcoxon test on number of self-reports of problems (from 0 to 19) according to health transitions on two successive waves.

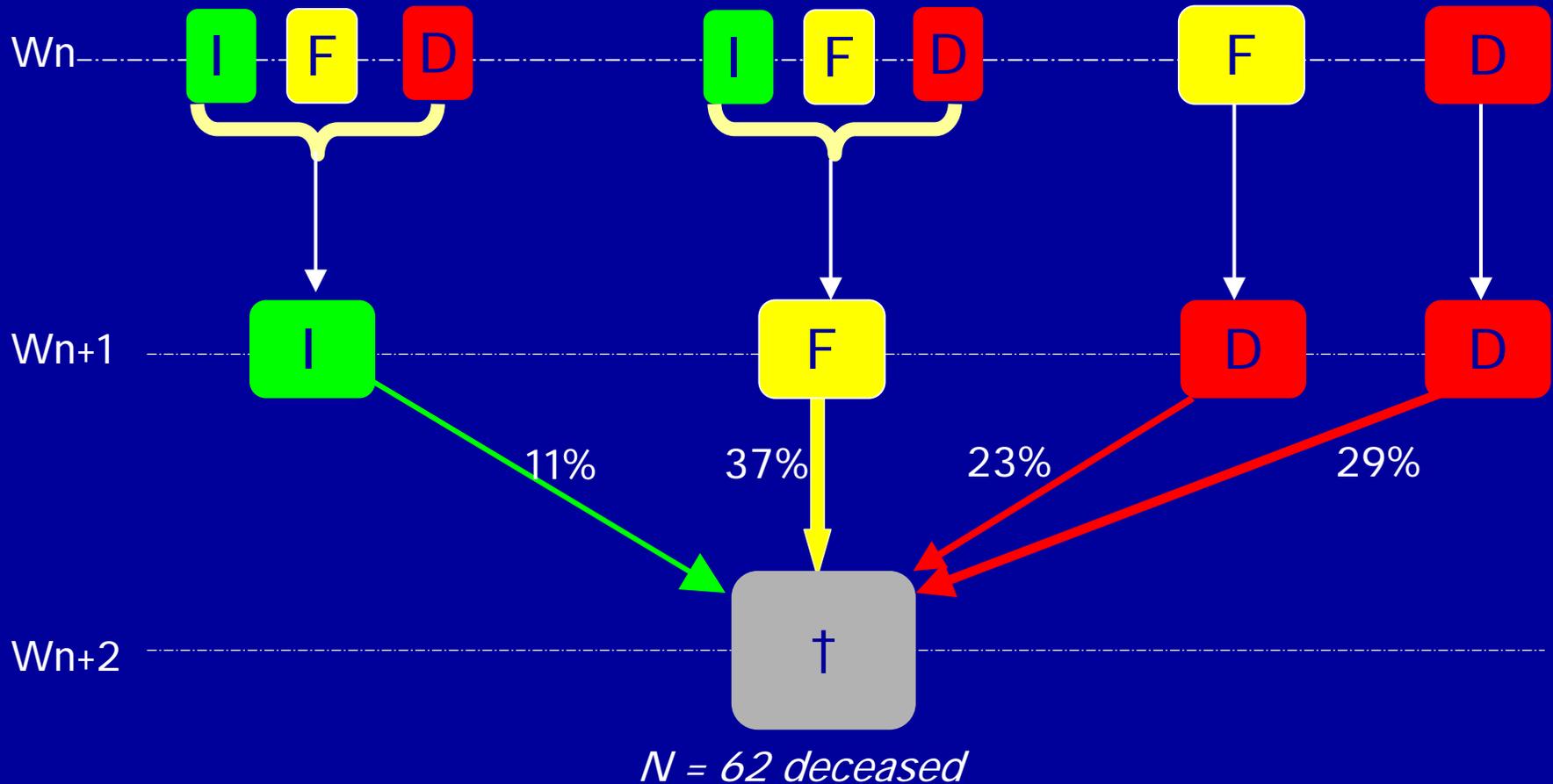
W_n	W_{n+1}	Frequency (%)	Z - test	Evolution
I	I	25	-0.23	⇒
I	F	12	-8.24***	↗
F	I	8	-6.73***	↘
F	F	30	-2.56*	↗
F	D	8	-6.16***	↗
D	D	12	-1.49	⇒

The arrows indicate stability (⇒), increase (↗) or decrease (↘) of number of self-reported deficiencies, respectively.

The other health transitions (ID, DI, DF) were experienced by a small number of persons and were not considered here.

* $p < .05$; *** $< .001$

Long-term dependence is not necessarily the last (health) stage of life



A majority of the oldest old die without having to suffer from long-term functional dependence

Associations between 5 dimensions of frailty (Cramer's V)

