

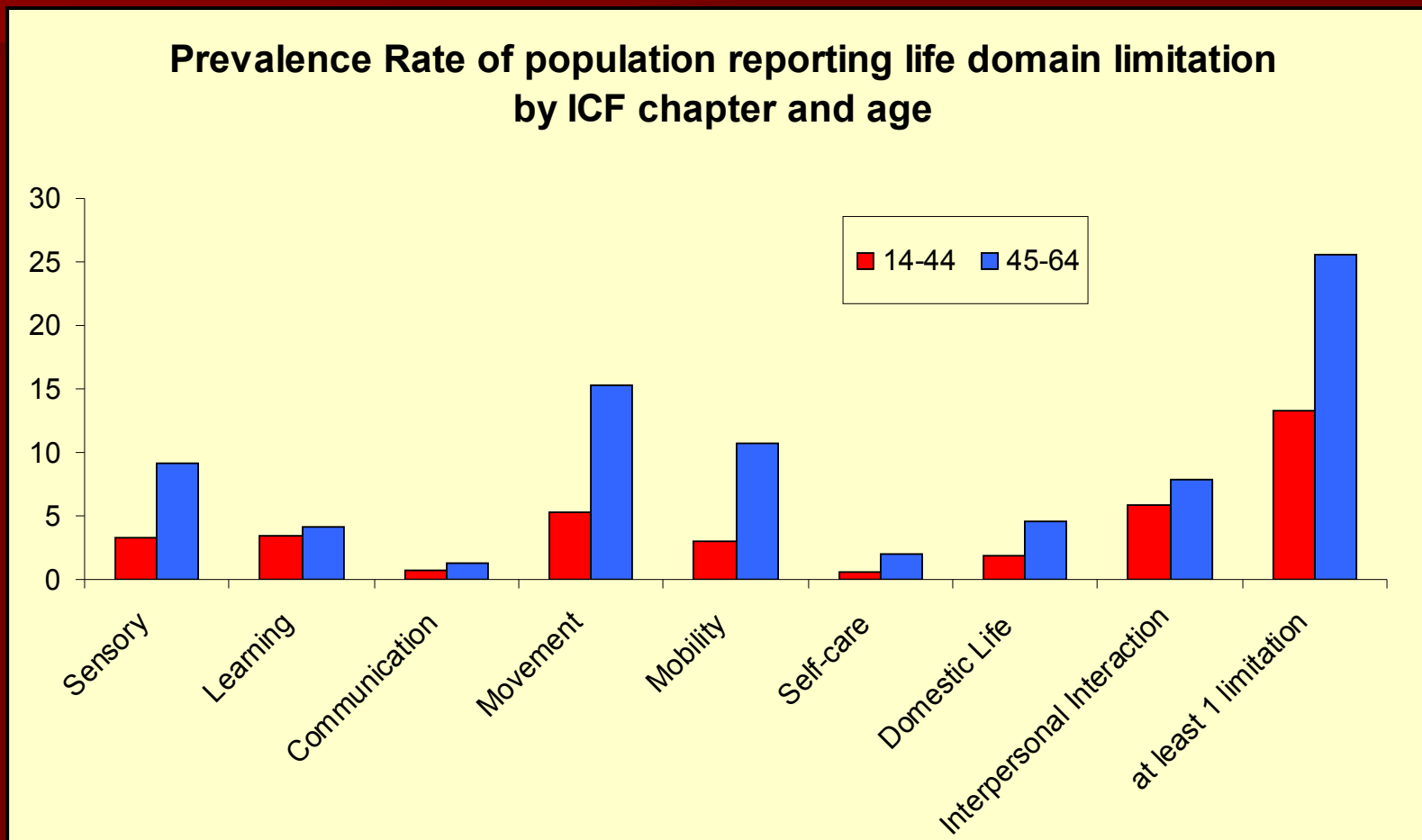
Work Ability and Health Status in Dialysis Patients

Neri, L., Costa, G., Rocca-Rey, LA., Fichera, G., Gallieni, M., Brancaccio, D.

Demographic transformations in the XXI century

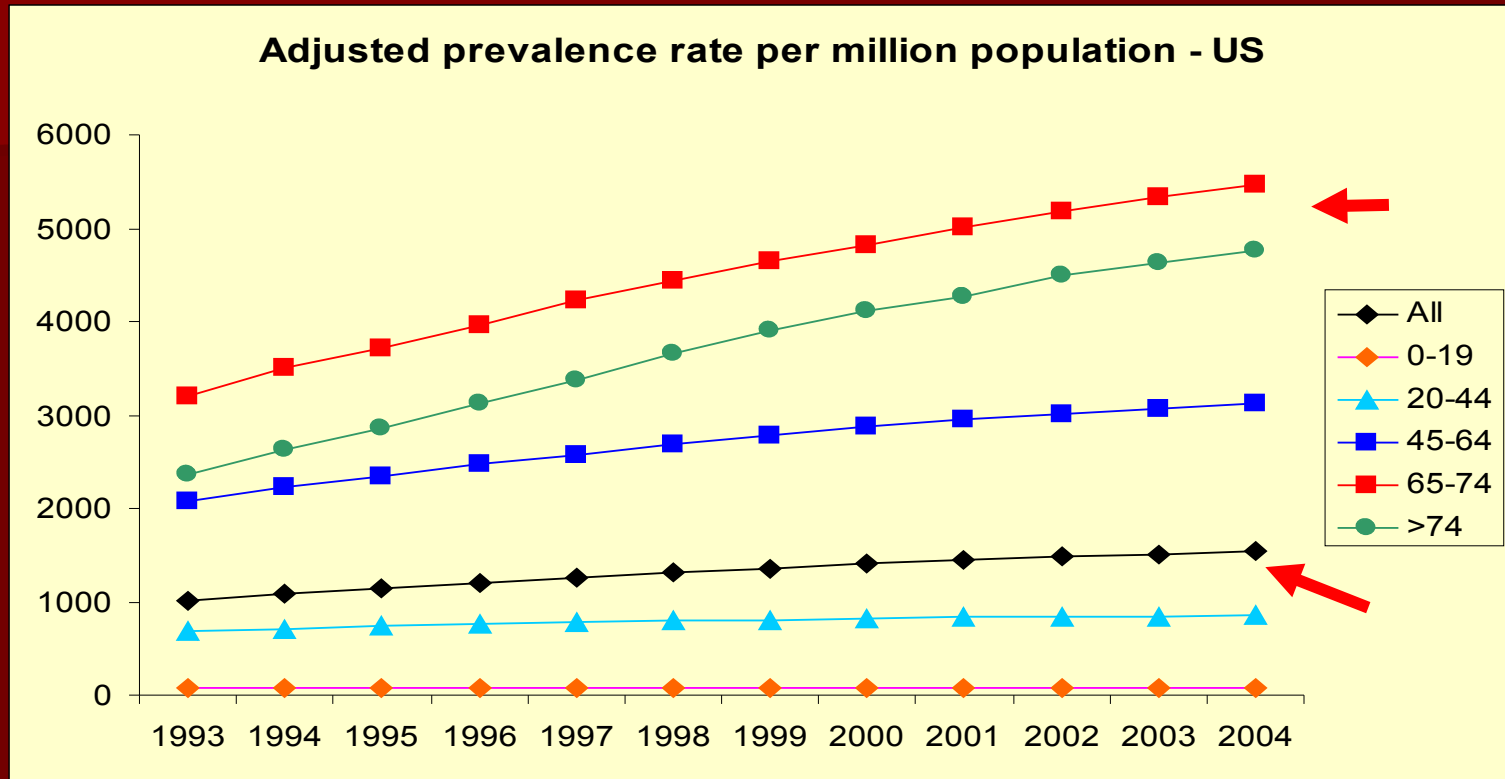
- **By 2020 the 20% of US population will be older than 65 years** (O'Donnel, MP, 2002).
- **By 2050, 20% of world population will be older than 60 years.**
- **Within 15-20 years the workforce of developed countries will decrease by 1% per year. This trend is much stronger in Europe than in US.**

Prevalence of disability in the working-age population



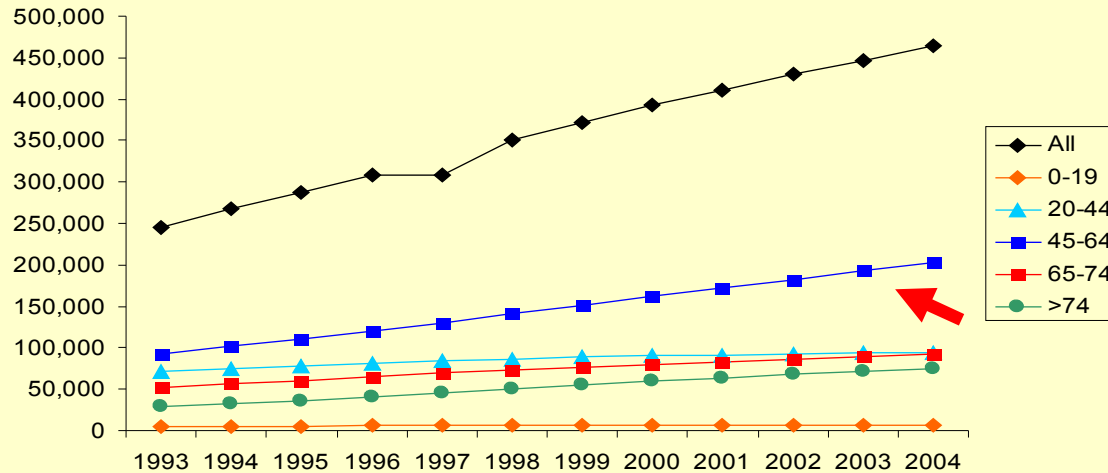
Fedeyko, L and Lollar DJ, 2003. The National Health Interview on disability.

Prevalence of ESRD

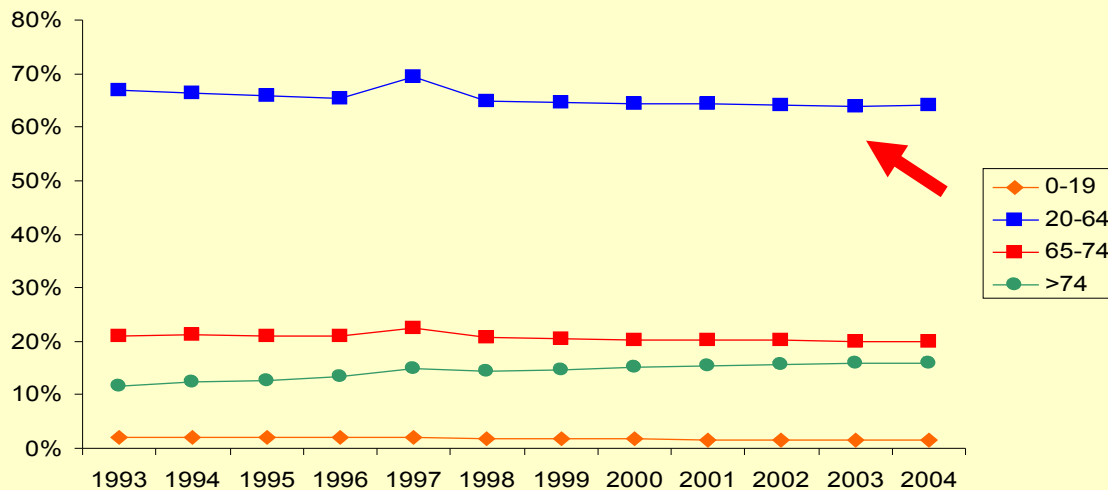


In 2004 patients with ESRD were 0.6% of overall Medicare population and accounted for 6.7% of total economic expenditure of the program. [USRDS 2006: Annual Data Report]

Point Prevalent count of reported ESRD in US



Proportion of working-age patients in the ESRD population

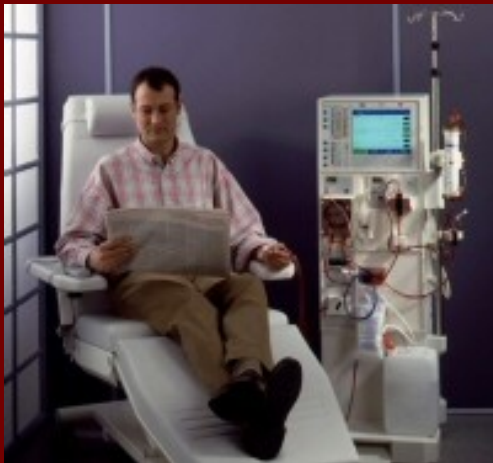


- According to USRDS data only 22% of patients are employed at Dialysis onset and 70% loose their job within 1 year.
- The employment rate of hemodialysis patients in the US ranged between 11% to 50% in previous surveys.
- Most industrialized countries consider ESRD patients unable to work and eligible for Social Security Benefit.
- As the Chronic Kidney Disease progress the cost of current Social Security provisions may become financially unsustainable unless a larger share of patients return to work.

ESRD patients: Functional limitations (2)

Hemodialysis (HD)

Peritoneal Dialysis (PD) Kidney Transplant (KTX)



ESRD patients: Functional limitations (2)

	HD	PD	KTX
Life Expectancy at 20-64 yrs of age ^(a)	~ 4 - 14 years	~ 4 - 14 years	~ 10 - 37 years
Hospitalizations (days/patients*year) ^(a)	14.6	14.4	5.8
Cardiovascular Diseases ^(a)	++++	+++	+
Digestive diseases ^(a)	+	++	+
Endocrine/Metabolic Disease ^(a)	++	++	+
Autonomy with Care ^(b,d)	Poor	Good	Good/Excellent
Ability to Travel ^(b,d)	Poor	Good	Excellent
Logistical restrictions	Strong	Moderate	None
Dietary Restrictions ^(b,d)	Strong	Moderate	GFR dependent
Physical SF-36 Composite ^(b,c,d)	Poor	Poor	Normal
Mental SF-36 Composite ^(b,c,d)	Normal	Normal	Normal
Time required for therapy	4 hours, 3 times/week	20'- 40', 3-4 exch/day	N/A

(a) US Renal Data System, Annual Report 2006: <http://www.usrds.org/reference.htm>

(b) Wu AW. Changes in Quality of Life during Hemodialysis and Peritoneal Dialysis Treatment: Generic and Disease Specific Measures, JASN, 2004

(c) Diaz-Buxo JA Quality-of-Life Evaluation Using Short Form 36: Comparison in Hemodialysis and Peritoneal Dialysis Patients. AJKD, 2000

(d) Fiebiger W. Health-related quality of life outcomes after kidney transplantation. Health and Quality of Life Outcomes, 2004

ESRD and Work: state of the art (1)

Factors affecting the employment status of dialysis patients can be grouped in 4 classes:

- ✓ **Demographic (age, gender, residence, race, etc)**
- ✓ **Psychological (subjective assessment of Work Ability and QoL, social support, stress related symptoms, etc)**
- ✓ **Medical (physical and cognitive impairment degree, mode and adequacy of dialysis, adequacy of rehabilitation program, comorbidity, etc.)**
- ✓ **Occupational (incentives/disincentives to retirement, job tasks and exposures, working times and schedules, previous employment status)**

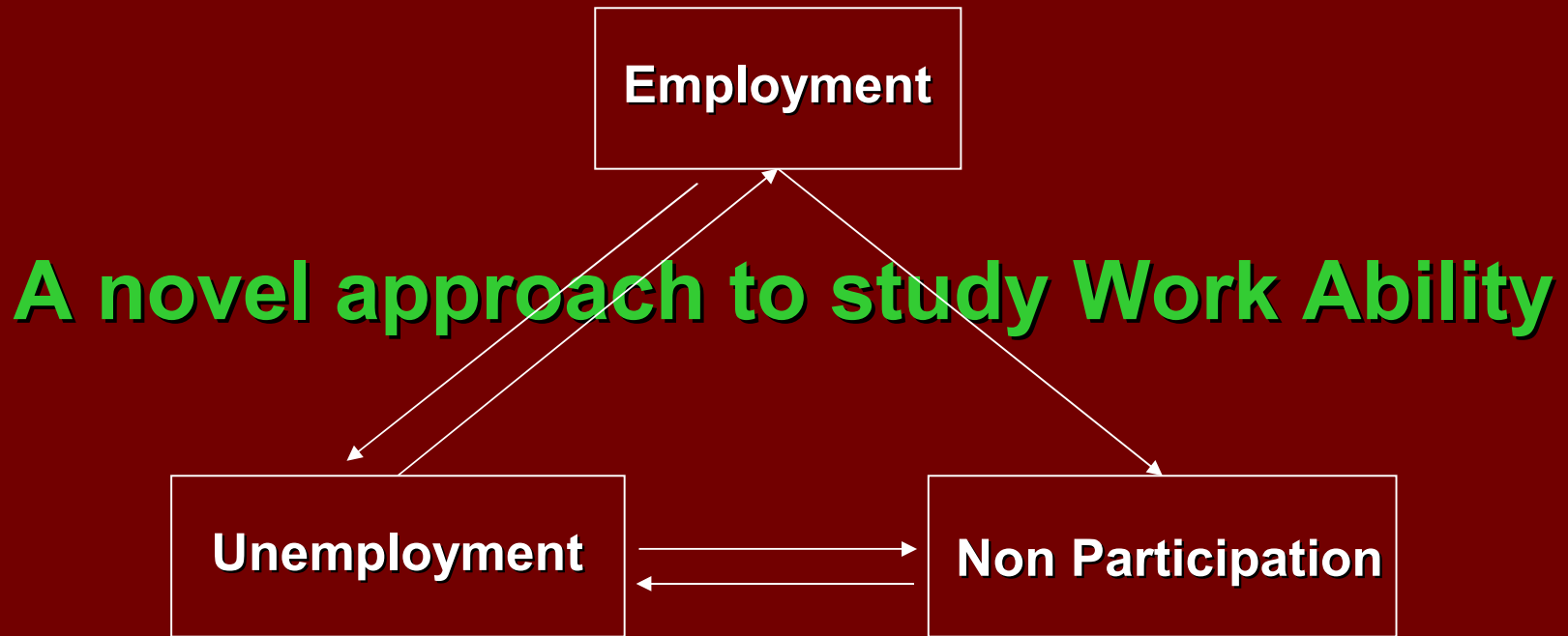
ESRD and Work: state of the art (2)

“These analyses demonstrated that neither the published literature nor the DMMS wave 2 data could ...” help define valid and reliable predictors of Ability to Work in ESRD patients

“Answering these questions require a large-scale prospective study of patients who are followed at least 1 year to monitor their functional, psychological and disability status”

(Agency for Healthcare Research & Quality, Evidence report 1-60, 2000 - <http://www.ahrq.gov/clinic/epcsums/renalsum.htm>)

Employment dynamic



Which questions then?...

To understand ESRD patients Work Ability we should investigate the two processes implicated in the employment dynamics:

- ✓ Which factors prevent incident dialysis patients finding a job?
- ✓ Which factors determine early exit from work among incident employed dialysis patients?

Pilot study

Targets:

- 1. To describe aspects of hemodialysis patients' occupational adjustment.**
- 2. To assess the suitability of an occupational adjustment measure, the Work Ability Index in hemodialysis patients.**
- 3. To estimate sample size requirements for future research.**

Design

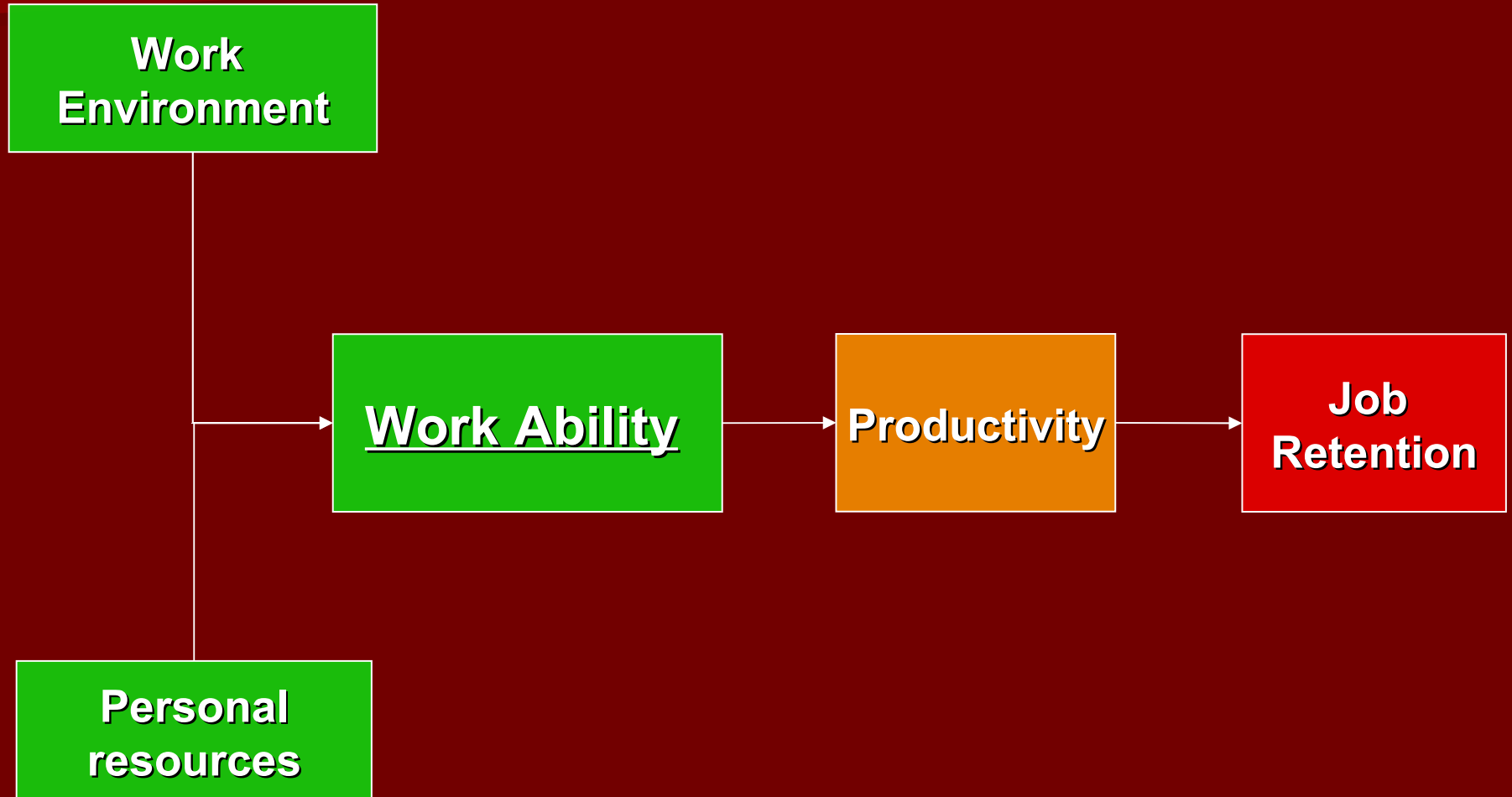
Subjects:

- 40 employed HD subjects, aged between 18 and 67 years.
- International labor office definition for employment.
- Able to read and write in English.

Design:

- **Baseline:** socio-demographic characteristics, occupational background and adjustment to work activity.
- **Follow-up:** 4 weeks, sick leave rate assessment.

Work Ability and Job Retention



Measures

Outcomes

- ✓ **Work Ability Index:** 7 subscales and a summary score
- ✓ **Sick Leaves:**
 - Cumulative duration
(Sick_Days/Working_Days)*(Working_Days_Year)
 - Frequency of spells
 - Frequency of long spells (>75th percentile of cumulative time lost)

Measures

Predictors

Personal resources and characteristics: age, gender, ethnicity, family composition, education, perceived health status, family income, hourly income, insurance modality

Occupational Background: job security, job tasks, occupational role, productive sector (ISIC 3 classification), OSH programs, Control Over Working Times (COWT), Effort/Reward Imbalance (ERI), Work-to-Family Conflict (WFC)

Measures

- **Work-to-Family conflict (WFC)**: role pressure from the work and family domains. WFC is high when these roles are mutually incompatible.
- **Effort-Reward Imbalance**: occupational stress. Failed reciprocity elicits strong negative emotions and sustained stress responses (Smith, 2004).
- **Control Over Working times**: flexibility of working times, an important organizational resource for HD patients.
- **KDQOL-36**: disease-specific and generic quality of life. From the KDQOL we have also estimated the SF-6D, a utility measure, using a mapping equation.

Analysis

Internal consistency of ERI, WFC or COWT scales: Cronbach's alpha coefficient with 95% confidence intervals;

WAI psychometric internal consistency: inter-item and item-total correlation matrix;

WAI construct validity: correlations and linear regression of WAI with other constructs measured concurrently;

Association of WAI and sick leave: Differences in the cumulative duration of sick leave between subjects with poor versus normal/excellent WAI were tested with the Mann-Whitney statistics. The Kolmogorov-Smirnov two-sample test assessed differences in distribution shape. We used the Fisher's exact test to compare the proportion of long term absentees (>75th percentile) among poor versus normal/excellent WAI.

Results (1)

Socio-Demographic Characteristics		
	N=40	%
Gender		
Female	10	25%
Male	30	75%
Age		
18-46	19	48%
47-67	21	52%
Ethnicity		
African-American	29	73%
Other	11	28%
Family Composition		
Living with stable Partner	16	40%
Single/lone parent	24	61%

Occupational Background		
	N=40	%
Employment last 6-mo		
Yes	36	90%
No	4	10%
Industrial Sector (a)		
Manufacturing	9	22,5%
Services	30	75,0%
Not Classified	1	2,5%
Job Type		
Blue Collar	17	43%
White Collar	23	57%
Family Income*		
Low (<\$50,000)	31	78%
Medium (\$50,000-\$75,000)	7	18%
High (>\$75,000)	2	5%

a: subjects originally classified into 17 categories according to the ISIC 3 classification of production sector and then collapsed into 3 classes: agriculture, service, manufacturing.

*Classification by the USDC Bureau of Census, Census of Population and Housing, 2000 (SF3)

Results (2)

Internal Consistency Reliability

	Cronbach's alfa	5% CI	95% CI
Effort Scale	0,83	0,75	0,89
Reward Scale	0,89	0,84	0,93
WFC*	0,94	0,91	0,96
COWT**	0,76	0,63	0,84

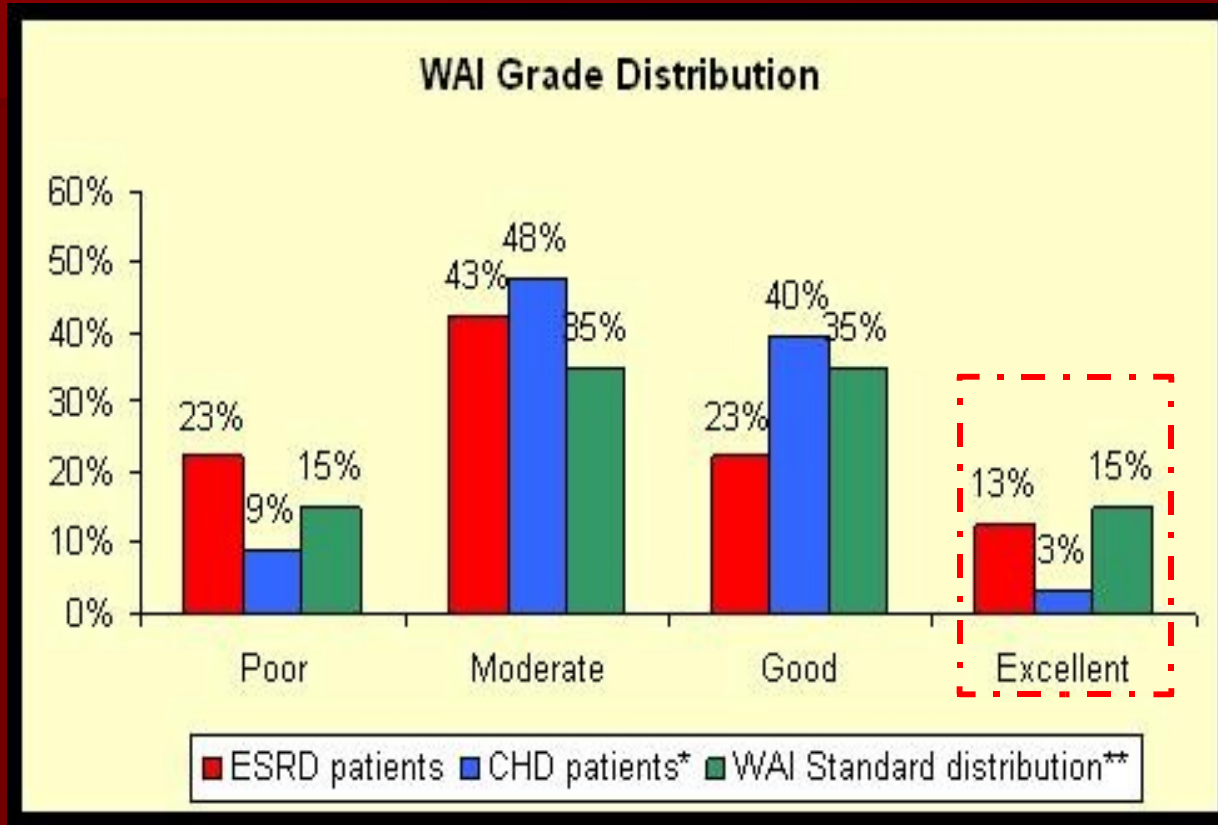
Cronbach's alfa of scales used to assess patient's adjustment to work activity.* WFC=Work-to-Family Conflict; COWT=Control Over Working Times;

Very low levels of occupational stress (ERI: mean=0.54; SD=±0.42) with only 3 values above 1 which indicates equilibrium between efforts and rewards.

High levels of control over working times (about 10% of subjects scored below 3, a value indicating intermediate job control)

Results (3)

Work Ability Index distribution in HD patients



* Jedryka-Goral A. et al. Work Activity and Ability in ageing patients suffering from Chronic Cardiovascular Disease. In Costa G. Assessment and promotion of Work Ability, Health and Well-being of ageing workers. International Congress Series 1280 (2005), 190-195, Elsevier.

**Tuomi et al Work Ability Index 2nd revised edition. Finnish Institute of Occupational Health, Helsinki, 1998.

Results (4)

WAI inter-item and item-total correlations

Inter-item correlations:

- ✓ Correlations coefficient ranged from 0.17 to 0.53.
- ✓ 8 out of 21 possible correlations among items were weak and not statistically significant
- ✓ Item 5 (self-reported sick-leave during the past 12 months) accounted for 5 of the 8 non-significant correlations

Item-total correlations:

- ✓ All correlations were moderate and statistically significant (range ρ : 0.5-0.77)
- ✓ Item 5 showed the worse correlation with total score ($\rho=0.5$)

Results (5)

Work Ability and Quality of Life

Quality of life:

✓ Our patients reported poor quality of life in the physical domain (mean PCS=37.6; SD= \pm 10.6) and only slightly impaired quality of life in the mental domain (mean MCS=48.9; SD=10.1).

✓ 70% of patients reported severe limitation in at least one of the SF-6D domains.

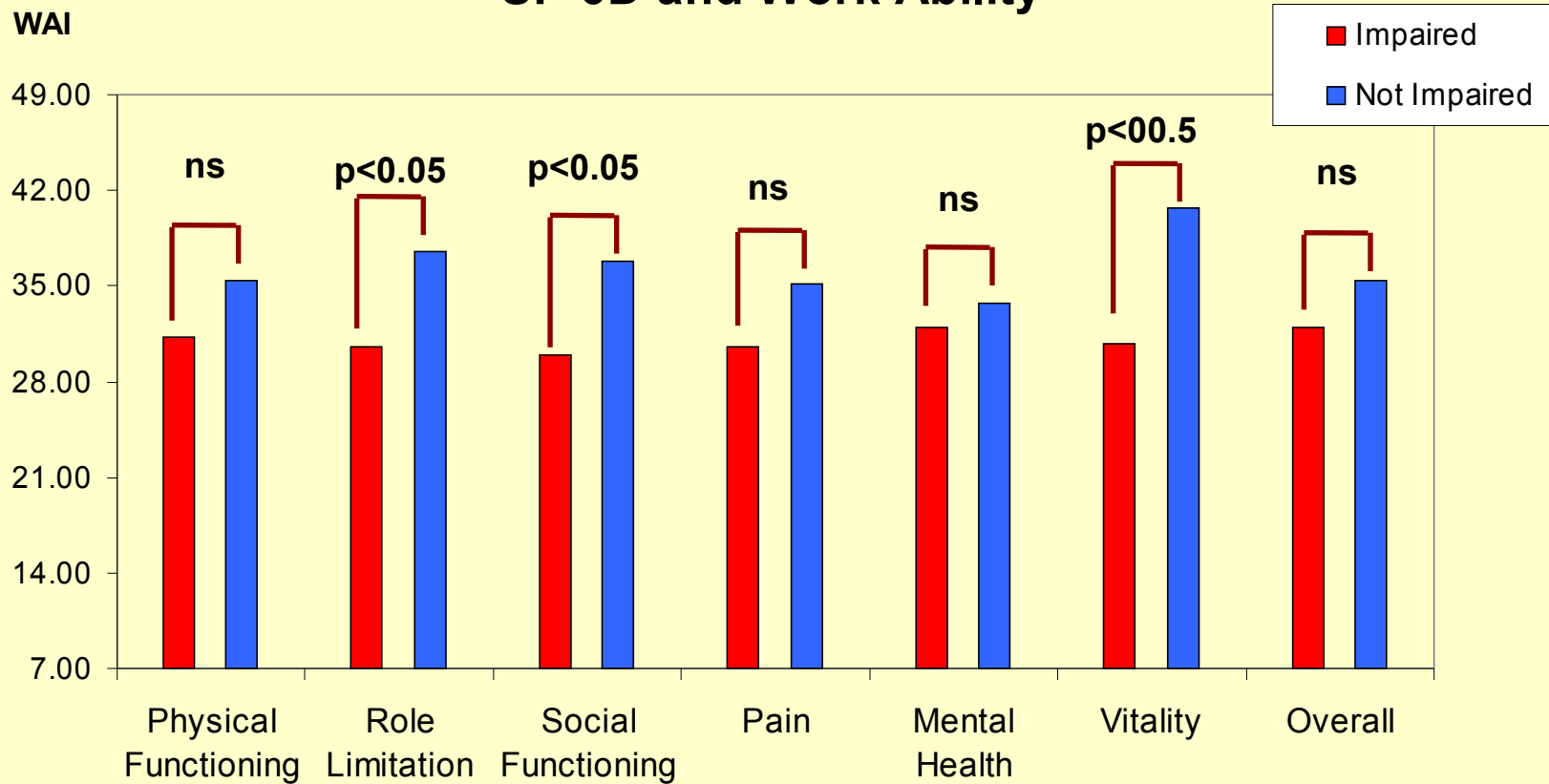
Correlations and regression:

✓ Both generic and disease specific quality of life scales were positively and strongly correlated to WAI (ρ range: 0.45-0.54, $p < 0.001$; β range: 0.49-0.56, $p < 0.001$).

✓ The Utility index, SF-6D, was strongly associated to WAI (ρ : 0.53, $p < 0.001$; $\beta = 0.47$)

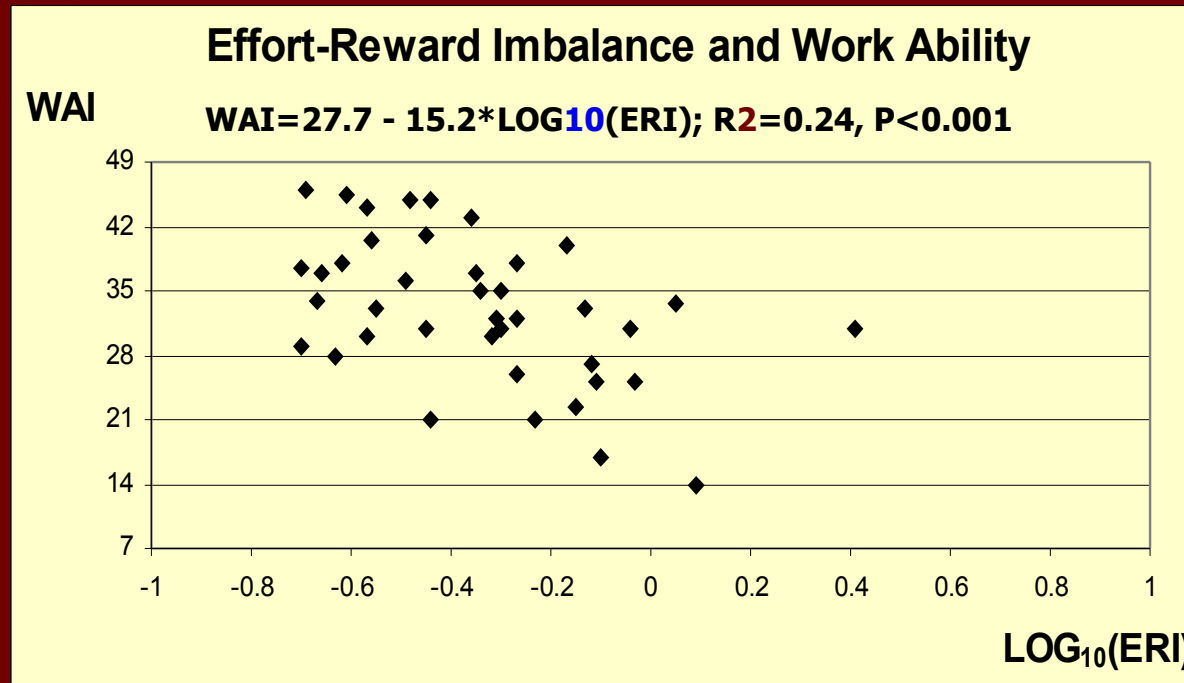
Work Ability and Quality of Life

SF-6D and Work Ability



Results (6)

Work Ability and Occupational Stress



Both scales defining stress, job demand and rewards from work activity, were associated to work ability ($\beta = -0.49, p < 0.001$ and $\beta = 0.18, p = 0.004$ respectively)

Results (7)

Sick Leave

	Count	(%)
No absence	18	60%
Short Term absence	5	16%
Long Term Absence	7	24%
Total	30	100%

Absenteeism patterns.
Long Term absence = overall duration > 75th percentile.

The average cumulative duration of sick leave extrapolated to 1 year was 51 (SD=90) days/year. The median absence rate was 0 (IQR=70).

The distribution of sick leave was extremely skewed.

Results (8)

WAI and Sick Leave

- ✓ Subject with poor Work Ability reported 3-fold higher aSLR than patients with normal/excellent work ability (103 vs. 35 sick_days/year; MW U= 45, $p=0.049$);
- ✓ The KS two-sample test was not significant (KS $z=1.022$, $p=0.25$);
- ✓ On the other hand MW p value was merely significant and post hoc power for this analysis was very poor ($\beta=0.63$);
- ✓ When 4 extreme values (aSLR=260days/year) have been excluded from the analysis the difference remained large but not anymore significant (40 vs. 14 sick_days/year; MW U= 33, $p=0.121$).
- ✓ Additionally, people with poor Work Ability were more likely to report long term absences ($>75^{\text{th}}$ percentile of cumulative time lost) than subject with normal/excellent Work Ability (57% vs. 13%, $p=0.03$)

Conclusions (1)

1. Our data confirmed that WAI is a reliable and valid tool for functional assessment even in severely impaired patients.
2. Subjects with poor work ability were more likely to be absent from work compared to more adjusted patients in the month following WAI examination.
3. Most of ESRD reported poor or moderate WAI indicating the need for urgent rehabilitative support and workplace accommodations to allow patients continuing to be productive in the workplace
4. There is no study evaluating the effectiveness of job accommodations in improving ESRD Ability to Work
5. One study provided evidence of successful psycho-educational programs in improving patients Ability to enter the work-force

Conclusions (2)

1. The very small range in the COWT measure prevented us to evaluate the effect of poor working time flexibility on work ability. However our data suggest a strong selection process toward workplaces allowing high level of job control, high Job Rewards and low Job Demands.
2. The pattern of impairment of ESRD patients is highly variable and should be evaluated individually. However low exertion capacity, fatigue, cardiovascular instability, sleep disturbances and immune system suppression are common limitations.
3. Among those in dialysis PD patients are more likely to work and have more time flexibility. However a clean and safe room in the workplace where to perform fluid exchanges is absolutely mandatory to avoid severe systemic infections.