

Frailty en (Nier-)Transplantatie

Robert A. Pol, chirurg



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Komt een patiënt bij de dokter

- 45-jarige man
- Type I DM (sinds zijn 20^e)
- Kreatinine klaring 20ml/min
- Toenemend vermoeid
- Wie vind dit een geschikte kandidaat voor een niertransplantatie?
- Of wellicht gecombineerde nier-pancreas transplantatie?



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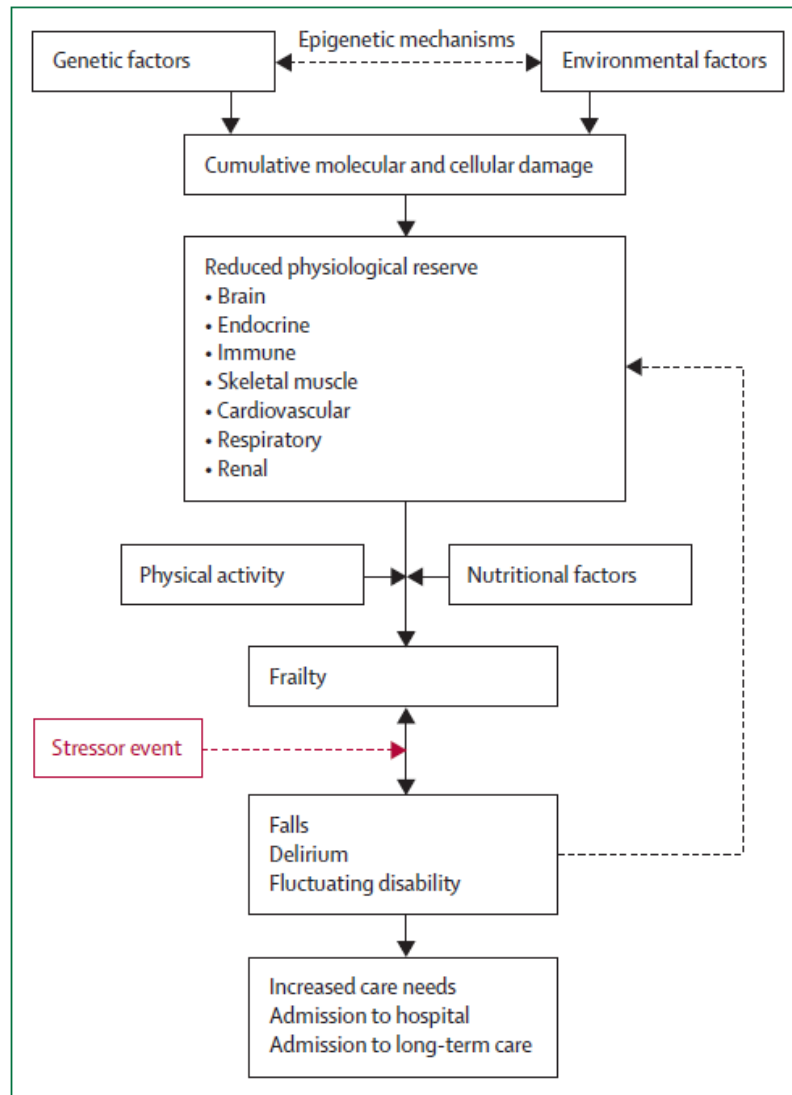
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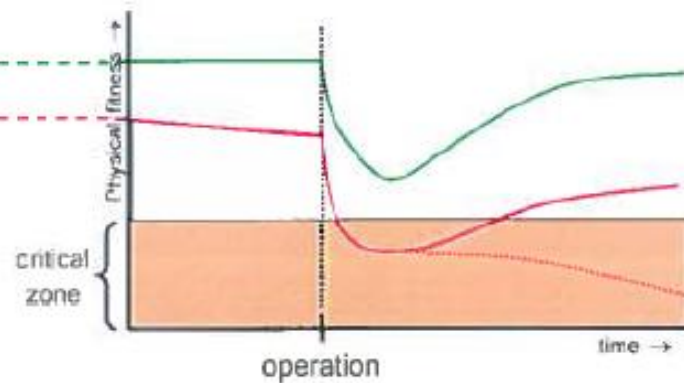
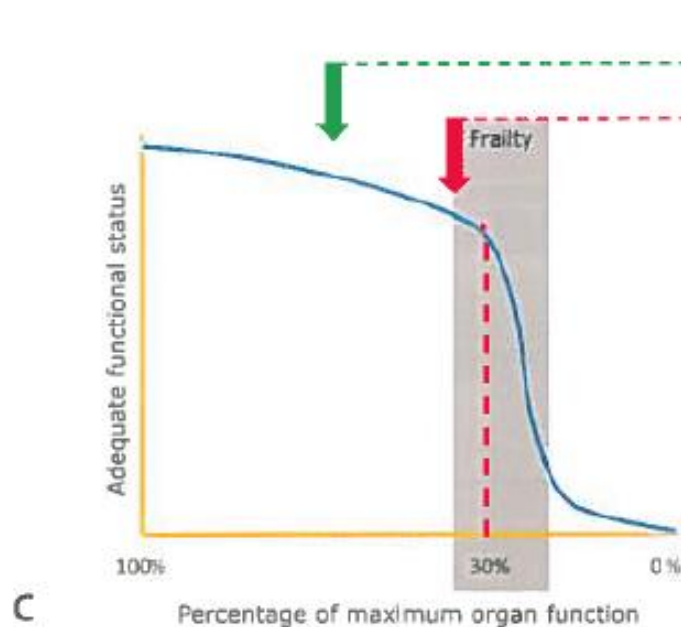
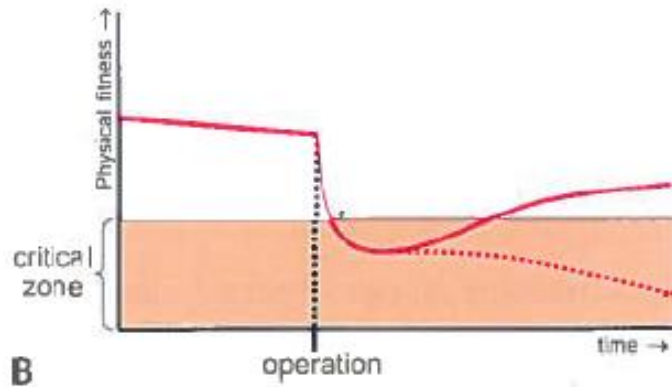
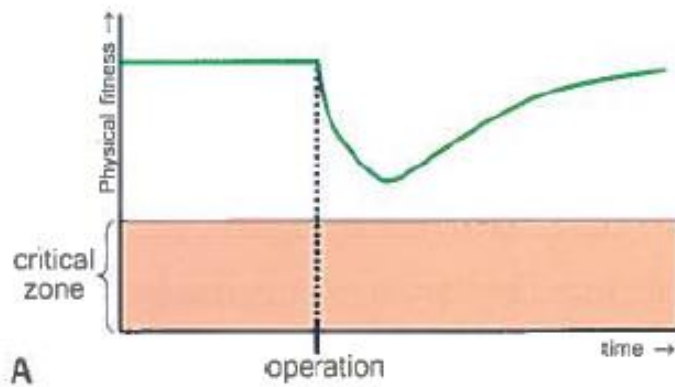
Kunnen we betrouwbare de fysieke (en/of cognitieve) conditie van een patiënt inschatten?



Waarom is deze fysieke en cognitieve conditie ('Frailty') zo belangrijk?

- Kwetsbaarheid is een syndroom dat leidt tot een verhoogde kwetsbaarheid voor ernstige verslechtering van de gezondheid en behelst het verminderde vermogen om met fysieke stressoren om te gaan.
- Het leidt tot een afname in energie, kracht en functie evenals aan een verhoogde ontstekingsfase (o.a. verhoogde spiegels van Interleukine 6 en CRP).





Frailty componenten (vlgs Fried)

- 5 componenten:
 - Onbedoeld gewichtsverlies van meer dan 5 kg in het afgelopen jaar (op basis van droog gewicht) (zelfrapportage)
 - Zwakte (knijpkracht onder een vastgestelde afkapwaarde, op basis van geslacht en BMI)
 - Uitputting (zelfrapportage)
 - Lage dagelijkse activiteit
 - Vertraagde/verminderde loopsnelheid

Frailty domeinen

- Mobiliteit
- Cognitie
- Visus/gehoor
- Voeding
- Comorbiditeit
- Psychosociaal functioneren
- Lichamelijke fitheid

Frailty assessment tool

	Includes items in these frailty assessment domains			Definite construct overlap observed between frailty assessment tool items and DSM-5 diagnostic criteria	Includes items from psychiatric assessment tools
	Physical	Psychological	Other		
Brief Clinical Instrument to Classify Frailty ⁴⁰⁻⁴²	✓		✓		
Brief Frailty Index ⁴³	✓	✓*	✓*	✓	✓
British Frailty Index ⁴⁴	✓*	✓*	✓	✓	
Care Partners-Frailty Index-Comprehensive Geriatric Assessment (CP-FI-CGA) ⁴⁵	✓*	✓*	✓	✓	
Clinical Frailty Scale ⁴⁶⁻⁴⁹	✓		✓		
Clinical Global Impression of Change in Physical Frailty (CGIC-PF) ⁵⁰	✓*	✓*	✓*	✓	
Comprehensive Assessment of Frailty (CAF) ⁵¹⁻⁵³	✓*			✓	
Comprehensive Frailty Assessment Instrument ^{54,55}	✓	✓*	✓	✓	
Continuous Composite Measure of Frailty ⁵⁶	✓*			✓	✓
Deficit-Accumulation Frailty Index (DAFI) ⁵⁷	✓*	✓*	✓*	✓	✓
EASYcare Two-Step Older Persons Screening (EASYcare-TOS) ⁵⁸⁻⁶⁰	✓*	✓*	✓	✓	
Edmonton Frail Scale (EFS) ⁶¹⁻⁶⁴	✓*	✓*	✓	✓	
Electronic Frailty Index (eFI) ⁶⁵	✓*		✓*	✓	
Evaluative Frailty Index for Physical Activity (EFIP) ⁶⁶	✓*	✓*	✓	✓	✓
Frailty Groupe Iso-Resource Evaluation (FRAGIRE) tool ⁶⁷	✓*	✓*	✓	✓	
Frailty Index-Comprehensive Geriatric Assessment (FI-CGA) ^{26,42,68-70}	✓*	✓*	✓*	✓	✓
Frailty Predicts Death One Year After Cardiac Surgery Test (FORECAST) ^{52,53,71}	✓		✓		
Frailty Index ⁷²	✓		✓*	✓	
Frailty Index Based on Common Laboratory Tests (FI-LAB) ⁷³	✓				
Frailty Index based on Primary Care Data ^{74,75}	✓*	✓*	✓*	✓	

Frailty Index for Elders (FIFE) ⁷⁶	✓*	✓*	✓*	✓	
Frail Non-Disabled Instrument (FIND) ⁷⁷	✓*			✓	✓
Frailty Screening Tool ⁷⁸	✓		✓*	✓	
FRAIL Scale ⁷⁹	✓*			✓	
Frailty Trait Scale (FTS) ⁸⁰	✓*		✓	✓	
FRESH-Screening Instrument ⁸¹	✓*		✓*	✓	
Groningen Frailty indicator (GFI) ^{41,82-90}	✓*	✓*	✓	✓	
Guilley Frailty Instrument ⁹¹	✓*		✓	✓	✓
Head and Neck Cancer-Specific Frailty Index ⁹²	✓*	✓*	✓	✓	✓
Inactivity and Weight Loss ^{93,94}	✓*			✓	
INTER-FRAIL Study Questionnaire ⁹⁵	✓*		✓	✓	
InterRAI Home Care Frailty Scale ⁹⁶	✓*		✓*	✓	
KLoSHA Frailty Index ⁹⁷	✓		✓	✓	
Marigliano-Cacciafesta Polypathological Scale (MPS) ⁹⁸	✓*	✓*	✓*	✓	✓
Maastricht Frailty Screening Tool for Hospitalized Patients (MFST-HP) ⁹⁹	✓*	✓*	✓	✓	
Palumbo Frailty Index ¹⁰⁰	✓		✓		
Paulson-Lichtenberg Frailty Index ¹⁰¹	✓*			✓	
Phenotype of Frailty ^{3,9,41,102,103}	✓*			✓	✓
Predictive Physical Frailty Score ¹⁰⁴	✓*		✓	✓	
Prognostic Risk Score ¹⁰⁵	✓*		✓*	✓	
Self-Reported Screening Tool for Frailty ¹⁰⁶	✓*			✓	✓
Self-Reported Questionnaire for Frailty ¹⁰⁷	✓*	✓*		✓	
Self-Report Tool of Frailty ¹⁰⁸	✓*	✓*		✓	
SHARE Frailty Instrument (SHARE FI) ¹⁰⁹⁻¹¹³	✓*			✓	
SOF Frailty Criteria ¹¹⁴⁻¹¹⁶	✓*			✓	
Strawbridge Frailty Measure ^{117,118}	✓*		✓*	✓	
Tilburg Frailty Indicator (TFI) ^{27,83-85,119-128}	✓*	✓*		✓	
WHIOS Multicomponent Measure (WHI-OS) ¹²⁹	✓*			✓	
9-Item Frailty Measure ¹³⁰	✓			✓	

onderzoek

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Table 2. Overview of healthy assessment in vascular surgery.

Author	Year	Design	Surgical type	Sample size	Frailty, no. (%)	Age	FU length ^f	Frailty assessment	Assessment tool	Mobility	Sensorium	Cognition	Function	Activity	Balance	Central muscle	Nutrition	Comorbidities	Mood
Overall																			
Partridge et al. ⁷	2014	Prospective cohort	Overall vascular surgery	114	77 (68)	76.3 ± 7.36 ^a	73 ± 31.4d ^a	Single domain	MoCA			●							
Partridge et al. ³⁴	2017	RCT	Overall vascular surgery	176	NA	75.5 ± 6.6 ^a	30d	Multi-domain	NA	○		●	○	○			○	○	○
Ambler et al. ²⁸	2015	Retrospective cohort	Overall vascular surgery	413	NA	77 (65–95) ^b	18 (12–24) m ^b	Multi-domain	AVFS		○	○	●	○	○		●	●	
Pol et al. ⁸	2011	Prospective cohort	Overall vascular surgery	142	50 (35)	68 ± 11 ^a	30d	Multi-domain	GFI	●	○	○	○	○			○	○	○
Partridge et al. ³¹	2015	Prospective cohort	Overall vascular surgery	125	60 (48)	76.3 ± 7.27 ^a	30d	Multi-domain	EFS			○	○	○			○	○	○
Karam et al. ³⁰	2013	Retrospective cohort	Overall vascular surgery	67,308	NA	68 ^c	30d	Multi-domain	mFI		○		○					○	
AAA																			
Endicott et al. ¹²	2017	Retrospective cohort	EVAR, OAR	1340	128 (10)	≥80	30d	Single domain	3-point FS				○						
Harris et al. ³⁸	2017	Retrospective cohort	EVAR	13,432	389 (3)	77 ± 8/ 73 ± 8 ^{a,d}	30d	Single domain	Dependent/independent				○						
Scarborough (1) et al. ³³	2015	Retrospective cohort	EVAR	11,687	452 (4)	64.8 ± 14.1/ 72.2 ± 13.2 ^{a,d,e}	30d	Single domain	Dependent/independent				○						
Drudi et al. ¹¹	2016	Retrospective cohort	EVAR, OAR	149	49 (33)	75.6 ± 8.8 ^a	4yr	Single domain	PMA							●			
Lee et al. ³⁶	2011	Retrospective cohort	OAR	262	NA	69.5 ± 10.5 ^a	2.3yr	Single domain	PMA							●			
Hale et al. ³⁹	2016	Retrospective cohort	EVAR	200	25 (13)	74 ± 7.5 ^a	8.4yr	Single domain	L3 skeletal muscle area							●			
Newton et al. ³⁷	2018	Retrospective cohort	EVAR	135	45 (34)	70 (65–76) ^b	5yr	Single domain	PMA							●			
Srinivasan et al. ²⁷	2016	Retrospective cohort	Ruptured AAA repair	205	NA	85 ^c	3yr	Multi-domain	RAFS				○					○	
Arya et al. ¹⁴	2015	Retrospective cohort	EVAR, OAR	23,027	4178 (23)	73.4 ± 8.6 ^a	30d	Multi-domain	mFI		○		○					○	
LEAD																			
Shiraki et al. ³⁵	2016	Retrospective cohort	Endovascular (CLI)	473	236 (50)	74 ± 10 ^a	3yr	Single domain	GNRI								●		
Scarborough (2) et al. ³³	2015	Retrospective cohort	LEB	17,929	2523 (14)	64.8 ± 14.1/ 72.2 ± 13.2 ^{a,d,e}	30d	Single domain	Dependent/independent				○						
Dinga et al. ³²	2017	Retrospective cohort	Endovascular (CLI)	1048	251 (24)	≥70	30d	Single domain	Dependent/independent				○						
Nyers et al. ¹⁰	2017	Retrospective cohort	Endovascular, LEB	188	NA	66 ^c	12 (3–24) m ^b	Single domain	PLVI							●			
Matsubara et al. ⁴⁰	2015	Retrospective cohort	Endovascular, LEB (CLI)	64	28 (44)	69.2 ± 11.8/ 73.8 ± 9.6 ^{a,g}	3.5 yr	Single domain	L3 skeletal muscle area							●			
Morisaki et al. ²⁵	2017	Retrospective cohort	Endovascular, LEB (CLI)	266	92 (35)	77.8 ± 9.5/ 72.5 ± 10.5 ^{a,g}	2 yr	Multi-domain	CLI Frailty Index	○						●	●		

Figure 1: Change in frailty during follow-up

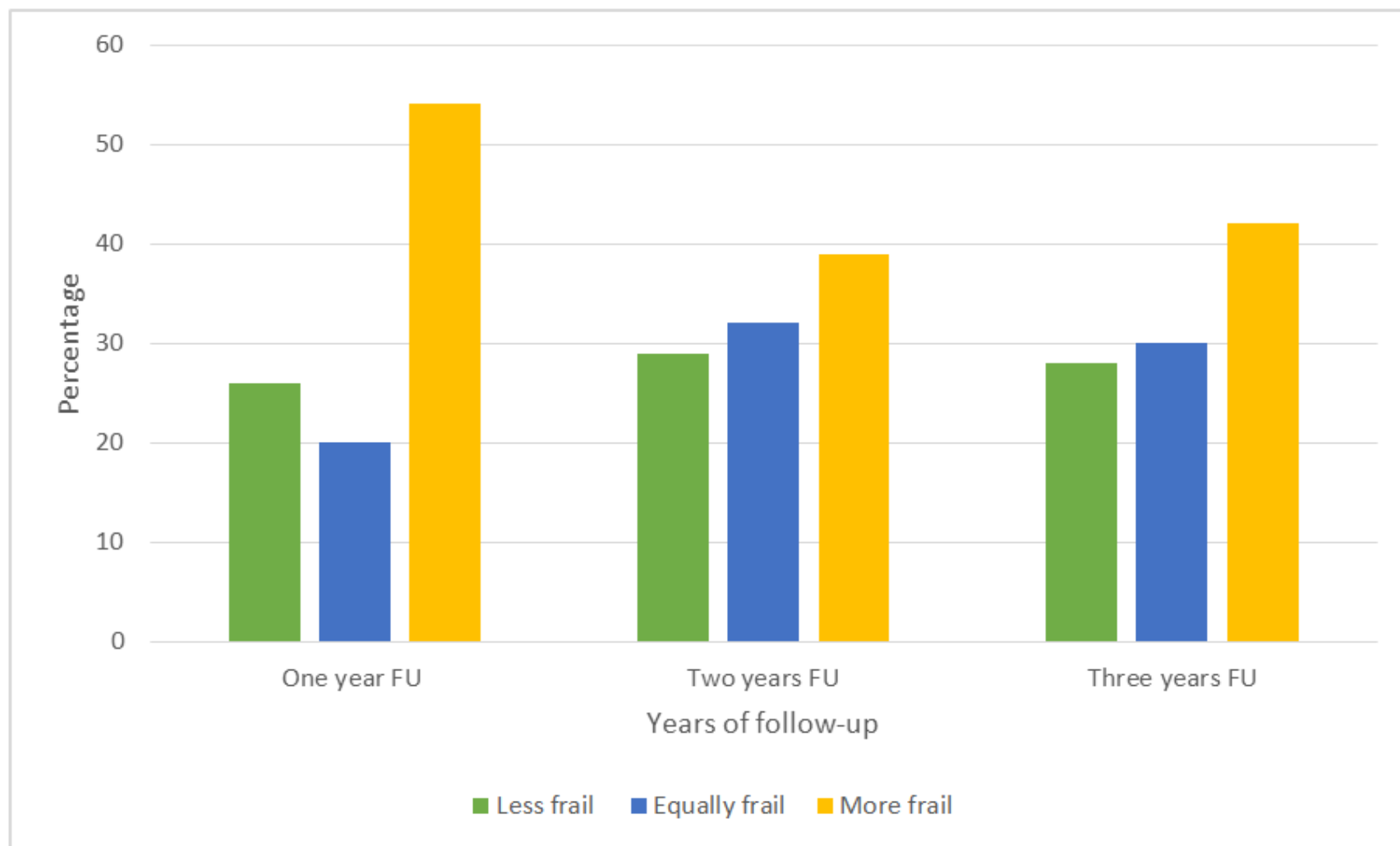


Figure 2: Patients with a deterioration in frailty during follow-up, per domain



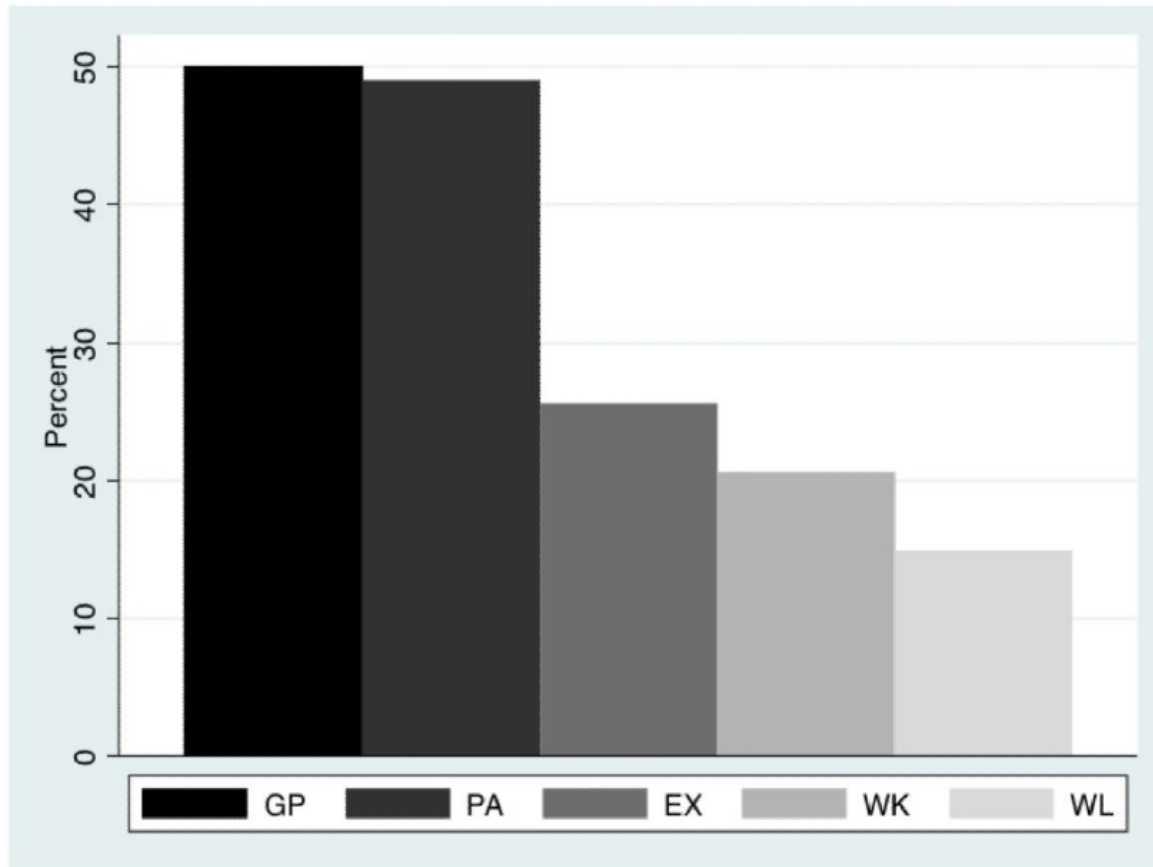
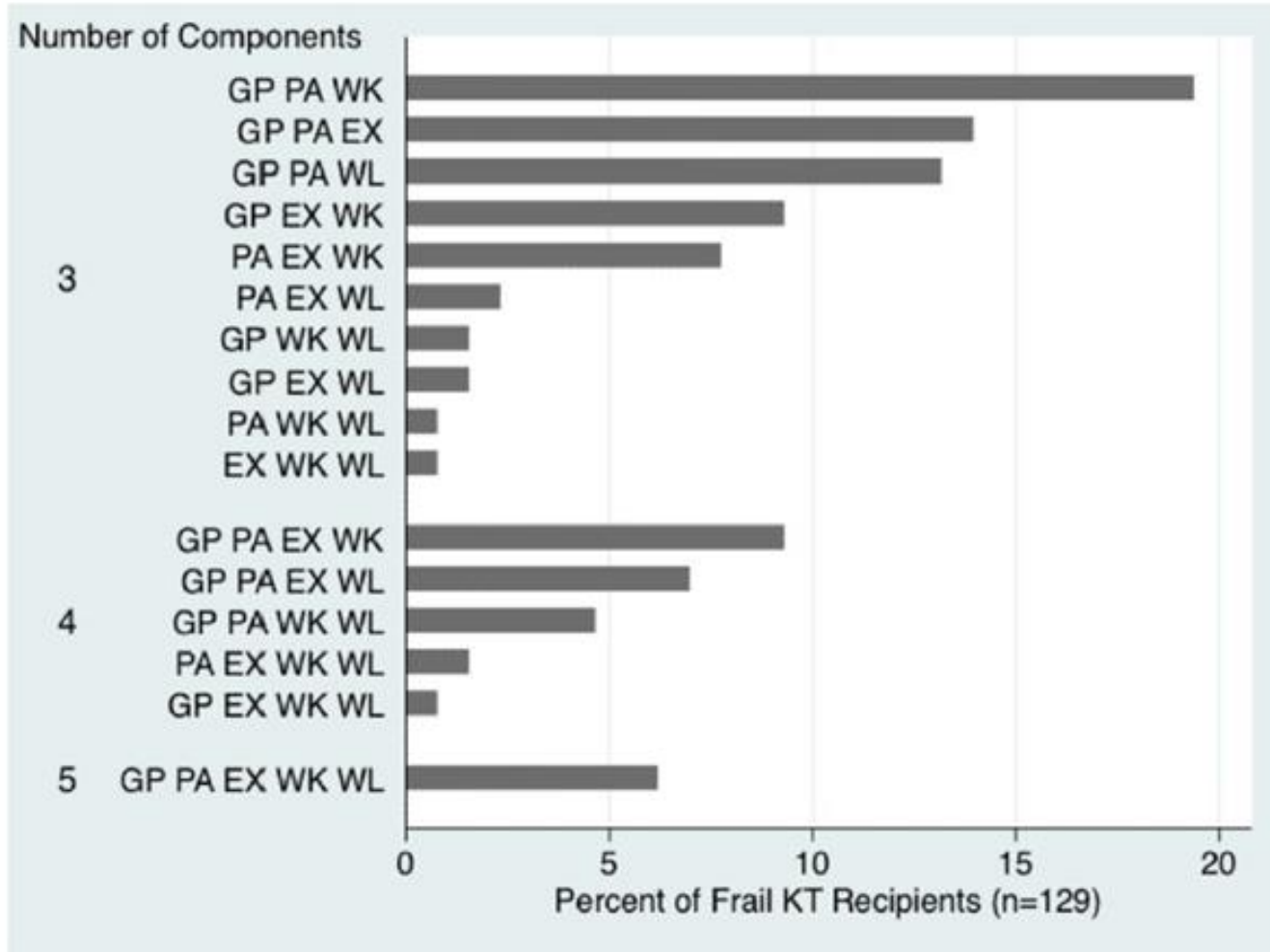


Figure 2. Prevalence of the Frailty Components Among Kidney Transplant (KT) Recipients (n=663)

GP=verminderde knijpkracht; PA=lage fysieke activiteit; EX=vermoeidheid; WK=loop snelheid; WL=gewichtsverlies



GP=verminderde knijpkracht; PA=lage fysieke activiteit; EX=vermoeidheid; WK=loop snelheid; WL=gewichtsverlies

ORIGINAL ARTICLE

Frailty has a significant influence on postoperative complications after kidney transplantation—a prospective study on short-term outcomes

Lasse Schopmeyer¹, Mostafa El Moumni¹, Gertrude J. Nieuwenhuijs-Moeke³, Stefan P. Berger²,
Stephan J. L. Bakker² & Robert A. Pol¹ 

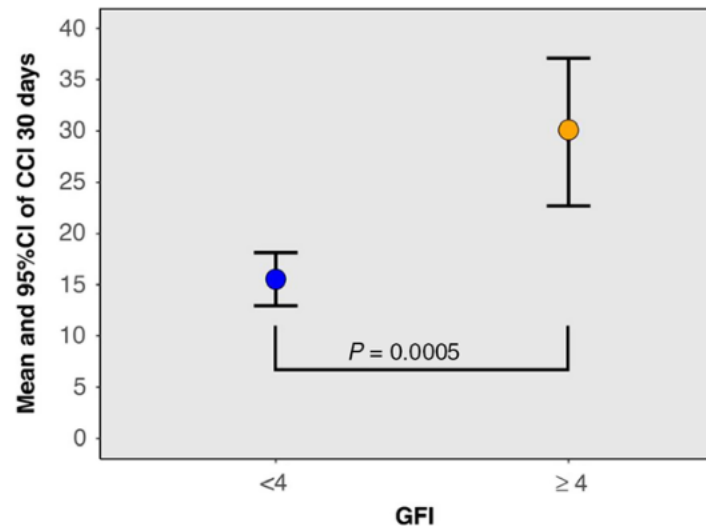
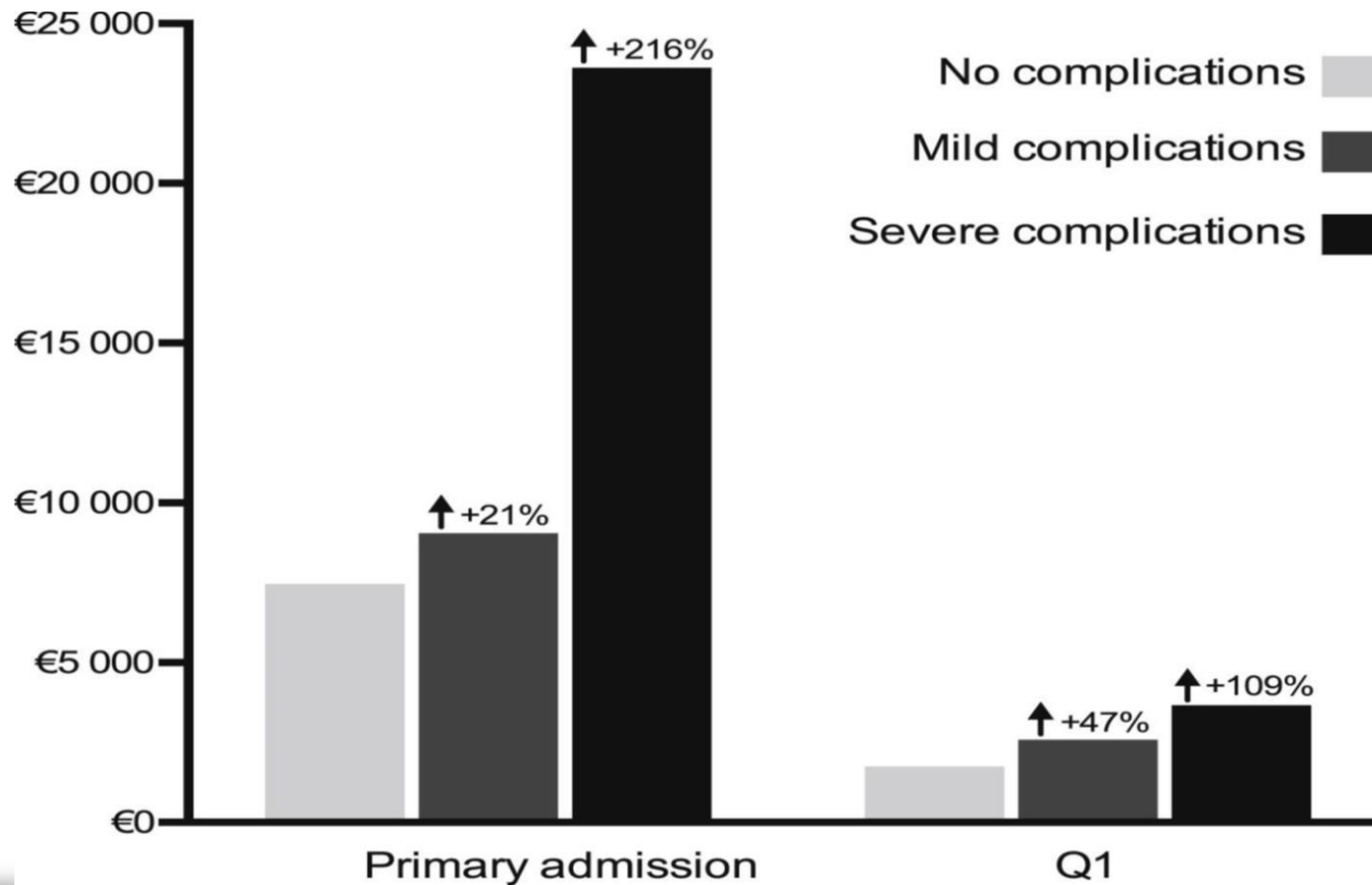
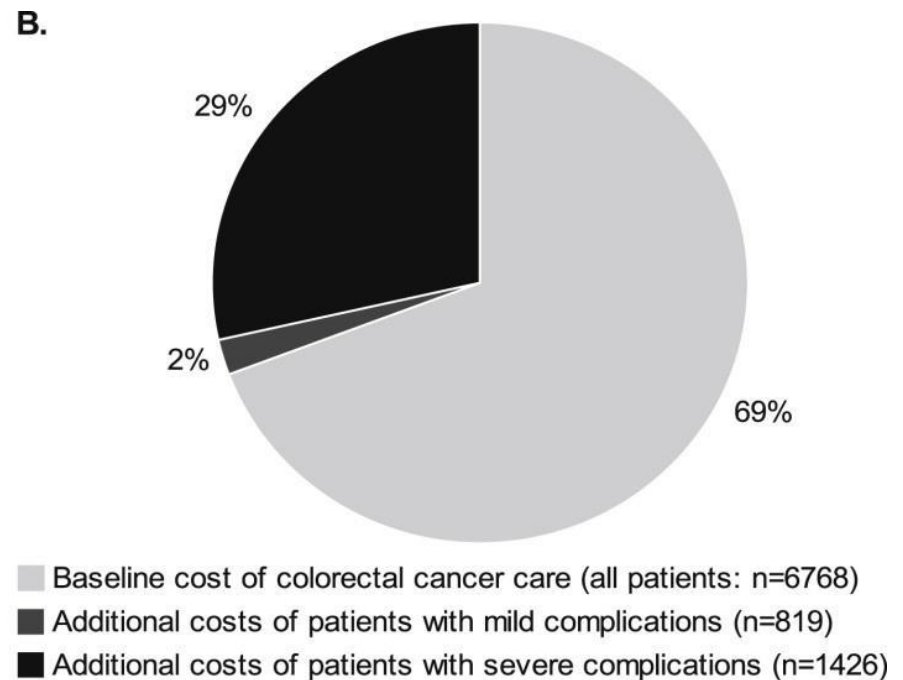
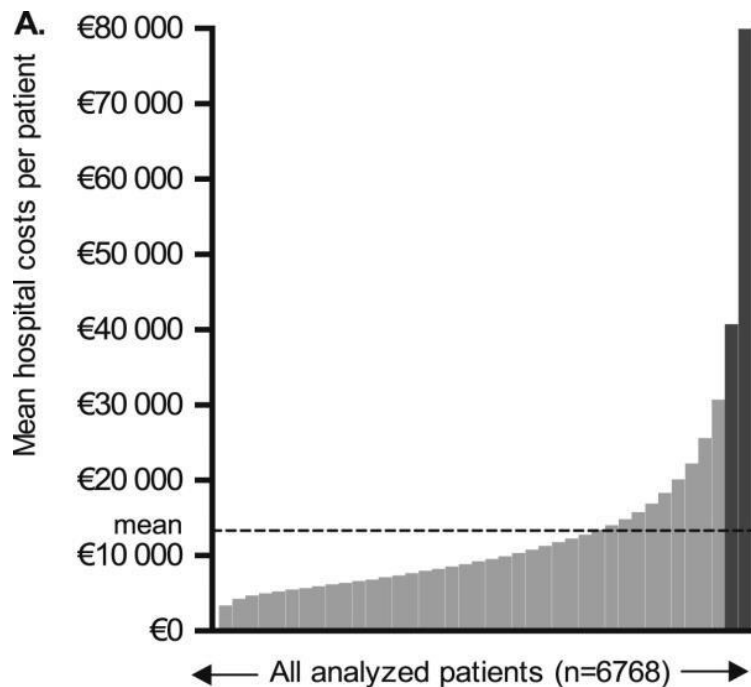


Figure 2 Relation between frailty and CCI. Relation between Groningen Frailty Indicator Score (GFI; ≥ 4 considered as frail) and Comprehensive Complication Score (CCI) within 30-day postsurgery.

Introduction of Value based healthcare

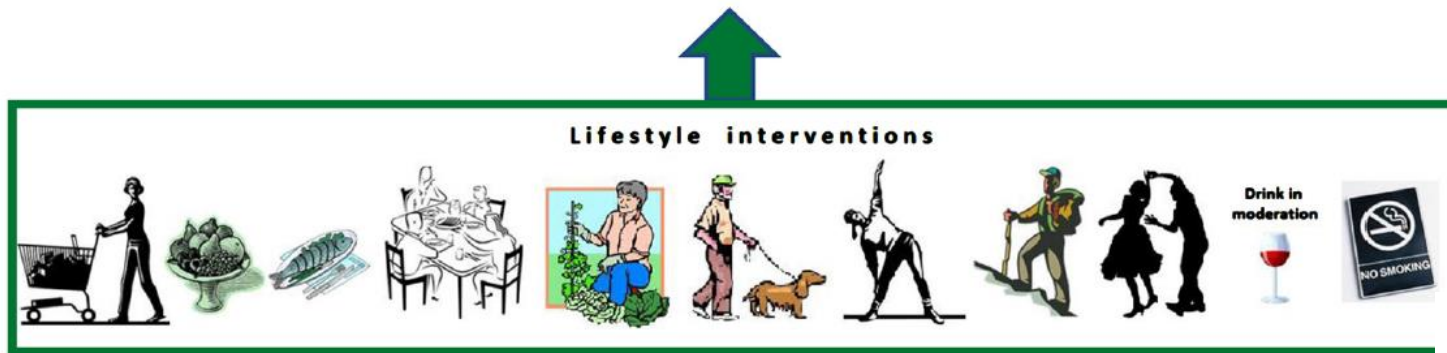


30% van de gecompliceerde opnames is verantwoordelijk voor **90%** van de ziekenhuis kosten!



Maar nu we weten wat het probleem is.....wat doen we nu?

- Meer bewegen?
- Goede of betere voeding?
- Bevorderen en/of behouden fysieke en lichamelijke fitheid

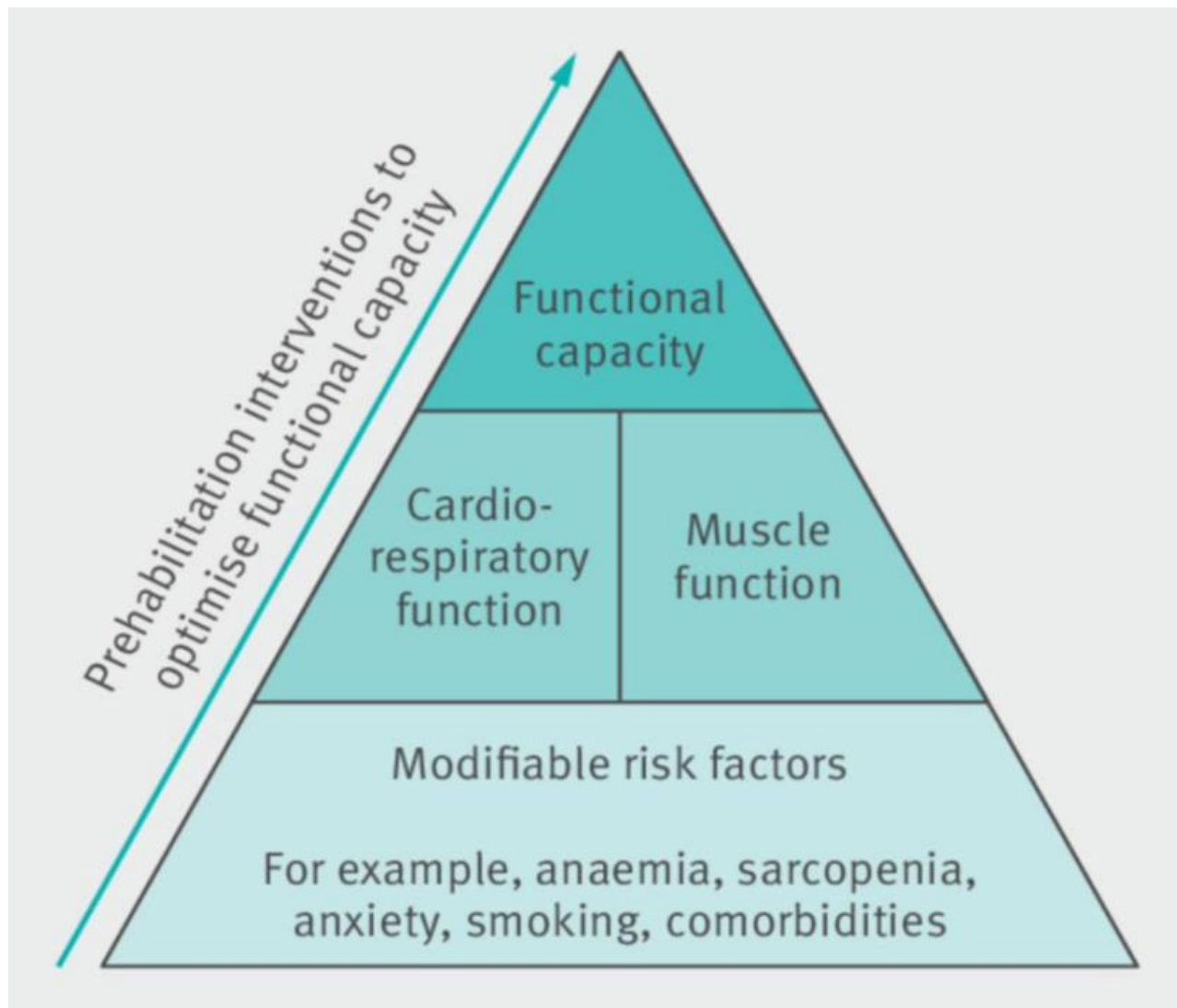


- Prehabilitatie!



Prehabilitatie: Patiënten voorbereiden op een grote operatie is net zoiets als een marathon lopen - en voor beide moet je trainen!





Chirurgische stress

- Toename in zuurstof verbruik
- Na 36 uur vasten ('nuchter zijn') word alle energie voorzien door de lever (Gluconeogenesis)
- Er ontstaat een relatieve insuline-resistentie
- Glucose aanmaak verder onder druk
- Complicaties verhogen de druk en behoefte

- Een verbeterde fysieke activiteit leid tot betere uitkomsten:
 - Verhoogde capaciteit voor zuurstof afgifte.
 - Minder insuline-resistentie.
 - Mogelijk een meer efficiënte gluconeogenese.
- Verhoging van de anaerobe drempel:
 - Lagere mortaliteit.
 - Minder complicaties.
 - Minder IC opnames.
 - Kortere opnameduur

Intradialytic Cognitive and Exercise Training May Preserve Cognitive Function



Mara A. McAdams-DeMarco^{1,2}, Jonathan Konel¹, Fatima Warsame¹, Hao Ying², Marlís González Fernández³, Michelle C. Carlson⁴, Derek M. Fine⁵, Lawrence J. Appel^{2,5} and Dorry L. Segev^{1,2}

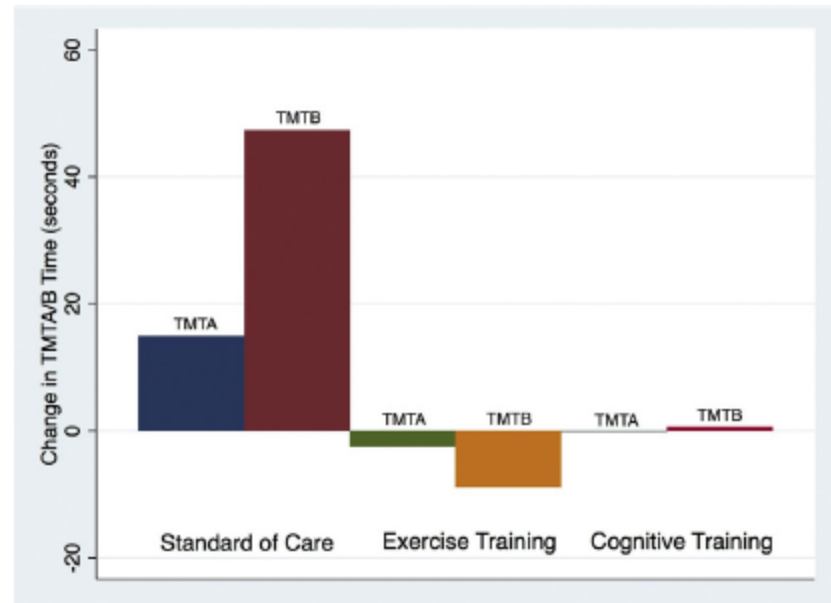


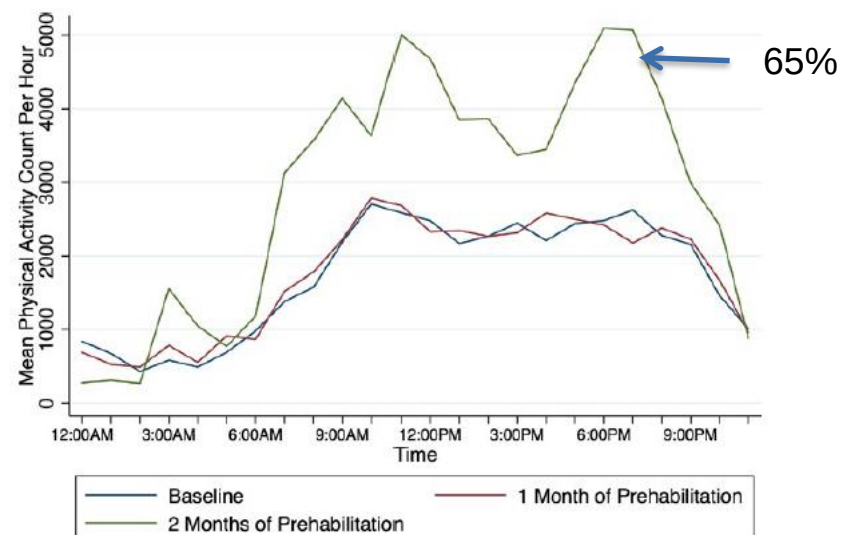
Figure 2. Mean change in psychomotor speed (Trail Making Tests A and B [TMTA and TMTB]) at 3 months for those with cognitive training, exercise training, and standard of care.



Prehabilitation prior to kidney transplantation: Results from a pilot study

Mara A. McAdams-DeMarco^{1,2}  | Hao Ying¹ | Sarah Van Pilsum Rasmussen¹  |
Jennifer Schrack² | Christine E. Haugen¹  | Nadia M. Chu² |
Marlís González Fernández³ | Niraj Desai¹ | Jeremy D. Walston⁴ | Dorry L. Segev^{1,2}

NTX patiënten hadden een kortere opnameduur (5 vs 10 dagen) (RR = 0.69; 95% CI: 0.50-0.94; $P = 0.02$).

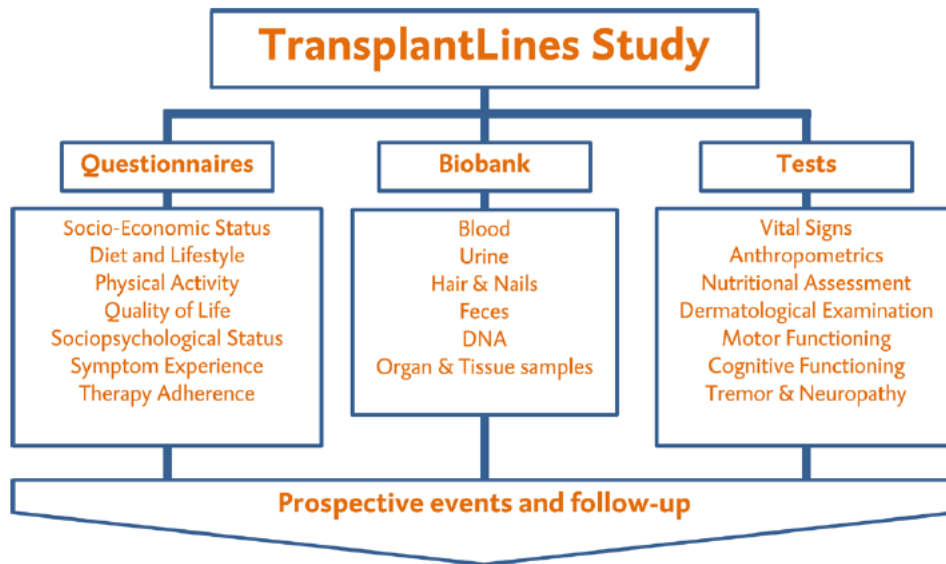


Voordat je gaat ingrijpen/behandelen..

- Bepaal welke domeinen in iedere individuele patient de belangrijkste bijdrage leveren aan de mate van frailty!
- Verbeter cognitie, fysieke conditie, voeding en/of psychosociaal functioneren

BMJ Open Rationale and design of TransplantLines: a prospective cohort study and biobank of solid organ transplant recipients

Michele F Eisenga,¹ Antonio W Gomes-Neto,¹ Marco van Londen,¹ Aaltje L Ziengs,^{1,2} Rianne M Douwes,¹ Suzanne P Stam,¹ Maryse C J Osté,¹ Tim J Knobbe,¹ Niek R Hessels,¹ Anne M Buunk,² Coby Annema,³ Marion J Siebelink,³ Eموke Racz,⁴ Jacoba M Spikman,² Frank A J A Bodewes,⁵ Robert A Pol,⁶ Stefan P Berger,¹ Gea Drost,⁷ Robert J Porte,⁶ Henri G D Leuvenink,⁶ Kevin Damman,⁸ Erik A M Verschuuren,⁹ Vincent E de Meijer,⁶ Hans Blokzijl,¹⁰ Stephan J L Bakker¹



Transplant Recipients



Living Donors



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Table 2 List of questionnaires in the TransplantLines study

Questionnaires	Related subject
EQ6D ⁶⁰	EuroQoL six dimensions
VAS ⁶¹	Visual Analogue Scale
SF36 ⁶²	Short Form-36 Health Survey
SQUASH ⁶³	Short Questionnaire to Assess Health-Enhancing Physical Activity
BAASIS ⁶⁴	Basel Assessment of Adherence to Immunosuppressive Medications Scale
MTSOSDS-R59 ⁶⁵	Modified Transplant Symptom Occurrence and Symptom Distress scale
CIS ⁶⁶	Checklist Individual Strength (Fatigue)
PSQI ⁶⁷	Pittsburgh Sleep Quality Index
STAI6 ⁶⁸	Short form State Trait Anxiety Inventory
PHQ9 ⁶⁹	Patient Health Questionnaire (Depression)
CFQ ⁷⁰	Cognitive Functioning Questionnaire
WHO-5 ⁷¹	World Health Organization-5 (Well-Being Index)
TxEQ ⁷²	Transplant Effects Questionnaire
Mastery Scale ⁷³	Pearlin Mastery Scale
UCL-47	Utrecht Coping List-47

USER-P	Utrecht Scale for Evaluation of Revalidation-Participation
Work	Participation in Labour
WRFQ ⁷⁴	Work Role Functioning Questionnaire
FAD	Family Assessment Device
ABO	Active Engagement, Protective Buffering and Overprotection Questionnaire
Social Support Questionnaire	Social support
DAG ⁷⁵	DArmGezondheid (Bowel Health) Questionnaire
FFQ ⁷⁶	Food Frequency Questionnaire
LIVAS Scale for Physical Self-Efficacy movement	Lichamelijke vaardigheden schaal, Dutch version of the Perceived Physical Activity Scale
OBiN Sedentary Behaviour Questionnaire	Sedentary behaviour
Smoking Behaviour Questionnaire	Smoking behaviour
Alcohol Use Disorders Identification Test (AUDIT)*	Alcohol use

*The AUDIT questionnaire will only be gathered from liver transplant recipients.



Parameter/Test	Details
General (all protocols)	
General parameters	Collection of Biobank material and evaluation of questionnaires, check quality of data
Blood pressure	Using an automatic or semiautomatic device
Weight	Using digital measuring scale
Length	Using measuring tape fixed to the wall
Waist and hip size	Using measuring tape roll
BIA	Bioimpedance analysis (Quadscan 4000)
SAF	Skin autofluorescence (AGE Reader SU)
Dermatological questionnaire	After physical examination by student researcher
Clinical Frailty Scale	After physical examination by student researcher
PG-SGA	Scored Patient-Generated Subjective Global Assessment
Lung function	Using spirometry (Vitalograph Asma-1)
Breath analysis	Using QuinTron BreathTracker
Physical protocol	
Balance test	Using Axivity accelerometer
Hand grip	Using hydraulic handheld dynamometer
Physical strength	Multiple muscle groups, using digital dynamometer
Sensibility tests	Using pin-prick, monofilament and biothesiometer
Tremor analysis	Using Tetras scale and Axivity accelerometers
Manual dexterity	Using dexterity PEG-Board
Cognitive protocol	
Nederlandse Leestest voor Volwassenen	Dutch version of the National Adult Reading Test
Digit Span	Subtest of the Wechsler Adult Intelligence Scale IV
15 Words Test	Dutch version of Ray Auditory Verbal Learning Test
Cognitive Screening Test	Cognitive Screening Test (20)
Trail Making Test	
Clock-Drawing Test	
Symbol Digit Modalities Test	
Letter Fluency Test	Dutch version of the Controlled Word Association Test
Word Fluency Test	Subtest of the Groningen Intelligence Test
Key Search Test	Subtest of the Behavioural Assessment of the Dysexecutive Syndrome

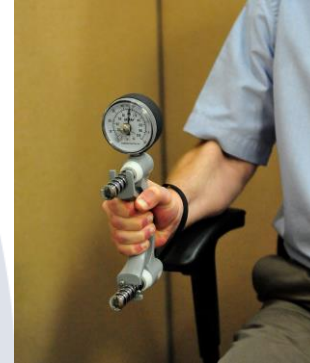
Lichaamssamenstelling

- Multifrequency bio-electrical impedance device (BIA)
- Onderscheid tussen lean body mass en vetmassa, rekening houdend met verschillen in volumestatus.
- Belangrijkste uitkomsten zijn geschatte vetmassa, vetvrije masse en lichaamsvetpercentage.



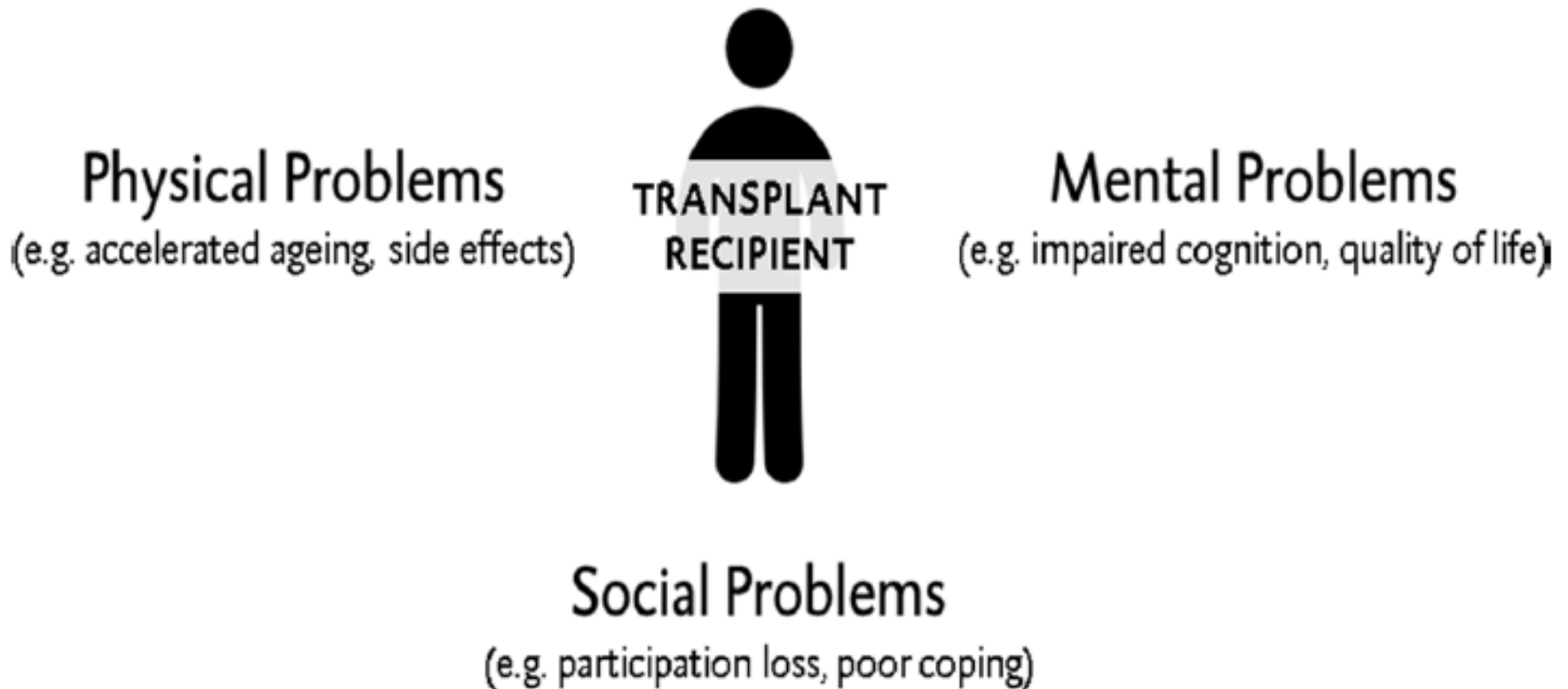
Lichamelijke fitheid

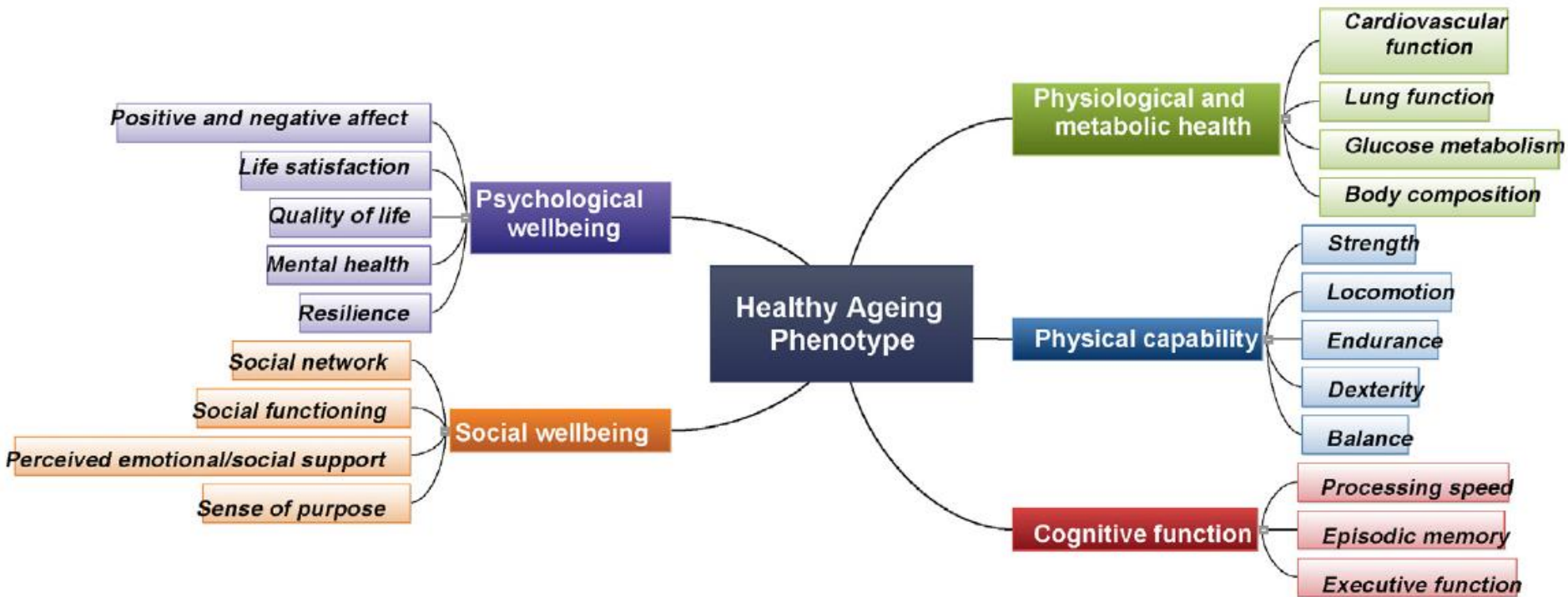
- Hand knijpkracht
- 2-minuten looptest
- Loop snelheid (4MWT)
- Van zit naar staan test
- Timed-up-and-go test



Patient and Graft survival

(e.g. poor long-term outcomes)





Bedankt voor jullie aandacht



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