

CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE  
CONTROVERSIES & UPDATES IN VASCULAR SURGERY

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MARRIOTT RIVE GAUCHE & CONFERENCE CENTER

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# Natural history of autologous arteriovenous fistulae and consequences for planning of dialysis access

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## Disclosure

Speaker name: Teun Wilmink

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- I have the following potential conflicts of interest to report:
  - Consulting
  - Employment in industry
  - Shareholder in a healthcare company
  - Owner of a healthcare company
  - Other(s)
- I do not have any potential conflict of interest



# Objective

To accurately estimate PF rates, maturation-times, and the long-term survival of common AVF to inform decision-making in access planning



# Methods

- Study from 1 Dec 2002 – 31 Dec 2011
- Follow up till 1 Dec 2014
- AVF is deemed mature after 6 consecutive dialysis sessions on AVF with 2 needles
- PF is failure to achieve maturation.
- Maturation time is to 6<sup>th</sup> needling date
- Survival is defined as date when AVF is abandoned for a new form of access





# Primary Failure

Type AVF	Dialysis use	PF	Total
RCAVF	491 (74%)	173 (26%)	664 (57%)
BCAVF	311 (83%)	66 (17%)	377 (32%)
BBAVF	90 (74%)	32 (26%)	122 (10%)
Total	892 (77%)	271 (23%)	1163 (100%)



# Predictors for PF

Factor	Yes	No	P value
female	28%	20%	0.003
diabetes	25%	22%	0.43
On dialysis	24%	23%	0.52
Previous AVF	23%	23%	0.98
Access surgeon	23%	24%	0.70
Mean age (95% CI)	66 (15)	66 (16)	0.53



# Independent predictors of PF

Variable	OR	95% CI	P value
Female sex	1.61	1.21 – 2.14	0.001
BCAVF	0.59	0.42 – 0.83	0.003
vascular CKD	1.93	1.24 – 3.02	0.004

- Previous AVF, diabetes, surgeon, dialysis state did not predict PF



# Time to needling

<b>percentile</b>	<b>1<sup>st</sup> needling date</b>	<b>Maturation date</b>
10	3.5	4.9
25	5.3	7.3
median	7.9	10
75	12.7	16
90	26.3	29.4





# Maturation times

Type AVF	25%	Median	75%
RCAVF	7	10	17
BCAVF	7	9	13
BBAVF	9	13	19

P = 0.002



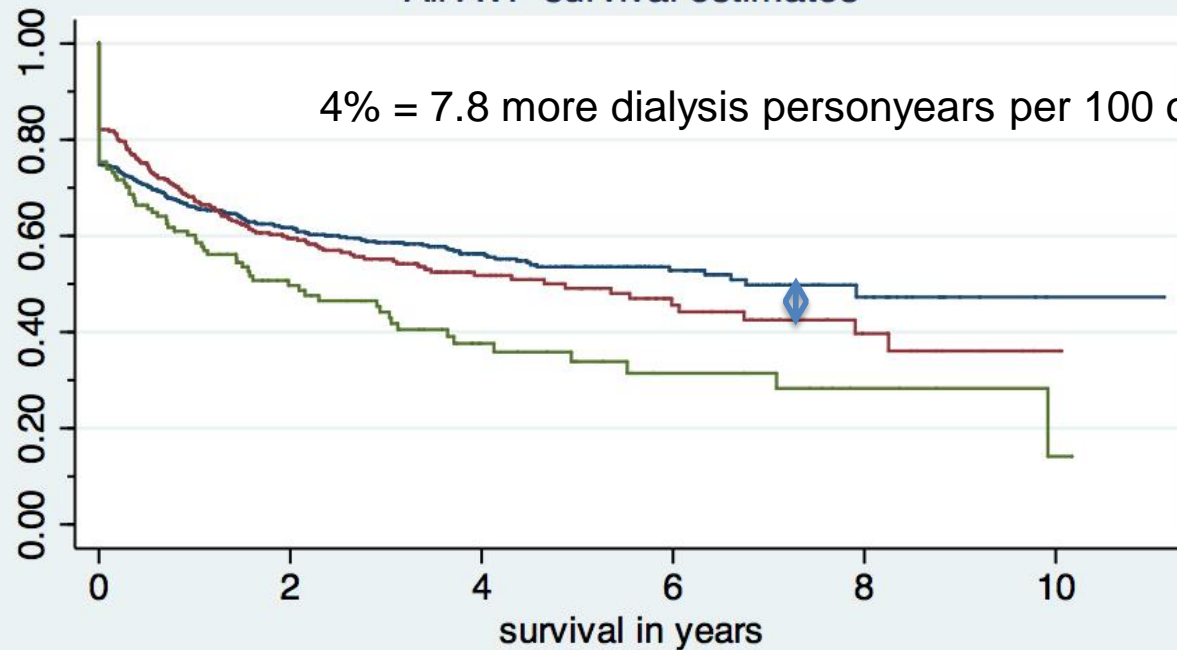
# Maturation simplified

- Half of the fistulae are mature after 10 weeks
- Three quarters are mature after 16 weeks
- 90% of fistulae are mature after 29 weeks



# Survival by type AVF

All AVF survival estimates



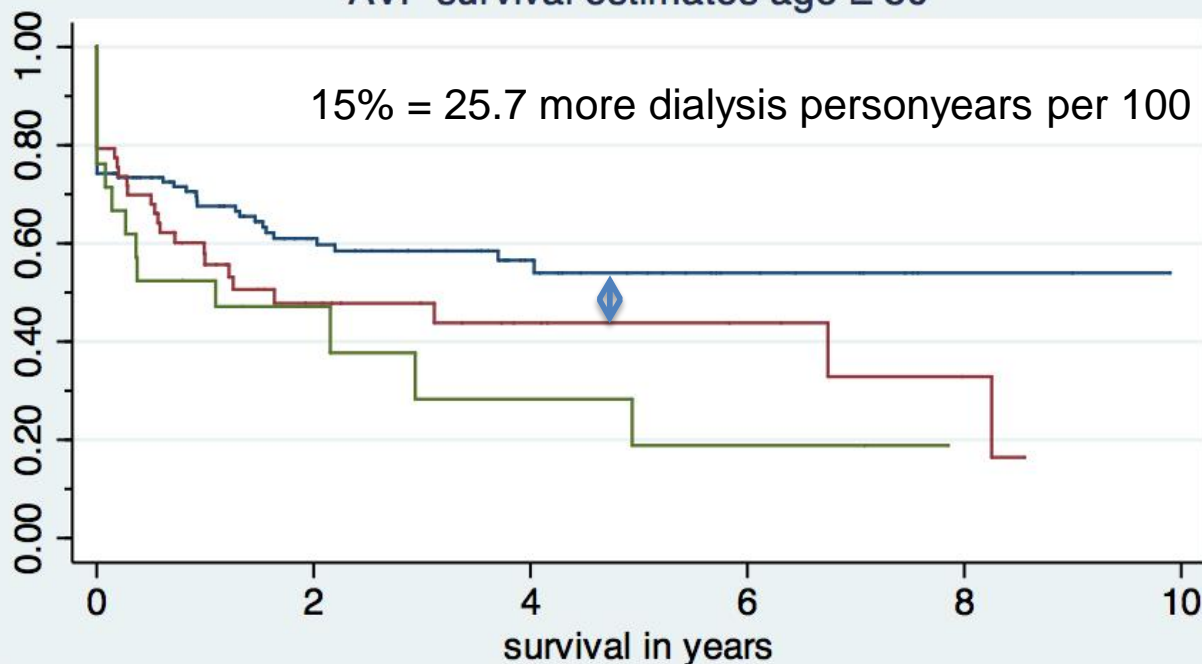
Number at risk	0	2	4	6	8	10
typeavf = rcavf	687	301	161	69	19	1
typeavf = bcavf	380	153	73	33	12	2
typeavf = bbavf	134	48	21	11	4	1





# Survival by type AVF

AVF survival estimates age  $\geq 80$



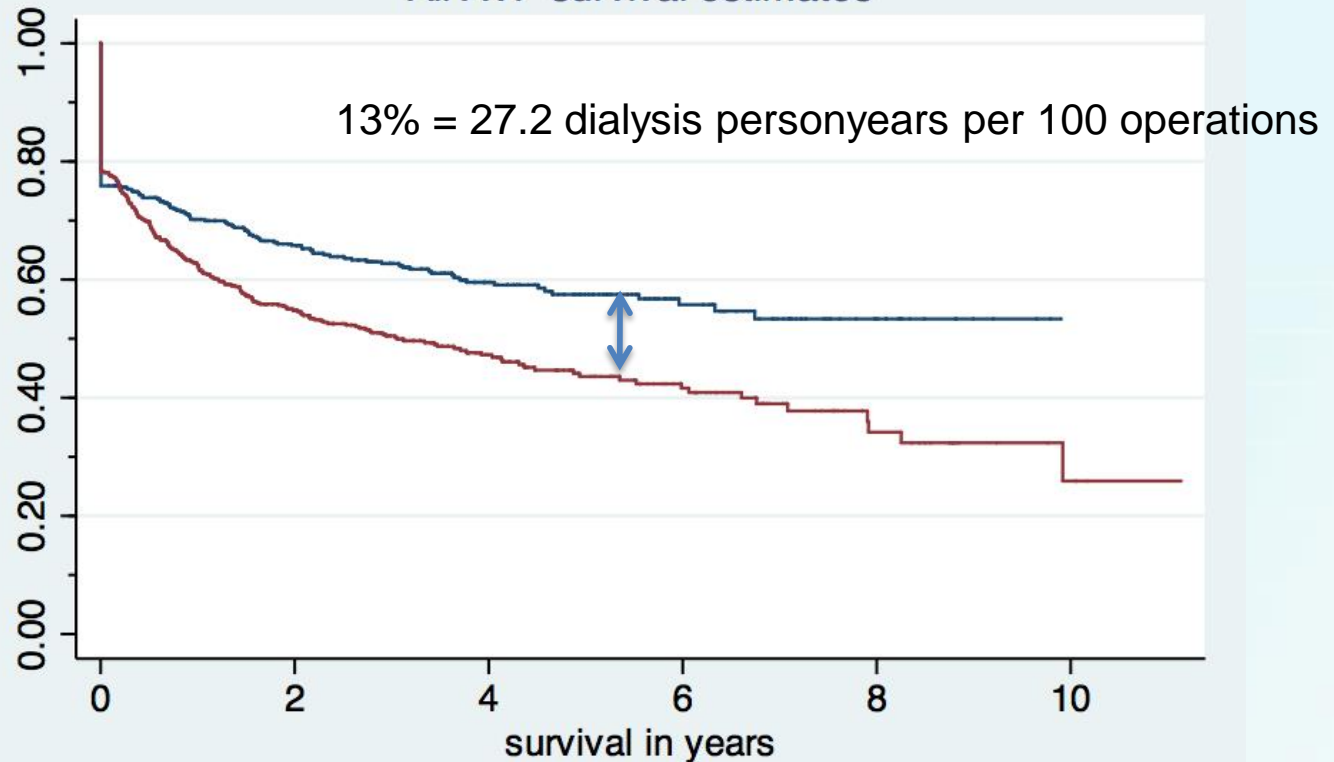
Number at risk	0	2	4	6	8	10
typeavf = rcavf	132	48	23	9	2	0
typeavf = bcavf	58	16	8	5	2	0
typeavf = bbavf	21	5	3	2	0	0





# Survival by dialysis state

All AVF survival estimates



Number at risk	0	2	4	6	8	10
ondialysis = no	547	250	133	56	16	0
ondialysis = yes	654	252	122	57	19	4







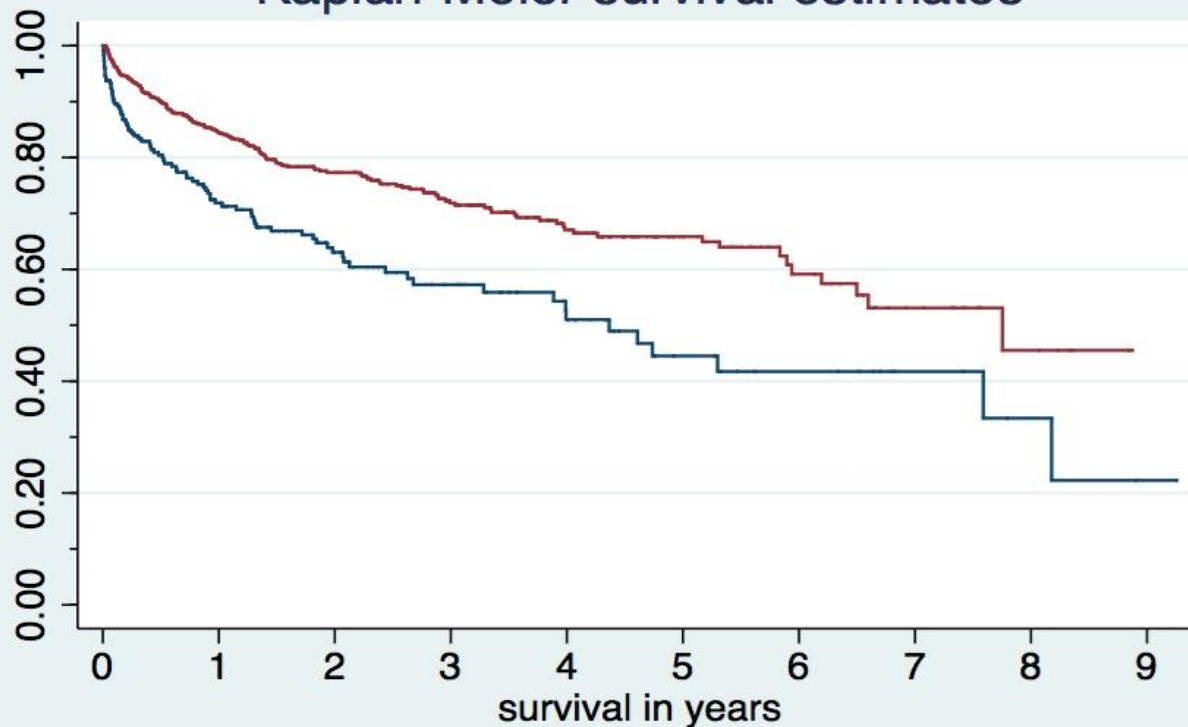
# Multivariate survival analysis

Variable	HR	95% CI	P
Type AVF	1.36	1.13 – 1.62	0.001
On dialysis	1.62	1.20 – 2.18	0.001
Six from start	0.67	0.51 – 0.88	0.004
diabetes	1.44	1.12 – 1.86	0.004
age	1.00	0.99 – 1.01	0.136
sex	1.09	0.84 – 1.40	0.514



# Survival by successful needling

Kaplan-Meier survival estimates

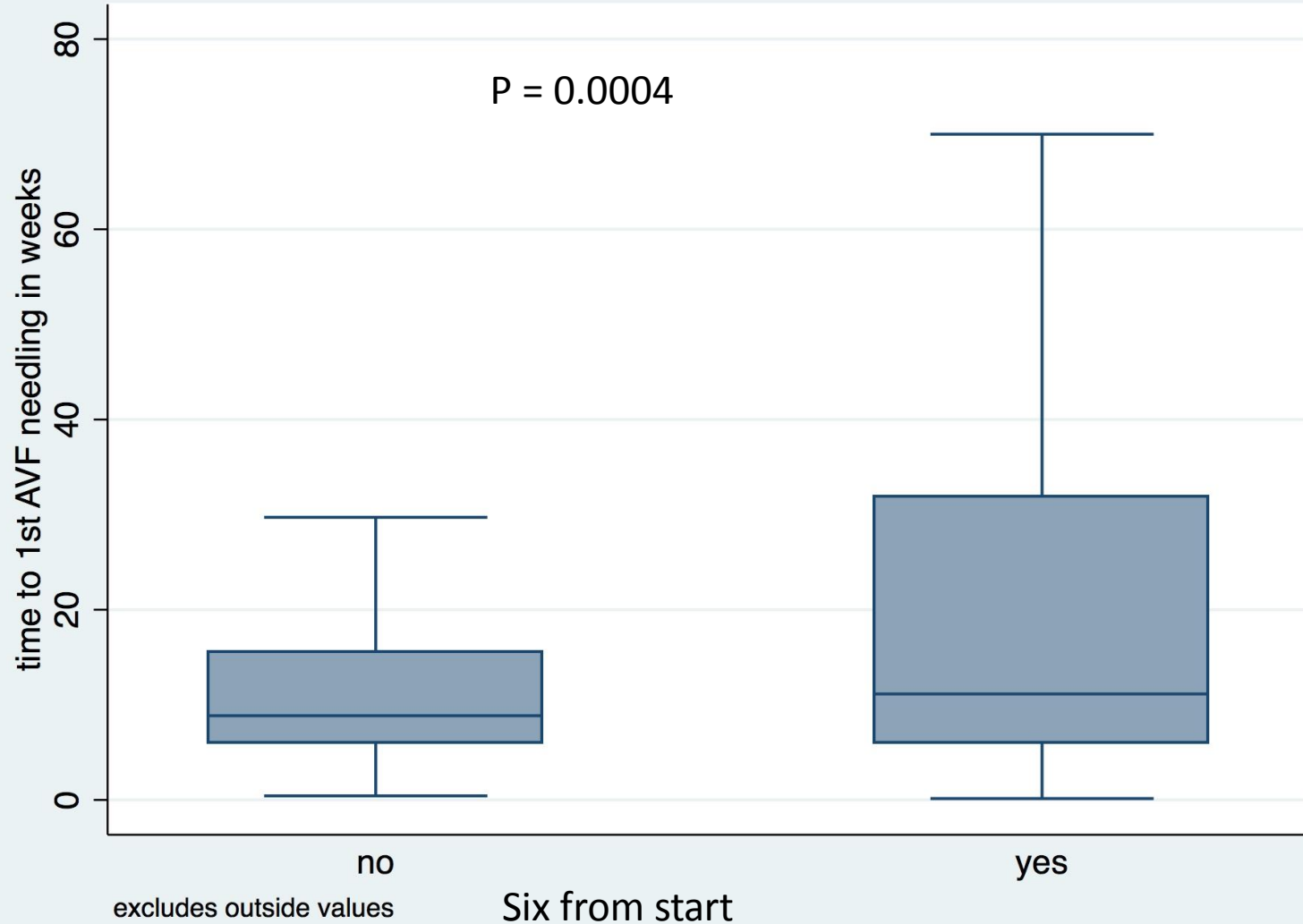


Number at risk	0	1	2	3	4	5	6	7	8	9
sixfromstart = no	228	123	76	46	31	17	12	6	3	1
sixfromstart = yes	649	441	298	190	117	74	36	15	6	0

— sixfromstart = no      — sixfromstart = yes



# Successful needling





# Weeks needed ?

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	<b>median</b>	<b>p75</b>
Maturation time	10	16
Wait for assessment	3	6
Wait for operation	4	7
<b>Total</b>	<b>17</b>	<b>29</b>

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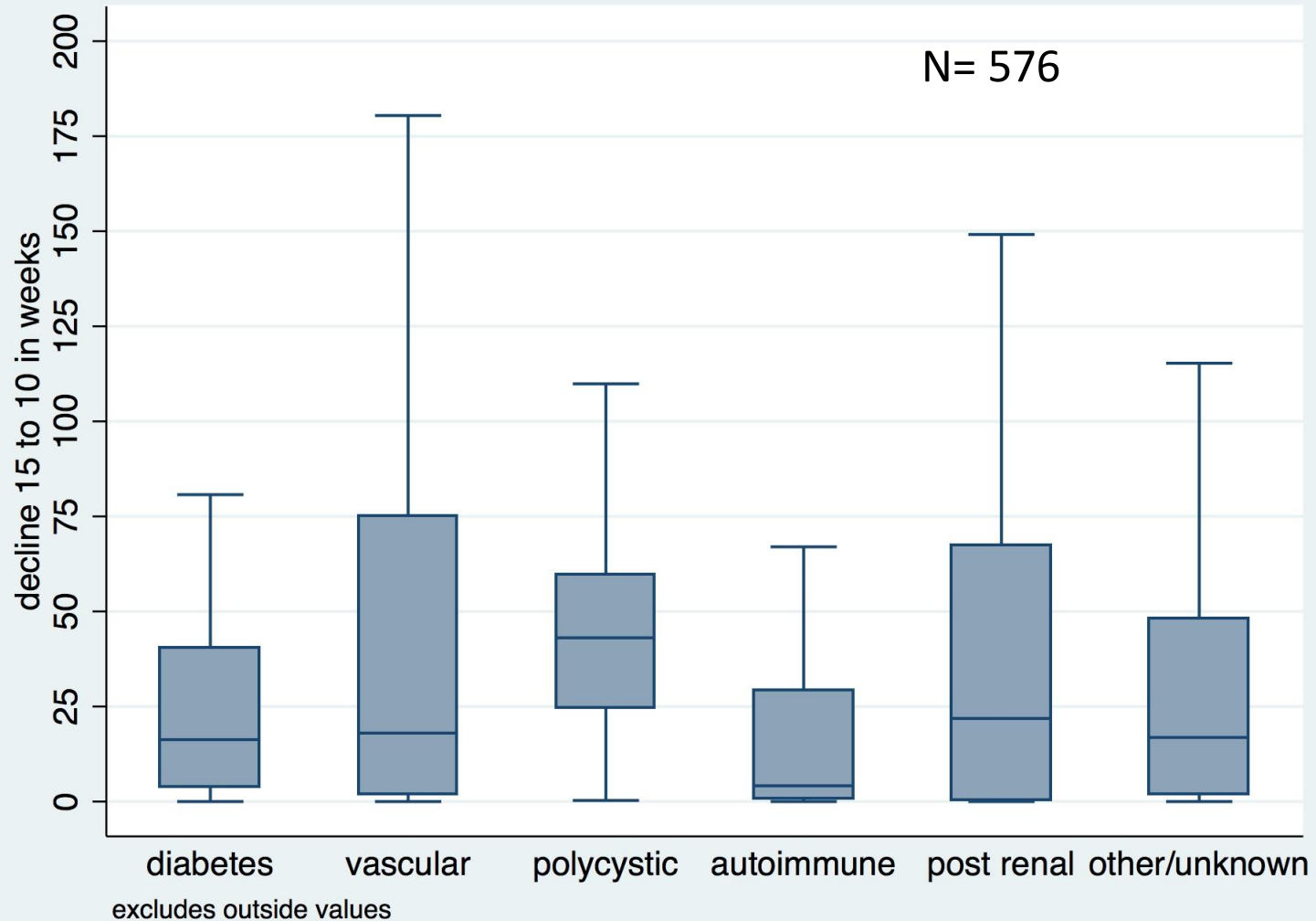
# Decline eGFR in weeks

Percentile	15 to 10	20 to 10
p10	0.3	1.3
p25	2.4	15
median	17	50
p75	48	112
p90	91	193





# Decline eGFR by cause





# Estimation expected dialysis date





# Lessons learnt

- RCAVF's have best survival
- Age should not influence choice of AVF
- AVF survival is much better in pre-dialysis patients
- 75% of AVF are needed in 16 weeks
- Decline in eGFR is highly individual
- We need individual prediction of estimated dialysis date