Community Hospital-Based Research…Opportunities for Quality Assessment and Change

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- Community practice is about providing clinical care
- Most medical research is done in academia…(generally competitive) environments that foster excellence in medical research

- Unique position:
  - Non-competitive environments
  - Opportunities to ask and answer a broad range of questions
  - Direct access to a lot of patients
  - Can gain valuable insights/perspectives into our own practices

3 Projects at the Scarborough Hospital…

The Toronto Western Hospital catheter: one center's experience and review of the literature.

- Chart review
- 192 patients, 208 TWH peritoneal catheters
- 1 and 3 yr survivals 91.8%
- Complication rates (number of catheter months per event:
  - Peritonitis 31.3
  - ESI 42.9
  - Malfunction 538.4
  - Catheter leak 969.1

- Our rates compared favorably with those in the literature
- Helped with the establishment of a database to more readily access these data continuously

Vascular Access for HD

- Establishing a database
  - Systematically and comprehensively record relevant access-related data
  - Setting up such a database is itself a guideline of KDOQI
  - Will then allow us identify areas of strength and weakness…

And compare with guidelines/published results

- AVF (65%)>AVG>CVC(<10%)
- Complication rates…
  - Primary failure rates 9-35% AVF, 0-13% AVG
  - Steals, aneurysms , infections
  - Catheter survival rates
- After enough time, with the number of patients we have, we will likely be able to publish the results

AVF   Date Created:

R / L ₒ radial-cephalic ₒ brachial-cephalic
ₒ brachial-basilic ₒ other
Surgeon:

Problems (and date)
- o ↓blood flow (<600 ml/min)
- o ↑venous pressure
- o Excessive bleeding (>1/2 hour)
- o ↑recirculation
- o Fevers/hypotension/suspected systemic infection
- o Suspected steal
- o Aneurysmal dilation/high risk for rupture
- o TRANSONICS
- o Cannulation problems/pain
- o Other…

Investigations (and date)
- o Fistulogram
- o Transonic
- o Surgical referral
- o Other…

Diagnosis (and date)
- o Collaterals
- o Aneurysm/pseudoaneurysm
- o Venous stenosis
- o Arterial stenosis
- o Maturation failure
- o Steal
- o Other…

Intervention (and date)
- o Ligation
- o Surgical revision
- o Thrombolysis
- o Angioplasty
- o Other…

Outcome (and date)
- o Salvaged/problem solved without need for temporary catheter
- o Salvaged/problem solved but needed temporary catheter
- o Failed/terminated access
- o Primary failure
- o Other…

# Quantifying Chronic Kidney Disease Stage Changes in Stable Outpatients.

Tabo Sikaneta, Mohamed Abdolell, Hulya Taskapan, Janet Roscoe, Jason Fung, Gordon Nagai, Robert Ting, Paul Ng, George Wu, Dimitrios Oreopoulos, Paul Tam.

ABSTRACT

BACKGROUND: Chronic Kidney Disease (CKD) stage values are used to classify and help manage patients with CKD, and co rrelate with subsequent risk of death and cardiovascular events. However it is unknown how CKD stage values vary over time. We quantified and characterized CKD stage value changes in a large group of outpatients with CKD.

125 cc/min   vs   15 cc/min

~1-3 4/day   ~0-1 4/day

60 cc/min

125 cc/min

15 cc/min

~1-3 4/day

~0-1 4/day
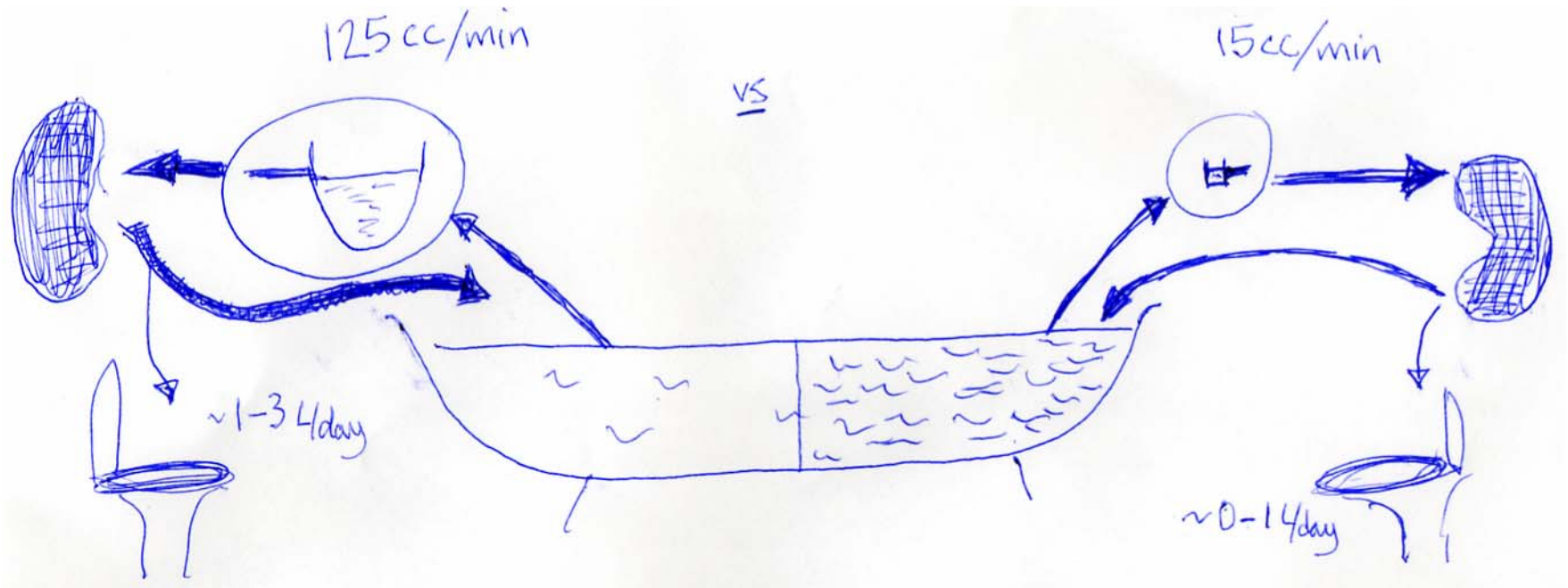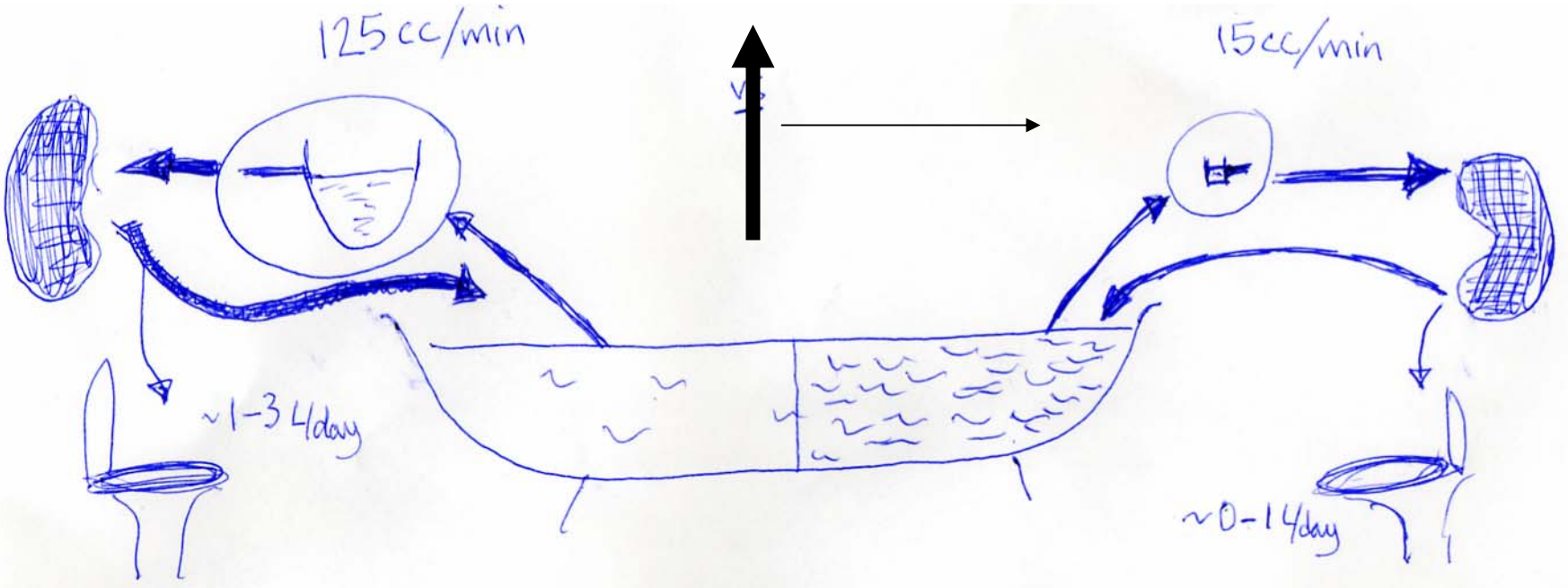
NKF system

Stage	GFR
I	>90 cc/min
II	90-60 cc/min
III	60-30 cc/min
IV	30-15 cc/min
V	<15 cc/min

Alan S Go et al, NEJM Sept 2004

- Kaiser Permanente Renal Registry - health care system insuring >35% of San Francisco
- Collaboration with researchers from UCSF

- Followed pts during a 5 yr period, mean 2.6 yrs/person
- Looked to see whether DEATH, CV morbidity, HOSPITALIZATION was affected by estimated GFR

NKF system

Stage	GFR
I	>90 cc/min
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IV	30-15 cc/min
V	<15 cc/min

NKF system		Modified staging system
Stage	GFR	
I	>90 cc/min	
II	90-60 cc/min	
III	60-30 cc/min	60-30
		45-30
IV	30-15 cc/min	30-15
V	<15 cc/min	<15

Table 1. Baseline Characteristics of 1,120,295 Ambulatory Adults, According to the Estimated GFR at Baseline.*

Characteristic	Total Cohort (N=1,120,295)	Estimated GFR at Baseline				
		≥60 ml/min/1.73 m² (N=924,136)	45–59 ml/min/1.73 m² (N=153,426)	30–44 ml/min/1.73 m² (N=34,275)	15–29 ml/min/1.73 m² (N=7085)	<15 ml/min/1.73 m² without dialysis (N=1373)
Age (yr)	52.2±16.3	49.1±15.1	65.4±13.5	71.2±12.9	70.1±14.5	63.0±16.1
Female sex (%)	54.6	53.4	60.7	61.6	57.7	50.6
Race or ethnic group (%)†						
White	50.9	47.2	68.4	71.4	66.3	54.9
Black	7.4	7.2	4.7	6.7	10.6	16.8
Hispanic	5.9	6.3	3.9	3.9	5.4	6.8
Asian	8.1	8.5	6.4	6.3	7.6	11.9
Pacific Islander	0.04	0.03	0.03	0.1	0.2	0.4
Native American	0.5	0.5	0.5	0.6	0.7	0.7
Mixed or nonblack	2.4	2.4	2.2	2.9	4.0	4.5
Other or unknown	24.8	27.4	13.9	8.0	5.3	4.2
Medical history (%)						
Coronary heart disease	6.3	4.5	13.2	20.6	24.5	17.9
Stroke or transient ischemic attack	2.6	1.7	5.7	10.2	12.8	10.2
Peripheral arterial disease	1.8	1.1	3.9	8.2	12.0	8.9
Chronic heart failure	2.1	1.0	5.2	12.6	20.8	18.5
Known proteinuria	6.3	5.1	8.9	17.7	33.7	50.2
Diabetes mellitus	9.6	8.6	12.3	19.6	28.2	31.1
Diagnosed hypertension	19.1	15.4	33.7	45.8	49.6	50.3
Dyslipidemia	27.9	26.8	33.4	30.9	29.3	28.0
Chronic lung disease	19.1	18.6	21.2	22.4	20.7	19.1
Chronic liver disease	0.2	0.2	0.3	0.6	0.9	1.4
Cancer	2.9	2.5	4.6	5.5	5.7	5.8
Serum albumin ≤3.5 g/dl	1.7	1.2	2.8	5.9	13.7	24.0
Diagnosed dementia	0.8	0.5	1.9	3.2	4.0	3.1
Prior hospitalizations	22.4	20.3	29.4	41.2	50.4	51.1

* Plus–minus values are means ±SD. Because of rounding, percentages may not total 100.
† Information on race and ethnic group was reported by the subjects; information was not available for 5.3 percent of the subjects.

Table 2. Adjusted Hazard Ratio for Death from Any Cause, Cardiovascular Events, and Hospitalization among 1,120,295 Ambulatory Adults, According to the Estimated GFR.*

Estimated GFR	Death from Any Cause	Any Cardiovascular Event	Any Hospitalization
	adjusted hazard ratio (95 percent confidence interval)		
≥60 ml/min/1.73 m²†	1.00	1.00	1.00
45–59 ml/min/1.73 m²	1.2 (1.1–1.2)	1.4 (1.4–1.5)	1.1 (1.1–1.1)
30–44 ml/min/1.73 m²	1.8 (1.7–1.9)	2.0 (1.9–2.1)	1.5 (1.5–1.5)
15–29 ml/min/1.73 m²	3.2 (3.1–3.4)	2.8 (2.6–2.9)	2.1 (2.0–2.2)
<15 ml/min/1.73 m²	5.9 (5.4–6.5)	3.4 (3.1–3.8)	3.1 (3.0–3.3)

* The analyses were adjusted for age, sex, income, education, use or nonuse of dialysis, and the presence or absence of prior coronary heart disease, prior chronic heart failure, prior ischemic stroke or transient ischemic attack, prior peripheral arterial disease, diabetes mellitus, hypertension, dyslipidemia, cancer, a serum albumin level of 3.5 g per deciliter or less, dementia, cirrhosis or chronic liver disease, chronic lung disease, documented proteinuria, and prior hospitalizations.

† This group served as the reference group.

Their conclusions

- "An independent, graded association was observed between a reduced estimated GFR and the risk of death, cardiovascular events, and hospitalization in a large, community-based population."

Cross-sectional GFR determination leading to bad outcomes, NOT a look at delta GFR over time leading to bad outcomes…

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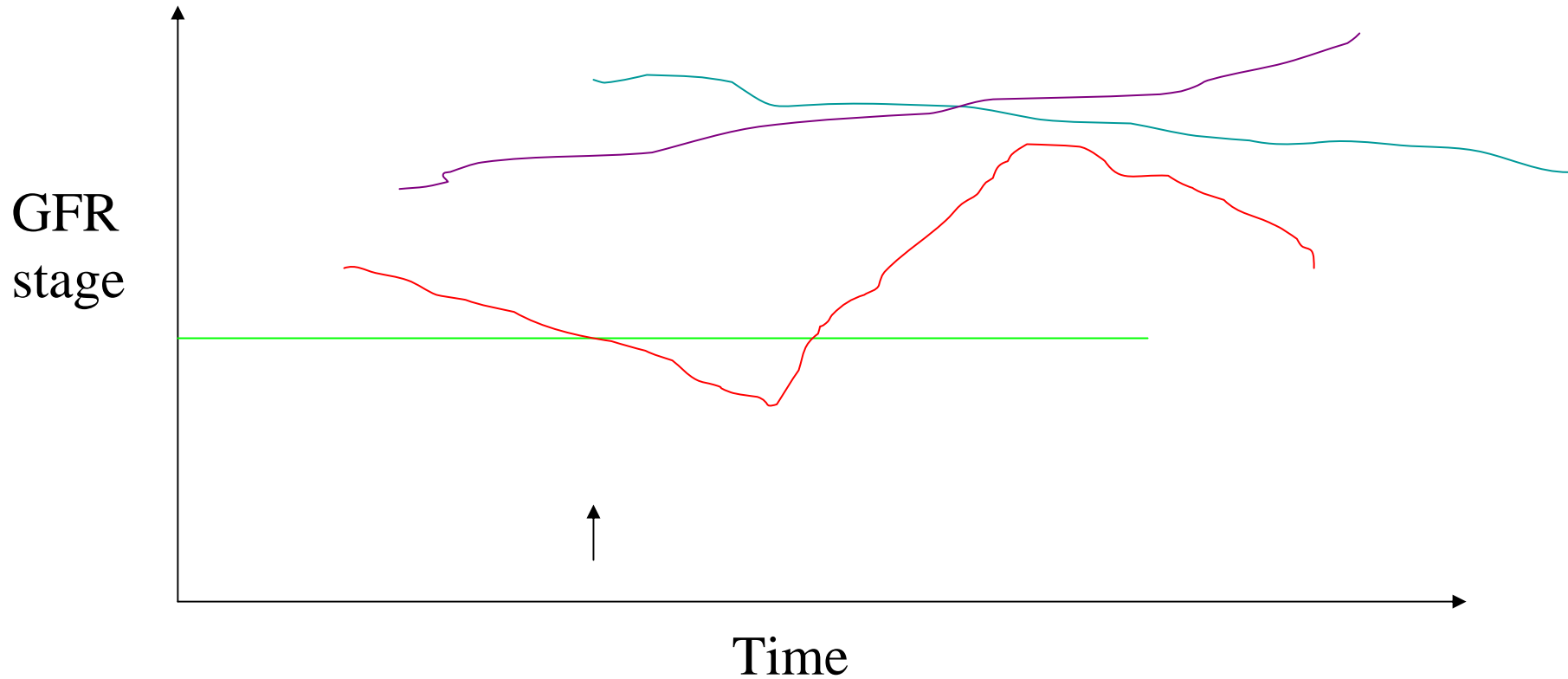
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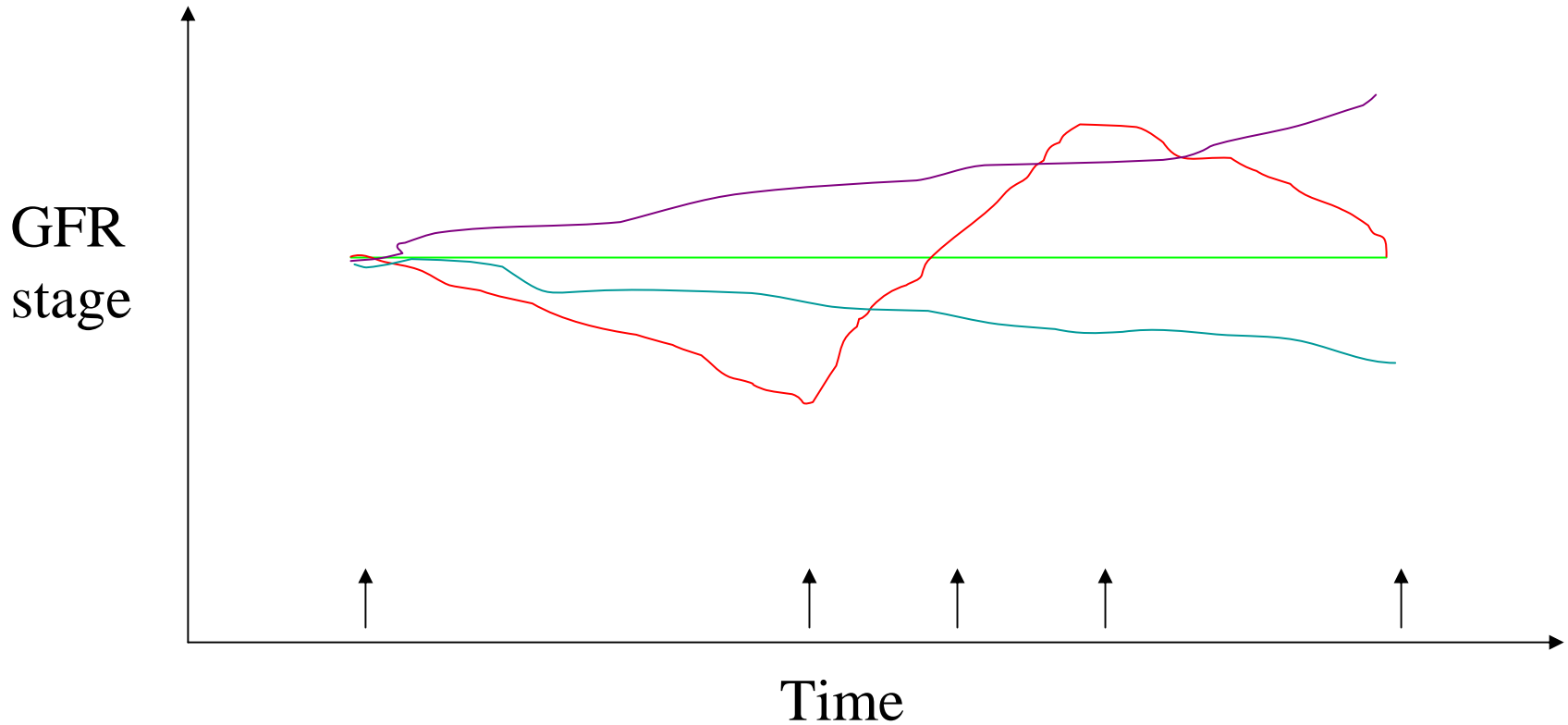
GFR - a moving target?

- How often does it move?
- In whom does it move?
- Does this independently affect important outcomes?

objectives

- Determine the variability in GFR determinations in a busy nephrology practice where patients have multiple office visits/determinations
- Identify variables associated with this variability

ETHNICITY (NUMBER)
Caucasian (514)
African (59)
East Asian (245)
South Asian (184)
Native (3)
Unknown/mixed (257)

CAUSE OF KIDNEY DISEASE/COMORBIDITIES (NUMBER)
diabetes (510)
history of diabetes (572)
hypertension (256)
history of hypertension (965)
history of congestive heart failure (177)
glomerulonephritis (202)
pyelonephritis(59)
interstitial nephritis(16)
acute tubular necrosis (2)
previous nephrectomy for tumor(11)
multiple myeloma (5)

PROTEINURIA (GRAMS PER DAY) (NUMBER)
</=1 (265)
1-3.5 vs </=1 (207)
>3.5 vs </=1 (108)
unknown/unmeasured (682)

MEAN AGE (YEARS) (STANDARD ERROR)
71.25 (1.30)

	Static (N (%))	Improving (N (%))	Worsening (N (%))	Fluctuating (N(%))
Initial CKD stage (ml per min per 1.73m2 (N)) 59-45 (38)	16 (42.1)	3 (7.9)	12 (31.6)	7 (18.4)
44-30 (186)	81 (43.6)	13 (7)	55 (29.6)	37 (19.9)
29-15 (646)	361 (55.9)	39 (6)	121 (18.7)	125 (19.4)
14 or less (389)	304 (78.2)	38 (9.8)	0 (0)	47 (12.1)
All stages (1262)	762 (60.4)	93 (7.4)	188 (14.4)	217 (17.2)

Static

IIIa

30

20
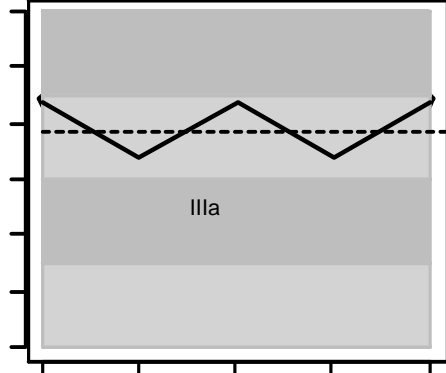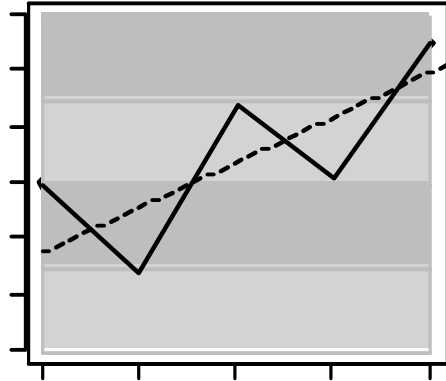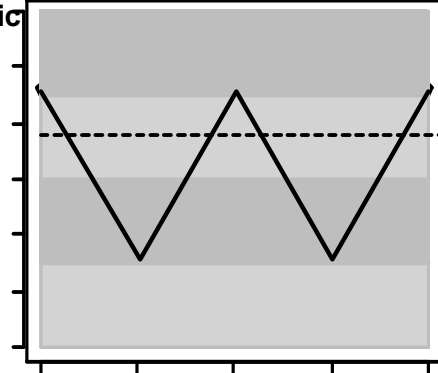
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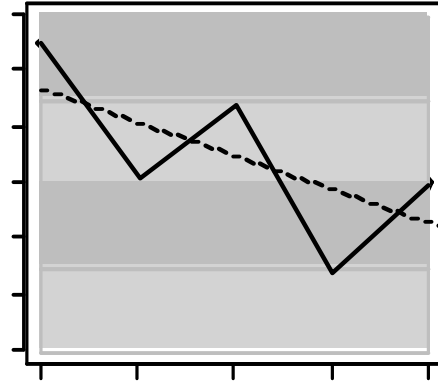
CKD Stage Stability Pattern	Static	Improving	Worsening	Fluctuating
eGFR slope	(-)0.0024	(+)0.083	(-)0.027	(-)0.0022
Slope different from 0 (p value)	0.26	<0.0001	<0.0001	0.57
Slope different from fluctuating (p value)	0.98	-	-	-
Greater Variance in eGFR values compared with static (p value)	-	-	-	<0.0001

	CKD STAGES TABILITY PATTERN							
	static		improving		worsening		fluctuating	
	OR	P	OR	p	OR	p	OR	p
DISEASE/COMORBIDITY								
diabetes	nc	ns	nc	ns	nc	ns	1.3	0.09
history of diabetes	0.75	0.02	1.74	0.02	nc	ns	1.31	0.09
hypertension	nc	ns	nc	ns	nc	ns	nc	ns
history of hypertension	nc	ns	nc	ns	nc	ns	nc	ns
history of CHF	nc	ns	nc	ns	nc	ns	nc	ns
glomerulonephritis	nc	ns	0.61	0.15	nc	ns	nc	ns
pyelonephritis	nc	ns	2.06	0.06	1.66	0.11	0.53	0.14
interstitial nephritis	nc	ns	1.81	0.62	nc	ns	0.32	0.33
nephrectomy for malignancy	6.64	0.06	e	e	0.57	0.71	e	e
HUS/TTP	1.51	0.26	nc	ns	nc	ns	0.59	0.38
acute tubular necrosis	0.66	1	e	e	5.74	0.28	e	e
multiple myeloma	2.63	0.65	3.17	0.31	e	e	e	e
ETHNICITY								
(vs Caucasian)								
African	0.66	0.97	1.5	0.92	nc	ns	nc	ns
East Asian	nc	ns	0.68	0.03	nc	ns	0.88	0.1
South Asian	nc	ns	nc	ns	1.62	0.96	0.82	0.07
Native Canadian	<0.001	0.96	6.65	0.14	<0.001	0.96	8.71	0.07
Unknown	nc	ns	1.57	0.77	nc	ns	0.67	0.01
PROTEINURIA								
(vs </=1 gm/day)								
1-3.5	nc	ns	0.35	0.74	nc	ns	nc	ns
>3.5	nc	ns	0.08	0.05	1.8	0.13	nc	ns

limitations

- Medications not accounted for
- Retrospective
- Observation period arbitrary
- Given enough time, any variable can change

Our findings…

– GFR class didn't change in 60% of our large group of patients over a 400 day observation period

– In the 40% whose GFR class changed, most had fluctuating class values or worsening GFR class

- Heavy proteinuria negatively associated with improving eGFR stage, diabetes associated with improving eGFR stage
- Trends to proteinuria positively associated with worsening eGFR stage, diabetes positively associated with fluctuating and negatively associated with static eGFR stages.

- Yielded an interesting hypothesis to be tested…does GFR class change independently affect clinical outcomes?

- Answering this would require design and implementation of a database that would record and track important clinical variables… something that can only help our patients.

Summary

- Community centres have some advantages over academic centres…relative freedom in what questions to ask, how to answer them
- Necessary ingredients are time, desire, willingness to follow through, and patience!

- It's fun!
- Quality assurance purposes (QC)
- Opportunity to publish
- Ultimate goal would be to inform or change practice