

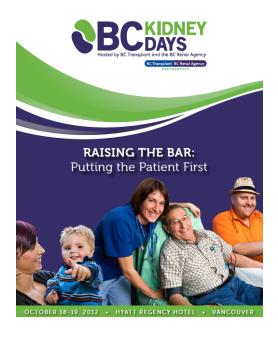
2012

Innovations in Kidney Care and Practice

A. Levin MD FRPC

Innovations in Kidney Care and Practice: 2012

- in·no·va·tion (n -v sh n)
 - 1. The act of introducing something new
 - 2. Something newly introduced.
 - 3. (the act of making) a change or a new arrangement







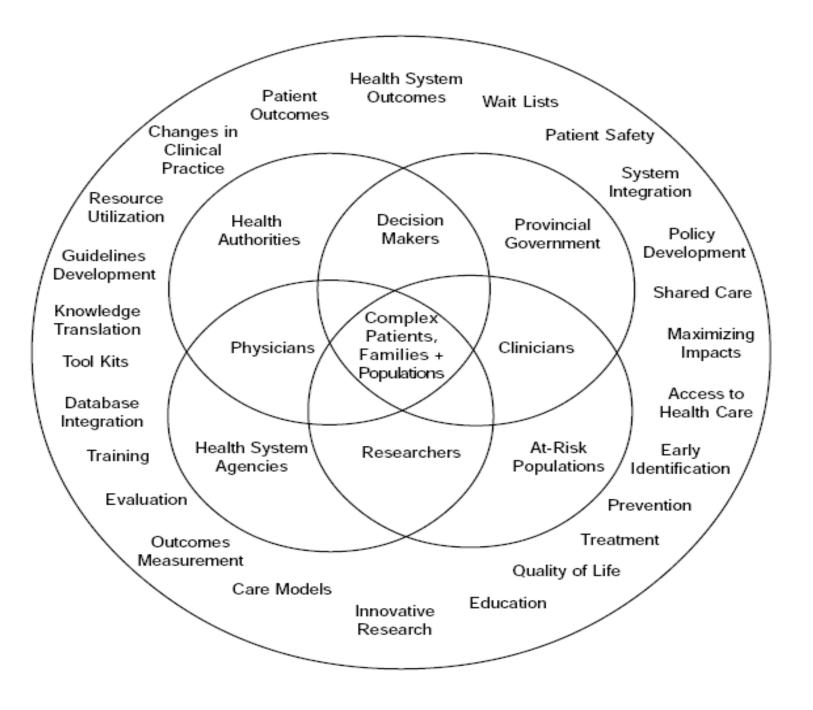
What's new?

- New perspectives
- New focus
 - Optimal Care
 - Patients First
 - System redesign
 - Practical Research involvement

Optimal care

 ...that care which leads to the best outcomes for the individual, the population and society



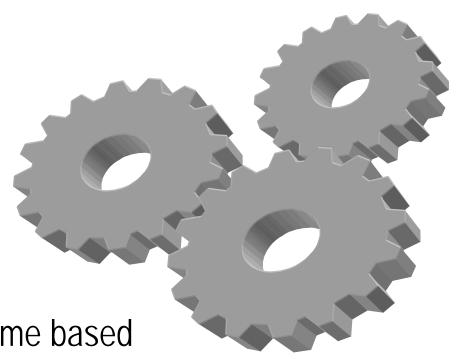


Requirements for Optimal care of Individuals

- Scientific understanding of disease(s)
- Ability to identify the disease
- Ability to identify patients at risk
- Knowledge of best therapies and strategies
- Ability to deliver effective therapies in a timely manner
- Supportive health environment

Inter-related strategies to improve patient outcomes

- 1. Public awareness
- 2. Professional education
- 3. Policy Influence
- 4. Care Delivery Systems
- 5. Research
 - Basic, clinical, and outcome based



The problems: patient perspective

- Who, what, where and why?
 - Understanding the system and the options
- How can I stop the disease?
 - Delaying the progression of disease
- Why am I on these/ so many medicines?
 - Understanding Medications: Side effects and errors
- Why don't I feel well?
 - Improving Pain and symptom control
- How do I get to all my appointments and treatments?
 - Navigation and Transportation

The problems: the clinical and system perspectives

- Timely identification and referral
- Delay of progression of CKD
- Optimal dialysis modality selection and timing
 - Pre-emptive (vascular) access
 - Independent dialysis on modality of choice
- Timely Transplant referral (managing wait lists)
- Continuity of care and transitions over time

Solutions

- Understand disease processes
- Implement best practices
- Generate new knowledge

Create systems and teams that address important patient problems

Innovations

- In Science and Discovery
- In Care and Practice
- In Policies



Science and Discovery

Diagnostics

- Identifying high risk patients : simple and newer biomarkers
- Genetic testing for specific diseases
- Improved imaging

Newer Drugs

- Bardoxalone (DM Nephropathy?)
- Tolvaptan (Hyponatremia/ ? PCKD)
- Eceluzimab (HUS)

Therapies and Strategies

- Identification and CKD care
- Extended dialysis
- Improved preparation for dialysis
- Anemia protocols
- Steroid free Transplant protocols
- Medication reconciliation

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Bardoxolone Methyl and Kidney Function in CKD with Type 2 Diabetes

Pablo E. Pergola, M.D., Ph.D., Philip Raskin, M.D., Robert D. Toto, M.D.,
Colin J.

Melis

The NEW ENGLAND JOURNAL of MEDICINE
Heidi Christ-S

ORIGINAL ARTICLE

Tolvaptan, a Selective Oral Vasopressin V₂-Receptor Antagonist, for Hyponatremia

Robert W. Schrier, M.D., Peter Gross, M.D., Mihai Gheorghiade, M.D., Tomas Berl, M.D., Joseph G. Verbalis, M.D., Frank S. Czerwiec, M.D., Ph.D., and Cesare Orlandi. M.D., for the SALT Investigators*

Exciting science...Progression, Prediction, Prevention

- Population-based Risk Assessment of APOL1 on Renal Disease Friedman, DJ, et al JASN. 2011 Oct 13.
- Circulating urokinase receptor as a cause of focal segmental glomerulosclerosis.
 Wei, C, et al. Nature Medicine 17, 952-960 2011
- **Fibroblast Growth Factor 23** and Risks of Mortality and End-Stage Renal Disease in Patients With Chronic Kidney Disease Isakova, T, et al *JAMA. 2011;305(23):2432-2439*
- Bardoxolone methyl and kidney function in CKD with type 2 diabetes. Pergola PE, et al N Engl J Med. 2011;365(4):327-36.
- The effects of lowering LDL cholesterol with simvastatain plus ezetimibe in patients with chronic kidney disease (Study of Heart and Renal Protection): a randomized placebo controlled trial. Baigent, C, et al Lancet 2011; 377:2181-92

Innovations in Care and Practice

Focus on patient outcomes

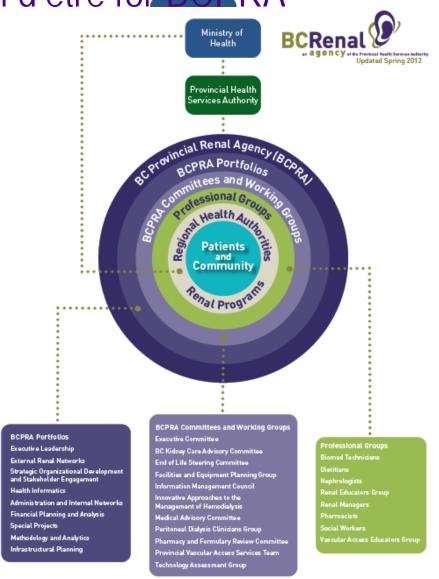
- Focus on knowledge translation
 - What we know to what we do
 - What works in the real world

Focus on creating systems which optimize outcomes

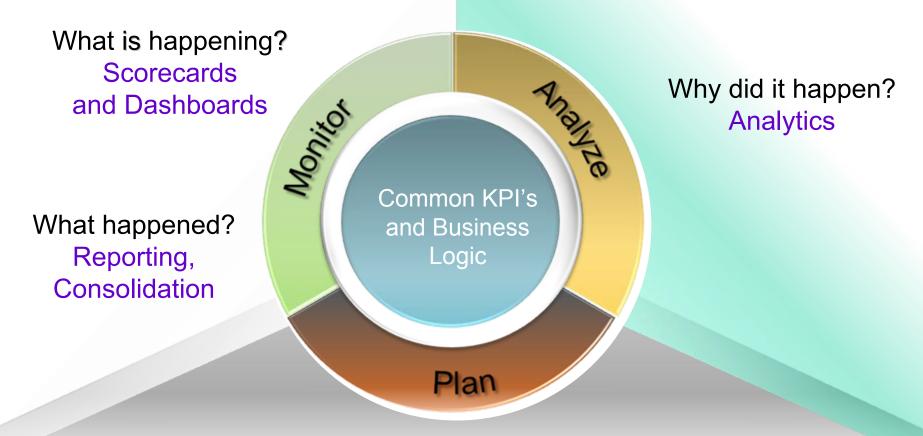
Form follows function:

Patients are the raison d'etre for BCRRA

- 'Unique' organizational chart patients at the centre
- Health authorities have operational responsibility for delivery of programs
- BCPRA forms an overarching support for those programs, and is accountable to the PHSA and MOH for outcomes



PROMIS Information system: an Integrated Approach of using data to guide decision making



What will happen? Forecasting

What do I want to happen? Planning, Budgeting

Provincial Initiatives: focus on patient and system needs

- Provincial Patient Education Strategy
 - Tailoring information and processes for patients
- Patient Safety
 - Medication Reconciliation
 - Vascular access initiatives
- Delaying progression of CKD
 - GP education/ Guidelines
 - BC Kidney Care Advisory Committee (CKD Strategy)
- Improving outcomes and choices
 - Independent Dialysis Strategies and Transplant (funding, training, education)
 - End of life Care and Advanced Care Planning
- Reducing variability in care
 - Protocols and standards: anemia mgmt, CKD bloodwork, VA, pain algorithm

Dialysis Care

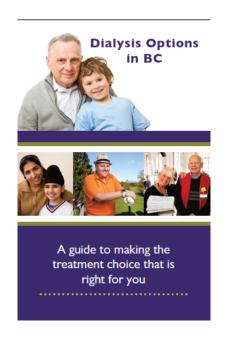
- Extended dialysis
 - Independent dialysis
 - Nocturnal Home hemodialysis
 - Nocturnal Facility based hemodialysis
 - Independent
 - dependent
 - Assisted PD



- New machines, dialysis membranes, solutions
- New anticoagulation protocols
- Improved catheter locking solutions and protocols

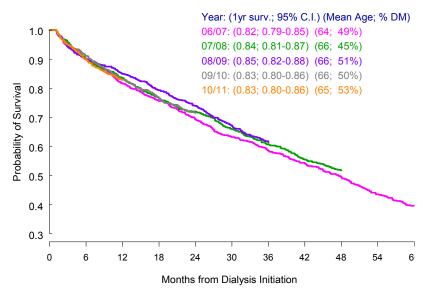
Patient education about choices

- New materials
- Translation to 5 languages
- Web site and other materials : patient friendly



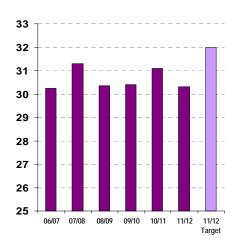
	Peritoneal Dialysis	Home Hemodialysis	Involved Care*	Community Units	Facility-base Treatment
lexibility of when you dialyze - It can suit your schedule	yes	yes	sometimes	no	no
tuts you in charge	yes	yes	sometimes	no	no
ortable, so you can travel	yes	no	no	no	no
Diet and fluid Intake flexibility	yes	yes	sometimes	no	no
leed to travel 3 times per week for dialysis	no	no	yes	yes	yes
et more dialysis, which means you feel better	yes	yes	sometimes	no	no
Veedle-free treatments	yes	no	no	no	no
ong support network of clinic nurses, dietitians, social orkers and nephrologists	yes	yes	yes	yes	yes
tential reduction in some medications	yes	yes	no	no	no
manent catheter in the abdomen	yes	no	no	no	no
cular access surgery	no	yes	yes	yes	yes
e required to store supplies	yes	yes	no	no	no
order supplies and accept home deliveries	yes	yes	sometimes	no	no
quires several weeks of training	yes	yes	sometimes	no	no
table sewer/septic system needed	no	yes	no	no	no
ght to needle vascular access	no	yes	sometimes	no	no
ephone in room needed	sometimes	yes	no	no	no
set up and monitor your dialysis	yes	yes	sometimes	no	no
st of supplies and delivery covered	yes	yes	yes	yes	yes
sble home electrical and plumbing upgrades needed sts covered by program)	no	yes	no	no	no

Highest Survival and highest independent dialysis rates in Canada

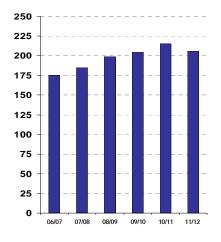


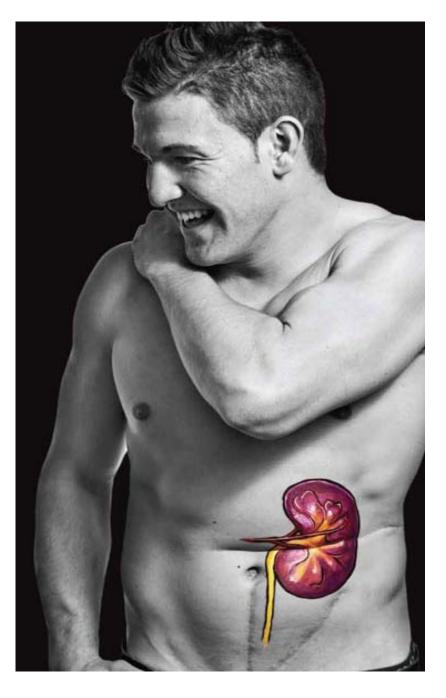
Test for adjusted HR* for Year of Dialysis Initiation: Chi-sq=8.1325, p=0.087 *Adjusted for age, gender, diabetes, initial modality, HA at dialysis initiation, CKD follow-up

Percentage of patients on independent dialysis (PD or Home or Independent Facility-based HD)



Number of patients participating in Home or Independent Facility-based HD



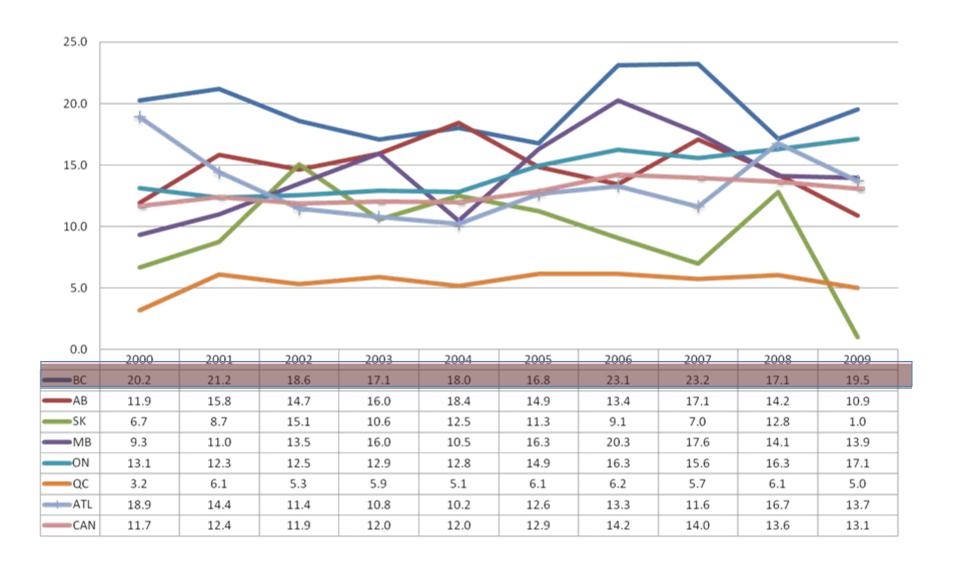


Optimizing access to Transplantation

Transplantation

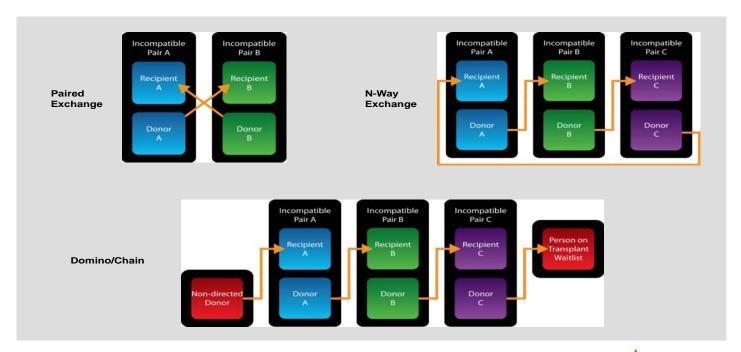
- Donor supply:
 - Paired exchanges and domino chains
 - Donation after cardiac death (DCD)
 Extended criteria donors (ECD)
- Recipient care:
 - Reduction in acute rejection rates
 - Steroid free protocols
 - Tailoring of immuno-suppression to individuals

BC has the highest living donation rate



Incompatible transplantation: more choices more possibilities

Types of Donor Exchanges



Transplantation processes

Improved procurement system and resources = increase in deceased donor organ availability

- Funding model:
 - Patient centered focus
 - Multidisciplinary team roles and responsibilities
 - Right people, right place, right time for the patient
 - Recognized need for navigation and closer to home activities





A collaboration:

An integrated funding model for patients with kidney disease :focus on Kidney Transplantation

Key Concepts

- Tx funding model and Renal funding model = first comprehensive funding model to include all aspects of care throughout the continuum from identification to death for patients with CKD
- Pre and Post Transplant care modeled on best practices and patient perspectives
- Activities described
 - Location of activity may vary by region or pt
- Concept of "home team" and 'transplant team'

CKD Care

Identification and awareness

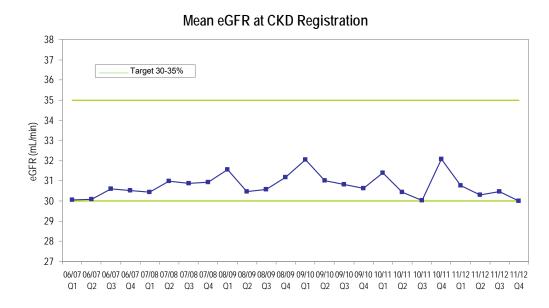
- Integrated care
- Shared care
- Multidisciplinary teams



- BC Kidney Care Advisory committee (KCAC)
 - Understand variability in structure and outcomes
 - Improve and align care and outcomes

Median eGFR at time of CKD registration

- Consistently ~ 30- 33 ml/min
- Optimized time and exposure to team and resources



Variability and Risk Factors for Kidney Disease Progression and Death Following Attainment of Stage 4 CKD in a Referred Cohort

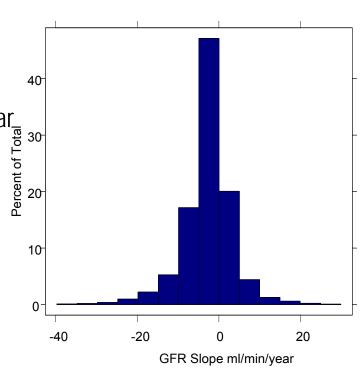
Adeera Levin, MD, FRCPC, Ognjenka Djurdjev, MSc, Monica Beaulieu, MD, FRCPC, and Lee Er, MSc

- N=~4000 pts referred cohort
- GFR slope

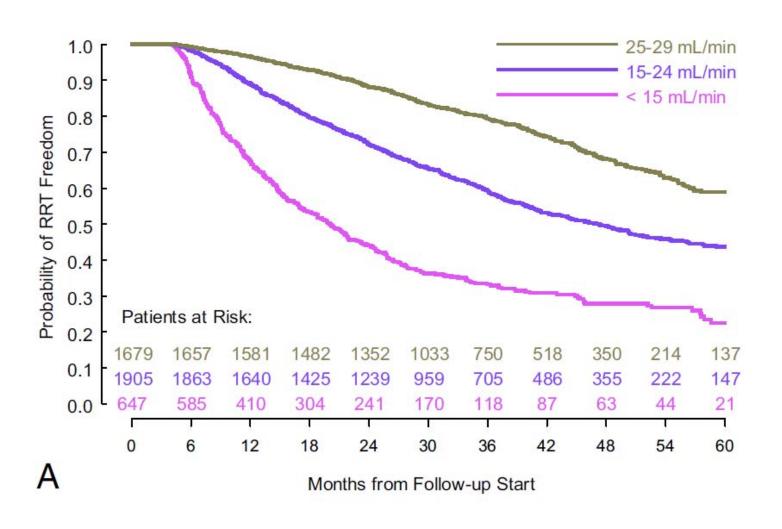
GFR slope

Median: -2.06 (P₂₅: -5.22, P₇₅: 0.43) ml/min/ year of the slope of t

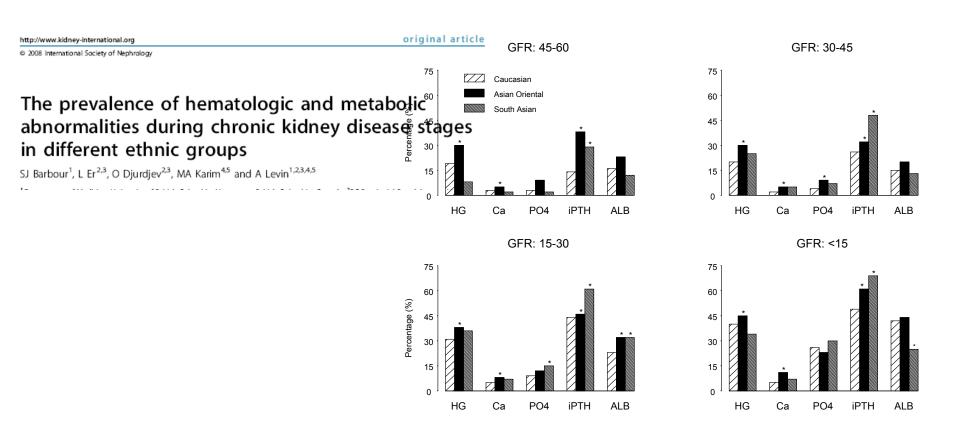
- 28 % 0 ml/min/ year
- 46 % 0.1 5.0 ml/min / year
- 26 % > 5 ml/min / year



Even at low eGFR levels, substantial proportion of patients do not require RRT

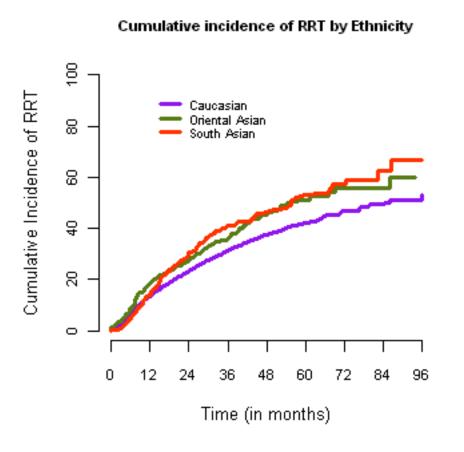


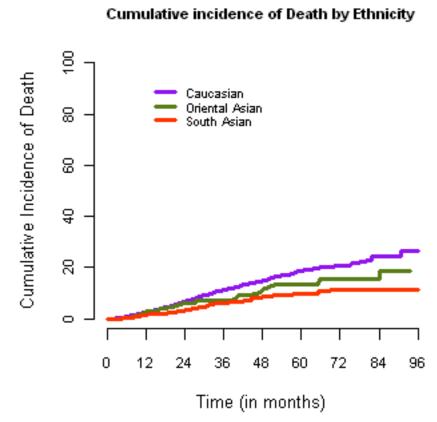
We have learned that there is variation between ethnicities at each stage of CKD with respect to associated CKD laboratory abnormalities



Asians more likely to have abn of Hb, PO4, PTH and Alb at any level of GFR vs Whites

And that Asian patients have faster progression to ESRD — but better survival





Barbour et al NDT 2010

Episodes of AKI in CKD populations modifies prognosis

Nephrol Dial Transplant (2010) 1 of 7 doi:10.1093/ndt/gfg011

Original Article



Incidence and outcomes of acute kidney injury in a referred chronic kidney disease cohort

Jean-Philippe Lafrance^{1,2}, Ognjenka Djurdjev³ and Adeera Levin^{3,4}

In a referred CKD cohort in BC (N>6000): prediction of AKI events, (change in serum creatinine of at least 25 umol/L (0.30 mg/dl)) is predicted by:

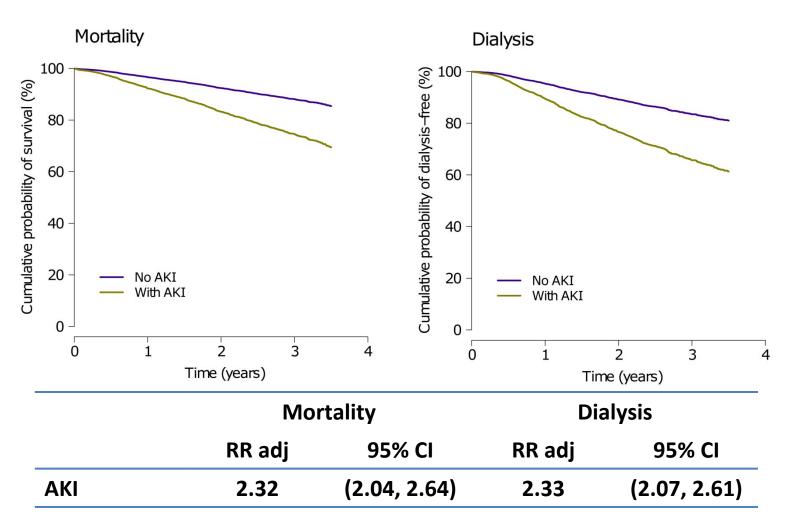
- •gender (male),
- younger age
- and duration of CKD follow up

And modifies prognosis

Many CKD patients experience Acute Kidney Injury (AKI) event(s)

Number of AKI events	N
0	1395
1	741
2	243
≥3	67
TOTAL No of events	1442

Small changes creatinine (AKI) in CKD pts have profound impact on outcomes



CKD Models of Care

- Patient centred
- Multidisciplinary
- Longitudinal
- Education and Care
- Self Management fostered

Original Article

Nephrology Dialysis Transplantation

The short- and long-term impact of multi-disciplinary clinics in addition to standard nephrology care on patient outcomes

Bryan M. Curtis¹, Pietro Ravani², F. Malberti², Fiona Kennett³, Paul A. Taylor³, Ognjenka Djurdjev⁴ and Adeera Levin³

- Median follow up ~40 m prior to dialysis start
- Italian and Canadian cohorts
- Comparison between Nephrologist along and Nephrologist + multidisciplinary team
- Non randomized observational cohort study

Table 1. Summary demographics at dialysis initiation

	Entire cohort	Standard nephrologist office care	Nephrologist and multi- disciplinary clinic	Pª
N (%)	288	156	132	
Clinic duration (months)	41 ± 34	43 ± 34	40 ± 33	0.4
Age (years)	62 ± 16	64 ± 16	60 ± 17	0.02
Female (%)	39.9	43.6	35.6	0.2
Diabetes (%)	33.7	33.3	34.1	0.9
Race (%)				0.001
Caucasian	72.1	66.4	78.9	
Asian	17.1	25.0	7.8	
East Indian	6.4	3.3	10.2	
Other	2.5	2.6	2.3	
Aetiology of kidney f	ailure (%)		0.5
Diabetes	22.3	20.5	24.4	
Hypertension	20.2	21.2	19.1	
GN ^b /Autoimmune	24.7	23.1	26.7	
Cystic disease	7.3	5.8	9.2	
Chronic kidney disease ^c	13.6	16.0	10.7	
Other	11.8	13.5	9.9	
Dialysis Modality ^d (% HD)	60.4	61.5	59.1	0.7

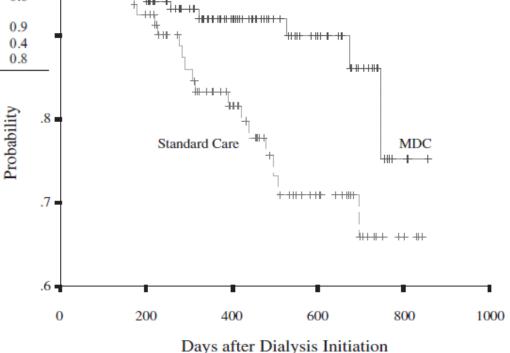
Table 2. Laboratory data (mean ± standard deviation) at dialysis start, 6 and 12 months post-dialysis

	Standard nephrologist office care	Nephrologist and multi-disciplinary clinic	P
Kidney function at dia	alysis start		
Creatinine (µmol/l)	707 ± 188	650 ± 225	0.03
GFR ^a (ml/min/m ²)	7.0 ± 2.6	8.4 ± 3.8	0.001
Haemoglobin (g/l)			
Dialysis start	90 ± 14	102 ± 18	< 0.0001
6 months	108 ± 15	116 ± 16	< 0.0001
12 months	110 ± 17	120 ± 16	< 0.0001
Albumin (g/l)			
Dialysis start	34.8 ± 5.3	37.0 ± 5.4	0.002
6 months	36.5 ± 4.5	37.0 ± 4.7	0.4
12 months	36.9 ± 4.6	37.0 ± 4.2	0.9
Calcium (mmol/l)			
Dialysis start	2.16 ± 0.27	2.29 ± 0.21	< 0.0001
6 months	2.33 ± 0.24	2.32 ± 0.22	0.9
12 months	2.28 ± 0.21	2.29 ± 0.17	0.6
Phosphate (mmol/l)			
Dialysis start	1.73 ± 0.55	1.73 ± 0.54	0.9
6 months	1.56 ± 0.51	1.61 ± 0.43	0.4
12 months	1.61 ± 0.47	1.59 ± 0.44	0.8

^aGFR estimated by abbreviated MDRD formula.

Despite long exposure to nephrology specialists, laboratory parameters at the time of dialysis start were poorer and survival on dialysis poorer, when compared to those who were also seen by a multidisciplinary team

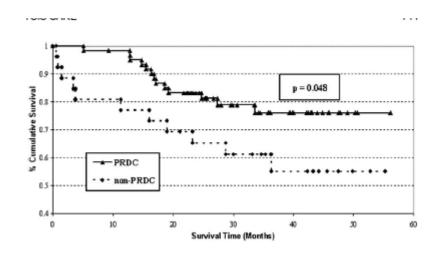
Log-Rank p=0.01



Multidisciplinary Predialysis Care and Morbidity and Mortality of Patients on Dialysis

AJKD 2004

Marc Goldstein, MD, Teraiza Yassa, MD, Niki Dacouris, BSc, and Philip McFarlane, MD



- Toronto based study demonstrated similar results
- Better preparation for dialysis (AVF vs catheter)

Table 2. Functioning HD Access at Onset of Dialysis Therapy

	PRDC	Non-PRDC	Р
No. of patients	42	21	
Temporary access (%) Cuffed tunneled internal			
jugular line Permanent access (%)	52.4	95.2	< 0.01
Fistula	45.2	4.8	< 0.01
Graft	2.4	0	1.00
Total permanent	48	5	<0.01

Care models to improve outcomes... in children and adults

Pediatr Nephrol (2012) 27:1921–1927 DOI 10.1007/s00467-012-2209-6

ORIGINAL ARTICLE

The effect of a multidisciplinary care clinic on the outcomes in pediatric chronic kidney disease

Salma Ajarmeh • Lee Er • Genevieve Brin • Ognjenka Djurdjev • Janis M. Dionne

Table 2 Outcome variables by cohort year and by chronic kidney disease (CKD) stages

Laboratory	Cohort 2003			Cohort 2009			p value*
	Total	CKD stages 1–2	CKD stages 3–5	Total	CKD stages 1–2	CKD stages 3–5	(Cohort)
Anemia							
Hemoglobin (g/dl)	12.2 ± 1.6	12.8 ± 1.4	12.0 ± 1.6	13.0 ± 1.6	13.5 ± 1.3	12.5 ± 1.6	0.03
Bone mineral metabolism							
Calcium (mg/dl)	9.1 ± 0.6	9.3 ± 0.4	9.1 ± 0.7	9.6 ± 0.6	9.7 ± 0.6	9.5 ± 0.5	< 0.001
Phosphate (mg/dl)	4.7 ± 0.9	4.3 ± 0.7	4.8 ± 0.9	4.6 ± 0.9	4.4 ± 0.8	4.7 ± 0.9	0.92
Intact parathyroid hormone (pg/ml)	7.6 [4.7, 13.5]	3.3 [2.1, 6.0]	9.4 [5.7, 14.9]	7.2 [4.0, 10.0]	4.9 [3.3, 7.0]	9.6 [7.6, 16.3]	0.15
Bicarbonate (mEq/l)	23.4 ± 3.86	25.3 ± 4.4	22.9 ± 3.6	24.6 ± 3.5	25.1 ± 3.8	24.3 ± 3.2	0.12
Growth and nutrition							
Albumin (g/dl)	3.8 ± 0.6	4.0 ± 0.4	3.8 ± 0.6	4.4 ± 0.5	4.5 ± 0.4	4.3 ± 0.5	< 0.001
Z-score weight	-0.43 ± 1.15	-0.44 ± 1.13	-0.42 ± 1.18	-0.52 ± 1.26	-0.47 ± 1.26	-0.58 ± 1.27	0.54
Z-score height	-0.71 ± 1.11	-0.53 ± 1.25	-0.77 ± 1.07	-0.69 ± 1.13	-0.53 ± 1.21	-0.85 ± 1.03	0.75
Progression of disease							
Annualized eGFR rate of progression (ml/min/1.73 m²)	-4.0 ± 9.0	-5.3 ± 6.7	-3.5 ± 9.6	0.5 ± 11.2	-1.8 ± 13.1	1.8 ± 9.8	0.01

International attention to structure and care models..

DOI 10.1007/s00467-012-2236-3

EDITORIAL COMMENTARY

Why multidisciplinary clinics should be the standard for treating chronic kidney disease

Guido Filler • Steven E. Lipshultz

Dedicated additional funding was the key to establishing the multidisciplinary CKD clinic. Furthermore, the province of British Columbia provided an infrastructure with a centralized renal disease registry and a clinic data manager. It is

The govern-

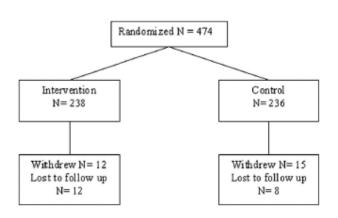
ment of the province of British Columbia and the Provincial Renal Agency should be congratulated for funding the Patient Records, Outcome and Management Information System (PROMIS). The impressive improvement in the eGFR

A Nurse-coordinated Model of Care *versus* Usual Care for Stage 3/4 Chronic Kidney Disease in the Community: A Randomized Controlled Trial

Brendan J. Barrett,* Amit X. Garg,[†] Ron Goeree,[‡] Adeera Levin,[§] Anita Molzahn,^{||} Claudio Rigatto,[¶] Joel Singer,[§]
George Soltys,** Steven Soroka,^{††} Dieter Ayers,^{‡‡} and Patrick S. Parfrey*

Clin J Am Soc Nephrol 6: 1241–1247, 2011.

- Multi-centre Canadian RCT N = 474
- Laboratory case finding CKD
- GP vs Nurse coordinated care model
- 2 year follow up



No differences in achievement of targets or clinical endpoints bn groups

Table 2. Achievement of clinical and treatment targets comparing trial groups over time						
	Time	Experimental Intervention Number (%)	Standard Care Co Number (%)			
BP ≤130/80	Baseline	139/236 (59)	101/235 (43)			
	12 months	134/218 (61.5)	100/218 (45.9))		
	24 months	81/128 (63.2)	64/136 (47)			
LDL <2.5 mmol/L	Baseline	99/230 (43)	81/220 (36.8))		
	12 months	97/206 (47.1)	99/214 (46.3))		
	24 months	78/122 (63.9)	76/128 (59.4))		
On RAAS blocker	Baseline	165/236 (70)	156/235 (66)			
	12 months	165/219 (75)	146/220 (66)			
	24 months	102/130 (78)	92/140 (66)			
$Hba_{1c} \le 7.0\%$ in diabetics	Baseline	38/68 (55.9)	36/74 (48 1			
	12 months	50/70 (71.4)	52/77 (6)			
	24 months	40/49 (81.6)	43/52 (82	Tab		
Hemoglobin ≥105 g/L	Baseline	229/235 (97.4)	232/234 (99			
	12 months	208/214 (97.2)	203/214 (94			
	24 months	125/128 (97.7)	130/136 (9			
Iron saturation ≥0.2	Baseline	169/225 (75.1)	160/226 (70			
	12 months	154/210 (73.3)	155/210 (73			
	24 months	95/128 (74.2)	95/124 (70	Car		
Serum phosphate <1.8 mmol/L	Baseline	235/235 (100)	233/233 (10	Oth		
	12 months	211/211 (100)	218/218 (10	My		
	24 months	125/126 (99.2)	126/127 (99			
Bicarbonate ≥22 mmol/L	Baseline	225/234 (96.1)	230/234 (98	Act		
	12 months	209/215 (97.2)	212/214 (99	Cor		
	24 months	124/127 (97.6)	124/127 (9)	Stro		

Table 3. Distribution of clinical endpoints by study group					
		Standard Care Control (n = 236)			
Cardiovascular death	2 (0.8)	2 (0.8)			
Other death	5 (2.1)	0 (0.0)			
Myocardial infarction	5 (2.1)	4(1.7)			
Acute coronary syndrome	1 (0.4)	2 (0.8)			
Congestive heart failure	5 (2.1)	8 (3.4)			
Stroke	1 (0.4)	1 (0.4)			
Amputation above ankle	2 (0.8)	2 (0.8)			
Dialysis	2 (0.8)	1 (0.4)			
Doubled serum creatinine	1 (0.4)	4(1.7)			
Total cases with ≥1 event	19 (8.0)	19 (8.0)			
Total events	24	24 `			
Event rate per year (%)	5.3	5.2			

The proportions are presented as numbers (percentages).

0.03°a
0.47°b
0.76°a
0.41°a
<0.001°b
0.74°a
0.49°a
0.92°b
0.06°a

But... highly cost effective Reduced hospitalization and health care resource use

Cost-Effectiveness Analysis of a Randomized Trial Comparing Care Models for Chronic Kidney Disease

R.B. Hopkins, ** A.X. Garg, * A. Levin, * A. Molzahn, ** C. Rigatto, ** J. Singer, ** G. Soltys, ** S. Sorc ** ** C. P. L. Barrott ** and P. Coorce**

B.J.	Barrett,##	and R.	Goeree**

Table 5. Incremental costs, incremental health-related quality of life (QALYs), and cost-effectiveness analysis by level of GFR				
	Costs	QALYs	Costs	QALYs
	GFR ≥ 45 (Inte	ervention n =	GFR < 45 (Inte	ervention n =
	79, Contr	$\operatorname{rol} n = 81$	159, Contr	ol $n = 155$)
Cost-effectiveness results (disease-related costs)				
intervention	\$3582	1.511	\$4986	1.446
control	\$6185	1.456	\$5738	1.440
incremental ^a	-\$2603	0.055	-\$753	0.006
Cost-effectiveness results (all costs)				
intervention	\$10,598	1.511	\$12,205	1.446
control	\$14,603	1.456	\$14,084	1.440
incremental ^a	-\$4005	0.055	-\$1880	0.006
	$GFR \ge 40$ (Inte	ervention $n =$	GFR < 40 (Inte	ervention $n =$
	158, Contr	n = 146	80, Contr	ol $n = 90$)
Cost-effectiveness results (disease-related costs)				
intervention	\$4389	1.536	\$4945	1.459
control	\$5304	1.498	\$7233	1.382
incremental ^a	-\$915	0.038	-\$2,288	0.077
Cost-effectiveness results (all costs)				
intervention	\$11,761	1.536	\$11,360	1.459
control	\$12,927	1.498	\$16,664	1.382
incremental ^a	-\$1166	0.038	-\$5304	0.077

Table 4. Incremental costs, incremental health-related quality of life (QALYs), and cost-effectiveness analysis Costs OALYs ICER Cost-effectiveness results (disease-related costs) 1.502 intervention \$4631 control \$5741 1.456 incremental^a -\$11090.046 Dominant^b Cost-effectiveness results (all costs) 1.502 intervention \$11,739 control \$14,180 1.456 -\$24410.046 Dominantb incremental^a lesults in Table 4 include imputed data and differ from Table because of imputation and discounting 2nd-year costs and ALYs by 5%. Incremental, intervention — control. Less costly, more QALYs.

^aIncremental, intervention minus control. ^bLess costly, more QALYs. CJASN ePress. Published on May 26, 2011

Original Article



Towards rational approaches of health care utilization in complex patients: an exploratory randomized trial comparing a novel combined clinic to multiple specialty clinics in patients with renal disease—cardiovascular disease—diabetes

- RCT comparing Multiple specialty clinics with Combined clinic for those with CKD +/- DM +/- CVD
- N= 150
- 3 year follow up

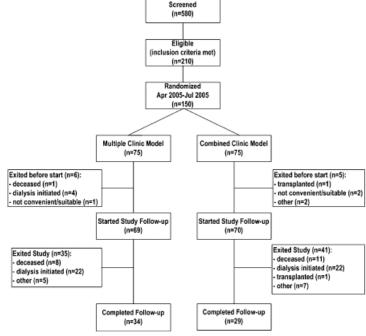
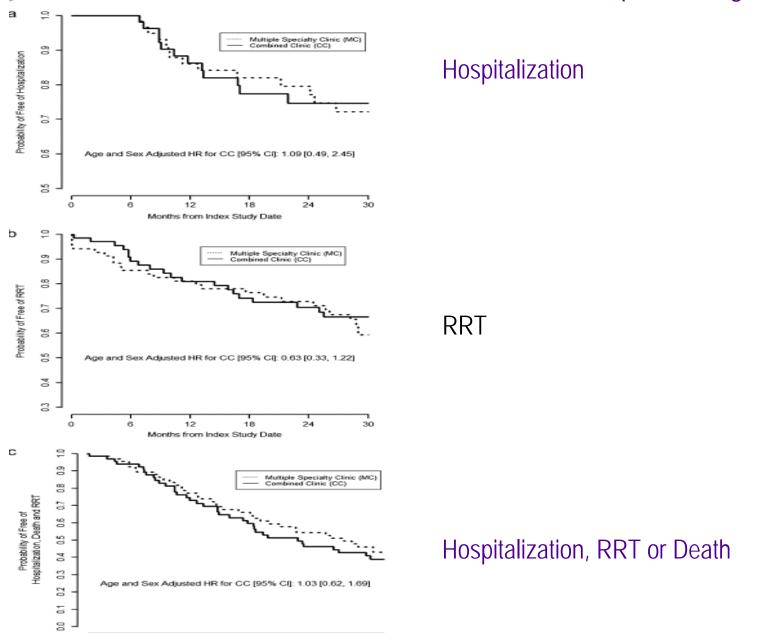
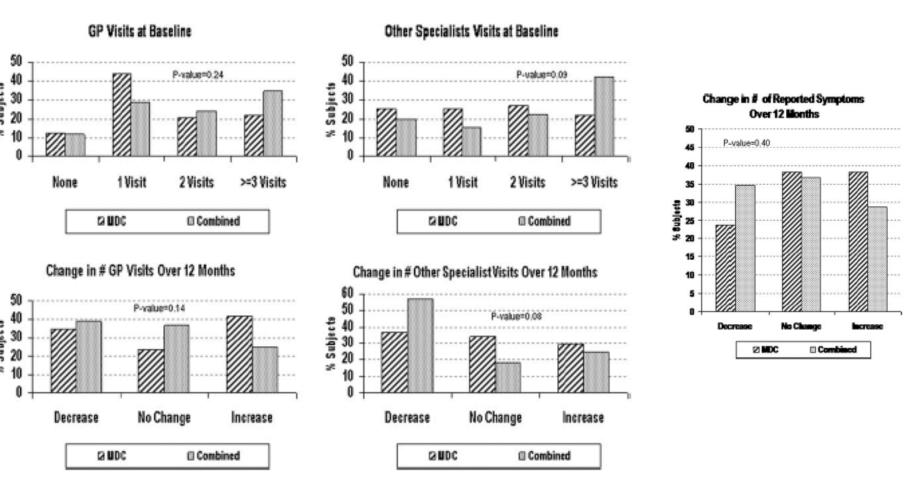


Fig. 1. Patient flow through the study

No differences in hard outcomes between combined vs multiple clinic groups



But... improved symptom control and reduced specialist visits in combined groups



Quality of life and Costs to the Health care system

Cost implications of combined care clinic

strategy on a larger scale needs to be considered. In British Columbia, the estimated population with any two of the three conditions is 189 000; [1] not all need or currently attend any multidisciplinary clinic, thus a conservative estimate of 'use' might be 50% of this total or 95 000 persons. The total cost of health care delivery for that population using cost calculations would be \$419 million per year with multiple specialty clinics attendance. Alternatively, attendance at one integrated comprehensive clinic would cost \$171 million per year: a potential annual cost savings of \$250 million a year for similar clinical outcomes. Assuming, a lower clinic usage (25%) would still result in substantial cost savings.

Improved understanding of CKD outcomes: Non linearity of trajectory over time.....



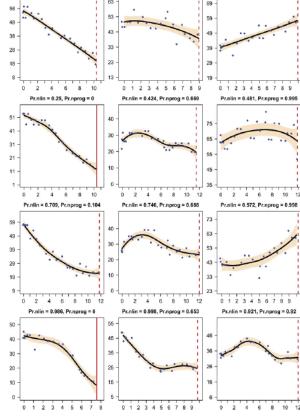
Original Investigation

Longitudinal Progression Trajectory of GFR Among Patients With CKD

Liang Li, PhD,¹ Brad C. Astor, PhD,² Julia Lewis, MD,³ Bo H Lawrence J. Appel, MD, MPH,⁴ Michael S. Lipkowitz, MD,⁵ Robert Xuelei Wang, MS,⁷ Jackson T. Wright Jr, MD, PhD,⁷ and Tom H.

12 year follow up AASK Study Longitudinal observational cohort

Non linearity of progression over time has implications for clinical care and design of research studies



Pr.nlin = 0.2, Pr.nprog = 0.698

Pr.nlin = 0.003, Pr.nprog = 1

Pr.nlin = 0.003, Pr.nprog = 0

Figure 4. Glomerular filtration rate trajectories of 12 patients and their probabilities of nonlinearity (Pr.nlin) and nonprogression (Pr.nprog). The setup of each trajectory plot is similar to those in Fig 1.

More publications re: quantitative research to inform care

Discussions of the Kidney Disease Trajectory by Elderly Patients and Nephrologists:

A Qualitative Study

Jane O Schell, MD, Uptal D Patel, MD, Karen E Steinhauser, PhD Natalie Ammarell, PhD, James A Tulsky, MD, AJKD 2012

- Interviews and Focus groups
 - Patient uncertainty
 - MD uncertainty
- Impairs ability to discuss future and planning
- Implications for future work and care

Looking Back and Looking Forward: Impact of CKD Care on Outcomes

Major steps forward in early 2000s - major patient benefits over time

2001	2002	2003	2004 2005 +
Funding for CKD clinics approved	MOH recognizes CKD as important part within Chronic Disease Management	MOH commissions development of guidelines	Guidelines disseminated
0	nosing Kidney Disease Dackets to all GPs	Reporting GFR in all labs	
	DM group formed	Stand	dardize creatinine
- CHF, Diabetes, Asthma		Stand	dardize comments
	Publication of AJKD CKD evaluation, definition		sing # of publications in medic y press re CKD and CVD

BC 2005 and beyond...

- BC Kidney Summit 2005: Need for integration
- Increasing initiatives and formation of CKD Clinics in all health authorities
- Ongoing dissemination of GP and specialist education
- Increasing awareness of importance of CKD
 - Within professional groups (Cardiology, Diabetes)
 - Within patient groups
- Publications and research
- BC environment: PoP, ACP, Shared Care

Impact of CKD Care: Dialysis Initiation and Survival

Unique cohorts of incident patients registered as CKD

- 10,111 CKD patients in BC :2003-2007
- Basis for ongoing outcomes evaluation for clinical, CQI and research purposes.

Over time, CKD care has made a significant impact on:

- 1. Delay in progression (less RRT starts)
- 2. Overall patient survival

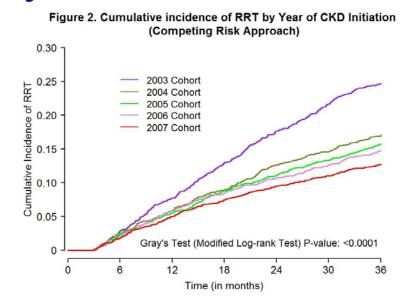
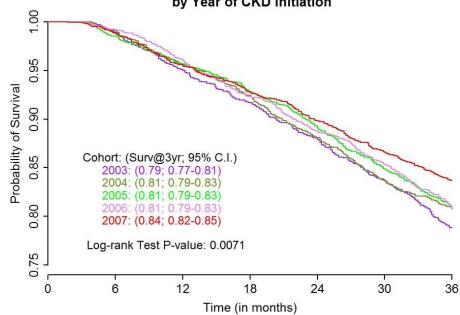
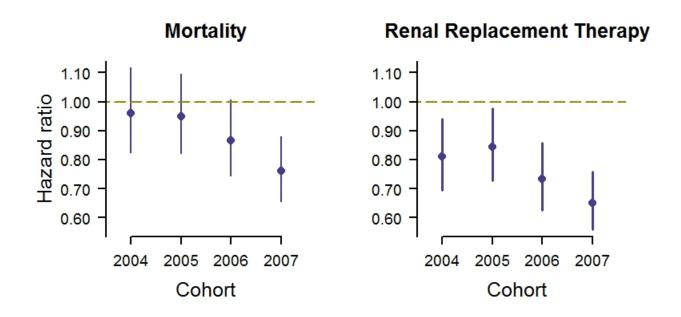


Figure 1. Kaplan-Meier Overall Patient Survival Curves by Year of CKD Initiation



Over time, there has been a steady improvement in outcomes of BC patients: less progression to RRT and survive longer



Adjusted for eGFR at CKD initiation, uACR, age, gender and ethnicity

New ways of doing things along the continuum



End of Life / Advanced Care Planning initiatives

 Attention to EOL training and provincial implementation of shared principles and tools

- Improved pain control
 - ESAS questionnaire implementation

Workshops

Champion Training Workshop: End-of-Life May 13 - 14, 2010 The Fairmont Airport, Finch Salon

ACCREDITATION

This event is a group learning activity (section 1) as defined by the maintenance of certification program of the Royal Collage of Physicians and Surgeons of Canada, approved by the Canadian Society of Nephrology. E-certificates will be sent out following the workshop.

After this session the participant will be able to:

- Define Advance Care Planning.
- Explore why Advance Care Planning conversations are important.
- Describe the components of effective Advance Care Planning conversations.
- Describe who Healthcare Professionals should initiate these conversations with.
- Increase comfort with initiating and engaging in Advance Care Planning conversations.

1215 - 1345

Last Days/Management of Dying

Dr. D. Barwich

After attending this session, the participant will be able to:

- Describe the physical changes that would indicate that a patient in the last hours of life.
- Describe what is meant by a "good death".
- Be able to deal with the concerns of family and caregivers.
- Be able to identify common issues in the last days, a have management strategies in place.
- Be able to identify common stressors for professional caregivers when caring for the dying and some self care strategies to deal with them.

EOL Provincial Priorities for 2012-2015

- Improved documentation of interaction regarding Advanced Care Planning (ACP) completion.
- 2. Provincial indicator selection: meaningful regarding the patient and family's experience around the planning process and conversation as well as the actual death experience.
- Sustainability in Training & education for all renal staff

Provincial Vascular Access Strategy and Team

- Initiatives to improve VA creation in BC
- Save the Vein campaign

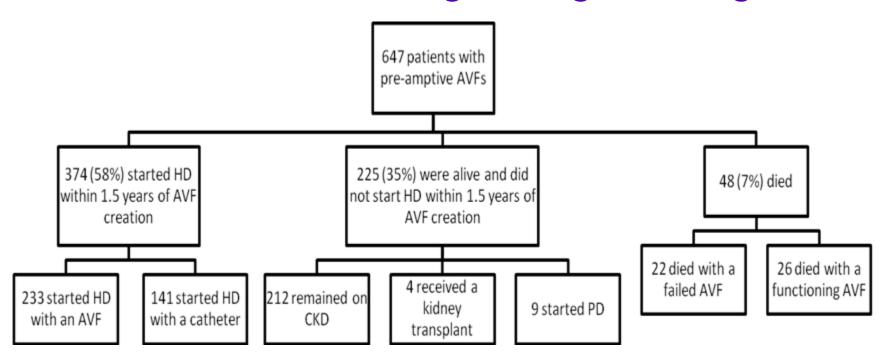


- Vascular access multidisciplinary teams
 - Nephrologist, Vascular Surgeon, Radiology, Vascular Access Nurse
- Vein mapping
- Robust information collection to inform strategies

Over time, there has been an increase in incident AVF rates...more pronounces in those with extended exposure to care teams



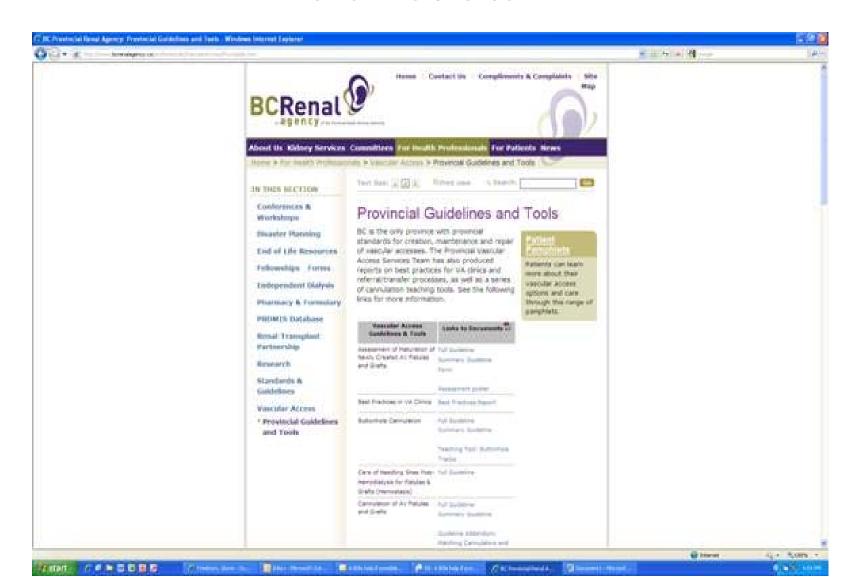
Evaluating outcomes of preemptive AVF in BC : data guiding strategies



72% of patients (72%) started dialysis within the follow-up period and very few died before dialysis start, indicating appropriate selection of patients.

Our comparative analysis between AVF creations in CKD versus HD using complete BC data re-confirms the necessity of early AVF planning in CKD patients to save resources and patient discomfort caused by complications that arise from no or late planning.

Multiple patient and care provider resources on the web site



Dialysis Newer initiatives:

Why catheter? Reports

Independent dialysis reports

PD Bedside catheter insertion

 Collaborative efforts to understand variation and change

Medication Reconciliation

Renal Medication Reconciliation Initiative Recognized with Provincial and National Awards



- BC Patient Safety and Quality Council Excellence in Quality: Across the Province Award
- Canada Health Infoway Trailblazer Award: Use of PROMIS in Med Rec

Patients at greatest risk for Adverse Drug Reactions (ADE)

- >3 concurrent disease states
- Drug regimen changes > 3 times in last 12 months
- >4 medications in present regimen
- >11 doses per day
- History of non-adherence
- = the average kidney patient

My medication list BLOW, JOE

DRUG ALLERGIES:

Patient/caregiver is	Medication ACETAMINOPHEN 300mg/CAFF
asked to review the	15mg/CODNE PHOSPHATE 30mg (TYLENOL WITH CODEINE NO. 3
list every six	CALCITRIOL
months and report	CALCIUM CARBONATE (TUMS REGULAR)
.	COLCHICINE DIMENHYDRINATE (GRAVOL)
back (and report	FLUOXETINE HCL (PROZAC)
"other physician"	GABAPENTIN (NEURONTIN)
orders in between)	HYDROMORPHONE (DILAUDID)
,	IRON SODIUM FERRIC GLUCON. COMPLEX (FERRLECIT)
	LEVOTHYROXINE SODIUM (ELTI
	LORAZEFAW (ATIVAN)

Wedication	Directions
ACETAMINOPHEN 300mg/CAFF 15mg/CODNE PHOSPHATE 30mg (TYLENOL WITH CODEINE NO. 3)	Orally Take 1 tablet(s) twice daily as needed.
ATORVASTATIN CALCIUM	Orally Take 20 mg at bedtime.
CALCITRIOL	Orally Take 0.25 microgram 3 times a week.
CALCIUM CARBONATE (TUMS REGULAR)	Orally Take 2 tablet(s) 3 times daily.
COLCHICINE	Orally Take 0.6 mg once daily.
DIMENHYDRINATE (GRAVOL)	Orally Take 25-50 mg as needed.
FLUOXETINE HCL (PROZAC)	Orally Take 40 mg once daily.
GABAPENTIN (NEURONTIN)	Orally Take 400 mg at bedtime. Indication(s): for pain
HYDROMORPHONE (DILAUDID)	Orally Take 4 mg every 4 hrs as needed. Indication(s): for pain
IRON SODIUM FERRIC GLUCONATE COMPLEX (FERRLECIT)	Orally Take 125 mg every 2 weeks.
LEVOTHYROXINE SODIUM (ELTROXIN)	Orally Take 100 microgram once daily.
LORAZEPAM (ATIVAN)	Sublingual Take 1 mg every Dialysis Run.
NIACIN	Orally Take 500 mg 3 times daily. Indication(s): for high cholesterol/lipids
RABEPRAZOLE SODIUM (PARIET)	Orally Take 20 mg once daily. Indication(s): for my stomach
REPLAVITE (REPLAVITE)	Orally Take 1 tablet(s) once daily.
SEVELAMER (RENAGEL)	Orally Take 2 tablet(s) 3 times daily. Indication(s): to bind phosphate
WARFARIN SODIUM (COUMADIN)	Orally Take 3 mg once daily. Indication(s): to prevent blood clots

PHN:

Directions

DOB: 25-DEC-1900

This medication list was considered correct at the time of printing. However, you may have had a recent medication change, or you may be taking additional non-prescription or herbal medications that are not listed here. If this is the case, please notify a member of your renal team, who will help ensure your medication list is as accurate as possible.

This medication list is an important component of your care. Please ensure that it is kept up to date. We suggest that you keep a copy of the list with you at all times so that you can show it to any health care providers involved in your care.



The current PROMIS list is compared with Pharmanet, the chart and the patient interview

PHN:		NAME		DOB:
Start date	End date	Discont. date	Drug Name	Dose/Directions/Schedule
09-OCT-02			EPOETIN ALFA	Subcutaneous Take 8000 unit(s) once weekly.
08-OCT-02			TERAZOSIN HCL (HYTRIN)	PO Take 1 mg at bedtime.
01-OCT-02			ACETAMINOPHEN (TYLENOL)	PO Take 1 tablet(s) as needed.
01-OCT-02			CLONIDINE HCL	PO Take 0.2 mg 3 times daily.
01-OCT-02			DIMENHYDRINATE (GRAVOL)	PO Take 25 mg as needed.
01-OCT-02			FELODIPINE (PLENDIL)	PO Take 10 mg twice daily.
01-OCT-02			QUININE SULFATE	PO Take 300 mg once daily.
01-OCT-02			REPLAVITE (REPLAVITE)	PO Take 1 tablet(s) once daily.
26-MAY-00			ALFACALCIDOL	PO Take 2 microgram once weekly.
01-MAY-00			ACETAMINOPHEN (TYLENOL)	PO Take 1-2 tablet(s) as needed.
01-MAY-00			CALCIUM CARBONATE (TUMS REGULAR)	PO Take 2 tablet(s) every morning. + 3 tablet(s) every noon. + 3 tablet(s) every supper. + 2 tablet(s) as needed. Take with food.
01-MAY-00			CAPTOPRIL	PO Take 25 mg 3 times daily.
01-MAY-00			VITAMIN D	PO Take 1 microgram once weekly.



A reconciliation report is created to resolve any discrepancies and create the "BPMH"



Medication Reconciliation Report

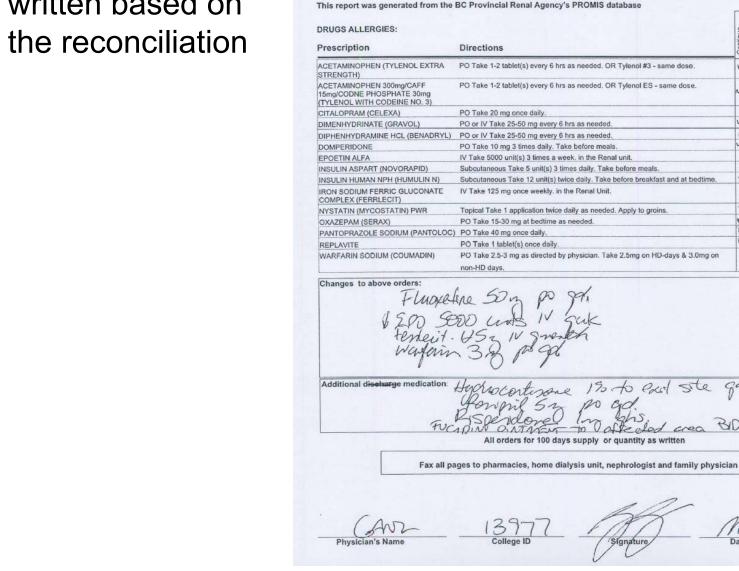
Note: This list may not include the following type of drugs: investigational, antiretroviral, oncology, physician sample, herbal, or self selected over the counter medications. Always review the list with the patient or reliable alternative caregiver

PATIENT: BLOW, JOE

PHN: 07-MAY-2008 10			_	
DOB: 25-DEC-1900 Printed by Martin	lusen, Dan	ъ	S ~	
DRUG ALLERGIES:		Reconciled	Discrepanc) see below)	Suggest change
Prescription	Directions	æ	S S	ಬ್ ಲ
ACETAMINOPHEN 300mg/CAFF 15mg/CODNE PHOSPHATE 30mg (TYLENOL WITH CODEINE NO. 3)	PO Take 1 tablet(s) twice daily as i		1	
ATORVASTATIN CALCIUM	PO Take 20 mg at bedtime.			
CALCITRIOL	PO Take 0.25 microgram 3 times a			
CALCIUM CARBONATE (TUMS REGULAR)	PO Take 2 tablet(s) 3 times daily.			
COLCHICINE	PO Take 0.6 mg once daily.			
DIMENHYDRINATE (GRAVOL)	PO Take 25-50 mg as needed.			
FLUOXETINE HCL (PROZAC)	PO Take 40 mg once daily.			
IRON SODIUM FERRIC GLUCONATE COMPLEX (FERRLECIT)	PO Take 125 mg every 2 weeks.			
LEVOTHYROXINE SODIUM (ELTROXIN)	PO Take 100 microgram once daily			
LORAZEPAM (ATIVAN)	Sublingual Take 1 mg every Dialys			
RABEPRAZOLE SODIUM (PARIET)	PO Take 20 mg once daily.			
REPLAVITE (REPLAVITE)	PO Take 1 tablet(s) once daily.			
SEVELAMER (RENAGEL)	PO Take 3 tablet(s) 3 times daily.			
WARFARIN SODIUM (COUMADIN)	PO Take 3 mg once daily.			
Discrepancies and drug related cond	cerns. Physician, please review a			
	_			
	_			
	_			

Completed by Signature

Clinic medication orders are written based on the reconciliation



Clinic Medication Orders

alternative caregiver

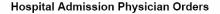
PATI PHN DOB

Note: This list may not include the following type of drugs: investigational, antiretroviral, oncology, physician sample, herbal, or self selected over the

counter medications. Always review the list with the patient or reliable



Admission orders may be printed from PROMIS



Note: This list may not include the following type of drugs: investigational, antiretroviral, oncology, physician sample, herbal, or self selected over the counter medications. Always review the list with the patient or reliable alternative caregiver

PATIENT: BLOW, JOE 07-MAY-2008 10:28 written below DOB: 25-DEC-1900 Printed by Martinusen, Dan Discontinue This report was generated from the BC Provincial Renal Agency's PF Change DRUG ALLERGIES: Prescription Directions ACETAMINOPHEN 300mg/CAFF PO Take 1 tablet(s) twice daily as nee 15mg/CODNE PHOSPHATE 30mg (TYLENOL WITH CODEINE NO. 3) ATORVASTATIN CALCIUM PO Take 20 mg at bedtime. CALCITRIOL PO Take 0.25 microgram 3 times a we CALCIUM CARBONATE (TUMS PO Take 2 tablet(s) 3 times daily REGULAR) COLCHICINE PO Take 0.6 mg once daily DIMENHYDRINATE (GRAVOL) PO Take 25-50 mg as needed. FLUOXETINE HCL (PROZAC) PO Take 40 mg once daily. IRON SODIUM FERRIC GLUCONATE PO Take 125 mg every 2 weeks. COMPLEX (FERRLECIT) LEVOTHYROXINE SODIUM (ELTROXIN) PO Take 100 microgram once daily. LORAZEPAM (ATIVAN) Sublingual Take 1 mg every Dialysis F RABEPRAZOLE SODIUM (PARIET) PO Take 20 mg once daily REPLAVITE (REPLAVITE) PO Take 1 tablet(s) once daily. SEVELAMER (RENAGEL) PO Take 3 tablet(s) 3 times daily WARFARIN SODIUM (COUMADIN) PO Take 3 mg once daily. Changes to above orders: Please order additional medications on I Fax all pages to hospit



Physician's Name College ID Signature Date page 1 of 1

Discharge



Improved

Patient Safety and Understanding

Goal is to reconcile the <u>medications the patient</u>
 <u>is taking prior to admission</u> (BPMH) and <u>those</u>
 <u>initiated in hospital</u> with <u>medications they should</u>
 <u>be taking post-discharge</u> to ensure all changes
 are intentional and that discrepancies are
 resolved prior to discharge. It should result in
 avoidance of therapeutic duplications, omissions,
 unnecessary medications and confusion

tanding -	Continue	Discontinue	Change
Hospital Discharge Medication			
Note: This list may not include the following type of dru antisetroviral, oncology, physician sample, herbal, or se counter medications. Always review the list with the pal alternative caregiver			
PATIENT: BLOW, JOE PHN: 07-MAY-2008 10:30 DOB: 25-DEC-1900 Printed by Martinusen,			
This report was generated from the BC			
DRUG ALLERGIES:			
Prescription			
ACETAINOPHEN 300mp/CAFF tismpcoon Proshwate 30mg (TYLENOL WITH CODENE NO. 3) ATORNASTATIN CALCIUM CALCITROL CALCIMIC CARBONATE (TUAS REGULAR) COLCHORIE DIMERHYDDRINATE (GRAVOL) FLUDSETINE HEL, IPPOZACI SION SOODIM SPERIL COLLONATE COMPLEX FERRILECTI COMPLEX FERRILECTI COMPLEX FERRILECTI			
LEVOTHYROUNE SODIOM (ELTROWN) LORAZEPAM (ATIVAN) RABEPRAZOLE SODIUM (PARIET) REPLAVITE (REPLAVITE) SEVELAMER (REMAGEL)			
WARFARIN SODIUM (COUMADIN) Changes to above orders:			
Additional discharge medication:			
Unless otherwise speci-			
Fax all pages !			
Physician's Name			



Provincial Education Strategy and Framework

- Principles of adult learning
- Professional review and oversight by trained educators
- Collation of current materials and strategies
- Reconfiguration within common framework
 - Patient centered education
 - Right time, right place, right tools
- Evaluation of outcomes
 - Improved understanding by pts and families
 - Improved decision making

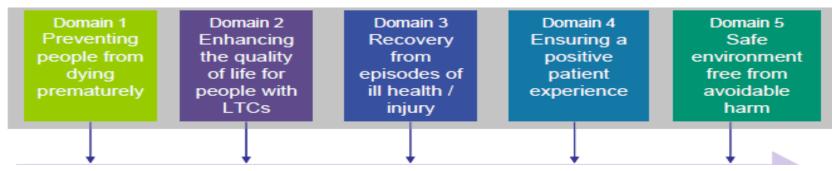
Requirements for Optimal care of Individuals

- Scientific understanding of disease(s)
- Ability to identify the disease
- Ability to identify patients at risk
- Knowledge of best therapies and strategies
- Ability to deliver effective therapies in a timely manner
- Supportive health environment

Frameworks: National Institute for Health and Clinical Excellence (NICE)

Figure 1: NHS Outcomes Framework (2011/12) – 5 domains





- CKD identification and treatment
- Improved dialysis and transplant treatments
 - Independent dialysis
 - Steroid free transplant regimens
 - Increasing the donor pool
- Funding model and support for chronic disease
- Education and patient safety initiatives
 - Translated, pt focused materials
 - Medication reconciliation
 - Vascular access initiatives
- End of life and advanced care planning

The Present and Future

- Improving patient access to new drugs and therapies through participation in clinical trials
 - PEXIVAS
 - GN studies
 - PreCLOT (TPA)
 - Tx studies
- Improving data accuracy to help decision making
 - PROMIS modernization
 - eHealth Strategy

Challenges: Sustainability of...

- Environments
- Kidney function
- Health care services
- Research activities
- Educational activities
- Partnerships
 - ♦ Industry
 - **♦** Governments
 - ♦ Collaborators



Challenges: Diversity of...

- Culture
- Resources
- Access to care
- Access to education
- Perspectives



Innovations

- In Science and discovery
- In Care and Practice
- In Policies



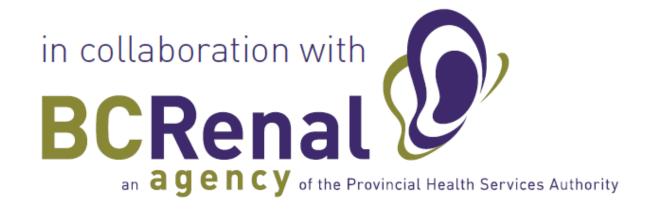
- 1. The act of introducing something new
- 2. Something newly introduced.
- 3. (the act of making) a change or a new arrangement







Thank you for your attention and participation



Innovations in Kidney Care and Practice: 2012

Putting the patients first

