

Introduction

Wait time for out-patient specialist assessment is a critical measure of quality in healthcare. In Canada, the initial delay in gaining access to expert management of chronic diseases like congestive heart failure, diabetes, and chronic kidney disease (CKD), occurs outside of the publicly accountable domain, at the doors of physicians' private practices. Accurate wait time data are desirable for patients as well as hospital decision-makers, who have traditionally failed to consider the out-patient needs of communities for physician human resource planning. Improved wait times among medical specialties should also be important to governments interested in opportunities for cost-efficient investments at the early stages of chronic disease.

Patients with renal disease require care aimed at secondary prevention. CKD is prevalent, with recent estimates suggesting that approximately 2 million Canadians¹¹ and up to 26 million Americans¹² are affected; and, early referral to a nephrologist has been shown to postpone or prevent progression to End Stage Renal Disease (ESRD)¹³⁻¹⁵. Public health measures aimed at improving access to nephrologists would be well positioned to make a significant impact.

Benchmarks for appropriate waiting are lacking in most medical specialties, but where available, they may be used by physicians and health agencies as yardsticks to estimate comparative service quality. However, ideal wait times are difficult to define. That is because the wait time equation involves multiple considerations including medical safety, equity within the constraints of a publicly funded, universally accessible health care system, economic implications of waiting, and referring physicians' as well as patients' expectations. The BCNAS initiative prospectively measured waiting, and then weighed medical safety, expert opinion and expectations of the referral base to systematically develop condition-specific wait time benchmarks for Nephrology.

Methods

The BCNAS was an investigator-initiated, prospective cohort, continuous quality improvement design, approved by the University of British Columbia Ethics Review Board (see study flow diagram, figure 1). The study had a 3 phase design including: 1. Measurement of current wait times in nephrology; 2. Assessment of nephrologists' opinions regarding appropriate wait times; and 3. Measurement of expectations among the General Practitioner referral base.

In stage 1, all BC adult nephrologists were sent data-collection forms on which their private office Medical Office Assistants (MOAs) were asked to record patient data. Physician and patient anonymity was guaranteed. Data collection occurred during the 2-week period spanning Jan 18-28, 2010.

Form 1 contained questions about nephrologists practice patterns and availability. Form 2 sought information on new referrals that were received during the 2-week window; and Form 3 was used for new referrals that were seen in the office for the first time. *New referrals* were defined as those patients not previously known to the nephrologist, or those last seen more than 24 months ago. *Urgent referrals* were defined as those who the nephrologist determined needed to be seen in less than 30 days.

The second survey collected data at the annual BC Nephrology Days consensus meeting, which the majority of Provincial Nephrologists attend. BC Nephrologists who were not present were asked to complete the survey online. The nephrologists were asked to suggest appropriate wait times for selected referral categories 1st from the physician's perspective, and then to assume the perspective of a patient who has been told by their General Practitioner that they need to see a specialist.

The third survey was given to BC GPs attending a one-day, continuing education course in nephrology. It was identical to the survey given to nephrologists, except did not ask GPs to assume the patient's perspective.

Statistical Methods

The underlying distributions of continuous variables were assessed using the Shapiro-Wilk test for normality. None of the continuous variables were normally distributed; hence, they are presented as median with interquartile range. Comparisons were made via the Wilcoxon test.

Categorical variables are described as frequency (percentage) and were compared using the χ^2 -test. Statistical software used was SAS, version 9.1 (SAS Institute, Cary, NC, USA).

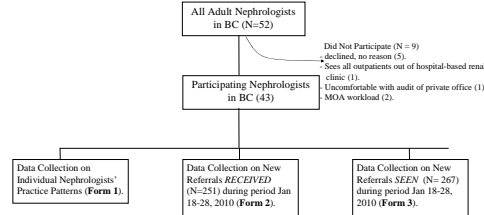


Figure 1 – Study flow diagram.

Results

New Patient Wait Times:

Findings of the MOA wait time analysis are presented in Table 1, which shows characteristics of patients *seen* and those *referred*. Newly referred patients had a median *planned* wait time of 90 days. New patients seen had a median *actual* wait time of 98 days. 14% of new consults seen were characterized as urgent.

Urgents versus Non-urgents:

The median wait time among urgent patients was 11 (3-18) versus 109 days (72-164) ($p<0.0001$) than non-urgents. Similarly, patients classified as urgent had a lower median GFR 37 versus 46 ml/min/m² ($p<0.0001$). The median GFR increased more for urgents +2.5 (-1.5-14.7) compared to non urgents +0.55(-0.37-1.9) ($p=0.09$) during the waiting period.

Nephrologists Practice Patterns:

Nephrologists booked an average of 17 (± 11.65) hours in the office per week. New consults were allotted a median of 60 (45-60) minutes, and follows a median 22.5 (15-30) minutes. There was a trend toward shorter waiting (median 83 days versus 98 days, $p=0.076$) for nephrologists with smaller practices (<500 active patients) versus larger (>500 active patients), but the majority (75%) of Provincial practices were large.

Regional Variability:

There was marked regional variability when data were examined by Health Authority (HA). Table 2 shows the referral rate was approximately double in regions A, B and E compared to regions C and D. Likewise, regions C and D were referred slightly higher GFRs and had longer wait times. Of note, the median wait was shortest in region B at 71 days and longest in region C at 267 days.

Table 1 – New Patients Seen and Referred in BC, January 18-28, 2010

	Overall	New Patients Seen	New Patients Referred
Number of Patients	518	267	251
Male (%)	253 (49)	125 (48)	128 (51)
Median Age at Time of Referral (IQR)	66(55-78)	67(56-77)	66(54-78)
Median Wait from Time of Referral (d)	92 (39-150)	98 (44-157)	90 (23-139)
Median Initial GFR at Time of Referral	44 (33-55)	44 (35-55)	43 (32-56)
Δ GFR/month (Δ GFR=followup GFR–initial GFR)	n/a	+0.59 (-0.44-2.45)	n/a

* For New Patients Referred, wait time refers to date booked – date referral received (aka *planned* wait time)

Table 2 – Regional Variability in Referral Rate, Acuity, and Wait Time*

	Region					p-value
	A	B	C	D	E	
Mean number referrals per nephrologist over 2 weeks	8.14	8	4	4.52	8	-
Initial eGFR (ml/min/m ²)	44 (37-53)	42 (29-52)	49 (53-58)	46.5 (33-60)	45 (36-49)	0.0491
Wait time in days from referral to date seen**	97 (23-201)	71 (17-132)	287 (45-286)	104.5 (56.5-141.5)	90.5 (86-100)	0.0004

* Reported as Median (IQR) unless otherwise stated

**Planned date used for new referrals not yet seen

In Phase 2, BC nephrologists were asked to indicate their estimate of maximal appropriate wait time for 11 common referral categories. They were asked to provide answers from both of the Physician's medical perspective as well as the patient's perspective. Figure 2 shows representative results for the category *Diabetic Nephropathy, GFR<45ml/min*. Table 3 describes nephrologists' responses when asked to shift their perspective to that of the patient. Nephrologists revised their maximal appropriate wait time downward 39% of the time overall when asked to assume the patient's perspective.

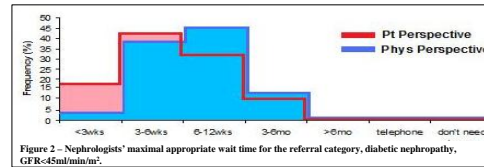


Figure 2 – Nephrologists' maximal appropriate wait time for the referral category, diabetic nephropathy, GFR<45ml/min/m².

In Phase 3, GPs were asked to record their maximal appropriate wait time for the same renal conditions as the nephrologists. GPs were not asked to assume the patient's perspective.

The following rules were then applied to derive condition-specific benchmarks for nephrology:

1. Use the median nephrologists' medically recommended wait time category except in cases where rules 2 or 3 apply.
2. If >1/3 of nephrologists revised their wait time recommendation downward when asked to assume the patient's perspective, revise wait time benchmark one category sooner.
3. If 50% of GPs believe the wait should be shorter than determined by rules 1 and 2, revise wait time to 1 category sooner.

The resulting condition-specific wait time recommendations are compared to actual waits in BC in Table 4.

Table 4 – Proposed Condition-Specific Wait Time Benchmarks For Nephrology

NEPHROLOGY CONDITION	ACTUAL WAIT (median)	BENCHMARK (Wks)	CATEGORY
Acute Kidney Injury, RPGN*, Vasculitis, Nephrotic Syndrome	1.6	<3	Threatening Renal Disease – Requires urgent access
Uncontrolled hypertension	16.1 (15-25)	3-6	Smouldering Renal Disease – Requires expedited Access To Prevent Adverse Outcomes
Diabetic nephropathy GFR<45	12	3-6	
GFR<30*	7.9 (3-15)	3-6	
New macroalbuminuria, no diabetes	7.7 (2-10)	3-6	Stable Renal Disease – Requires Timely Access
Diabetic nephropathy GFR<45	31	6-12	
New CKD, normal GFR	16 (9-16)	6-12	
GFR30-45	13.3 (6-23)	6-12	
Isolated microscopic hematuria	12.1 (8-21)	6-12	At risk kidneys – Requires Standard Access
Recurrent proteinithiasis	11.7 (2-13)	6-12	
GFR45-60	19.1 (12-31)	12-24	
Microalbuminuria, non DM, normal GFR	n/a	12-24	

Conclusions

- To our knowledge, this is the first study to prospectively quantify waiting for medical sub-specialty services offered outside of a hospital setting.
- The number of new referrals (251) was comparable to the number of new patients seen (267) during the study period, which suggests that demand for, and supply of, consultative services is in equilibrium.
- Current queues for outpatient nephrology assessment are medically safe. Glomerular filtration rates did not decline while waiting, and appointments for patients identified as urgent were expedited.
- Regional variability in access to nephrology out-patient assessment is another important finding. These data suggest that health regions should consider out-patient demand when planning future nephrology services capacity.
- The BCNAS initiative used systematic methodology to weigh medical safety alongside patient's and referring physician's expectations to propose the first condition-specific wait time benchmarks for nephrology.
- Our conclusions are limited by the potential for data-entry error by participating MOAs. In addition, the definition of urgent was subjective and independent nephrologists undoubtedly maintain variable definitions. A further limitation involves the failure to obtain information on proteinuria, which was felt to be too nuanced and time-consuming for MOAs.
- Future areas to explore include the use of electronic medical records with advanced planning scheduling functionality, enhanced support for tele-health by collective bargaining organizations, continued investment in shared care initiatives, and working toward publicly available wait time data, which may facilitate inter-regional patient movement to optimize waiting.

References

1. Srigant C, Stevens L, & Levin A. Nephrology. 4. Strategies for the care of adults with chronic kidney disease. CMAJ 2003;168:1553-60.
2. Corsh J, Selvin E, Stevens LA. Prevalence of chronic kidney disease in the United States. JAMA 2007;298:2038-47.
3. Levin A, Himmelfarb J. Human Resources, Training, and the Growing Worldwide Epidemic of Kidney Disease: Introduction. Seminars in Nephrology 2009;29(5):455-56.
4. Raitis RA, Norris K, Nassezen AR. Chronic Kidney Disease in the United States: A Public Policy Imperative. Clin J Am Soc Nephrol 2008;3:1902-1910.
5. Huisman RM. The deadly risk of late referral. Nephrol Dial Transplant 2004;19:2175-2180.
6. Cass A, Cunningham J, Arnold PC, et al. Delayed referral to a nephrologist: outcomes among patients who survive at least one year on dialysis. Med J Aust 2002; 177:135-8.
7. Avron J, Bohn RL, Levy E, et al. Nephrologist care and mortality in patients with chronic renal insufficiency. Arch Intern Med 2002;162:2002-6.
8. Teng CL, Kern ER, Miller DR, et al. Survival benefit of nephrologic care in patients with diabetes mellitus and chronic kidney disease. Arch Intern Med 2008; 168:85-92.