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## Chronic Renal Failure – the insidious epidemic

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## Objectives

- Recognize the threat that rising rates of end stage renal disease (ESRD) represent to the Canadian Health Care system
- Recognize disparities in renal disease and renal disease progression
- Identify major determinants of the problem
- Explore how these determinants inform risk stratification and possible therapeutic responses

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## The Problem: CKD Numbers in BC 2009

| Category       | Approximate Number | % Increase 2001-8 |
|----------------|--------------------|-------------------|
| CKD estimated  | 150,000            | -                 |
| CKD identified | 20,000             | 445%              |
| Dialysis       | 10,000             | 42%               |

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### The Problem: Economic burden of dialysis in Canada

Average cost of dialysis = Average total tax payment of 2.54 Canadian families

(data adapted from McFarlane A et al. 2002 and Canadian Consumer Tax Index)

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### The Problem: % Change 1999 -2009

(data from CORR 2009 report, with extrapolation 2007 to 2009, and Statistics Canada)

| Indicator                | % Change 1999-2009 |
|--------------------------|--------------------|
| Population Canada        | 11.9               |
| Dialysis prevalence      | 58.3               |
| Diabetes prevalence (DP) | 77.1               |
| Inflation                | 25.48              |
| GDP                      | 27.85              |
| GDP per person           | 14.23              |
| GDP per DP               | -27.8              |

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### The Issues

- Disparity
- Antenatal environment and renal reserve
- Obesity
- Aging
- Type 2 diabetes

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### Disparity in prevalence: First Nations children

|   |   |
|---|---|
| <p><b>Congenital Structural Renal Anomalies</b></p> <p>Odds ratio 6.5</p> | <p><b>Inflammatory Renal Injury</b></p> <p>Odds ratio 6.1</p>                                     |
| <p><b>“Hostile environment”<br/>Hypertension,<br/>Diabetes Toxins</b></p> | <p><b>Single gene inherited Disorders<br/>PKD, MCKD,<br/>Cystinosis</b></p> <p>Odds ratio 0.9</p> |

*Bullock et al, Pediatr Nephrol, 1996*

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### Disparity in prevalence: non diabetic renal disease First Nations adults

| Age Group | Non-Aboriginal | Aboriginal |
|-----------|----------------|------------|
| 0-19      | ~1             | ~2         |
| 20-39     | ~3             | ~7         |
| 40-59     | ~7             | ~16        |
| 60 plus   | ~10            | ~26        |

*Dyck, RF and Tan L, Clin Inv Med, 1998*

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### Disparity in outcome: Diabetic ESRD in First Nations

*From Dyck R and Tan L, CMAJ, 1994*

| Age Group | Male | Female |
|-----------|------|--------|
| 20-39     | ~10  | ~5     |
| 40-49     | ~15  | ~8     |
| 50-59     | ~25  | ~12    |
| 60-69     | ~45  | ~20    |
| 70+       | ~15  | ~8     |

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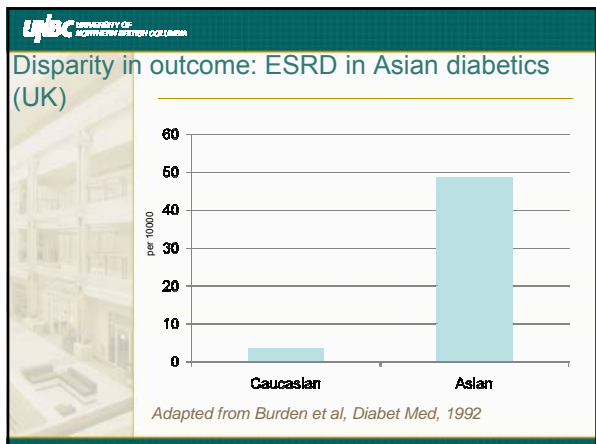
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### Disparity in outcome: emerging factors in BC

- Younger age, male sex, higher eGFR at referral, ↑BP, ↑PO4, ↑PTH all associated with more rapid progression (Levin et al, 2008).
- Asian origin also emerging as a factor (Levin and Beaulieu, unpublished communication)
- Low socioeconomic status unanimously agreed as risk factor for both increased prevalence and poor outcome; mechanisms not understood

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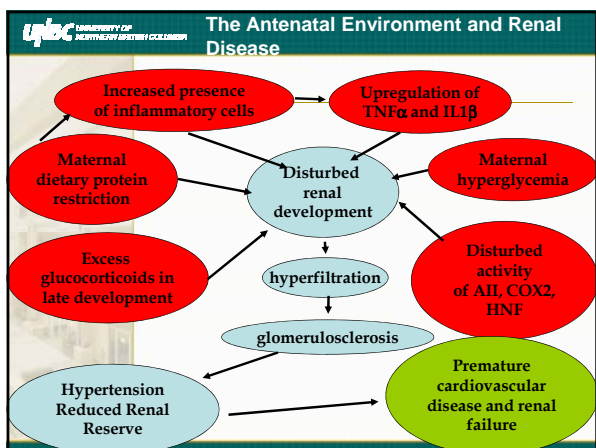
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### Intrauterine environmental risks: First Nations Women

- Higher rates of smoking, drug and alcohol use in pregnancy
- Less prenatal visits
- More prematurity
- More LGA babies
- Fewer C-sections, forceps
- More deliveries in small facilities

*Johnson D et al, J Obstet Gynecol Can, 2002*

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### Antenatal environment: clinical-basic science correlation

*Dyck et al, Am J Nephrol, 2003*

| Group | ESRD  | non-ESRD |
|-------|-------|----------|
| FN    | ~10.5 | ~5.5     |
| Other | ~6.5  | ~4.5     |

| Group | ESRD all cases | ESRD T2D |
|-------|----------------|----------|
| FN    | ~15            | ~60      |
| Other | ~12            | ~8       |

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### A Word on Obesity and Glomerular Injury

- First reported in 1974 (*Weisenger et al, Ann Int Med, 1974*)
- Several case reports and small series, particularly in association with sleep apnea.
- Features variable proteinuria and renal dysfunction, normal or elevated BP.
- Pathologic features include diffuse glomerulomegaly, segmental sclerosis and arterial narrowing.
- Limited response to ACE inhibitors

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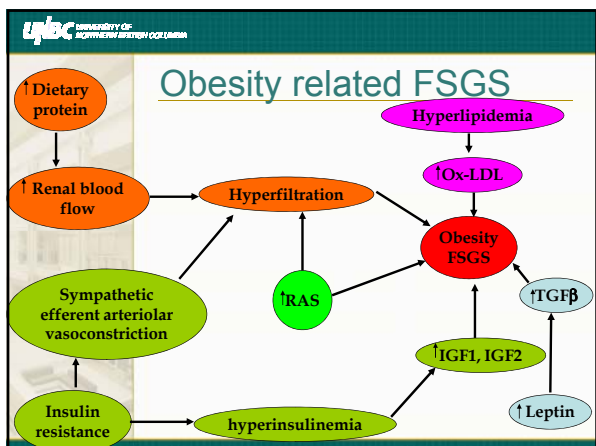
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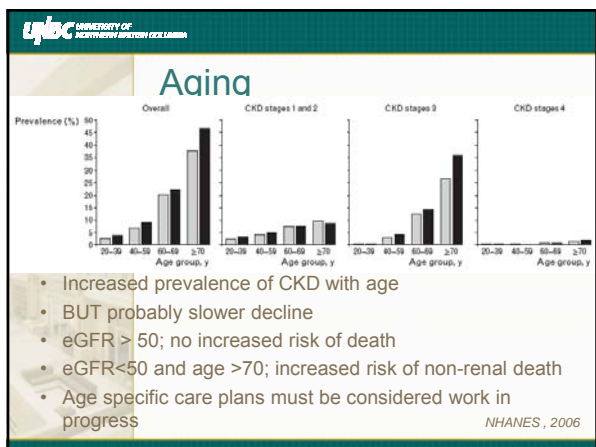
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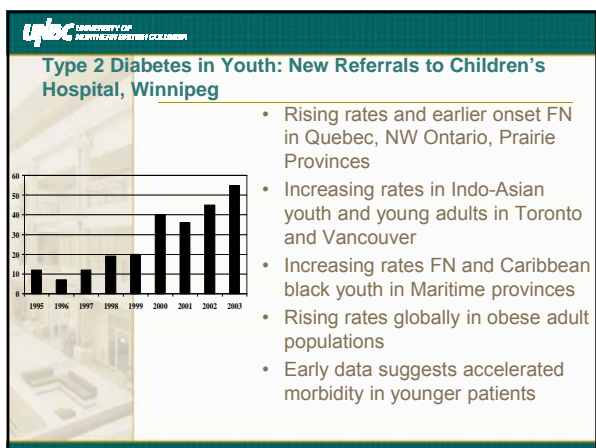
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## Type 2 Diabetes Mellitus

- Hyperglycemia leading to endothelial dysfunction and secondary inflammation and fibrosis is at the core of diabetic nephropathy
- A number of large studies document reversal of microalbuminuria, slowed or stopped progression to CKD with improved glycemic control
- Early diabetic nephropathy reverses in kidneys transplanted from diabetics to non-diabetics.

*From Satchell SC and Tooke JE, Diabetologia, 2008*

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## Issues: conclusion

- Many cases of CKD are the result of the interaction of a number of factors rather than just the outcome of a single disease process
- The prevalence of CKD already exceeds the capacity of the specialist care system to meet care needs
- New care paradigms are clearly required

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## Treatment

- [www.bcrenalagency.ca](http://www.bcrenalagency.ca)
- Excellent clinical practice guidelines
- Search "CKD Guidelines" on BCPRA website for "[CHRONIC KIDNEY DISEASE MANAGEMENT IN PRIMARY CARE \[PDF\]](#)" and "[NEW WAYS FOR GPs TO PROVIDE CKD CARE \[PDF\]](#)"

*The Blind Leading the Blind; 1568; Tempera on Canvas; National Gallery, Naples*

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## Nephrologist referral

**GUIDELINES & PROTOCOLS**  
**ADVISORY COMMITTEE**

**Chronic Kidney Disease –  
Identification, Evaluation and Management of Patients**

Effective Date: September 15, 2008

- Acute renal disease
- Advanced renal disease (GFR<30)
- Rapid decline
- Multisystem disease with renal involvement
- Multiple risk factors

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## Treatment: it's not rocket science



- ACE/ARB treatment – indicated in all proteinuric renal disease – strong evidence  
- caution in diabetics with established renal disease, autonomic neuropathy, hypoaldosteronism
- Optimize glycemic control – strong evidence
- Optimize body weight – minimal evidence, but other benefits
- Optimize nutrition, weight gain, toxin avoidance and glycemic control in pregnancy – minimal evidence but other benefits

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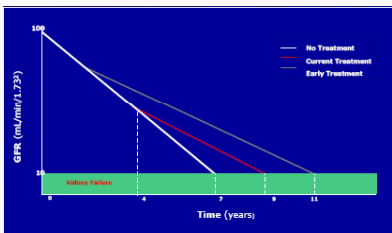
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## Treatment: timing matters



Narva, A NKDEP

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## Time for a different approach?



- BCPRA program supports access to specialized dietetic, pharmacy, social work and nursing services
- VIHA Renal Program most advanced in broadening access beyond traditionally nephrology clinics
- NH Renal Program starting discussions on central triage and regional CKD clinics using nursing, GPs and internists
- Group and individual programs being used or developed
- Systematic evaluation tools needed

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## Time for a different approach?



- BCPRA has recently generated materials to support end of life care for patients with renal failure
- Hope is to provide positive options for patients for whom dialysis is no longer or is unlikely to produce significant improvement in length or quality of life
- Major role for primary health care workers
- Look under "For Health Professionals" section

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## Summary



- Early and moderate CKD are complex multifactorial states
- Early primary care intervention is likely to have very significant impact on established disease, but also may have a role in prevention
- Good practice guidelines exist, but these will need continuous revision as our understanding of the contributing factors improve

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## Questions



The image shows a white plate with several segments of red grapefruit arranged to form a question mark. The segments are cut into wedges and are arranged in a circular pattern with a central opening, resembling the shape of a question mark.

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