Case finding, Epidemiology, and Quality improvement in Chronic kidney disease (CKD)

An exemplar from a career path underpinned by skills in primary care informatics

Academic and Research paths in family medicine

Simon de Lusignan
BSc  MBBS  MSc  MD(Res)  FHEA  FBCS CITP  FRCGP
Reader – Head of General Practice & Primary Care

St. George’s – University of London
GP – Woodbridge Hill Surgery – Guildford
slusigna@sgul.ac.uk
My practice & academic work

GP in Guildford (30 miles SW of London)
- 11,800 patient practice
- 6.5 Whole time equivalent GPs / 8 partners
- Computerised since 1988 – EMIS brand since 1994
- Involved in “Practice Based Commissioning” and UK’s First ICO (integrating Care Organisation)

Head of GP & Primary Care, St. Georges, London
- Teaching network - >200 practices >2000 placements – http://gp2.sgul.ac.uk
- Primary Care Informatics (PCI) research group interested in how IT enables QI

(1) Impact of IT in the consultation
(2) Using routinely collected data for QI

Assumptions....

- Team-working & Collaboration are essential....
- That skills in primary care informatics will be essential for tomorrow’s leaders...

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Overview:

• Introduction / my career pathway:
  • First 10 years – full-time GP
    • Developing practice IT & as GP Teacher
  • Second 10 years – Using IT for Quality Improvement (QI)
  • HoD for 3 years...

• Chronic kidney disease – as an exemplar of using IT for QI...
  • Can you find the patients with CKD?
  • We don’t believe this! – Proving we found the patients with CKD
  • Defining the UK prevalence of CKD – NEOERICA study
  • Introducing a financially incentivised quality target
  • Running a large cluster randomised trial – comparing quality improvement interventions & refining the UK prevalence

• Summary
  • Technology can enhance health care
  • Academia provides scope to be part of the process
Overview of career path

Mainly Academic

Medical education 6 years
  Intercalated BSc 1 year

Medical student teacher
  Hon Lecturer 8 years

Senior Clinical Research Fellow
  Hon Senior Lecturer 3 years
  - PT MSc Health informatics
  - MD Thesis

Senior Lecturer 7 years
  Reader 3 years

Mainly clinical practice

Student supervised clinical practice
  House jobs/Internship 18 months

GP Vocational training 3 years
  Qualified as Family Dr

Full-time GP 10 years
  Part time GP 3 years
  Part time GP 10 years
First 10 years

Full-time general practice

From four doctors at retirement age to a new team...

Setting up systems to improve quality
First 10–years full–time GP...
...introducing technology!

- Originally paper records
  - “Lloyd George” envelopes
- Age-sex registers...
  - Processed by hole punch + knitting needle!
- Constructed own networked practice <1990

- Academic development:
  1) Teaching
     - Medical students + trainee GPs
  2) Technology
     - Computerisation in late1980s
     - Networked practice
  3) Part-time academic post offered:
     “Simon, I want you to boost the profile of the department in computers...”
Second 10 years

**Practice:** Improved use of data

(1) Direct improvement in patient care / making it easier to monitor care

(2) Secondary use of data for health service management, QI & research

**Academia:**

(1) Building a team – developing collaborations

(2) Grants, studies, publications, degrees...

Linked data are now part of everyday practice...

Restricted access: Logon + authenticate with a smart card

Patients all have unique IDs

Enables an accurate denominator

On-line lab results posted into system

*Example includes serum creatinine*

Also:

1. Summary Care Record
2. ePrescribing – electronic transmission to pharmacy
3. Some vendors: On-line record access, On-line appointments & Prescription refills
Technology—Secondary use of data to **measure** quality & for research

Share anonymised data locally

www.guildoc.net

Data provided to research data bases

1. RCGP Spotter practice
   www.rcgp.org.uk/bru

2. Q-Research
   www.research.org

3. Ad hoc research projects

Royal College of General Practitioners

QOF – Quality based payments

www.ic.nhs.uk

Prescribing + referral data

Inspection, appraisal & Re-validation

Surgery website

www.woodbridgehillsurgery.co.uk
Developing as an academic...
Studies, grants, & higher degrees

1. Using routine data for quality improvement (QI)
   • Primary Care Data Quality project (PCDQ)
   • Feedback in an educational context..
   • Generic approach to QI, “Audit-based education”

2. Telemedicine
   • Monitoring heart failure & other diseases

3. Access to evidence to the consulting room desk
   • “Doctors Desk” project
   • Primary care electronic library (PCEL)

4. Use of the computer in the consultation
   • Use of video to evaluate new computer systems

+ Completed MSc in Health informatics & doctoral thesis!

Head of General Practice & Primary Care
Head of GP & Primary Care!

- Maintain identity & cohesion of discipline
- Strategic overview of teaching
- Continue to develop research & scholarship

Teaching Practice network
http://gp2.sgul.ac.uk

Editor – Informatics in Primary Care
http://www.radcliffe-oxford.com/ipc/

PCI WG – EFMI
www.efmi.org
Chronic kidney disease (CKD) ... how IT can enable Quality Improvement

- Case finding
- Defining the epidemiology
- Quality improvement (QI)

Identification and management of chronic kidney disease

Simon de Lusignan MSc, MD, FRCP and Hugh Gallagher MSc, PhD, MRCP

Chronic kidney disease (CKD) is a common long-term condition affecting between 5 and 10 per cent of the population. Its true prevalence has only been recognised since the widespread adoption of estimated glomerular filtration rate (eGFR) to measure renal function—a far more sensitive indicator of renal dysfunction than serum creatinine concentration.

Although the majority of individuals have renal function that is relatively stable over time, the presence of CKD is associated with increased cardiovascular risk. Smaller numbers will progress towards end-stage renal disease, the incidence of which is rising by approximately 7 per cent per annum. Spending on renal services—urinary tract infection—a common cause in children and young adults.

Medication, both prescribed and nonprescribed, is also an important factor in CKD development. This includes commonly prescribed medications such as NSAIDs—high cumulative exposure correlated with cardiovascular risk in renal function.

Signs and symptoms

CKD typically remains asymptomatic until the severe stages of disease are reached. Symptoms include chronic fatigue, hyperkalaemia, and nocturia. In more severe stages, patients may experience anemia, with a reduction in hematocrit and serum creatinine levels.

Causes of CKD

Diabetes and hypertension are the major causes of CKD. In diabetic patients, prevalence of CKD is around 30 per cent, compared to 9.9 per cent in non-diabetic patients. Hypertension is a frequent cause and consequence of CKD, and age-related decline in renal function is associated with high blood pressure (BP).

Cardiovascular co-morbidities are also extremely common in CKD, our research has found that approximately three-quarters of CKD patients are co-tired for one or more circulatory diseases.

Other causes include: hereditary conditions, adult polycystic kidney disease, inflammatory conditions, sphingolipidoses and systemic lupus erythematosus.
What is CKD?

• CKD is associated with:
  • Increased cardiovascular morbidity & mortality
  • Progression to end-stage renal disease
• Intervention in primary care can slow progression
  • Strict management of BP
  • Especially the use of ACE-I in people at high risk
    • Proteinuria
    • Diabetes

Chronic kidney disease: a new priority for primary care

Chronic kidney disease is a long-term condition that has been the focus of important recent initiatives. Although only a small minority of individuals with this condition will develop end-stage renal disease, the presence of even minor renal impairment is an independent risk factor for all cause mortality and cardiovascular disease. The number of patients treated with end-stage renal failure is increasing dramatically in the UK. Projections for hospital-based haemodialysis indicate an annual growth rate of 6–8%; a steady state is not predicted for at least 20 years. Currently one-third of people reach
Case finding in CKD

- People with CKD can be identified using a simple formula to estimate Glomerular Filtration Rate (eGFR)
  - MRDR formula
  - Age – Gender – Serum creatinine – Afro-Caribbean ethnicity
  - **Strictly: based on two measures >3 months apart**

- Set the challenge of identifying people with CKD from routinely collected data....
  - Did it!
  - Wrote it up!
  - **Prevalence 4.9%**

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**Identifying patients with chronic kidney disease from general practice computer records**


**Background.** Chronic kidney disease (CKD) is an important predictor of end-stage renal disease, as well as a marker of increased mortality. The New Opportunities for Early Renal Intervention by Computerised Assessment (NOCERA) project aimed to assess whether people with undiagnosed CKD who might benefit from early intervention could be identified from GP computer records.

**Methods.** The simplified Modification of Diet in Renal Disease (MDRD) equation was used to estimate glomerular filtration rate (GFR) and determine stage of CKD in patients from 12 practices in Surrey, Kent and Greater Manchester with SCR recorded in their notes. Further data were extracted on associated co-morbidities and potentially modifiable risk factors.

**Results.** One quarter (25.7%; 28 862/112 215) had an SCR recorded and one in five (18.9%) of them had a GFR <60 ml/min/1.73 m² (equivalent to Stage 3–5 CKD), representing 4.9% of the
Have your really found them?

- Disbelief that this was possible!
- Two medical students hand-searched 500 records....
- Wrote about it...

OK, we believe you but no tools...

- At the time many labs did not calculate eGFR....
- We built a series of tools
- Available at: www.pcel.info/gfr/

Defined National prevalence & scope for QI

- NEOERICA study defined UK national prevalence
- Prevalence 10.6% - women 5.8% - men 8.2% - population
- Scope for quality improvement – especially BP management
- Used by Association of Public Health Observatories to predict prevalence


CKD introduced as UK National Quality Improvement indicator

- A financially incentivised quality improvement (QI) indicator was created for CKD within the “Quality and Outcomes Framework” (QOF)
- As a new condition the negotiators for the profession requested FAQs (Frequently Asked Questions)

Post hoc systematic review....

- We conducted a systematic review of interventions to lower BP in CKD
- Pay-for-performance targets are a blunt instrument
  - They have raised awareness of CKD...
  - But may bias data recording
- Found very little evidence for effective interventions
  - Interventions for high risk minority populations were effective
  - Often interventions were by non-medical staff (Pharmacists, Nurses)
- Obtained funding for a trial of QI interventions...
Trial of QI interventions QICKd study...

- Study to explore what QI interventions might be most effective
  - Usual practice
  - Guidelines & prompts
  - Audit-based education

- Sample: 129 practices – 930,000 patients >50,000 with CKD
- UK prevalence: 7.34% -Females, 3.49% -Males, 5.41% -Population
  - NEOERICA problems were: using single eGFR reading, & lack of ethnicity recording

- No difference in the way high risk people are treated!
  - Despite introduction of pay-for-performance

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Discussion
Discussion

- My career pathway: From full time family physician to part-time GP, & academic
- A generalist – with informatics skills:
  - Able to work between domains (FP + computing, IS, epidemiology)
  - Key role in the translation of knowledge into practice
- Expertise:
  - Domain knowledge
    - Understanding of what works in primary care
  - Skills
    - How to process data, computer system architecture, coding systems
  - Attitude
    - Constantly pushing the boundaries > Data linkage & pseudonymisation
- Limitations
  - Less formal scientific knowledge & training
  - Scheduling & availability
  - Implementing IT systems is “messy” and not readily amenable to trials
  - Primary care & informatics: less literature & cited less...
Conclusions:

- There are career pathways from full-time practice to academia
  - Involvement in teaching makes you “visible” to academic colleagues
- Primary care informatics offers opportunities for research:
  - 11/107 of my papers are with (18) student co-authors (1 from McGill)
- Downsides of being an established GP & researcher:
  - Less flexible career – hard to move practice!
  - Not conventional: Fellowships, early career doctorates are more usual
  - Hard to manage the boundaries
- Advantages:
  - Deep contextual understanding & what it is possible to implement
  - Paid better! Flexible. Independent. Maybe, best of both worlds?
- No right or wrong career pathway – but opportunities through academic practice for QI, research & to influence policy... ...as with CKD...
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¹St. George's University of London
²South West Thames Renal Unit, St. Helier Hospital, Carshalton, Surrey
³City University, London
⁴Kidney Research UK, Peterborough.
⁵Leicester University Hospitals
⁶Southmead Hospital, Bristol

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The end – Thanks for listening

Simon de Lusignan

Reader in General Practice & Informatics
Head of General Practice & Primary Care

St. George’s – University of London

slusigna@sgul.ac.uk