Improving Ascertainment Of Chronic Kidney Disease With Laboratory-Based Case-Finding

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Introduction

Since the introduction of GP CKD registers as part of the Quality and Outcomes Framework (QOF), there has been a substantial rise in identification of CKD. There is marked variation in prevalence between practices, with rates of 1.3-9.0% in our population. We hypothesised that this variation was not due to genuine differences in population CKD prevalence.

Methods

Our population is mostly served by a single laboratory. We identified all adults with any eGFR <60 mL/min/1.73m² in 2009-2012 (n=44,445) and extracted all their serum creatinine results over that period. We excluded those without results >90 days apart (n=3,087). For patients with eGFRs straddling 60 mL/min/1.73m², those with >50% of time <60 mL/min/1.73m² were classified as CKD, as a mimic of 'real world' decision-making. Patients were grouped by practice to derive laboratory CKD prevalence (LabP) for each practice, and analysed against reported QOF prevalence (QOFP) for the same period. The population prevalence as a whole was also examined for associations after adjusting for age and gender. Practices bordering the north of the trust were excluded from final analysis because of known service incursions by neighbouring laboratories.

Results

Population prevalence:

Prevalence of CKD stage 3-5 in A&A was 7.06% female, 4.07% males and overall 5.6%, with 20.6% of the population age over 65 classed as having CKD. This rises to 32.6% of those aged over 75 despite only accounting for 10.3% of the total adult (≥18 years) population. Despite this, our CKD prevalence is lower than compared to earlier population estimates [table 1]. The prevalence of CKD after standardisation for age and gender is strongly correlated to deprivation (r=0.683, p<0.01) [figure 2].

Laboratory prevalence vs. GP reported prevalence:

QOFP and LabP are strongly correlated (r=0.74, p<0.01), but there is a higher variance in QOFP. In 2011, LabP was higher than QOFP by 0.29% (95% CI 0.01, 0.57). In 2012, QOFP rose and the difference was reversed to -0.06% (95% CI -0.33, 0.22). Relative difference ((QOFP-LabP)/QOFP) was positively correlated to QOFP (r=0.55, p<0.01) but not to deprivation, list size or rurality, suggesting practices reporting high prevalence rates tend to overestimate and vice versa [figure 2]. The difference between age and gender standardised laboratory prevalence and LabP was calculated to provide an indicator of relative differences in practice demographics, and this was positively correlated to ascertainment error by practices as represented by the absolute difference (QOFP-LabP) in prevalence (r=0.32, p=0.023)[Figure 3].

Discussion

CKD 3-5 is predominantly a laboratory diagnosis. In 2012 there was no statistical difference between the total prevalence of QOFP and LabP, but large variations across practices with a mean difference of -0.06% (range -2.17% to 2.80%). In real terms, this equates to approximately 2300 patients being misdiagnosed across A&A. It appears that practices serving a relatively older and more female population were more likely to underestimate their prevalence of CKD, whereas practices with proportionally more younger men tend to overestimate. Our study reveals a weakness in the QOF registers which can be improved through centralised laboratory reporting. Furthermore, our work supports earlier studies that demonstrate a strong link between the prevalence of CKD and deprivation.

Prevalence according to gender and age bands for NHS Ayrshire & Arran

Sex	Age band	Population with CKD	Study population	Prevalence %	NEOERICA* %
F	18-24	8	15834	0.05	0.18
F	25-34	19	21848	0.09	0.79
F	35-44	94	26061	0.36	2.69
F	45-54	356	29931	1.19	2.79
F	55-64	1080	26596	4.06	13.09
F	65-74	2769	21568	12.84	27.86
F	75-84	4458	13839	32.21	41.68
F	85+	2605	5718	45.56	48.61
all F		11389	161395	7.06	10.6
M	18-24	4	16858	0.02	0.01
M	25-34	20	22503	0.09	0.17
M	35-44	84	26422	0.32	0.71
M	45-54	204	29597	0.69	3.08
M	55-64	663	25266	2.62	6.89
M	65-74	1760	19279	9.13	17.65
M	75-84	2467	10159	24.28	33.16
M	85+	1003	2545	39.41	44.75
all M		6205	152629	4.07	5.8
Total		17594	314024	5.60	8.5

*Stevens PE, O'Donoghue DJ, de Lusignan S et al. Chronic kidney disease management in the United Kingdom: NEOERICA project results. Kidney International 2007; 72(1):92–99.

Table 1: Table showing total prevalence of CKD stage 3-5 for each age group by gender as compared to earlier published estimates.

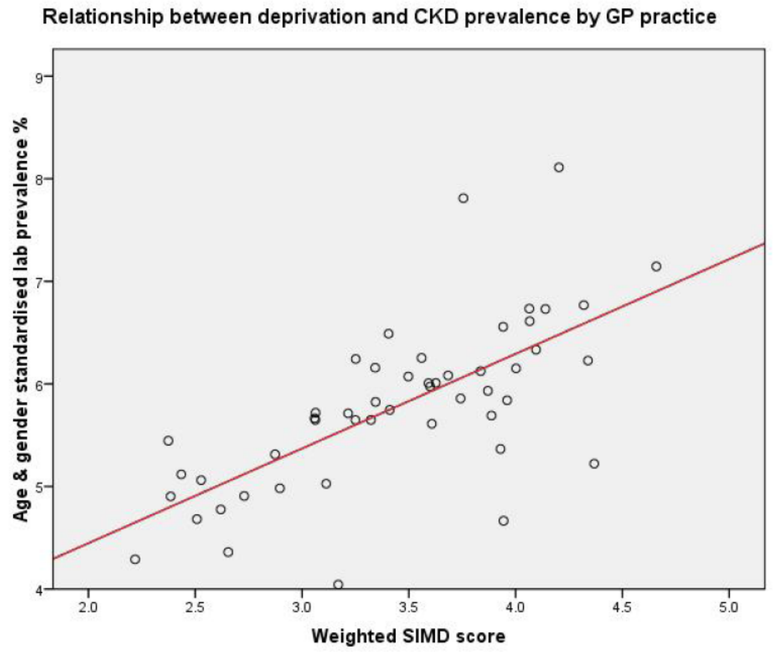

Figure 1: Scatter plot demonstrating the strong relationship between the prevalence of CKD stage 3-5 and a weighted Scottish Index of Multiple Deprivation score after accounting for age and gender of the population.

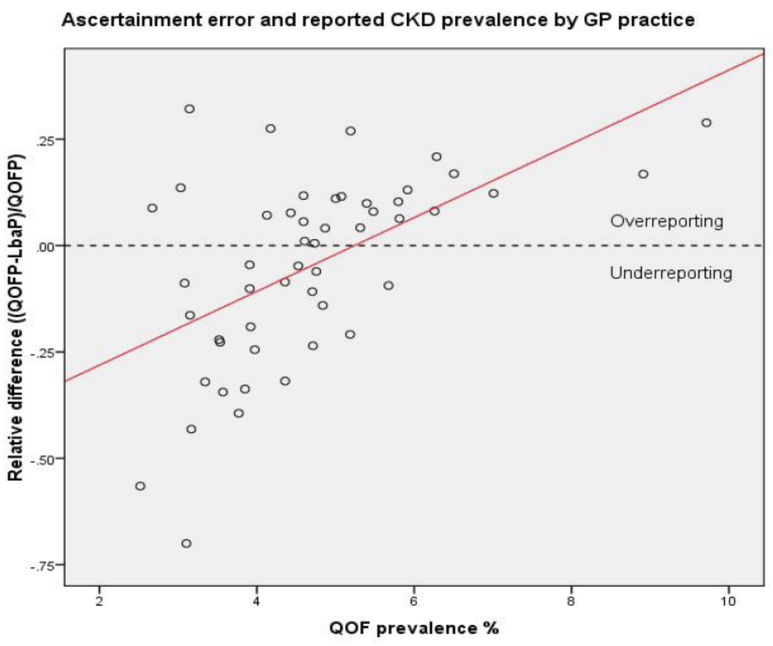

Figure 2: Scatter plot demonstrating the strong correlation between relative difference in ascertainment ((QOFP-LabP)/QOFP) against GP reported prevalence. The practices above the line tend to overestimate prevalence and those under the line underestimate prevalence relative to laboratory prevalence.

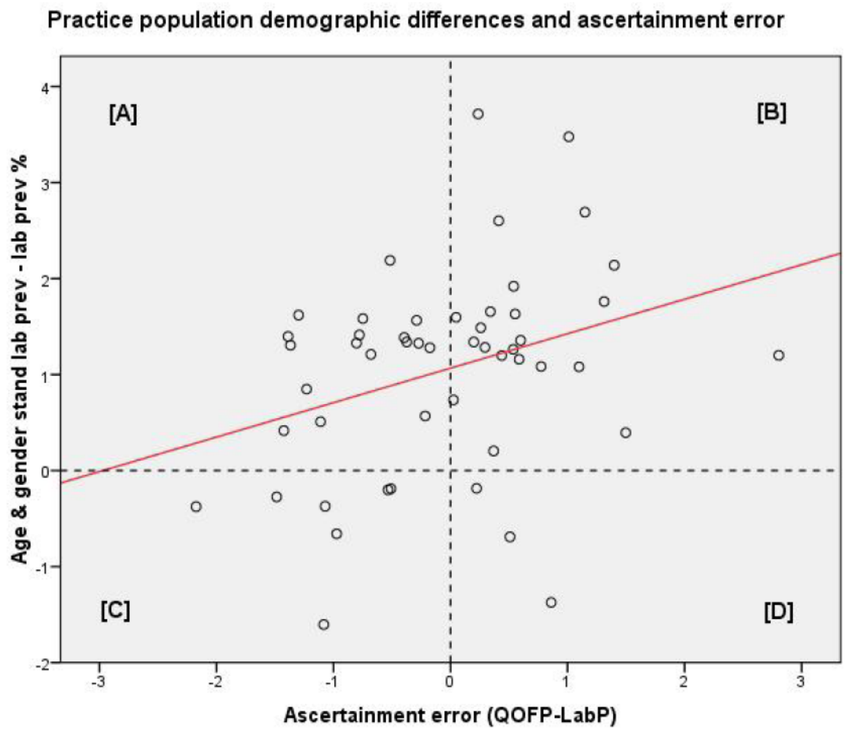

Figure 3: The four areas represent practices with:
[A] Lower risk population with underreporting, [B] Lower risk population with overreporting, [C] Higher risk population with underreporting and [D] Higher risk population with overreporting.