Prevalence of Hyperuricaemia within the Irish Health System and relationships with Chronic Kidney Disease

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INTRODUCTION

- Hyperuricaemia is an emerging risk factor for metabolic disorders and major cardiovascular events.
- A better understanding of the burden and variation of hyperuricaemia within the health system may uncover high-risk patient groups.

OBJECTIVE

- The goal of this study was to describe the prevalence of hyperuricaemia and period trends within the Irish Health System.

PATIENTS & METHODS

Study Design
- Observational cohort study
- Recruited between 2006-2014 (n=136,325 patients)

Data Sources:
- Health information systems in Northwest and Midwest regions

Variables:
- Hyperuricaemia was defined as uric acid > 416.40 umol/L in men >339.06 umol/L in women.
- eGFR was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation.
- KDIGO staging system was used to stage CKD.

- Prevalence of hyperuricaemia was calculated for calendar year, by CKD stage, geographical location, location of medical supervision; Emergency room (ER), General practice (GP), Inpatient (IP), Outpatient (OP), Outside facility (OF).

Statistical Analysis
- Comparisons across groups were conducted using chi-square and ANOVA
- Multivariate logistic regression was used to compare prevalence estimates from 2006 to 2014
- Results were expressed as odds ratio with 95% CI
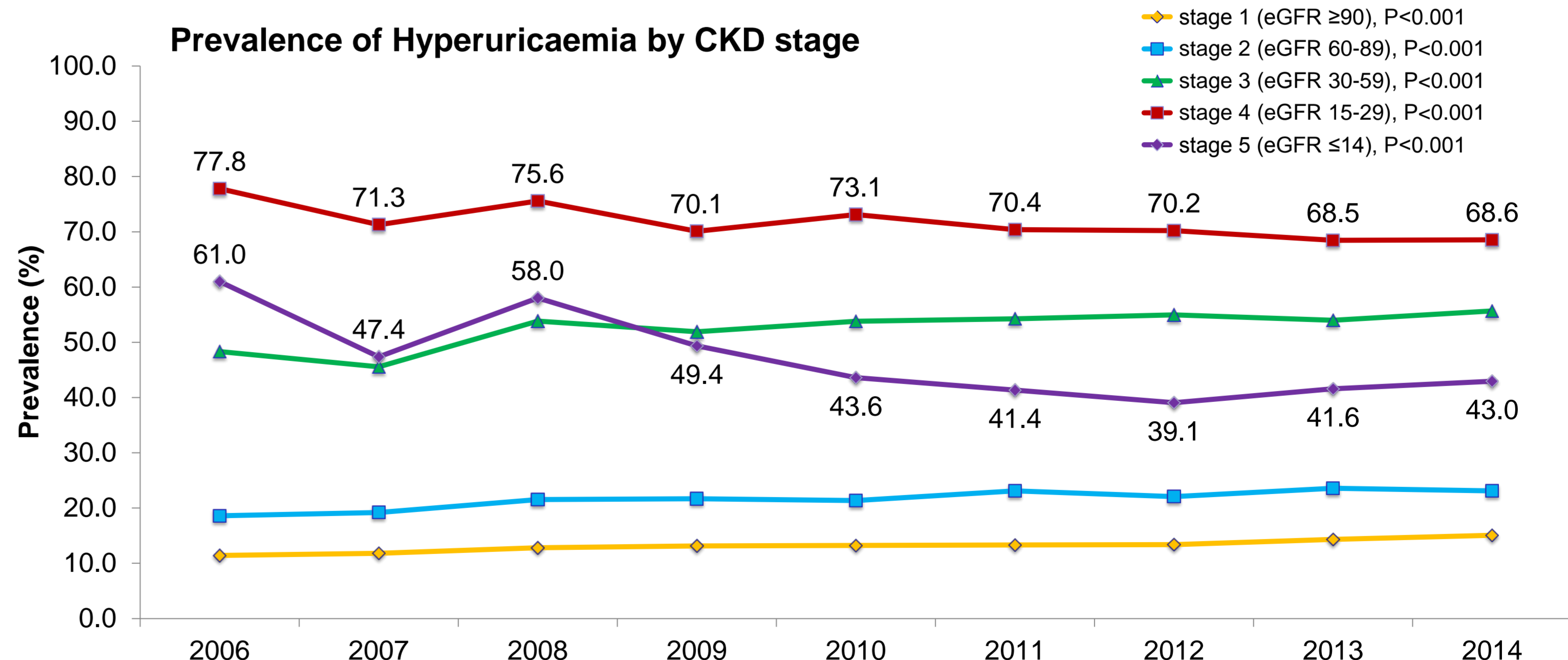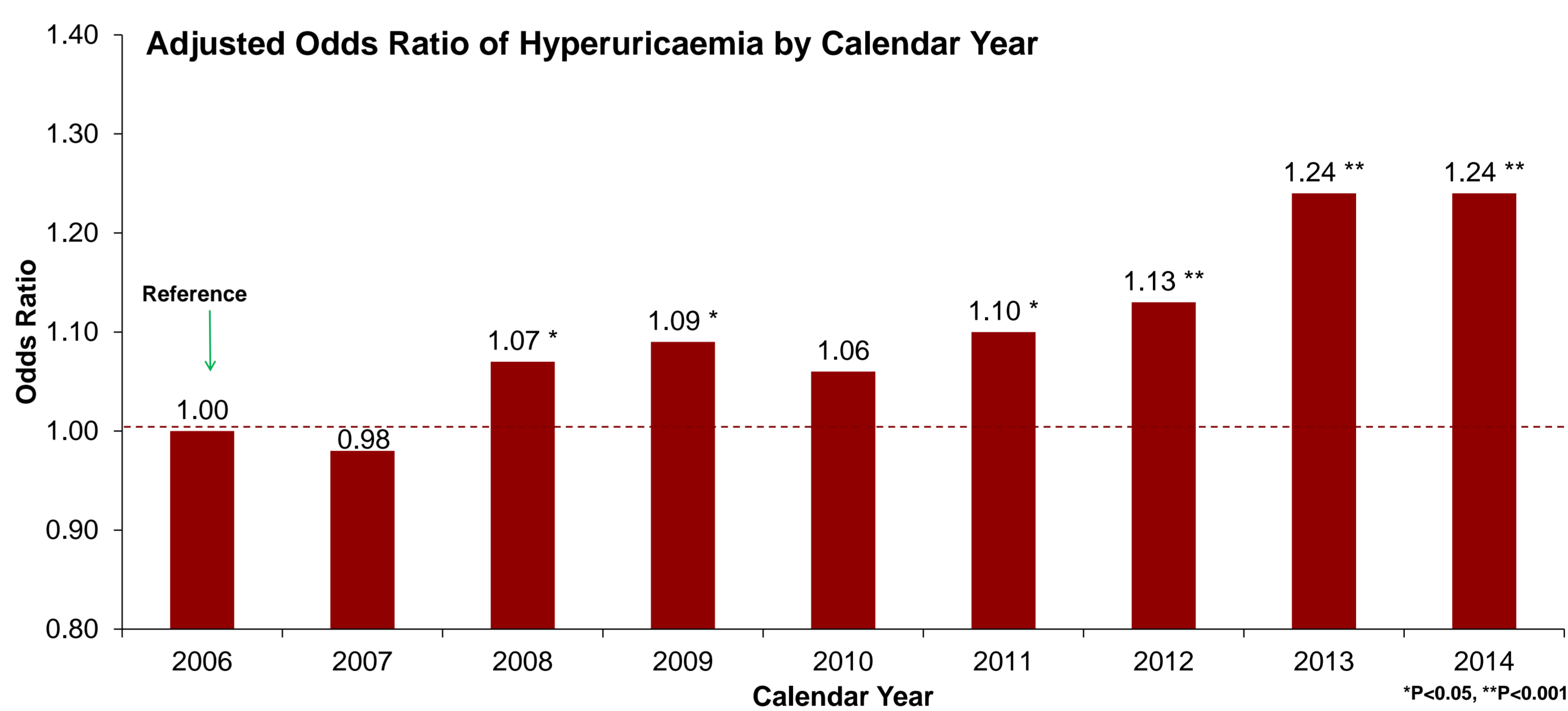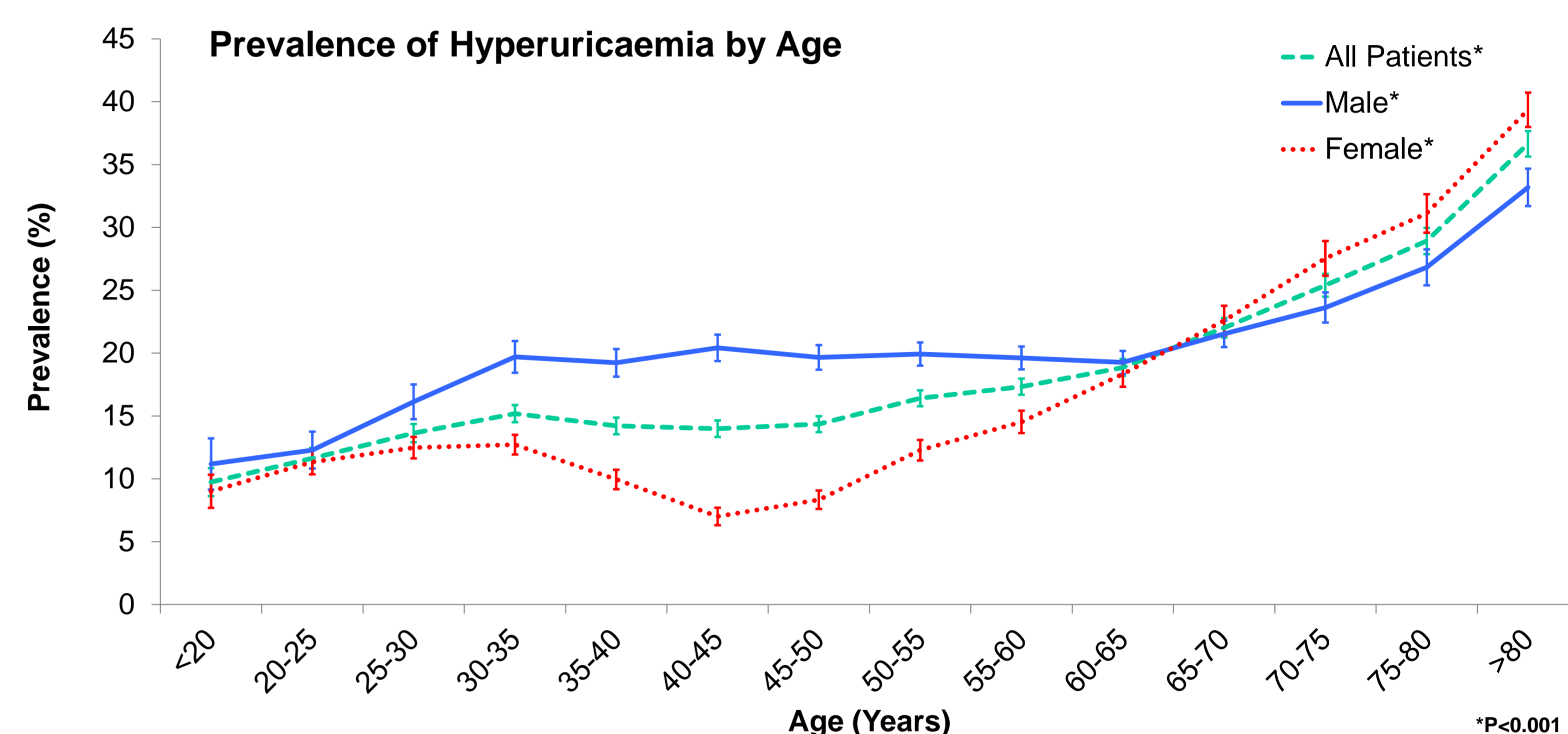- Final model was adjusted for demographic, geographic and clinical factors

RESULTS

- From 2006 to 2014, prevalence of hyperuricaemia increased in men from 20.3% to 26.5% and in women from 17.9 % to 20.4%, P<0.001.
- Age-specific prevalence rates increased over time for all age and sex groups, P<0.001.
- Although overall prevalence was higher in men than women, rates in women rose sharply after age 45 yrs and exceeded men after age 70 yrs, P<0.001
- Prevalence of hyperuricaemia increased in Stage 1-3 CKD over time, P<0.001.
- Interestingly, prevalence rates fell significantly over time for patients with Stage 4 and 5 CKD, P<0.001.

RESULTS

Table. Patient Characteristics by Presence of Hyperuricaemia at Baseline

Variable	n	No Hyperuricaemia	Hyperuricaemia	p value
Total Patients (%)	136325	111030 (81.4%)	25295 (18.6%)	
Mean Age at Baseline (SD)	136325	51.2 (17.4)	58.2 (18.5)	<0.001
Sex				<0.001
%Female	70225	83.6	16.4	
%Male	66100	79.2	20.8	
County of Residence (n,%)				<0.001
Clare	13584	78.5	21.5	
Donegal	27951	85.4	14.6	
Leitrim	8480	85.2	14.8	
Limerick	39847	78.1	21.9	
Sligo	19534	84.6	15.4	
Tipperary	6494	77.2	22.8	
All other counties	20435	81.2	18.8	
Location of Medical Supervision				<0.001
General Practice (GP)	4937	78.9	21.1	
Emergency Room (ER)	91119	83.0	17.0	
Inpatient (IP)	19265	74.4	25.6	
Outpatient (OP)	14375	79.8	20.2	
Outside Facility (OS)	5386	86.0	14.0	
Blood tests (Median IQR)				
Uric Acid (µmol/L)	136325	287.0 (94.3)	450.0 (81.0)	<0.001
Creatinine (µmol/L)	123106	72.0 (21.1)	86.0 (31.2)	<0.001
eGFR (ml/min/1.73m²)	123106	93.8 (27.4)	77.2 (40.3)	<0.001
Urea (mmol/L)	124752	5.6 (2.7)	7.2 (4.6)	<0.001
C-Reactive Protein (mg/L)	21792	1.0 (8.5)	6.2 (22.6)	<0.001
ESR (mm/hr)	59668	10.7 (14.2)	17.4 (25.6)	<0.001
White blood count (x10⁹/L)	123361	6.9 (3.1)	7.6 (3.3)	<0.001
Haemoglobin (g/dl)	123350	13.7 (2.1)	13.6 (2.7)	<0.001
Albumin (g/L)	108785	39.9 (5.3)	38.0 (7.0)	<0.001
Total protein (mmol/L)	104395	68.7 (6.8)	69.0 (7.8)	0.3
Calcium (mmol/L)	78049	2.3 (0.1)	2.3 (0.1)	<0.001
Phosphorus (mmol/L)	70307	1.2 (0.2)	1.2 (0.2)	0
Potassium (mmol/L)	109479	4.5 (0.4)	4.4 (0.4)	0.1
Glucose (mmol/L)	26543	5.1 (1.0)	5.4 (1.3)	<0.001
HbA1C (%)	16892	5.4 (2.3)	5.5 (2.1)	0.004
Baseline eGFR (ml/min/1.73m²) (%)				<0.001
eGFR >=90	80384	87.7	12.3	
eGFR 60-89	43476	80	20.0	
eGFR 30-59	10874	48.8	51.2	
eGFR 15-29	1259	24.9	75.1	
eGFR < 15	332	49.4	50.6	

Prevalence of Hyperuricaemia by Age
All Patients* / Male* / Female*
*P<0.001

Adjusted Odds Ratio of Hyperuricaemia by Calendar Year
Reference 1.00 (2006); 0.98 (2007); 1.07 * (2008); 1.09 * (2009); 1.06 (2010); 1.10 * (2011); 1.13 ** (2012); 1.24 ** (2013); 1.24 ** (2014)
*P<0.05, **P<0.001

Prevalence of Hyperuricaemia by CKD stage
stage 1 (eGFR ≥90), P<0.001
stage 2 (eGFR 60-89), P<0.001
stage 3 (eGFR 30-59), P<0.001
stage 4 (eGFR 15-29), P<0.001
stage 5 (eGFR ≤14), P<0.001

CONCLUSIONS

- Burden of hyperuricaemia is substantial in the Irish health system and has increased in frequency over the past decade.
- Burden was highest in young and middle-aged men and older age women.
- Although, the burden was highest among patients with advanced CKD, an encouraging decline in was evident in recent years, which may reflect increasing utilization of urate lowering therapies.