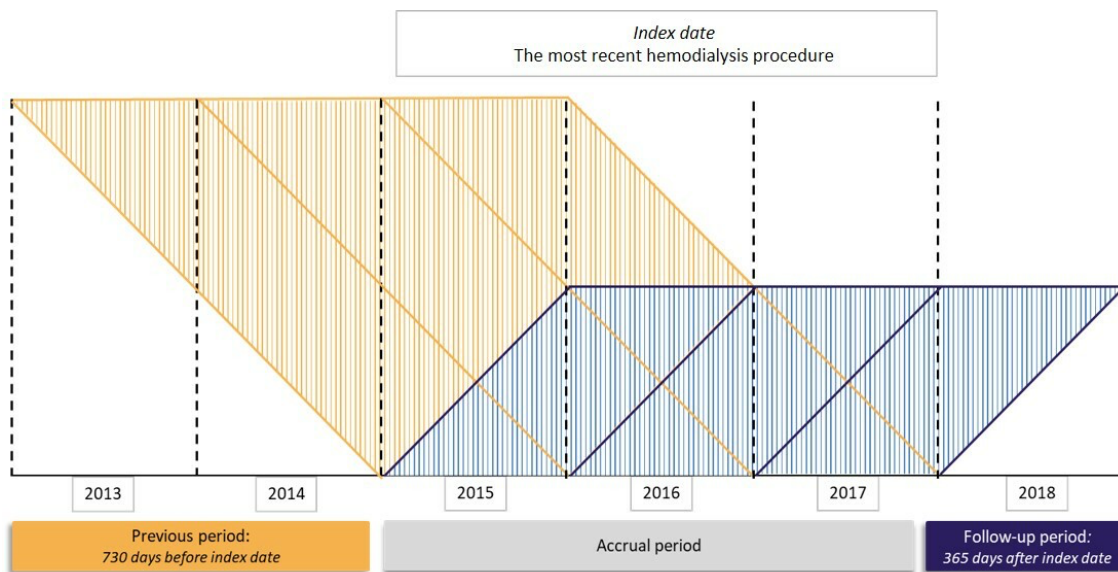


Supplementary figure 1 – Study design



Supplementary figure 1 shows the design of the observational retrospective study, consisting in an accrual period (2015-2017), a previous period of two years (2013-2014) and a follow-up period of one year (2018)

Supplementary table 1 - Identification criteria of patients affected by potentially confounding diseases, such as those that can frequently cause pruritus, in order to be excluded. The presence of at least one of the following codes per disease, implies that the patient is affected by the disease.

Healthcare administrative Database	Description
Chronic liver disease and cirrhosis	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code):: 571.x - Chronic liver disease and cirrhosis 572.x - Liver abscess and sequelae of chronic liver disease 573.x - Other disorders of liver V42.7 - Liver replaced by transplant
Disease waiver code for co-payment	016 – Chronic liver disease (active) 008 - Cirrhosis
Systemic lupus erythematosus	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code):: 710.0 - Systemic lupus erythematosus
Disease waiver code for co-payment	028 - Systemic lupus erythematosus
Arterial vasculitis	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code):: 440.x - Atherosclerosis 441.x - Aortic aneurysm and dissection 442.x - Other aneurysm 443.1 - Thromboangiitis obliterans [Buerger's disease] 443.2x - Other arterial dissection 444.x - Arterial embolism and thrombosis 445.x - Atheroembolism 447.x - Other disorders of arteries and arterioles and/or Hospital discharge form with one of the following procedures (ICD-9-CM code):: 39.24 - Aorta-renal bypass 39.25 - Aorta-iliac-femoral bypass 39.26 - Other intra-abdominal vascular shunt or bypass 39.50 - Angioplasty or atherectomy of other non-coronary vessel(s)

	<p>39.51 - Clipping of aneurysm 39.52 - Other repair of aneurysm 39.54 - Re-entry operation (aorta) 39.56 - Repair of blood vessel with tissue patch graft 39.57 - Repair of blood vessel with synthetic patch graft 39.58 - Repair of blood vessel with unspecified type of patch graft 39.71 - Endovascular implantation of graft in abdominal aorta 39.72 - Endovascular repair or occlusion of head and neck vessels 39.73 - Endovascular implantation of graft in thoracic aorta 39.74 - Endovascular removal of obstruction from head and neck vessel(s) 39.79 - Other endovascular repair (of aneurysm) of other vessels 39.90 - Insertion of non-drug-eluting peripheral vessel stent(s)</p>
Disease waiver code for co-payment	<p>002.440 - Diseases of the circulatory system - Atherosclerosis 002.441.2 - Diseases of the circulatory system - Thoracic aneurysm without mention of rupture 002.441.4 - Diseases of the circulatory system - Abdominal aneurysm without mention of rupture 002.441.7 - Diseases of the circulatory system - Thoracoabdominal aneurysm, without mention of rupture 002.441.9- Diseases of the circulatory system - Aortic aneurysm of unspecified site without mention of rupture 002.442 - Diseases of the circulatory system - Other aneurysm 002.444 - Diseases of the circulatory system - Arterial embolism and thrombosis 002.447.0 - Diseases of the circulatory system - Arteriovenous fistula, acquired 002.447.1 - Diseases of the circulatory system - Stricture of artery 002.447.6 - Diseases of the circulatory system - Arteritis, unspecified</p>
Diseases and inflammatory conditions of the skin and subcutaneous tissue	
Hospitalizations	<p>Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code):</p> <p>690 - Erythematous squamous dermatosis 691 - Atopic dermatitis and related conditions 692 - Contact dermatitis and other eczema 693 - Dermatitis due to substances taken internally 694 - Bullous dermatoses 695 - Erythematous conditions 696 - Psoriasis and similar disorders 697 - Lichen 708 - Urticaria</p>

Supplementary table 2 - Identification criteria of patients treated with chronic kidney disease-associated pruritus-related treatments: at least one of the following criteria among pharmaceuticals, local outpatient specialist services and in-hospital procedure had to be met in 180 days before and/or after index date.

Healthcare administrative Database	Code and description
Pharmaceuticals	Supply of one of the following CKD-aP related treatments (ATC code): N03AX12 – gabapentin N03AX16 - pregabalin L04AX02 – thalidomide R06 - antihistamines for systemic use (in absence of antineoplastic therapy *)
Outpatient specialist service	Performance of (current Italian classification): 99.82 – ultraviolet light therapy (Actinotherapy, UV Phototherapy)
Hospitalizations	Hospital discharge form with the following procedure (ICD-9-CM code): 99.82 – ultraviolet light therapy (Actinotherapy, UV Phototherapy)

* Antineoplastic therapy had to meet at least one of the following criteria:

Healthcare administrative Database	Code and description
Hospitalizations	Hospital discharge form with one of the following procedures (ICD-9-CM code): 00.10 - Implantation of chemotherapeutic agent 99.25 - Injection or infusion of cancer chemotherapeutic substance 99.28 - Injection or infusion of biological response modifier [BRM] as an antineoplastic agent
Outpatient specialist service	Performance of (current Italian classification): 99.25 - Injection or infusion of cancer chemotherapeutic substance
Pharmaceuticals	Prescription of at least a specific drug (ATC code): L01 – Antineoplastic agents

Supplementary table 3 – Identification criteria of potential chronic kidney disease-associated pruritus-related comorbidities and other comorbidities of interest within 2 years before the index date. The presence of at least one of the following codes per comorbidity, implies that the patient is affected by the comorbidity.

Healthcare administrative Database	Code and description
Potential CKD-aP-related comorbidities	
Anemia	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 285.21 - Anemia in chronic kidney disease
Pharmaceuticals	Supply of at least one of the following drugs (ATC code): B03A - Iron preparations B03XA - Other antianemic preparations
Xerosis cutis	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 706.8- Other specified diseases of sebaceous glands
Hyperparathyroidism	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 588.81 - Secondary hyperparathyroidism (of renal origin) 252.0x – Hyperparathyroidism
Pharmaceuticals	Supply of at least one of the following drugs (ATC code): H05BX01 – Cinacalcet H05BX02 – Paricalcitol H05BX04 - Etelcalcetide
Disease waiver code for co-payment	026.252.0 - Hyperparathyroidism
Hypercalcemia	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 275.42 - Hypercalcemia
Hypothyroidism	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 243.x - Congenital hypothyroidism

	244.x - Acquired hypothyroidism
Disease waiver code for co-payment	027 – Hypothyroidism
Pharmaceuticals	At least one supply of the following drug (ATC code): H03AA - Thyroid hormones
Hyperuricemia	
Hospitalizations	Hospital discharge form primary or secondary diagnosis of (ICD-9-CM code): 790.6 - Other abnormal blood chemistry
Pharmaceuticals	At least one supply of the following drug (ATC code): M04AA - Preparations inhibiting uric acid production
Hyperphosphatemia	
Hospitalizations	Hospital discharge form primary or secondary diagnosis of (ICD-9-CM code): 275.3 - Disorders of phosphorus metabolism
Pharmaceuticals	Supply of at least one of the following drugs (ATC code): V03AE02 – sevelamer V03AE03 - lanthanum carbonate V03AE04 - calcium acetate and magnesium carbonate V03AE05 - sucroferric oxyhydroxide
Other comorbidities of interest	
Diabetes mellitus	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 250.x - Diabetes mellitus
Disease waiver code for co-payment	013 - Diabetes mellitus
Pharmaceuticals	At least one supply of the following drug (ATC code): A10 – drugs used in diabetes
Depression	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 296.2x - Major depressive disorder single episode 296.3x - Major depressive disorder recurrent episode 296.5x - Bipolar disorder, most recent episode (or current) depressed 296.82 - Atypical depressive disorder 298.0x - Depressive type psychosis 300.4 - Dysthymic disorder

	301.12 - Chronic depressive personality disorder
Disease waiver code for co-payment	044.296.2 - Psychosis (major depressive disorder single episode) 044.296.3 - Psychosis (major depressive disorder recurrent episode) 044.296.5 - Psychosis (bipolar disorder, most recent episode (or current) depressed) 044.296.8 - Psychosis (manic depressive psychosis, other unspecified) 044.298.0 – Psychosis (depressive type psychosis)
Pharmaceuticals	Supply of at least four packs of the following drugs (ATC code): N06A– Antidepressants
Hypertension	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 401.x - Essential hypertension 402.x - Hypertensive heart disease 403.x - Hypertensive chronic kidney disease 404.x - Hypertensive heart and chronic kidney disease 405.x - Secondary hypertension
Disease waiver code for co-payment	031 – hypertension A31 – hypertension without organ damage
Pharmaceuticals	Supply of at least four packs of the following drugs (ATC code): C02 - antihypertensive C03 - diuretics C07 - beta blocking agents C08 - calcium channel blockers C09 – agents acting on the renin-angiotensin system
Viral hepatopathies	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 070.x - Viral hepatitis
Pharmaceuticals	Supply of at least one of the following drugs specific for liver diseases (ATC code): J05AP - antivirals for treatment of HCV infections J05AF08 – adefovir J05AF10 – entecavir J05AF11 – telbivudina
Coronary artery disease	
Hospitalizations	Hospital discharge form with primary or secondary diagnosis of (ICD-9-CM code): 410.x - Acute myocardial infarction

	<p>411.x - Other acute and subacute forms of ischemic heart disease 412 - Old myocardial infarction 413.x - Angina pectoris 414.x - Other forms of chronic ischemic heart disease and/or Hospitalization with one of the following procedures (ICD-9-CM code): 36.x - Operations on vessels of heart 00.66 - Percutaneous transluminal coronary angioplasty [PTCA] or coronary atherectomy</p>
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