

# Iris 2009 Staging of CKD

## 1. Staging of CKD (based on plasma creatinine concentration)

Staging is undertaken **following diagnosis of CKD** in order to facilitate appropriate treatment and monitoring of the patient. There are separate but related algorithms for staging CKD in cats and dogs.

Staging is based initially on fasting plasma creatinine, assessed on at least two occasions in the stable patient. The patient is then substaged based on proteinuria and blood pressure.

Based on these categories, some empirical recommendations can be made about the type of treatment it would be logical to use for these cases. In addition, predictions based on clinical experience might be made about the likely response to treatment.

Stage	Plasma creatinine µmol/l mg/dl		Comments
	Dogs	Cats	
-	<125 <1.4	<140 <1.6	<b>At risk of CKD</b> For patients identified as 'at risk' consider regular screening and taking steps to reduce risk factors
1	<125 <1.4	<140 <1.6	<b>Non-azotemic</b> Some other renal abnormality present e.g. inadequate concentrating ability without identifiable non-renal cause; abnormal renal palpation and/or abnormal renal imaging findings; persistent proteinuria of renal origin; abnormal renal biopsy results, progressively elevating creatinine levels
2	125 - 179 1.4 - 2.0	140 - 249 1.6 - 2.8	<b>Mild renal azotemia</b> [lower end of the range lies within the reference range for many labs but the insensitivity of creatinine as a screening test means that animals with creatinine values close to the upper limit of normality often have excretory failure] Clinical signs usually mild or absent
3	180 - 439 2.1 - 5.0	250 - 439 2.9 - 5.0	<b>Moderate renal azotaemia</b> Systemic clinical signs may be present
4	>440 >5.0	>440 >5.0	<b>Severe renal azotaemia</b> Systemic clinical signs are usually present

*Note these plasma creatinine levels apply to average size dogs – those of extreme size may vary*

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## 2a. Substaging by Proteinuria

The goal is to identify renal proteinuria having ruled out post-renal and pre-renal causes.

Standard urine dipsticks can give rise to false positives therefore practitioners should consider using a more specific screening test such as the sulphosalicylic acid turbidometric test or the ERD® test.

The urine protein to creatinine (UP/C) ratio should be measured in all cases, provided there is no evidence of urinary tract inflammation or hemorrhage and the routine measurement plasma proteins has ruled out dysproteinemias. Ideally staging should be done on the basis of at least three urine samples collected over a period of at least 2 weeks.

UPC value		Substage
Dogs	Cats	
<0.2	<0.2	Non-proteinuric (NP)
0.2 to 0.5	0.2 to 0.4	Borderline proteinuric (BP)
>0.5	>0.4	Proteinuric (P)

Patients with persistent proteinuria in the BP subcategory should be re-evaluated within 2 months and re-classified as appropriate.

UP/Cs in the NP or BP range may be categorized as 'microalbuminuric' on the ERD® test. The significance of microalbuminuria in predicting future renal health is not understood at present. IRIS recommendation is to continue to monitor this level of proteinuria.

Proteinuria may decline as renal dysfunction worsens and so may be less frequent in animals in stages 3 and 4.

Response to any treatment given to reduce glomerular hypertension, filtration pressure, and proteinuria, should be monitored at intervals using the UP/C ratio.

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## 2b. Substaging by Arterial Blood Pressure

Patients should be acclimatized to the measurement conditions and multiple measurements taken. The final classification should rely upon multiple pressure determinations (preferably multiple patient visits to the clinic on separate days but acceptable if during the same visit with at least 2 hours separating determinations).

Patients are substaged by blood pressure according to the degree of risk of end organ damage, and whether there is evidence of end-organ damage or complications.

<b>Systolic BP mm Hg</b>	<b>Diastolic BP mm Hg</b>	Adaptation when breed-specific reference range is available *	<b>Arterial Pressure Substage (AP)</b>
<b>&lt;150</b>	<b>&lt;95</b>	<10 mm Hg above reference range	<b>0 Minimal Risk</b>
<b>150 – 159</b>	<b>95 - 99</b>	10 – 20 mm Hg above reference range	<b>1 Low Risk</b>
<b>160 – 179</b>	<b>100 - 119</b>	20 – 40 mm Hg above reference range	<b>2 Moderate Risk</b>
<b>≥ 180</b>	<b>≥ 120</b>	≥ 40 mm Hg above reference range	<b>3 High Risk</b>
<b>No evidence of end organ damage/complications</b>			<b>No complications (nc)</b>
<b>Evidence of end organ damage/complications</b>			<b>Complications (c)</b>
<b>Blood pressure not measured</b>			<b>Risk not determined (RND)</b>

As with proteinuria, in the absence of evidence of end organ damage, demonstration of persistence of blood pressure readings within a particular category is important.

'Persistence' of elevation should be judged on multiple blood pressure measurements made over the following timescales:

- 2 months (if at moderate risk – 160 to 179 mm Hg systolic BP)
- 1 to 2 weeks (if at severe risk - ≥180 mmHg).

*\*If available, it is preferable to use breed specific ranges for normal values and compare the measurement to the upper limit of the normal range for the breed being evaluated. Sighthounds, in particular, have a higher reference range than most breeds of dog.*

## 3 Therapy Effect

If antihypertensive/antiproteinuric therapy is instigated, subsequent staging of hypertension/proteinuria should be based on the **current actual** blood pressure/UPC with **(T)** to indicate that this level reflects the effects of therapy,

For example:

### **Cat A before treatment**

Creatinine 260  
UPC 0.3  
Systolic blood pressure 200  
*IRIS stage 3, BP, AP3*

### **Cat A after treatment**

Creatinine 300  
UPC 0.3  
Systolic blood pressure 155  
*IRIS stage 3, BP, AP1 (T)*

### **Dog B before treatment**

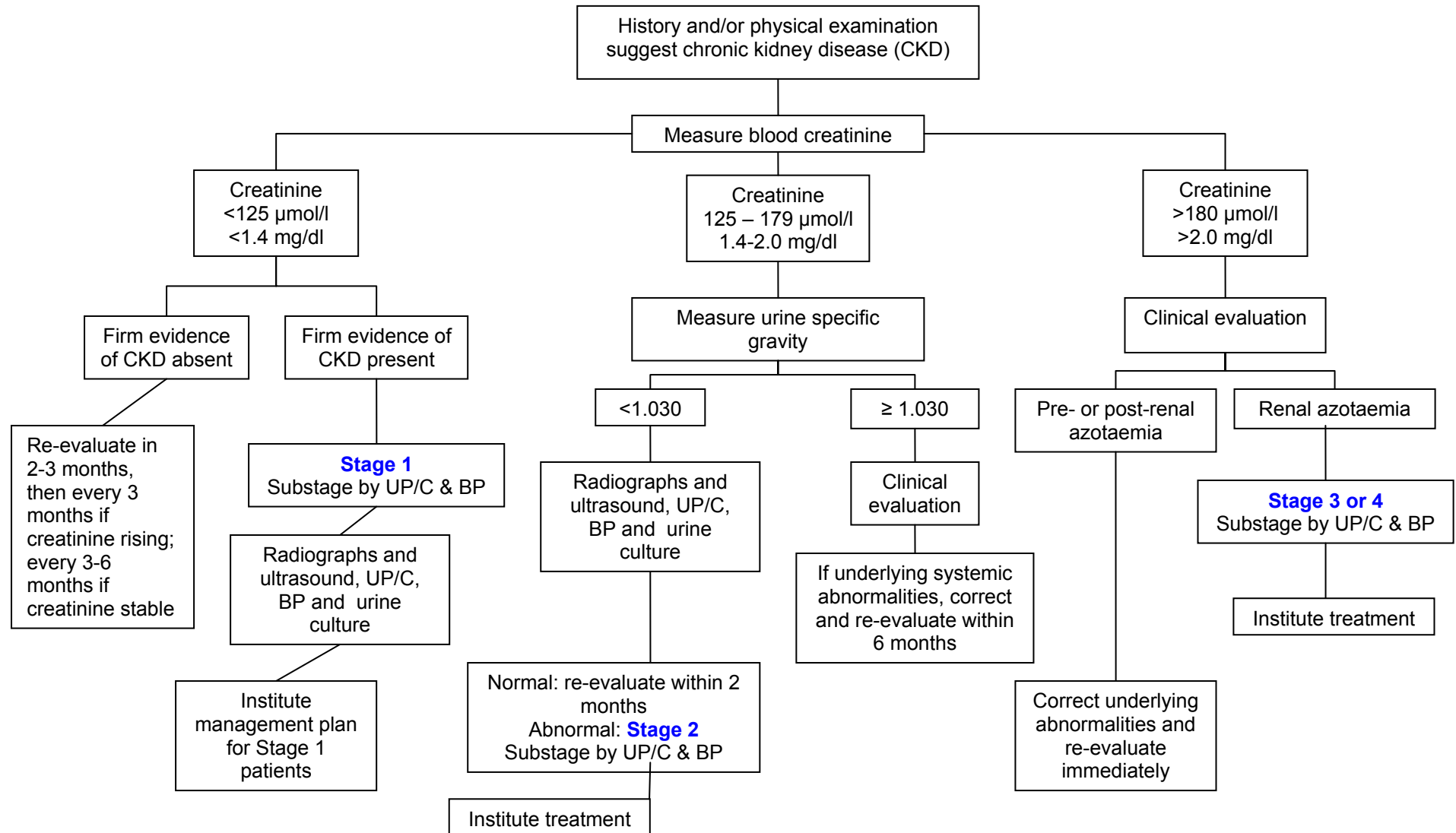
Creatinine 160  
UPC 0.8  
Systolic blood pressure 155  
*IRIS stage 2, P, AP1*

### **Dog B after treatment**

Creatinine 170  
UPC 0.4  
Systolic blood pressure 155  
*IRIS stage 2, BP (T), AP1*

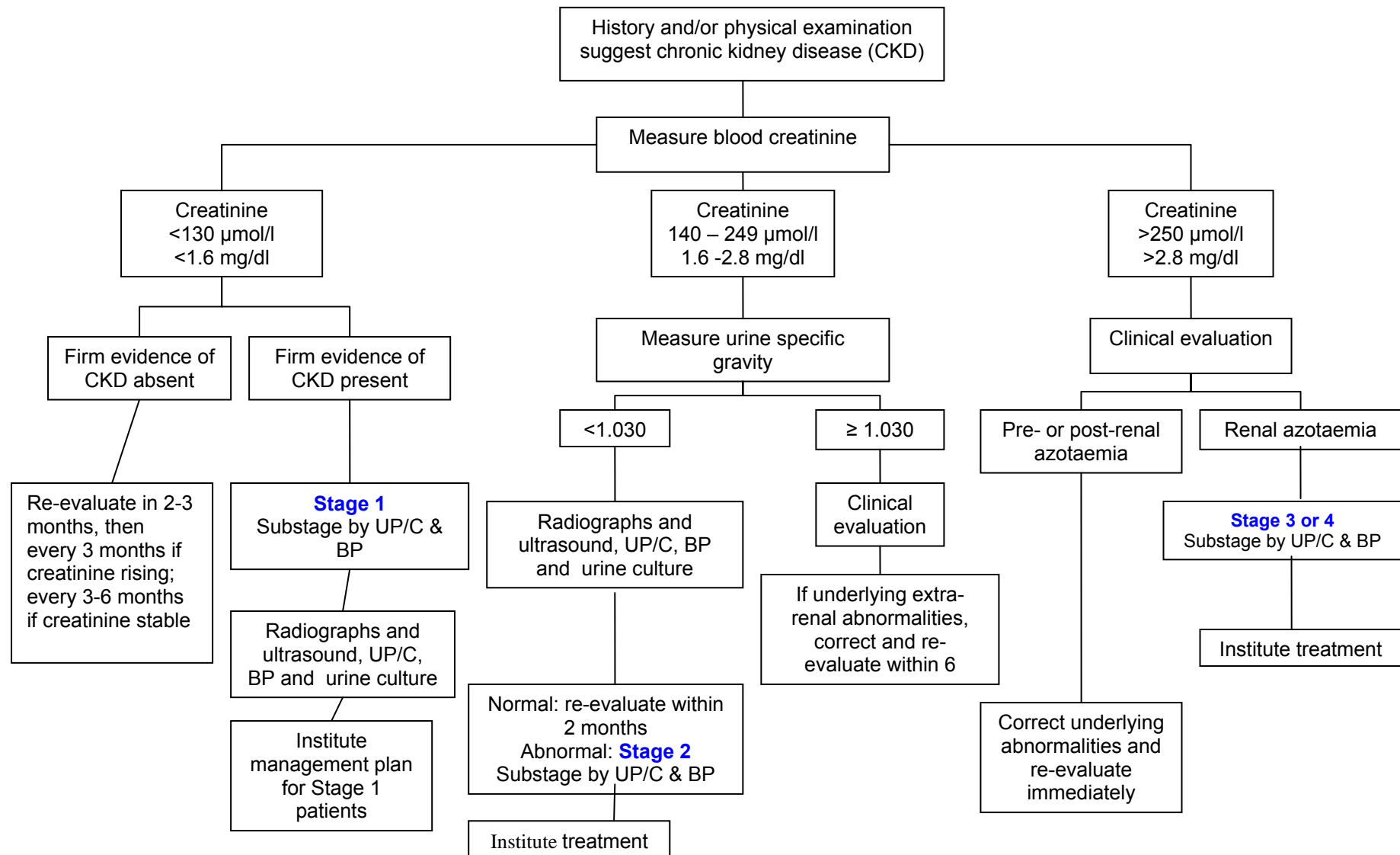
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## Algorithm for Staging of Chronic Kidney Disease in Dogs



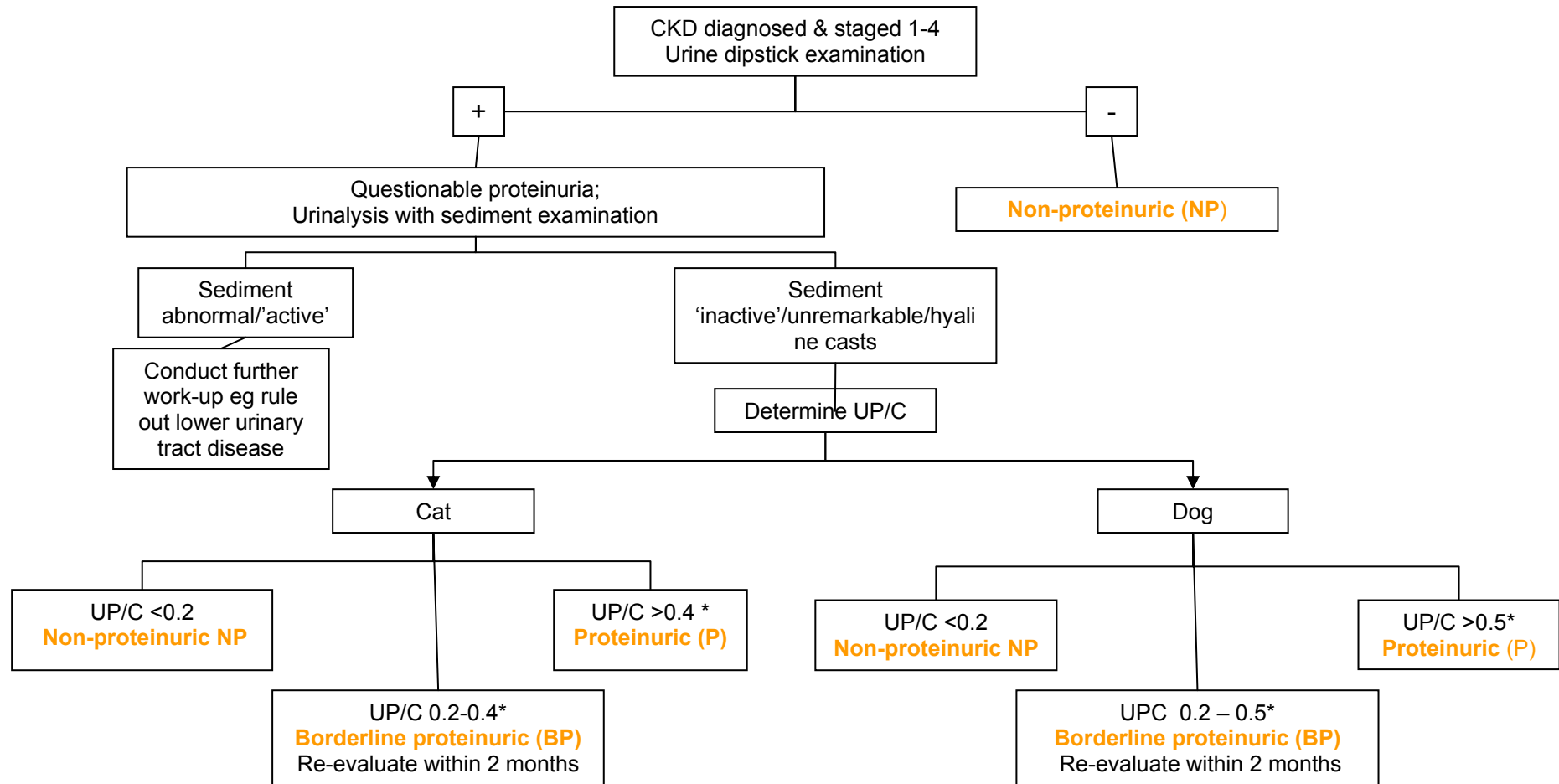
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## Algorithm for Staging of Chronic Kidney Disease in Cats



# Iris 2009 Staging of CKD

## Algorithm for Substaging by Proteinuria



*\*demonstrate persistence by re-evaluating:  
if Borderline Proteinuric in 2 weeks to 2 months  
if Proteinuric in 2-4 weeks  
if UPC>2 no need to demonstrate persistence prior to initiating therapy (severe proteinuria)*

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## Algorithm for Substaging by Blood Pressure (risk of end organ damage from hypertension)

