The Renal System at a Glance contains a state of the art coverage of renal science, renal medicine, and the key areas of internal, general or family medicine which involve the kidneys, hypertension, and fluid and electrolyte balance.

Although the kidney is often thought of as a specialized organ, of interest only to a small number of hospital doctors and nurses, this is far from the truth. In reality, understanding the kidney is important for much of the clinical work done by non-renal doctors and nurses in hospital or in family or general practice in primary care. The same is true for pharmacists and other health care workers. The kidney plays a key role in some of the most important conditions in clinical practice such as hypertension, heart failure, edema, and urinary tract infection. The most frequent blood tests performed in hospital are those which indicate renal disease or malfunction such as blood electrolytes and creatinine, urea or BUN (blood urea nitrogen). Even in high dependency or intensive care units, renal medicine is central to the care of most patients.

Despite the central role that the kidney and renal medicine and science play in modern health care there is often a poor understanding of the subject which sadly can contribute to poor patient care. This book aims to present the subject in a way which has not been done before using explanatory diagrams and clear explanations to demystify the subject and allow all who need to understand it to do so.

The book itself is divided into sections which cover the basic science and clinical aspects of each topic and the website also follows the pattern of the book. The key points revision guide and self-assessment exercises on the website are designed to help the reader study and understand the material presented. The parts and chapters are listed below.

Introduction
1 The kidney: structural overview
2 The kidney: functional overview
3 Development of the renal system
4 Clinical features of kidney disease
5 The kidney: laboratory investigation and diagnostic imaging

Filtration and blood flow
6 Renal vascular biology
7 Glomerular filtration
8 Renal vascular disease
9 Erythropoietin and anemia in renal disease

Sodium and water
10 Renal sodium handling
11 The kidney and water handling

12 Regulation of body sodium and body water
13 Disorders of sodium and water metabolism
14 Hyponatremia and hypernatremia
15 The edema states: sodium and water retention

Potassium
16 Renal potassium handling
17 Regulation of potassium metabolism
18 Hypokalemia and hyperkalemia

Acid-base
19 Renal acid-base and buffer concepts
20 Renal acid-base handling
21 Acid-base regulation and responses to acid-base disturbances
22 Clinical disorders of acid-base metabolism and metabolic acidosis
23 Metabolic alkalosis, respiratory acidosis, and respiratory alkalosis
24 Renal tubular acidosis

Divalent ions – calcium, phosphate and magnesium
25 Calcium, phosphate and magnesium metabolism
26 Regulation of divalent ions and disorders of phosphate and magnesium
27 Hypocalcemia and hypercalcemia

Drugs and genetic disorders
28 Drug and organic molecule handling by the kidney
29 Renal pharmacology: diuretics
30 Hereditary disorders of tubular transport
31 Polycystic kidney disease

Glomerular and tubulointerstitial disease
32 Glomerular disease: an overview
33 Glomerular pathologies and their associated diseases
34 Specific diseases affecting the glomeruli
35 Proteinuria and the nephrotic syndrome
36 Tubulointerstitial disease

Systemic conditions and the renal system
37 Hypertension: causes and clinical evaluation
38 Hypertension: complications and therapy
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40 Diabetes mellitus and the kidney
# Acute kidney injury and chronic kidney disease

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# Stones, infection and cancer

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*Christopher A. O’Callaghan, 2016*