Contents

Foreword *v*
Preface *vii*
Glossary *xiii*
Normal values *xv*

Chapter 1 First principles
1.1 Anatomy 1
1.2 Respiration 7
1.3 Ventilation and lung volumes 7
1.4 Gas exchange in the alveoli 10
1.5 Gas transport in the blood 18
1.6 pH homeostasis 21
1.7 Neurological control of breathing 24
1.8 Physiological changes during exercise 25

Chapter 2 Understanding the tests
TESTING BLOOD GASES
2.1 Arterial blood gases 29
2.2 Capillary and venous blood gases 34
2.3 Monitoring ABGs in ventilated and anaesthetised patients 36
LUNG FUNCTION TESTS
2.4 Spirometry 37
2.5 Measurements of lung volume 49
2.6 Measurements of gas diffusion 53
2.7 Additional lung function tests 55
EXERCISE AND FITNESS TESTS
2.8 Cardiopulmonary exercise testing 61
2.9 Field walk tests 65
2.10 Fitness to fly 67

Chapter 3 Recognising abnormal results
3.1 Arterial blood gas disturbances 73
3.2 Respiratory failure 82
3.3 Lung function testing abnormalities 87

Chapter 4 Lung diseases
4.1 Asthma 93
4.2 Chronic obstructive pulmonary disease 99
4.3 Other airway diseases 105
4.4 Parenchymal disease 108
4.5 Pulmonary vascular disease 111
4.6 Pleural disease 113
4.7 Obstructive sleep apnoea 114
4.8 Obesity 116
4.9 Chest wall disorders 117

Chapter 5 Circulatory dysfunction
5.1 Pathophysiology of circulatory dysfunction 119
5.2 Cardiac diseases 121

Chapter 6 Neuromuscular disorders
6.1 Respiratory tests in the management of neuromuscular disorders 127
6.2 Motor neurone disease 130
6.3 Myasthenia gravis 132
6.4 Guillain–Barré syndrome 133
6.5 Diaphragm palsy 133
6.6 Myopathies 135
6.7 Vocal cord paralysis 136
6.8 Trauma and chest wall deformities 137
6.9 Neuroactive drugs 138
6.10 Stroke 139

Chapter 7 Metabolic, endocrine and renal dysfunction
7.1 Diabetic ketoacidosis 141
7.2 Conn's syndrome 146
7.3 Lactic acidosis 146
7.4 Renal failure 147

Chapter 8 Other disorders
8.1 Hyperventilation 153
8.2 Vomiting and nasogastric suction 155
8.3 Diarrhoea 156
8.4 Starvation 157
8.5 Diuretics 159

8.6 Methaemoglobinaemia 159
8.7 Carbon monoxide poisoning 160
8.8 Cyanide poisoning 161

Index 163