

Index

a

- ABO blood groups 1, 215–216
 - antibody screening test 60–61
 - autoantibodies 62–63
 - centralised transfusion service 250
 - column-agglutination systems 62
 - crossmatching techniques 63
 - grouping patterns 59
 - immunoglobulin test 61
 - liquid-phase systems 61–62
 - recipient's D type 59
 - recipient's identity, verification of 58–59
 - solid-phase systems 62
 - weak and partial D recipients 59–60
- ABO-incompatible bone marrow problems 325, 326
- ABO system
 - biosynthesis and molecular genetics 22
 - clinical significance 20, 22
 - H antigen 22–23
- acquired haemostatic defects
 - anticoagulant, thrombolytic drugs 274–275
 - cardiopulmonary bypass 275
 - coagulation inhibitors 275–276
 - disseminated intravascular coagulation 271–273
 - liver disease 273–274
 - oral anticoagulants 274–275
 - thrombolytic agents 275
 - thrombotic thrombocytopenic purpura 275
 - trauma 273
 - uraemia 274
 - vitamin K antagonists 274
 - vitamin K deficiency 275
- active immunisation 490
- acute anaemia 288, 290, 334
- acute chest syndrome 334, 450
- acute haemorrhage and critical care
 - ANH 291–292
 - antifibrinolytics 292–293
 - autologous transfusion techniques 291–292
 - coagulopathy 293–294
 - desmopressin 293
 - erythropoietin 292
 - fibrinogen replacement 295–296
 - fresh frozen plasma transfusion 295
 - iron therapy 292
 - massive blood transfusion 298
 - mechanical cell salvage 292
 - PAD 291
 - PCCs 296–298
 - red cell transfusion 287–289
 - rFVIIa 293
 - treatment adjuncts 289–291
- acute HTR (AHTR) *see also* haemolytic transfusion reactions (HTRs)
 - aetiology and incidence 85–87
 - clinical presentations 87
 - complications 87
 - definition 81
 - intravascular haemolysis 82
 - management 89–90
 - prevention 90–91

- suspected 87–90
 - symptoms and signs 87
- acute normovolaemic haemodilution (ANH) 291–292
- acute respiratory distress syndrome (ARDS) 109–110
- acute transfusion reactions
 - algorithm 77–78
 - blood component types 71
 - categories 69
 - clinical presentation 71–75
 - considerations 69, 76
 - definition 69
 - fever 76
 - investigation and treatment of 76–77
 - management strategies 77, 78
 - medications 71
 - patient history 71
 - screening tests 77
 - signs/symptoms of 69–70
 - volume of blood components 76
- adaptive humoral immunity 125
- adaptive immune cells 11–13
- adaptive immunity 125
- adverse transfusion reactions
 - plasma and cryoprecipitate 169
 - platelet concentrates 168–169
 - red blood cells 169
- affinity maturation 14
- Age of Blood Evaluation (ABLE) study 122
- Age of Red Blood Cells in Premature Infants (ARIP) study 120
- allergic transfusion reactions 97
 - antipyretics and/or antihistamines, premedication with 104
 - clinical presentation 101–102
 - differential diagnosis 102
 - frequency 102
 - IgA-deficient blood components 105
 - leucocyte reduction 104
 - management 103–104
 - pathogenesis 102–103
 - prevention 104–105
 - washed components/plasma-reduced components 104–105
- allogeneic cells 468
- allogeneic donations 209–211
- allogeneic stem cell transplant 456–457
- allogeneic vs. autologous HSCT 466
- alloimmunisation
 - haemoglobinopathies 336
 - HLA 322–324
 - red cell alloimmunisation 17–18
 - red cell antigens 324–327
- α -thalassaemia syndromes 330–331
- altruism-based blood donation 203
- altruistic model 204
- American Association of Blood Banks (AABB) 177, 288, 437–438
- American Board of Internal Medicine (ABIM) 405
- American Society for Apheresis (ASFA) 449
- American Society for Histocompatibility and Immunogenetics (ASHI) 439
- America's Blood Centers (ABC) 190, 563
- 7-aminoactinomycin 458
- anaemia
 - and acute haemorrhage 287–288
 - and major surgery 393, 395
 - management strategies 387–389
 - of prematurity 372
- anaemia of chronic disease (ACD) 396
- anaphylactic reactions 101–102
- anaphylactoid reactions 101–102
- Anaplasma phagocytophilum* 163
- ankylosing spondylitis and HLA 41
- anti-A and anti-B high titres 216
- anti-A antibodies 82
- anti-A,B antibodies 82
- anti-B antibodies 82
- antibodies
 - and complement-mediated blood cell destruction 16–17
 - HLA 18
 - complement-dependent cytotoxicity test 36–37
 - DNA sequencing 35, 36
 - ELISA technique 37
 - flow cytometric techniques 37
 - formation of 35–36
 - Luminex technique 37
- antibody-coated cells 15
- antibody effector functions 15–16
- antibody screening test 60–61

- antibody variability 14–15
 - anti-D antibodies 15
 - antifibrinolytics 292–293
 - antigen–antibody interaction 218
 - antigen-presenting cells (APC) 11
 - function of B-cells 13
 - MHC class II molecules of 12
 - antiglobulin test 61
 - anti-Jk^a antibodies 82–83
 - anti-Lu^a antibodies 83
 - antithetical red cell antigens 27
 - APC *see* antigen-presenting cells (APC)
 - apheresis components 222–223
 - arboviruses 161
 - Augustine glycoprotein 26
 - autoantibody formation/hyper haemolytic crises 336
 - autoimmune haemolytic anaemia (AIHA)
 - cold antibody 315
 - drug-induced 315–316
 - paroxysmal cold haemoglobinuria 315
 - red cell transfusions 312
 - warm antibody 314–315
 - autoimmune neutropenia 55
 - autologous cells 467
 - autologous stem cell transplant 455
 - autologous transfusion techniques 291–292
- b**
- Babesia* infection 155, 163–164
 - Babesiosis 163
 - back/plasma typing test 59
 - BacT/ALERT® 3D system 171–172
 - bacterial contamination
 - blood collection and production process 170
 - blood donors 170
 - contaminant species 169
 - incidence 168
 - platelet concentrates 168–169, 172
 - prevention strategies
 - BacT/ALERT® 3D system 171–172
 - bacterial detection methods 171
 - BacTx colorimetric assay 173
 - donor screening 170
 - first aliquot diversion 171
 - Pall Bacterial Detection System 172
 - Pan Genera Detection immunoassay 173
 - pathogen reduction technologies 173
 - single donor apheresis vs. pooled platelet concentrates 171
 - skin disinfection 170–171
 - S. aureus* 168
 - septic transfusion reactions 168, 170
 - sources 170
 - BacTx colorimetric assay 173
 - B-cell activation 13
 - B-cell receptor (BCR) 13, 14
 - BCL11A* 9
 - β-thalassaemia syndromes
 - intermedia 331–332
 - major 332–333
 - trait 331
 - biological response modifiers (BRMs) 99, 112
 - biostatistics
 - confidence intervals 542
 - data analysis 536
 - considerations 536, 538–539
 - nonparametric methods 539–541
 - parametric methods 539, 540
 - regression analysis 539, 541
 - diagnostic tests
 - accuracy characteristics, 2 × 2 table 533, 534
 - disseminated intravascular coagulation score 533, 535
 - post-test disease probability 533, 536
 - pretest disease probability 533
 - statistical terms 533, 535
 - equivalence trials 543
 - forest plots 544–546
 - incidence and prevalence 533
 - meta-analysis 544
 - noninferiority trials 543
 - P values 542
 - statistical significance, determination of 542
 - superiority trials 543
 - blood-borne infections 255–256
 - blood collection agencies 560
 - blood components
 - administration of 243
 - adverse transfusion reactions 168–169
 - apheresis collection of 222–223
 - clinical use of 5–7
 - collection, delivery of 242

- component modifications 230–231
 - patient's identity band 243–244
 - prescription of blood 240
 - processing 222
 - production and storage
 - cryoprecipitate 228–229
 - granulocyte 229
 - plasma 227–228
 - platelet 226–227
 - red blood cell 223–225
 - specifications for 223
 - blood donations 2, 3
 - ABO blood group 215–216
 - adequate donor base 562
 - anti-A high titre 216
 - anti-B high titre 216
 - and iron deficiency 562
 - metabolomics 561–562
 - microbiological testing 217–219
 - pathogen reduction technology 561
 - quality framework, operational issues 220
 - red cell genomic testing 561
 - red cell serological testing 215–217
 - RhD blood group 215–216
 - screening tests on 219
 - blood donors
 - adverse events, reactions 204–205
 - collection/donation process 212–213
 - EHN/ISBT 206
 - eligibility requirements 562–563
 - in Europe 204
 - infections risks from 206–208
 - iron deficiency in 208, 212
 - obligations to 213
 - paid, directed, payback/altruistic 203–204
 - recruitment and retention of 2
 - risks to 204–206
 - supply and usage 255–256
 - blood groups
 - antigens, biological significance of 26–27
 - definition 20
 - human *see* human blood group
 - blood product safety initiatives 560
 - Blood Safety and Quality Regulations (BSQR) 2005 223
 - blood supply
 - fiscal sustainability 563–564
 - safe and adequate of 2
 - blood transfusion
 - and HLA 39
 - infectious agents, transmission of 153
 - regulatory aspects
 - agencies involved 186–189
 - application and enforcement 185–186
 - donor involvement 191
 - feedback 186
 - guiding principles and law 184–185
 - haemovigilance 186
 - inspection/accreditation/licencing 185–186
 - ISO standards 185
 - market surveillance 186
 - national statutory bodies 186, 190
 - other agencies 190
 - patient involvement 190–191
 - precautionary principle 185
 - professional organisations 190
 - public bodies 191
 - regulatory compliance 191
 - supranational agencies 190
 - threat surveillance 186
 - blood-transmitted infections 259–260
 - blood utilisation metrics 419
 - Blundell, James 1, 2, 4, 9
 - B-lymphocytes 13
 - bone marrow 457
 - failure 317–318
 - transplantation, 8 *see also* haematopoietic stem cell transplantation (HSCT)
 - Bonferroni correction 542
 - B19 parvovirus 155, 162
 - B-type natriuretic peptide (BNP) 111
- C**
- carbohydrate antigens, on glycolipids and glycoproteins 43
 - cardiac surgery
 - leucocyte-reduced allogeneic red cell transfusions 128
 - POC technologies 304
 - RECESS study 565
 - cardiopulmonary bypass (CPB) surgery 275, 318
 - Cas9* 8–9

- cascade model, coagulation 264–265
- case–control studies 509–511
- Case Mix Index (CMI) 424
- CD34+ enrichment 459
- CD34+ enumeration 458
- cell-based model, coagulation 264–265
- CELLEX™ system 451
- cell separators 442–443
- cellular immunotherapy
 - gene-modified T-cells 492–494
 - HPC transplantation 490–491
 - nonspecific T-cell immunotherapy 491
 - passive 496–497
 - translational research 497
 - tumour-restricted natural killer cell immunotherapy 494–496
 - tumour-specific/tumour-restricted T-cell immunotherapy 491–492
- cellular therapy 8, 9
 - American Association of Blood Banks 437–438
 - CD34 cell expansion 568–569
 - challenges 439
 - chimeric antigen receptors 567–568
 - College of American Pathologists 438
 - European Union directives and legislation 430–431, 433
 - FACT and JACIE 436–437
 - haematopoietic stem cell transplant activity 430–431
 - histocompatibility accreditation 439
 - Human Tissue Act 2004 433
 - immunotherapy 568
 - manufacturing issues 569–570
 - NetCord-FACT 437
 - nongovernmental (voluntary) accreditation 435–436
 - Provenge® 568
 - stem cell tourism 569
 - structure of SCT programmes 430–432
 - T-cell receptors 567–568
 - United States Food and Drug Administration 433–435
 - World Marrow Donor Association 438–439
- Central Blood Bank (CBB) 250
- centralised transfusion service (CTS) 250
- Chagas' disease 164
- chikungunya virus 161–162
- chimeric antigen receptor modified T-cells 492
- chimeric antigen receptors (CARs) 567–568
- chimerism 144
- chronic anaemias 313
- chronic GvHD 471
- chronic transfusion support 7
- class I HLA genes 29, 30
- class II HLA genes 31–32
- clinical and laboratory practice issues 248
- clinical audit 246–247
- clinical decision support (CDS) 405
 - effectiveness 409–410
 - historical approaches 409
- Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage (CRASH-2) study 511, 513
- clustered regularly interspaced short palindromic repeats (CRISPR) technology 8–9
- coagulation
 - cascade model of 264–265
 - cell-based model of 264–265
- coagulopathy
 - diagnosis 293–294
 - fibrinogen replacement 295–296
 - fresh frozen plasma transfusion 295
 - injury 281
 - PCCs 296–298
 - platelet transfusion 294–295
- cohort studies 510–511
- cold antibody AIHA 315
- Colton glycoprotein 26
- column-agglutination blood grouping technology 62
- common variable immunodeficiency (CVID) 358–360
 - comparative effectiveness research (CER) 526
- complement activation, pathways for 15, 16
- complement-dependent cytotoxicity (CDC) test 36–37
- complement-mediated blood cell destruction 16–17
- computerised physician order entry (CPOE) systems 295–385
- confidence intervals 524, 542
- confounding by indication 424
- Coombs' test *see* antiglobulin test

cost analysis 551
 cost-benefit analysis 553
 cost-effectiveness analysis 553
 cost minimisation analysis 553
 cost-utility analysis 553
Coxiella burnetii bacterium 163
 CRISPR-associated genes (cas) 8
 CRISPR technology *see* clustered regularly
 interspaced short palindromic repeats
 (CRISPR) technology
 crossmatching techniques 63–64
 crossmatch-to-transfusion ratio 424
 cryoprecipitate 66, 295
 and plasma 169
 production and storage 228–229
 cryopreservation, of HPC
 freezing cellular products 462
 product preservation 460–462
 red cell removal 462
 cytomegalovirus (CMV) 160–161, 319–321
 cytotoxic T-cell therapy 473

d

DAT *see* direct antiglobulin test (DAT)
 data analysis, biostatistics 536
 considerations 536, 538–539
 nonparametric methods 539–541
 parametric methods 539, 540
 regression analysis 539, 541
 decellularised tissues 504–505
 deferasirox 338
 deferoxamine 337–338
 delayed haemolysis 93
 delayed HTR (DHTR) *see also* haemolytic
 transfusion reactions (HTRs)
 aetiology and incidence 91
 definition 81
 extravascular haemolysis 82
 haemolysis 93
 management 92
 prevention 92–93
 sickle cell disease 93–94
 signs and symptoms 92
 suspected 92
 delayed-onset HIT 345–346
 delayed serological transfusion reaction
 (DSTR) 91

descriptive statistics 536
 desmopressin 293
 diagnostic tests, biostatistics
 accuracy characteristics, 2 × 2 table 533, 534
 disseminated intravascular coagulation score
 533, 535
 post-test disease probability 533, 536
 pretest disease probability 533
 statistical terms 533, 535
 Diego antigen 26
 dimethyl sulfoxide (DMSO) 462, 463
 direct antiglobulin test (DAT) 216–217
 direct medical and nonmedical expenses
 551, 552
 disability-adjusted life-years (DALYs) 553
 disease/case frequency measurements
 533, 534
 disseminated intravascular coagulation (DIC)
 87, 318
 causes of 272
 ISTH 272
 laboratory abnormalities 271
 score 533, 535
 DNA sequencing 34–36
 DOMAINE donor management in Europe
 Project 204
 Dombrock glycoprotein 27
 donor lymphocyte infusions 457
Donor Management Manual 204
 donor screening 170
 drug-dependent antibodies (DDAbs) 46, 48
 drug-dependent antigens 43
 drug-induced AIHA 315–316
 drug-induced immune neutropenia (DIIN) 55
 Duffy system 25–26
 dysfibrinogenaemia 273

e

EBM *see* evidence-based medicine (EBM)
 EHN *see* European Haemovigilance
 Network (EHN)
 EHN/ISBT Working Group 206
 electronic health records (EHR) 405
 electronic medical record (EMR) 416
 electronic PBM (ePBM) performance
 measures 426
 electronic red cell issue 63

- emerging infections *see also* transfusion-transmitted infections (TTIs)
- awareness 177
 - blood safety 177
 - definition 176
 - disease severity 180
 - donor blood, infectivity test 181
 - factors 176
 - interventions 181–182
 - outbreak 180
 - pathogen reduction method 181–182
 - precautionary principle 182
 - risk assessment 177, 179, 180
 - transfusion transmission, recognition of 180–181
 - transmissible by blood transfusion 176–178
 - XMRV recognition and management 180
- endogenous antigen-constituting self-antigens 12
- enzyme immunoassay (EIA) screening 255
- enzyme-linked immunosorbent assay (ELISA) technique 37
- enzyme method 61
- Epstein–Barr virus (EBV) 161, 473
- equivalence trials 543
- European Commission 186, 190
- European Haemovigilance Network (EHN) 204, 206
- The European Union Tissue and Cells Directives (EUTCD) 500
- evidence-based medicine (EBM) 530
 - comparative effectiveness research 526
 - critical appraisal process 521–522
 - description 520
 - limitations 529
 - narrative reviews 522
 - systematic reviews 522–526
- evidence base, for transfusion medicine
 - activated recombinant factor VII 528, 529
 - platelet transfusions 527–528
 - Transfusion Evidence Library 527
 - transfusion practices 528
- external quality assessment (EQA) schemes 248
- extracorporeal photochemotherapy (ECP) 451
- extravascular haemolysis 82
- f**
- Fagan nomogram 536, 537
- fatal haemolytic transfusion reactions 87, 88
- FDA Good Tissue Practice (GTP) Regulations 433
- febrile non haemolytic transfusion reactions (FNHTRs) 39
 - antibody mechanism 99
 - biological response modifiers 99
 - blood component factors 99
 - clinical presentation 97
 - definition 97
 - differential diagnosis 97–98
 - frequency 98–99
 - human neutrophil antigens 54–55
 - management strategy 100
 - pathogenesis 99
 - patient susceptibility factors 99
 - platelets 101
 - premedication 101
 - prevention 101
 - red cells 101
- fibrinogen replacement 295–296
- flow cytometric techniques 37
- Food and Drug Administration (FDA)
 - fatal haemolytic transfusion reactions 87, 88
 - TRALI 108
- Foundation for Accreditation of Cell Therapy (FACT) 436–437
- fresh frozen plasma (FFP) 112, 227, 448
 - transfusion 295
- front/cell typing test 59
- frozen plasma 566
 - components 227–228
- functional iron deficiency (FID) 396
- FUT1* and *FUT2* 23
- g**
- galactose (Gal) 22
- gastrointestinal 287
- gene-modified T-cells 492–494
- genotyping 4
- Glanzmann's thrombasthenia 303
- global blood safety report 254
- global context, blood transfusion
 - blood products 256–257
 - blood-transmitted infections 259–260
 - Ebola pandemic in West Africa 261

- financial requirements 260
 - future of 261–262
 - improvements 258–261
 - safety and supply 254–255
 - sub-Saharan Africa 257–258
 - supply and usage 255–258
 - testing blood products 255
 - transfusion practice 260–261
 - good manufacturing practice (GMP) 185, 446, 451, 497, 569
 - The Grading of Recommendations Assessment, Development and Evaluation (GRADE) tool 526
 - graft-*versus*-host disease (GVHD), 199 *see also*
 - transfusion-associated graft-*versus*-host disease (TA-GVHD)
 - granulocyte antigens 43
 - granulocyte chemiluminescence tests 54
 - granulocyte colony-stimulating factor (G-CSF) 229, 318, 443
 - granulocyte immunofluorescence test by flow cytometry (GIFT-FC) 54
 - granulocyte production and storage 229
 - granulocyte transfusions 318–319
- h**
- haematological disease
 - complications 319–327
 - granulocyte transfusions 318–319
 - platelet transfusions 316–318
 - red cell transfusions 312–316
 - haematopoietic progenitor cell mobilisation 443–445
 - haematopoietic stem cell transplantation (HSCT) 317, 429
 - allogeneic cells 468
 - autologous cells 467
 - complications 470–472
 - cytotoxic T-cell therapy 473
 - donor care and selection 468
 - early post-engraftment 471–472
 - graft-*versus*-host disease 470–471
 - immediate post-HSCT 471
 - indications 467
 - infectious complications 471–472
 - late effects 472
 - outcome 472–473
 - post-bone marrow transplant chimerism 473
 - principles 466
 - reduced intensity conditioning transplants 470
 - regimen-related toxicity 470
 - registry data 472–473
 - regulatory aspects 473
 - rejection 470
 - relapse 471
 - sources of stem cells 467–469
 - stem cell collection 468–470
 - syngeneic cells 468
 - transplant activity 430–431
 - haemoglobin (Hb) Bart's hydrops fetalis 331
 - haemoglobin-based oxygen carrier (HBOC) 567
 - haemoglobinopathies 331–333
 - α -thalassaemia syndromes 330–331
 - β -thalassaemia syndromes 331–333
 - iron chelation 337–338
 - SCD 333–336
 - transfusions in 336–337
 - haemolysis
 - acute haemolysis, from ABO-incompatible platelet transfusions 94
 - haemopoietic stem cell transplantation 93
 - haemolytic transfusion reactions (HTRs)
 - antibody specificities 85
 - definition 81–82
 - in sickle cell disease 93–94
 - pathophysiology
 - anti-A antibodies 82
 - anti-A,B antibodies 82
 - anti-B antibodies 82
 - antigen-antibody interactions 82
 - anti-Jk^a antibodies 82–83
 - anti-Lu^a antibodies 83
 - complement activation 83–84
 - cytokines 84–85
 - Fc receptor interactions 84
 - haemophilia A 266–269
 - haemophilia B 269–270
 - haemopoietic progenitor cells (HPCs)
 - ABO incompatibility 459
 - allogeneic stem cell transplant 456–457
 - ambient temperature 460
 - 7-aminoactinomycin 458
 - autologous stem cell transplant 455
 - bone marrow 457

- haemopoietic progenitor cells (HPCs) (*cont'd*)
 - CD34+ enrichment 459
 - CD34+ enumeration 458
 - cryopreservation 460–462
 - donor lymphocyte infusions 457
 - human 455, 456
 - laboratory processing procedures 460, 461
 - peripheral blood 457–458
 - quality assurance 463
 - sterility testing 459
 - storage requirements 460
 - T-cell depletion 460
 - terminology 455
 - thawing 462–463
 - transplant procedures 455–457
 - trypan blue 458
 - umbilical cord blood 458
 - in vitro* HPC assays 458–459
- haemopoietic stem cell transplantation 361
 - haemolysis from 93
 - and HLA 38–39
- haemorrhage *see also* acute haemorrhage and critical care
 - major 399–400
 - protocols 298
 - urgent transfusion during 7
- haemorrhage-related mortality injury 280–281
- haemostasis 8
 - of abnormal 266–268
 - clinical manifestations, treatment of 268
 - normal 264–265
 - screening tests 266
- haemovigilance programmes 248
- haemovigilance, transfusion safety
 - adverse event detection, reporting 194, 196
 - breadth of 197
 - data management 198
 - future directions 200
 - goal of 193
 - incident reports 197
 - intangible benefits 200
 - learning from experience 199–200
 - limitations of 196–197
 - origin and structures 193–194
 - reporting requirements structure 198
 - terminology 194–195
 - timeline of 193–194
- haploidentical donors 468
- haploidentical SCT 457
- haplotypes 33
- HbH disease 330
- Health Canada 190
- health economics
 - economists view 549–550
 - healthcare costs, within US 549
 - in transfusion medicine, evaluation of
 - cost analysis 551
 - cost-benefit analysis 553
 - cost-effectiveness analysis 553
 - cost minimisation analysis 553
 - cost-utility analysis 553
 - design 550–553
 - direct medical and nonmedical expenses 551, 552
 - incremental cost-effectiveness ratio 555
 - intangible costs 551–552
 - Markov models 556
 - model analysis 553–556
 - monetary outcomes 553
 - net cost and net effectiveness calculation 554
 - one-way sensitivity analysis 556
 - probabilistic sensitivity analysis 556
 - two-way sensitivity analysis 556
- health research studies 520
- Hemocue® 398
- haemopoietic chimerism 144
- HemosIL AcuStar HIT-IgG_(PF4-H) 351
- HemosIL HIT-Ab_(PF4-H) 350–351
- heparin-induced thrombocytopenia (HIT) 48
 - clinicopathological syndrome
 - Iceberg model 344–345
 - pretest probability score 346–348
 - thrombocytopenia 345
 - thrombosis and other sequelae 346
 - timing 345–346
 - epidemiology 343–344
 - laboratory testing
 - PF4-dependent immunoassays 349–351
 - platelet activation assays 347, 349
 - washed platelet activation assays 347
 - pathogenesis 341–343
 - treatment
 - adjunctive therapies 353
 - heparin exposure 353

- management of isolated HIT 353
- prevention of warfarin-induced venous limb gangrene 351–353
- rapidly acting, non-heparin anticoagulants 351–352
- hepatitis A virus 155, 157
- hepatitis B virus 157–158
- hepatitis C virus 158
- hepatitis D virus 158
- hepatitis E virus 158–159
- hereditary haemochromatosis (HH) 29, 40
- high-dose intravenous immunoglobulin (IVIgG) 353
- high-resolution (HR) molecular typing 457
- high-throughput HPA SNP typing techniques 46
- histo-blood group system *see* ABO system
- histocompatibility accreditation 439
- HNA-1 52–53
- HNA-2 53
- HNA-3 53
- HNA-4 and HNA-5 54
- hospital blood transfusion
 - administration of 239–243
 - clinical audit 246–247
 - CTS 250–251
 - education, continuing professional development 249–250
 - governance of 235–236
 - guidelines, algorithms and protocols 245–246
 - HTCs 236
 - improve process to 236–238
 - influencing clinical practice 244–245
 - informed consent 238–239
 - litigation of 248–249
 - MSBOS 251–252
 - national schemes 248
 - patient misidentification errors in 243–244
 - SHOT 249
 - steps in 233–234
 - surveys 247–248
 - warning message 247
- hospital transfusion committees (HTCs) 236–238
- hospital transfusion process 233–234
- human blood group
 - ABO system 20, 22–23
 - Duffy system 25–26
 - Kell system 25
 - Kidd system 26
 - MNS system 26
 - Rh system 23–24
 - systems 20, 21
- human herpes virus 8 161
- human immunodeficiency virus 155, 159–160
- human leucocyte antigens (HLAs)
 - alloimmunisation 322–324
 - and blood transfusion 39
 - and haemopoietic stem cell transplantation 38–39
 - and solid organ transplantation 38
 - ankylosing spondylitis 41
 - antibodies 18
 - complement-dependent cytotoxicity test 36–37
 - ELISA technique 37
 - flow cytometric techniques 37
 - formation of 35–36
 - Luminex technique 37
 - class I genes 29, 30
 - class II genes 31–32
 - direct allorecognition pathways 38
 - DNA sequencing 35, 36
 - genetics 32–33
 - hereditary haemochromatosis 29, 40
 - HLA molecules, expression of 32
 - HLA molecules, function of 33
 - indirect allorecognition pathways 38
 - Klebsiella* infection 41
 - neonatal alloimmune thrombocytopenia 41
 - nomenclature 34
 - PCR sequence-specific oligonucleotide probe 35
 - PCR sequence-specific priming 35
 - polymorphisms 33
 - recognised serologically defined antigens/alleles 34
 - subregions 29, 30
- human neutrophil antigens (HNAs) 53
 - autoimmune neutropenia 55
 - detection 54
 - drug-induced immune neutropenia 55
 - febrile nonhaemolytic transfusion reactions 54–55
 - HNA-1 52–53
 - HNA-2 53

- human neutrophil antigens (HNAs) (*cont'd*)
 - HNA-3 53
 - HNA-4 and HNA-5 54
 - neonatal alloimmune neutropenia 54
 - persistent post-bone marrow transplant neutropenia 55
 - transfusion-related acute lung injury 55
 - human platelet antigens (HPAs) 45
 - alloantibodies
 - clinical significance 48, 50–52
 - detection 48
 - autoantigens 46, 48
 - drug-dependent antigens 46, 48
 - GPIIb subunit 43
 - GPIIIa subunit 43
 - inheritance and nomenclature 44, 46
 - platelet isoantigens 46, 48
 - platelet membrane and glycoprotein representation 46, 47
 - typing for 46
 - von Willebrand factor 43, 44
 - Human Tissue Act 500
 - Human Tissue Act 2004 433
 - human T-lymphotropic viruses 1 and 2 160
 - humoral immune response 13–15
 - Hurler's syndrome 481
 - hyperhaemolytic transfusion reactions (HHTRs),
 - in sickle cell disease 93–94
 - hypotensive transfusion reaction 195
- i**
- Iceberg model 344–345
 - IgA-deficient blood components 105
 - IgG-mediated process 15
 - immune blood disorders 313–314
 - immune-mediated graft-*versus*-tumour (GvT)
 - effect 466
 - immune response
 - antibody effector functions 15, 16
 - cellular basis of 11–13
 - humoral immune response 13–15
 - immune thrombocytopenias 318
 - immunoassay 218
 - immunoglobulin G (IgG) test 61
 - immunoglobulin M (IgM) antibodies 59
 - immunoglobulins (Igs) 13, 14
 - immunoglobulin therapy
 - dose-related adverse effects 366–367
 - immediate infusion-related adverse effects 366
 - intravenous immunoglobulin 364–365
 - product selection and safe use 367
 - risks of viral transmission 367
 - secondary antibody deficiency 365–366
 - subcutaneous immunoglobulin 363, 367–369
 - use of IVIg 364
 - immunohaematology 4–5
 - IMPACT Online 420
 - implicated donor 114
 - implicit association test (IAT) 61
 - incompatible transfusion, reasons for 85
 - incorrect blood component transfusion (IBCT)
 - 86, 87
 - incremental cost-effectiveness ratio (ICER) 555
 - inflammatory aetiology 302
 - informing fresh-*versus*-old red cell management (INFORM) pilot trial 122, 526
 - inherited coagulation disorders
 - abnormal haemostasis 266
 - haemophilia A 266–269
 - haemophilia B 269–270
 - normal haemostasis 264–265
 - other disorders 271
 - TEG 266–267
 - VWD 270–271
 - innate immune cells 11
 - innate immunity 125
 - intangible costs 551–552
 - INTERCEPT™ Blood System 173
 - International Classification of Disease (ICD-9)
 - codes 424
 - International Haemovigilance Network (IHN)
 - 193, 197
 - International Society for Thrombosis and Haemostasis (ISTH) 272
 - International Society of Blood Transfusion (ISBT)
 - 194–195, 206, 216
 - International Standards Organization (ISO)
 - standards 185
 - intravascular haemolysis 82
 - investigational medicinal products (IMPs) 497
 - in vitro* HPC assays 458–459
 - iron therapy 292
 - irradiated red cell units 378

- irradiation, TA-GVHD
 adverse effects 138, 139
 guidelines and requirements 143–144
 universal 144
- ISBT *see* International Society of Blood
 Transfusion (ISBT)
- j**
- Joint Accreditation Committee of the ISCT and
 EBMT (JACIE) 436–437
- k**
- Kell system 25
 Kidd glycoprotein 26
 Kidd system 26
 killer immunoglobulin-like receptors (KIRs)
 33, 494, 495
- l**
- The Lancet* (Blundell) 1
 Landsteiner, Karl 1, 2
 leucapheresis 455, 457
 leucocytapheresis 446–447
 leucocyte inactivation methods 137, 138
 leucocyte/platelet-derived biological response
 modifiers 99
 leucocyte-reduced allogeneic red cell
 transfusions 128
 leucocyte reduction 226
 light transmission aggregometry (LTA) 303
 limbal stem cells 505
 liquid nitrogen, cryopreservation in 8
 liquid-phase systems 61–62
 liver disease 273–274
 low ionic strength solution (LISS) 61
 low-resolution (LR) typing 456
 Luminex technique 37
 lung histology 113
- m**
- MAIPA assay *see* monoclonal antibody
 immobilisation of platelet antigens
 (MAIPA) assay
 major ABO-incompatible transplants 93
 major haemorrhage 399–400
 major histocompatibility complex (MHC) class
 molecules 11–12
- malaria 163–164
 malignant disease 480–481
 Markov models 556
 massive blood loss
 burden of 279–280
 coagulopathy after injury 281
 conventional blood products 282–283
 damage control resuscitation 283–284
 definition of 279
 haemorrhage-related mortality injury
 280–281
 other situations 284
 in small children 284
 massive blood transfusion 298, 318
 maximum allowable storage duration, for red
 cells 118
 maximum surgical blood ordering schedule
 (MSBOS) 251–252, 386, 424
 mechanical cell salvage 292
 Medicines and Healthcare products Regulatory
 Agency (MHRA) in the UK 186
 membrane attack complex (MAC) 15
 membrane-bound molecules 17
 mesenchymal stem cells (MSCs) 567
 metabolic disorders 481
 metabolomics 561–562
 8-methoxypsoralen (8-MOP) 451
 microbiological test, blood donations
 infectious disease testing 218–219
 repeat reactive sample 217–218
 samples 217
 screening tests on 219
 testing process, donor management 217
 microchimerism (MC) 144
 mild non-systemic allergic transfusion
 reactions 103
 minimal clinically important difference
 (MCID) 516
 minimally important difference (MID) 516
 minor ABO-incompatible transplants 93
 Mirasol® system 173
 MNC-apheresis 457
 MNS system 26
 moderate non-systemic allergic transfusion
 reactions 103
 Mollison, Patrick 1, 2
 monoclonal antibodies 218

monoclonal antibody immobilisation of
granulocyte antigens (MAIGA) assay 54
monoclonal antibody immobilisation of platelet
antigens (MAIPA) assay 48, 49, 149
mononuclear cell-impregnated biodegradable
scaffolds 567
mononuclear phagocytic system 17
Mozobil 445
multiorgan failure syndrome (MOFS) 335
myasthenia gravis 447, 449
myeloablative treatment 313
myelosuppressive treatment 313

n

N-acetylgalactosamine (GalNAc) 22
narrative *vs.* systematic reviews 522
NAT *see* nucleic acid testing (NAT)
National Health Service Blood and Transplant
(NHSBT) 215, 216, 395, 550, 560–562
national transfusion service in Nigeria 259
natural killer (NK) cells 33
negative selection process 12
neonatal alloimmune thrombocytopenia (NAIT)
antenatal management 51–52
clinical features 50
counselling 52
definition and pathophysiology 50
differential diagnosis 50
history 48
and HLA 41
incidence 50
laboratory investigations 50–51
neonatal management 51
neonatal transfusion medicine 7
NetCord-FACT 437
next-generation advances, in blood donations
561–562
non-ABO AHTRs, prevention of 91
nongovernmental (voluntary) accreditation
435–436
noninferiority trials 543
noninvasive HPA genotyping assays 46
nonspecific T-cell immunotherapy 491
non-systemic allergic transfusion reactions
101, 103
nucleic acid amplification method 502
nucleic acid testing (NAT) 158, 159, 161, 163,
217–219, 255

o

obstetric transfusion medicine 7
Omenn syndrome 484
one-way sensitivity analysis 556
oral anticoagulants 274–275

p

PAD *see* preoperative autologous donation (PAD)
paediatric transfusion medicine 7
Pall Bacterial Detection System 172
Pan American Health Organization (PAHO) 190
Pan Genera Detection immunoassay 173
paraproteinaemia 449
parasitic diseases 163–164
paroxysmal cold haemoglobinuria 315
paroxysmal nocturnal haemoglobinuria
(PNH) 316
partial thromboplastin time 281, 283
passenger lymphocyte syndrome 93
passive cellular immunotherapy, of infectious
disease 496–497
passive immunisation 490
pathogen reduction technology 173, 561
patient assessment and treatment planning 443
patient blood management (PBM) 236
alternative blood transfusion methods and
systems 387
anaemia management strategies 387–389
blood management education, awareness and
auditing for clinicians 388, 390
blood utilisation metrics 419
clinical outcome data 421–424
computerised physician order entry systems
(CPOE) 295–385
cost of blood 388, 391
crossmatch-to-transfusion ratio 424
data extraction, analysis and presentation
421–423
data variables 416–417
electronic medical record 416
iatrogenic blood loss limitation 388
initiatives 560
preoperative anaemia screening and
management 425–426
risk adjustment 424–425
sources of data 419–421
transfusion triggers and targets 416, 418–419
waste reduction 385–387

- patient-centred care 238
 patient's identity band 243–244
 Paul Ehrlich Institute (PEI) in Germany 186
 PBM *see* patient blood management (PBM)
 PCCs *see* prothrombin complex
 concentrates (PCCs)
 perioperative patient blood management *see also*
 patient blood management (PBM)
 anaemia and major surgery 393, 395
 intraoperative management 398–399
 major haemorrhage 399–400
 pathways to surgery 401
 post-operative patient blood management
 399, 401
 preoperative optimisation 395–398
 three-pillar, nine-field matrix 393–394
 peripheral blood 457–458
 HPC collection 446–447
 progenitor cell transplants 325, 326
 peripheral blood cells, antigen expression on
 43, 44
 peripheral blood progenitor cells (PBPC) 429
 peripheral blood stem cell (PBSC) 468, 470
 persistent post-bone marrow transplant
 neutropenia 55
 PF4-dependent immunoassays
 enzyme-linked immunosorbent assays 349
 fluid-phase immunoassays 349
 instrumentation-based immunoassays
 350–351
 particle-based solid-phase immunoassays
 349–350
 phagocytes 11, 15, 32, 84
 photopheresis *see* extracorporeal
 photochemotherapy (ECP)
 physiological anaemia of infancy 372
 PIDs *see* primary immunodeficiency
 disorders (PIDs)
 PLADO trial 6
 plasma and cryoprecipitates
 adverse transfusion reactions 169
 Burkholderia cepacia 169
 Pseudomonas aeruginosa 169
 plasma coagulation factors 282
 plasma component selection 65–66
 plasma exchange 447–450
 plasma production and storage 227–228
Plasmodium falciparum 163, 164
 platelet concentrates 172
 adverse transfusion reactions 168–169
 propionibacteria 169
 Staphylococcus epidermidis 169
 Platelet Dose (PLADO) trial 513
 platelet immunofluorescence test (PIFT) 48
 platelet-rich plasma 226
 platelets
 additive solutions 227
 component selection 65–66
 production and storage 226–227
 storage lesion 227
 platelet therapy 566
 platelet transfusions 294
 bone marrow failure 317–318
 cardiopulmonary bypass surgery 318
 causes of 323
 DIC 318
 HLA alloimmunisation 322–324
 immune thrombocytopenias 318
 massive blood transfusion 318
 physiology and pathophysiology 378–379
 platelet products to transfuse 380
 practices 379–380
 Plerixafor 445
 point-of-care (POC) testing
 conventional coagulation testing 302–303
 options of 303–307
 platelet function 303–304
 rotational thromboelastometry 306–307
 ROTEM 306–307
 TEG 304–306
 in transfusion algorithms 307–309
 viscoelastic testing 304
 polymerase chain reaction sequence-specific
 oligonucleotide probe (PCR-SSOP) 35
 polymerase chain reaction sequence-specific
 priming (PCR-SSP) 35, 46
 post-bone marrow transplant chimerism 473
 post-operative patient blood management
 399, 401
 posttransfusion purpura (PTP)
 blood components causing 148
 clinical features 148
 definition 147
 differential diagnosis 148
 high-dose intravenous immunoglobulin 150
 HPA-1a antibodies 148

- posttransfusion purpura (PTP) (*cont'd*)
 - human leucocyte antigen antibodies 148
 - incidence 147
 - laboratory investigations 148–149
 - MAIPA assay 149
 - pathophysiology 149
 - platelet transfusions 150–151
 - recurrence 151
 - time course 149
 - treatment 149
 - posttransplant transfusions 325
 - Pragmatic Randomized Optimal Plasma and Platelet Ratios (PROPPR) trial 283
 - predominant B-cell deficiency disorders
 - common variable immunodeficiency 358–360
 - severe combined immunodeficiency 361–362
 - X-linked agammaglobulinaemia 360–361
 - preoperative anaemia screening and management 425–426
 - preoperative autologous donation (PAD) 291, 386
 - pretransfusion compatibility testing 241
 - goal of 58
 - plasma component selection 65–66
 - platelets component selection 65–66
 - red blood cell selection 64–66
 - priapism 335
 - primary immunodeficiency disorders (PIDs) 357–358
 - investigation of suspected immunodeficiency 362–363
 - management 363
 - predominant B-cell deficiency disorders
 - common variable immunodeficiency 358–360
 - severe combined immunodeficiency 361–362
 - X-linked agammaglobulinaemia 360–361
 - primary immunodeficiency syndromes 481, 484
 - probabilistic sensitivity analysis 556
 - process issues 248
 - progressive organ failure 335
 - ProMED Mail 177
 - prostatic acid phosphatase (PAP) 568
 - protein antigens 43
 - prothrombinase 264
 - prothrombin complex concentrates (PCCs) 296–298
 - protozoan parasites 155
 - PTP *see* posttransfusion purpura (PTP)
 - pulmonary infiltrates 108
 - P values 542, 543
- q**
- quality-adjusted life-years (QALYs) 553
- r**
- randomised controlled trials (RCTs) 288, 509
 - ABLE study 122
 - ARIPI study 120, 121
 - autologous transfusions 127
 - cluster design 514
 - Cochrane Collaboration's database 527
 - crossover design 514
 - design challenges 521
 - design considerations 511, 512
 - efficacy and effectiveness trial 511–513
 - external validity 511
 - factorial design 514
 - history 508
 - INFORM trial 122
 - leucocyte-reduced red cell transfusions 127
 - Multiple Organ Dysfunction Score 122
 - outcomes 515–517
 - parallel group design 513–514
 - planning suggestions 517
 - RECESS 122
 - of red cell storage duration 120–121
 - restrictive red cell transfusion thresholds 127, 128
 - statistical efficiency 511
 - study population, choice of 514–515
 - TRANSFUSE trial 122
 - rapidly acting, non-heparin anticoagulants 351–352
 - rapid-onset HIT 345
 - RBC transfusion 5, 6
 - RCTs *see* randomised controlled trials (RCTs)
 - recombinant activated Factor VII (rFVIIa) 293
 - recombinant erythropoietin (RhEpo) 313
 - recombinant human erythropoietin 292, 397
 - red blood cell (RBC)
 - serological testing
 - ABO, RhD blood group 215–216
 - supplementary test 216–217
 - storage duration and immunomodulation 130

- red blood cells (RBCs)
- adverse transfusion reactions 169
 - alloimmunisation 17–18
 - antibodies 15–16
 - antigens 5, 324–327
 - blood components 282
 - components 223–224
 - exchange 450–451
 - genomics 4
 - genomic testing 561
 - massive blood loss 279
 - production and storage 223–225
 - storage
 - maximum allowable storage duration 118
 - randomised controlled trials 120–122
 - in vitro* changes 118–119
 - Yersinia enterocolitica* 169
- red blood cells (RBCs) selection *see also* ABO blood groups
- ABO-compatible red cells 64
 - recommendations 65
 - uncrossmatched red cell usage 64–65
 - unexpected antibodies 64, 68
- red blood cell (RBC) transfusions 16, 112
- AIHA 312
 - anaemia and acute haemorrhage 287–288
 - chronic anaemias 313
 - immune blood disorders 313–314
 - indications for 288–289
 - irradiated red cell units 378
 - myelosuppressive/myeloablative treatment 313
 - physiology and pathophysiology 372–373
 - PNH 316
 - practices 373–376
 - prevention of transfusion-transmitted cytomegalovirus 377–378
 - red cell products to transfuse 376–377
 - RhEpo 313
- Red Cell Storage Duration Study (RECESS) 122, 565
- reduced intensity conditioning (RIC) regimens 486
- reduced intensity conditioning (RIC) transplants 456, 470
- regenerative medicine and tissue processing
- decellularised tissues 504–505
 - limbal stem cells 505
 - tracheal transplants 505
- restrictive transfusion practice
- accreditation agencies 405
 - clinical decision support 405
 - effectiveness 409–410
 - historical approaches 409
 - clinical practice guidelines 408–409
 - educational interventions 409
 - future directions 413
 - key clinical trials 406–407
 - Stanford experience 410–413
- RhD blood group 215–216
- Rhesus D-incompatible transplants 327
- Rh system
- anti-D 24
 - C/c and E/e antigens 24
 - D antigen 24
 - fetal Rh phenotype prediction 24
 - genes and proteins 23
- risk-based decision making (RBDM) 563
- rotational thromboelastometry (ROTEM) 306–307
- ROTEM® 398
- S**
- SaBTO (Advisory Committee on the Safety of Blood, Tissues and Organs) 320
- safe transfusion practice 243, 245
- secondary stroke prevention 335
- septic transfusion reactions 170
- Serious Hazards of Transfusion (SHOT) confidential reporting scheme 86
- Serious Hazards of Transfusion (SHOT) haemovigilance scheme 81
- severe combined immune deficiency (SCID) syndrome 361–362, 484
- severe non-systemic allergic transfusion reactions 103
- short tandem repeat DNA sequences *see* clustered regularly interspaced short palindromic repeats (CRISPR) technology
- sickle cell anaemia 7
- sickle cell disease (SCD)
- acute complications of 334–335
 - indications for regular transfusion in 335
 - preoperative blood transfusion 336
 - transfusions not indicated 335
 - types of 333

- sickle cell haemolytic transfusion reaction (SCHTR) syndrome 93–94
 - silent cerebral infarct (SIT) 335
 - single donor apheresis vs. pooled platelet concentrates 171
 - skin disinfection 170–171
 - solid organ transplantation
 - and HLA 38
 - recipients 143
 - solid-phase blood grouping technology 62
 - solvent–detergent (SD) method 113
 - somatic hypermutations (SHM) 14
 - Stanford Health Care (SHC) 410
 - Staphylococcus aureus* contamination 168
 - stem cell collection and therapeutic apheresis
 - cell separators 442–443
 - complications 451–452
 - extracorporeal photochemotherapy 451
 - haemopoietic progenitor cell mobilisation 443–445
 - patient assessment and treatment planning 443
 - peripheral blood HPC collection 446–447
 - plasma exchange 447–450
 - red cell exchange 450–451
 - sterility testing, HPC 459
 - storage requirements, HPC 460
 - Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) framework 522
 - stroke 334, 335
 - Stroke Prevention in Sickle Cell Anaemia (STOP) trial 511
 - stromal-derived factor 1 (SDF-1) 444, 445, 457
 - subcutaneous immunoglobulin 363, 367–369
 - superiority trials 543
 - suspected AHTR
 - laboratory investigation 89, 90
 - medical staff, actions for 89
 - nursing staff, actions for 87, 89
 - suspected DHTR 92
 - suspected TTI, investigation of 154
 - syngeneic cells 468
 - systematic reviews 530
 - confidence intervals 524
 - critical appraisal process 524–526
 - evaluation 526
 - hypothetical forest plot 524, 525
 - meta-analysis 524
 - vs. narrative reviews 522
 - rules 522–524
 - validity assessment 524–525
 - systemic allergic transfusion reactions 101
- t**
- TA-GVHD *see* transfusion-associated graft-*versus*-host disease (TA-GVHD)
 - Taqman assays 46
 - T-cell apheresis 457
 - T-cell-dependent antibody formation 13
 - T-cell depletion 460
 - T-cell receptors (TCRs) 11–12, 567–568
 - T-cell receptors (TCRs) gene transfer 492–494
 - TCR *see* T-cell receptors (TCRs)
 - TEG *see* thromboelastography (TEG)
 - thawing, of cryopreserved HPCs 462–463
 - T helper (Th) Cells 12–13
 - THERAKOS™ system 451
 - Therapeutic Goods Administration (TGA) in Australia 186
 - thrombocytopenia 345
 - Thromboelastogram (TEG®) 266–267
 - thromboelastography (TEG) 304–306
 - thromboembolism 353
 - thrombolytic agents 275
 - thrombolytic therapy 353
 - thrombosis 346
 - thrombotic thrombocytopenic purpura (TTP) 227, 275, 448
 - tick-borne *Rickettsia*-like bacteria 163
 - tissue allografts 504
 - tissue banking
 - adverse events and reactions 504
 - allografts, indications for 504
 - clinical applications 504
 - consent 500–501
 - donor selection and testing 501–502
 - regulation 500
 - supply and traceability 503–504
 - tissue processing 503
 - tissue procurement 502–503
 - T-lymphocytes 11–12
 - TOPPS trial 6–7
 - tracheal transplants 505

- TRALI *see* transfusion-related acute lung injury (TRALI)
- tranexamic acid (TXA) 259, 271, 284, 292, 293, 298, 299, 398, 567
- transcranial Doppler (TCD) scans 335
- transfusion algorithms 307–308
- transfusion-associated circulatory overload (TACO) 98, 110–112, 197, 199, 239, 246
- transfusion-associated dyspnoea (TAD) 112, 293
- transfusion-associated graft-*versus*-host disease (TA-GVHD) 39, 142, 321
- in allogeneic and autologous HSC transplant recipients 141
- in aplastic anaemic patients 141
- blood component factors
- age of blood 138, 140
 - cellular blood components 140
 - leucocyte dose 140
- bone marrow 137
- in Campath recipients 141
- in chronic lymphocytic leukaemia patients 141
- clinical features 136–137
- in congenital immunodeficiency patients 140–141
- definition 136
- development 136
- diagnosis 137
- in fetuses and neonates 141
- in fludarabine recipients 141
- γ -irradiation 137
- haemovigilance 144
- in HIV/AIDS patients 143
- in immunocompetent patients 143
- ionising radiation, source and dose of 137–138
- irradiation
- adverse effects 138, 139
 - guidelines and requirements 143–144
 - universal 144
- in leukaemia and lymphoma patients 141, 142
- leucocyte inactivation methods 137, 138
- liver biopsy 137
- pathogenesis 136
- pathogen inactivation technologies 137
- in patients receiving chemotherapy and immunotherapy 141, 143
- polymerase chain reaction-based HLA typing 137
- skin biopsy changes 137
- in solid organ transplantation recipients 143
- treatment 137
- transfusion-associated septic events 168, 170
- transfusion immunomodulation
- allogeneic transfusions 130, 131
 - animal models 126
 - description 125
 - effects 130, 131
 - experimental studies 130–132
 - history 125–126
 - leucocyte-reduced allogeneic red cell transfusions 128
 - mitigation after red cell transfusion 126–128
 - observational and cohort studies 128–130
 - and red cell storage duration 130
- transfusion medicine
- alternatives 566–567
 - case-control studies 509–511
 - cellular therapy 567–570
 - clinical practice 565–566
 - cohort studies 510–511
 - complications 564–565
 - hospital service and patient care perspectives 564–567
 - immunohaematology 564
 - neonatal and paediatric transfusions 565
 - observational studies 509–511
 - origins of 1
 - randomised controlled clinical trials *see* randomised controlled trials (RCTs)
 - range of disciplines 1, 2
 - risks of 3–4
- transfusion-related acute lung injury (TRALI) 3, 39, 199
- blood component types 113–114
 - chest x-rays of 110
 - clinical manifestations 109–110
 - definition of 108
 - diagnosis 109–112
 - human neutrophil antigens 55
 - lung histology 113
 - mitigation strategies 114
 - pathogenesis 112–113
 - patient management 114–115
 - and risk factors 108–109

- Transfusion Requirements after Cardiac Surgery (TRACS) 406
- Transfusion Requirements in Critical Care (TRICC) trial 6, 406, 418, 513
- transfusion resources 1, 2
- transfusion-transmitted infections (TTIs) 196, 258
- Anaplasma phagocytophilum* 163
 - arboviruses 161
 - Babesia* infection 155, 163
 - bacteria 163
 - B19 parvovirus 155, 162
 - chikungunya virus 161–162
 - control methods 156–157
 - Coxiella burnetii* bacterium 163
 - cytomegalovirus 160–161
 - donor prevalence rates 156
 - Epstein–Barr virus 161
 - hepatitis A virus 155, 157
 - hepatitis B virus 157–158
 - hepatitis C virus 158
 - hepatitis D virus 158
 - hepatitis E virus 158–159
 - human herpes virus 8 161
 - human immunodeficiency virus 155, 159–160
 - human T-lymphotropic viruses 1 and 2 160
 - parasitic diseases 163–164
 - P. falciparum* 163, 164
 - protozoan parasites 155
 - risks of 3
 - suspected TTI, investigation of 154
 - T. cruzi* infection 155, 164
 - tick-borne *Rickettsia*-like bacteria 163
 - Treponema pallidum* 163
 - variant Creutzfeldt–Jakob disease prion 156, 164
 - West Nile virus 161
- trauma resuscitation strategies 280
- Treponema pallidum* 163
- trypan blue (TB) 458
- Trypanosoma cruzi* infection 155, 164
- tumour-associated antigens (TAAs) 491, 492
- tumour-restricted natural killer cell immunotherapy 494–496
- tumour-specific antigens (TSAs) 491, 492
- tumour-specific/tumour-restricted T-cell immunotherapy 491–492
- twentieth-century transfusion 1
- two-way sensitivity analysis 556
- typical-onset HIT 345
- U**
- UK Blood Transfusion Services 223
- umbilical cord blood 458, 468
- advantages and disadvantages 484, 485
 - banking 478–479
 - donor recruitment, selection and consent 478, 479
 - future developments 484, 486
 - limitation 481, 484
 - reduced intensity conditioning regimens 486
 - testing 478, 480
 - transplantation 477
 - with HSC in adult patients 481, 483
 - with HSC in paediatric patients 481, 482
 - malignant disease 480–481
 - metabolic disorders 481
 - primary immunodeficiency syndromes 481, 484
- Unified Theory of Acceptance and Use of Technology (UTAUT) model 410
- United States Code of Federal Regulations (CFR) 222
- United States Food and Drug Administration (FDA) 186, 190, 433–435
- University of Pittsburgh Medical Center (UPMC) 247
- uraemia 274
- urgent transfusion 7
- utilisation and wastage schemes 248
- V**
- variant Creutzfeldt–Jakob disease (vCJD) 156, 164, 230, 248
- vasovagal reactions 206
- V genes 15
- viscoelastic testing 304
- vitamin K antagonists 274
- vitamin K deficiency 275
- von Willebrand disease (VWD) 266, 270–271
- von Willebrand factor (vWF) 43, 227, 264, 266, 293

W

warfarin-induced venous limb gangrene 351–353
warm antibody AIHA 314–315
washed platelet activation assays 347
West Nile virus (WNV) 161, 176, 177, 179–181,
196, 219
whole blood-derived plasma 222
World Health Organization (WHO) 2, 184, 190,
254–255, 257–261

World Marrow Donor Association
(WMDA) 438–439

wrong blood incidents 86, 90–91
wrong blood in tube (WBIT) 58, 249

X

X-linked agammaglobulinaemia (XLA)
360–361

XMRV recognition and management 180