



ACGME International

**Advanced Specialty Program Requirements for
Graduate Medical Education in
Renal Medicine
(Internal Medicine)**

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Int. Introduction

Background and Intent: Programs must achieve and maintain Foundational Accreditation according to the ACGME-I Foundational Requirements prior to receiving Advanced Specialty Accreditation. The Advanced Specialty Requirements noted below complement the ACGME-I Foundational Requirements. For each section, the Advanced Specialty Requirements should be considered together with the Foundational Requirements.

Int. I. Definition and Scope of the Specialty

The medicine-based specialty of renal medicine (nephrology) concerns the diagnosis and treatment of kidney diseases, including electrolyte disturbances and hypertension, and the care of those requiring renal replacement therapy, including dialysis and renal transplant patients.

Int. II. Duration of Education

Int. II.A. The educational program in renal medicine (nephrology) must be 24 or 36 months in length.

I. Institution

I.A. Sponsoring Institution

I.A.1. A fellowship in renal medicine must function as an integral part of an ACGME-I-accredited residency in internal medicine.

I.B. Participating Sites

See International Foundational Requirements, Section I.B.

II. Program Personnel and Resources

II.A. Program Director

See International Foundational Requirements, Section II.A.

II.B. Faculty

II.B.1. Faculty members must teach and supervise the fellows in the performance and interpretation of procedures, and this must be documented in each fellow's record, including indications, outcomes, diagnoses, and supervisor(s)

II.C. Other Program Personnel

II.C.1. There must be a close working relationship with dietary and/or nutrition services and social services, as well as with specialists in diagnostic radiology, general surgery, obstetrics and gynecology, pathology, psychiatry, vascular surgery, and urology.

II.D. Resources

II.D.1. The following laboratory and imaging services must be available at the primary clinical site or at participating sites:

II.D.1.a) biochemistry and serologic laboratories; and,

II.D.1.b) imaging services, including ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and a diagnostic radionuclide laboratory.

II.D.2. There must be surgical and pathological support available for the modern practice of renal medicine (nephrology), including an active renal transplant service.

II.D.3. Surgery for vascular and peritoneal dialysis access must be available.

II.D.4. Electron and immunofluorescence microscopy and other special studies for the preparation and evaluation of renal biopsy material must be available.

II.D.5. The program must provide acute and chronic hemodialysis, continuous renal replacement therapy, peritoneal dialysis, and renal biopsy service.

II.D.6. The program should be of sufficient size to ensure fellows' adequate exposure to patients with acute kidney injury and end-stage renal disease, including patients on chronic hemodialysis and peritoneal dialysis, to ensure adequate education and experience in chronic dialysis.

III. Fellow Appointment

III.A. Eligibility Criteria

III.A.1. Prior to appointment in the program, fellows should have completed an ACGME-I-accredited residency program in internal medicine, or an internal medicine residency program acceptable to the Sponsoring Institution's Graduate Medical Education Committee.

III.B. Number of Fellows

See International Foundational Requirements, Section III.B.

IV. Specialty-Specific Educational Program

IV.A. ACGME-I Competencies

- IV.A.1. The program must integrate the following ACGME-I Competencies into the curriculum.
- IV.A.1.a) Professionalism
- IV.A.1.a).(1) Fellows must demonstrate a commitment to professionalism and an adherence to ethical principles.
- IV.A.1.b) Patient Care and Procedural Skills
- IV.A.1.b).(1) Fellows must provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Fellows must demonstrate competence in:
- IV.A.1.b).(1).(a) the practice of health promotion, disease prevention, diagnosis, care, and treatment of men and women from adolescence to old age, during health and all stages of illness;
- IV.A.1.b).(1).(b) the evaluation and management of:
- IV.A.1.b).(1).(b).(i) acute kidney injury;
- IV.A.1.b).(1).(b).(ii) chronic kidney disease;
- IV.A.1.b).(1).(b).(iii) disorders of fluid, electrolyte, and acid-base regulation;
- IV.A.1.b).(1).(b).(iv) disorders of mineral metabolism, including nephrolithiasis and renal osteodystrophy;
- IV.A.1.b).(1).(b).(v) drug dosing adjustments and nephrotoxicity associated with alterations in drug metabolism and pharmacokinetics in renal disease;
- IV.A.1.b).(1).(b).(vi) end-stage renal disease;
- IV.A.1.b).(1).(b).(vii) genetic and inherited renal disorders, including inherited diseases of transport, cystic diseases, and other congenital disorders;
- IV.A.1.b).(1).(b).(viii) geriatric aspects of renal medicine (nephrology);
- IV.A.1.b).(1).(b).(ix) glomerular and vascular diseases, including the glomerulonephritides, diabetic nephropathy, and atheroembolic renal disease;

- IV.A.1.b).(1).(b).(x) hypertensive disorders;
- IV.A.1.b).(1).(b).(xi) renal disorders of pregnancy;
- IV.A.1.b).(1).(b).(xii) renal transplant patients;
- IV.A.1.b).(1).(b).(xiii) tubulointerstitial renal diseases; and,
- IV.A.1.b).(1).(b).(xiv) urinary tract infections.
- IV.A.1.b).(1).(c) dialysis therapy; and,
- IV.A.1.b).(1).(d) performance of:
 - IV.A.1.b).(1).(d).(i) acute and chronic hemodialysis;
 - IV.A.1.b).(1).(d).(ii) continuous renal replacement therapy;
 - IV.A.1.b).(1).(d).(iii) peritoneal dialysis;
 - IV.A.1.b).(1).(d).(iv) placement of temporary vascular access for hemodialysis and related procedures; and,
 - IV.A.1.b).(1).(d).(v) urinalysis.

IV.A.1.c) Medical Knowledge

- IV.A.1.c).(1) Fellows must demonstrate knowledge of established and evolving biomedical clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Fellows must demonstrate knowledge of:
 - IV.A.1.c).(1).(a) the scientific method of problem solving and evidence-based decision-making;
 - IV.A.1.c).(1).(b) indications, contraindications, and techniques for, and limitations, complications, and interpretation of results of those diagnostic and therapeutic procedures integral to the discipline, including the appropriate indications for and use of screening tests and procedures;
 - IV.A.1.c).(1).(c) clinical pharmacology, including drug metabolism, pharmacokinetics, and the effects of drugs on renal structure and function;
 - IV.A.1.c).(1).(d) dialysis and extracorporeal therapy, including:
 - IV.A.1.c).(1).(d).(i) the indication for each mode of dialysis;

IV.A.1.c).(1).(d).(ii)	dialysis modes and their relation to metabolism;
IV.A.1.c).(1).(d).(iii)	dialysis water treatment, delivery systems, and reuse of artificial kidneys;
IV.A.1.c).(1).(d).(iv)	the kinetic principles of hemodialysis and peritoneal dialysis;
IV.A.1.c).(1).(d).(v)	the principles of dialysis access (acute and chronic vascular and peritoneal), to include indications, techniques, and complications;
IV.A.1.c).(1).(d).(vi)	the short- and long-term complications of each mode of dialysis and its management;
IV.A.1.c).(1).(d).(vii)	the artificial membranes used in hemodialysis and biocompatibility; and,
IV.A.1.c).(1).(d).(viii)	urea kinetics and protein catabolic rate.
IV.A.1.c).(1).(e)	normal and abnormal blood pressure regulation;
IV.A.1.c).(1).(f)	normal and disordered fluid, electrolyte, and acid-base metabolism;
IV.A.1.c).(1).(g)	normal mineral metabolism and its alteration in renal diseases, metabolic bone disease, and nephrolithiasis;
IV.A.1.c).(1).(h)	nutritional aspects of renal disorders;
IV.A.1.c).(1).(i)	immunologic aspects of renal disease;
IV.A.1.c).(1).(j)	indications for and interpretations of radiologic tests of the kidney and urinary tract;
IV.A.1.c).(1).(k)	pathogenesis, natural history, and management of congenital and acquired diseases of the kidney and urinary tract, and renal diseases associated with systemic disorders;
IV.A.1.c).(1).(l)	renal anatomy, physiology, and pathology;
IV.A.1.c).(1).(m)	renal transplantation, including:
IV.A.1.c).(1).(m).(i)	biology of transplantation rejection;
IV.A.1.c).(1).(m).(ii)	indications and contraindications for renal transplantation;

- IV.A.1.c).(1).(m).(iii) principles of transplant recipient evaluation and selection;
- IV.A.1.c).(1).(m).(iv) principles of evaluation of transplant donors, both living and cadaveric, to include histocompatibility testing;
- IV.A.1.c).(1).(m).(v) principles of organ harvesting, preservation, and sharing;
- IV.A.1.c).(1).(m).(vi) psychosocial aspects of organ donation and transplantation; and,
- IV.A.1.c).(1).(m).(vii) the pathogenesis and management of acute renal allograft dysfunction.
- IV.A.1.c).(1).(n) management of renal disorders in non-renal organ transplantation;
- IV.A.1.c).(1).(o) geriatric medicine, including:
 - IV.A.1.c).(1).(o).(i) physiology and pathology of the aging kidney; and,
 - IV.A.1.c).(1).(o).(ii) drug dosing and renal toxicity in elderly patients.
- IV.A.1.c).(1).(p) the principles and practice of hemodialysis and peritoneal dialysis;
- IV.A.1.c).(1).(q) the technology of hemodialysis and peritoneal dialysis;
- IV.A.1.c).(1).(r) the pharmacology of commonly used medications and their kinetic and dosage alteration with hemodialysis and peritoneal dialysis; and,
- IV.A.1.c).(1).(s) the psychosocial and ethical issues of dialysis.

IV.A.1.d) Practice-based Learning and Improvement

IV.A.1.d).(1) Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning.

IV.A.1.e) Interpersonal and Communication Skills

IV.A.1.e).(1) Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.

IV.A.1.f) Systems-based Practice

IV.A.1.f).(1) Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, including the social determinates of health, as well as the ability to call effectively on other resources in the system to produce optimal care.

IV.B. Regularly Scheduled Educational Activities

IV.B.1. Fellows must have formal instruction in indications for and in interpretation of reports related to:

IV.B.1.a) balloon angioplasty of vascular access and other procedures utilized in the maintenance of chronic vascular access patency;

IV.B.1.b) management of peritoneal catheters;

IV.B.1.c) radiology of vascular access;

IV.B.1.d) renal imaging; and,

IV.B.1.e) therapeutic plasmapheresis.

IV.C. Clinical Experiences

IV.C.1. At least 12 months of education must be devoted to clinical experience.

IV.C.1.a) This must include at least four months of supervised involvement in dialysis therapy, including:

IV.C.1.a).(1) assessment of hemodialysis and peritoneal dialysis efficiency;

IV.C.1.a).(2) the complications of hemodialysis and peritoneal dialysis;

IV.C.1.a).(3) determining special nutritional requirements of patients undergoing hemodialysis and peritoneal dialysis;

IV.C.1.a).(4) end-of-life care and pain management for patients undergoing chronic hemodialysis and peritoneal dialysis;

IV.C.1.a).(5) evaluation of end-stage renal disease patients for peritoneal dialysis and hemodialysis, and their instruction regarding these treatment options;

- IV.C.1.a).(6) evaluation and management of medical complications in patients during and between hemodialysis and peritoneal dialyses;
- IV.C.1.a).(7) evaluation and selection of patients for acute hemodialysis or continuous renal replacement therapies;
- IV.C.1.a).(8) long-term follow-up of patients undergoing chronic hemodialysis and peritoneal dialysis;
- IV.C.1.a).(9) modification of drug dosage during hemodialysis and peritoneal dialysis; and,
- IV.C.1.a).(10) writing a hemodialysis and peritoneal dialysis prescription and how to assess dialysis adequacy.
- IV.C.1.b) Fellows must have at least two months of clinical experience on an active renal transplant service, including supervised involvement in pre- and post-transplant care, including:
 - IV.C.1.b).(1) clinical and laboratory diagnosis of all forms of rejection;
 - IV.C.1.b).(2) evaluation and selection of transplant candidates;
 - IV.C.1.b).(3) immediate post-operative management of transplant recipients, including administration of immunosuppressants to a minimum of 10 new renal transplant recipients;
 - IV.C.1.b).(4) management in the ambulatory setting for at least three months of at least 20 patients per fellow;
 - IV.C.1.b).(5) medical management of rejection, including use of immunosuppressive drugs and other agents;
 - IV.C.1.b).(6) pre-operative evaluation and preparation of transplant recipients and donors;
 - IV.C.1.b).(7) psychosocial and ethical issues of renal transplantation; and,
 - IV.C.1.b).(8) recognition and medical management of the surgical and non-surgical complications of transplantations.
- IV.C.1.c) Each fellow must see at least 10 new renal transplant patients during the educational fellowship.
- IV.C.1.d) Fellows' clinical experience must include management of patients with renal disorders in the intensive care unit setting.

- IV.C.1.e) Fellows must have experience in the role of a renal medicine (nephrology) consultant in both the inpatient and outpatient settings.
- IV.C.1.f) Fellows must participate in training using simulation.
- IV.C.1.g) Fellows should have a structured continuity ambulatory clinic experience that exposes them to the breadth and depth of renal medicine (nephrology).
- IV.C.1.g).(1) This experience should include an appropriate distribution of patients of each gender and a diversity of ages.
- IV.C.1.g).(2) This experience should average one half-day each week throughout the education program.
- IV.C.1.g).(3) Each fellow should, on average, be responsible for four to eight patients during each half-day session.
- IV.C.1.g).(3).(a) Each fellow should, on average, be responsible for no more than eight to 12 patients during each half-day ambulatory session.
- IV.C.1.g).(4) The continuing patient care experience should not be interrupted by more than one month, excluding a fellow's vacation.

IV.D. Scholarly Activity

See International Foundational Requirements, Section IV.D.

V. Evaluation

See International Foundational Requirements, Section V.

VI. The Learning and Working Environment

VI.A. Principles

See International Foundational Requirements, Section VI.A.

VI.B. Patient Safety

See International Foundational Requirements, Section VI.B.

VI.C. Quality Improvement

See International Foundational Requirements, Section VI.C.

VI.D. Supervision and Accountability

VI.D.1. Direct supervision of procedures performed by each fellow must occur until competence has been acquired and documented by the program director.

VI.E. Professionalism

See International Foundational Requirements, Section VI.E.

VI.F. Well-Being

See International Foundational Requirements, Section VI.F.

VI.G. Fatigue

See International Foundational Requirements, Section VI.G.

VI.H. Transitions of Care

See International Foundational Requirements, Section VI.H.

VI.I. Clinical Experience and Education

See International Foundational Requirements, Section VI.I.

VI.J. On-Call Activities

See International Foundational Requirements, Section VI.J.