

From apprenticeship to competency-based education

The evolution of Canadian urology training through the decades

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In the early 20th century, urology in Canada was not a discrete postgraduate discipline. Instead, urologic care largely fell within the scope of general surgery and was learned through an apprenticeship model rather than a formal residency structure. As cystoscopy and transurethral surgery emerged and became more widely adopted, urologic practice increasingly differentiated itself both on functional and technical grounds, helping establish urology as a recognizable surgical specialty.

Around 1920, early academic organizations began to appear with the formation of the first clinical department of urology at McGill University, led by Dr. David MacKenzie. Subsequently, in 1922, another major early milestone occurred with the establishment of Canada's first dedicated urology service under Dr. W. Warner Jones in Toronto. This development began in earnest with the shift from a subset of general surgery toward a more formal and discrete specialty. A few years later, broader structural forces in postgraduate medical education would accelerate this evolution.

In 1929, the Royal College of Physicians and Surgeons of Canada (RCPSC) was established, creating a national framework for specialty training and certification that would ultimately shape the pathway for urologic education across the country. By 1937, urology had achieved recognition as a specialty by the Royal College, although early certification expectations remained relatively general and were primarily time-based.

As the late 1930s and early 1940s unfolded, defined hospital residencies began to replace traditional "apprenticeships," reflecting a broader modernization of training models and the increasing recognition of urology as a distinct surgical specialty. Within this tran-

sitional era, early urology residency training structures were beginning to take form, with the first residency program often attributed to the University of Toronto or McGill University in historical recollections.

The formation of professional identity and community also contributed to the consolidation of urology training in Canada. In 1945, the Canadian Urological Association (CUA) was founded, with Robin Pearce (Toronto) as the first president. At that time, residency education remained highly experiential and service-driven, without standardized objectives and assessment practices that were inconsistent. In parallel, Canadian urology was increasingly contributing to major clinical innovations, such as the first documented renal transplant in Canada (and first in the Commonwealth) performed in 1958 by Dr. Ken MacKinnon at the Royal Victoria Hospital in Montreal.

The organization of postgraduate entry and progression also evolved substantially in the latter 20th century. In 1969, the concept of a national postgraduate internship match was advanced by the Canadian Association of Medical Students, aiming to replace decentralized arrangements with a more equitable and transparent system.

In the 1970s, the Canadian Interns Matching Service (CIMS) emerged as a precursor to our current system, and was created by students, faculty, and national medical organizations to administer a centralized match. This match initially applied only to the first postgraduate year. At this point in training, rotating internships were common and included broad clinical exposure. Completion of this internship year permitted general licensure, and it was common for physicians to delay entry into specialty training while practicing general medicine as a primary care physician.

At the same time, some internship streams were more specialty-oriented but were not a guaranteed pathway into a surgical residency. While this system provided a broad and varied early postgraduate experience, early trainees still faced uncertainty and bottlenecks in access to advanced training positions.

These structures matured further as CIMS became self-supporting in 1971 and later formalized as an independent non-profit organization. In 1980, a significant policy shift occurred when the Royal College required residency programs to be based at university medical centers and hospitals were no longer considered respon-

sible for resident remuneration. The resulting funding tensions contributed to resident strikes in Ontario in 1979 and 1980. Ultimately, hospitals continued as paymasters, while appointments were made by medical schools.

Until 1992, interns and residents were commonly appointed and funded by teaching hospitals and some larger community hospitals, where trainees could gain greater clinical responsibility due to the absence of competing residency programs. During this era, the national urology residency model coalesced into a five-year structure, often conceptualized as a one-year internship plus four years of training, typically including one year of related surgical subspecialties and three years of urology.

As training programs expanded, the need for clearer standards became more apparent. Some programs incorporated a research year, and at times, it could be counted as equivalent to clinical experience; however, evolving expectations ultimately required a minimum of three years of clinical urology training beyond the internship and general surgical year, disallowing the substitution of research time for core clinical requirements.

In the mid-1980s, the Royal College developed its first urology objectives in a short, general document. In fact, it was the CUA that produced a more detailed framework that was adopted in 1992 and later reformatted into the Royal College standards of training. Credentialing practices during these decades could, at times, be arbitrary, as training histories varied widely. This created challenges in standardization and in assessing equivalency for both Canadian trainees and internationally trained physicians. Accreditation surveys (including onsite program reviews) served as an important driver toward greater national consistency.

Certification methods likewise evolved. Royal College examinations became the endpoint of training, traditionally involving a written component (historically multiple-choice question-based) followed by oral examinations several months after completing formal residency training. The timing was not convenient for many candidates, who spent 4–5 months preparing for the orals while not earning any income. The structure changed over time, and included considerable variability in questioning and scope.

By 1990, there was recognition that the existing examination format was not an optimal assessment of residency outcomes, prompting the development and first implementation of a comprehensive objective examination (COE). Considerable efforts were made by several key opinion leaders in Canadian urology to facilitate this change, and after consultation with the statistical expertise of the Royal College staff, exams were reformatted into

a two-day event in Ottawa, incorporating multiple-choice questions, short-answer questions, and a more objective objective structured clinical examination (OSCE)-style component. This highly regarded examination aligned more closely with competencies expected of graduating residents. The first such Royal College examination in urology took place in September 1990.

The early 1990s also marked a major change in entry-to-practice and the structure of postgraduate training. In 1992, provincial colleges required at least two years of postgraduate training for general licensure and eliminated rotating internships as a route to independent practice. Family medicine became the shortest route to licensure, and all 32 disciplines (31 primary specialties plus family medicine) became entry programs from the first postgraduate year, with funding generally guaranteed through completion.

In 1993–1994, CIMS was incorporated under its current name, the Canadian Resident Matching Service (CaRMS), and direct entry from medical school to urology residency became standard. This replaced the system of frantic telephone calls with offers of residency spots requiring an immediate response. In the same decade, important cultural and logistical innovations occurred in the selection process, including the Michael Jewett-conceived concept of the Canadian Urology Interview Fair. This was established in 1994 and centralized interviews into a single-day event in Toronto, reducing cost and time burden for applicants.

Alongside structural reforms, Canadian urology training broadened in scope and pedagogical intent. In 1996, CanMEDS was formally approved and adopted by the Royal College, expanding training expectations beyond cognitive knowledge and operative skill to include communication, professionalism, scholarship, leadership, and collaboration.

National educational initiatives also emerged to support residents approaching certification. In 1997, the Queen's Urology Examination and Skills Training Program (QUEST), developed by Dr. Andrew MacNeily, provided an annual national mock examination and preparation course aligned with the newer COE format. In 1999, the Canadian Senior Urology Resident (CSUR) course began to provide structured "medical expert" content review for senior residents, and in 2001, the McGill oncology course for senior residents further enhanced resident knowledge.

Other courses included the Urology Basic Sciences Course for PGY1–2 trainees by Dr. Ron Kodama in 2005, which ultimately was revived by Dr. Keith Rourke as the CUA-funded Foundations in Urology course.

Long-term support for these courses is emblematic of the robust commitment to urology resident education by both the CUA and the entire Canadian urology community. Creation of the CUA Post-Graduate Training Committee and, more recently, the Resident & Fellow Committee at different points has facilitated this ongoing engagement.

Over time, evolving technology also altered operative exposure and training priorities, including the introduction of robotic-assisted radical prostatectomy to Canada in 2004. This contributed to reduced exposure to open surgery in some contexts.

In the 2010s, national standards became more explicitly codified. Formal specialty training requirements published by the RCPSC stated that the minimum accredited urology residency must be five years (65 blocks) for residents beginning on or after July 1, 2011, providing clearer expectations for rotations, procedural experience, and assessment. These developments set the stage for one of the most significant contemporary shifts in Canadian postgraduate training.

In 2018, Canadian urology transitioned to competence by design (CBD), moving from time-based progression to staged advancement anchored by entrustable professional activities (EPAs) and associated milestones. In parallel, certification examinations evolved, including taking examinations earlier in the final year and aligning written and OSCE components to the CBD environment.

At the same juncture, increased awareness of the delicate balance between service and education brought the Royal College into the discourse on residency duty hours (RDH). Recognition of the fact that residents are both paid employees of health authorities and university learners, in conjunction with acknowledgement of their need for a balance between the demands of clinical service, studying, sleep, and well-being, has led to a shift in focus for many urology training programs. Residency programs have expanded their intake numbers and bolstered their service providers with clinical fellows in order to meet increasing clinical service requirements while maintaining adherence to Royal College and Resident Professional Association regulations. The downstream consequences of these expansions include consternation among trainees regarding employment opportunities and a dilution of clinical, and especially surgical experience. This remains an area of active discussion and debate at all levels of the CUA and postgraduate medical education offices across the country.

The COVID-19 pandemic in 2020 introduced an unexpected disruption, temporarily reducing or pausing clinical and surgical experiences in many settings. It also

catalyzed national adaptations, including virtual recruitment and program outreach through centrally coordinated "open houses" organized with specialty leadership.

In the 2020s to the present, CBD continues to undergo much-needed refinement, supported by updated accreditation standards (including updated Royal College Standards of Accreditation in 2024), while maintaining training as a minimum five-year program that is competency-based, nationally standardized, and internationally renowned as some of the best urologic training in the world; however, new challenges have emerged and will demand change in a multitude of areas, including teaching objectives, strategies, and technology; residency inclusivity; and exploring alternative modalities to identify urology residents who are ready for independent practice.

With an estimated 20% of current medical students having medical and physical accommodations, program directors are working to adjust urologic training to be inclusive for all urology trainees, while still producing excellent urologists for our patients. Over the next two years, Canadian urology training programs will be subject to modification as "CanMeds II" begins its residency rollout. Refinement of current concepts and new areas of expertise, including planetary and Indigenous health, will need to be incorporated into urology training programs.

In addition, the explosion of artificial intelligence has already embedded itself in urology teaching and publications. How we embrace this new technology in a teaching environment will be an evolving and complex challenge.

Finally, using multiple-choice examinations and OSCE as a final assessment of a resident's competence to practice independently is under increased scrutiny. With a promise to de-emphasize the high-stakes end-of-training assessment during the implementation of CBD, are formal structured examinations truly the most appropriate format to gauge a graduating resident's ability to practice safely and professionally? Perhaps it's time to explore alternative methods of assessment.

Change can be unsettling; however, as an innovative and nimble specialty, we should embrace these opportunities and directly influence future educational frameworks. Canadian urology training programs have uniformly strived to be the best and, as a result, we are well-positioned to overcome new educational challenges as we continue through the new millennium.

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