

The Fourth Year of Medical Education: A Literature Review

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Abstract

Purpose

To identify expert recommendations and examples of programs that could be incorporated into curricular renewal of the fourth year of medical school.

Method

In 2009, the authors searched the relevant literature published from 1974 to 2009 using PubMed; they then searched bibliographies and related articles. They consulted clerkship and residency program directors at their institution and accessed recommendations from national organizations.

Results

Of the 66 publications reviewed, 40 focused on aspects of fourth-year

education and 26 included the fourth year in general reviews. Long-standing concerns included clarifying the purpose of the year, the optimal type and organization of courses, and academic quality of courses. Specific concerns included excessive focus on securing residency positions ("preresidency syndrome"), uncertainty about the optimal ratio of required and elective courses, and grade inflation.

Conclusions

Despite representing a substantial proportion of the student experience, the fourth year has received significantly less attention than other phases of the curriculum. The authors conclude that

goals for the year should be clarified, reflect the mission of the school, and be designed to both complete the medical school experience and facilitate the transition to residency. Schools should decide the types of courses and organization of the year based on these goals. Organizational strategies for the fourth year should incorporate the requirements of the United States Medical Licensing Examination examinations and the residency application process. Fourth-year curricula and their constituent courses should be well designed and stringently evaluated to ensure educational goals are met and appropriate grades awarded.

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The fourth year has been relatively ignored in curricular reforms.^{1,2} We reviewed the literature on the fourth year of medical education in U.S. medical schools to identify recommendations and examples of successful programs that could be incorporated into curricular renewal at our institution and might be of interest to colleagues in other medical schools.

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Background

Concerns about the added educational value of the fourth year of medical school are not new. In the 1970s, many schools reduced the curriculum to three years as a strategy to increase the numbers of physicians trained to meet projected workforce shortages. By 1973, 27% of U.S. schools offered compressed three-year curricula.³ Although educational outcomes were very similar for three-year and four-year curricula, most schools subsequently reinstated the fourth year to provide students with a broader clinical experience.^{4–6} Nevertheless, a review in 1980 characterized the elective-dominated fourth year as a period of "drift, lax evaluations, and passive absorption."⁷ Between the 1979–1980 and 1999–2000 academic years, the average number of fourth-year elective weeks dropped significantly from 25.4 to 19.1, while required experiences rose significantly from 10.6 to 15.1 weeks.⁸ The most common required additions were clerkships in neurology, critical care, or radiology; advanced experiences in medicine and/or surgery; and rural preceptorships. Family medicine clerkships tended to move from the fourth into the third year.⁸

Despite the trend to increase required courses, the fourth-year curricula of most U.S. schools continue to be dominated by elective experiences.⁹ For the academic year 2008–2009, U.S. MD-granting schools reported an average of 22.3 elective weeks in a 36-week fourth-year curriculum.⁹ Schools reported a wide variety of required fourth-year courses, predominantly in advanced clinical topics or research experiences.¹⁰

Method

In 2009, we conducted English-language literature searches of the PubMed database for U.S. medical education using the key words "fourth year," "senior year," "medical education undergraduate trends," "curriculum trends," and "organizational innovation." The bibliographies of the 46 relevant articles found were examined to identify additional publications. We also sought information on recommendations from specialty organizations by contacting clerkship and residency directors at our school and reviewing the Web sites of the major clinical specialties and their educational organizations. The final review consisted of 66 publications^{1–66} published between 1974 and 2009. We

focused on articles specifically addressing the fourth year but also considered articles that included fourth-year issues as part of a more general review of medical student education. Although some overlap exists, 40 of the cited references focus on an aspect of fourth-year education. The remaining 26 citations contain significant information on fourth-year courses in overviews of medical education or discussions of curricula based on strong organizational principles or themes sustained throughout the four years of medical school.^{10,11,63}

Results

As Barzansky and Simon⁸ reported in a 2000 survey, we identified three recurring concerns in the literature: a lack of clarity about the educational purpose of the fourth year, problems in curricular content and organization, and concerns about the educational quality of courses.

Lack of clarity of educational purpose

The literature shows two divergent views of the purpose of the fourth year: that it is either preparation for residency or is the culminating experience of the medical school curriculum.¹²

The “preresidency syndrome” (the selection of only those courses perceived to enhance a student’s chances of selection by a specific residency program or specialty) was criticized in 1985 as “an epidemic of educational disruption.”¹³ Using the fourth year predominantly as a “job-hunting tool” results in repeated “audition electives”¹⁴ despite lack of evidence that this strategy increases the chances of selection by a specific program or specialty,^{15–17} and it may actually be counterproductive.¹⁸ A major criticism of the preresidency approach is that it depends on clearly understanding the characteristics valued by residency programs in applicants. Paradoxically, even basic expectations can be difficult to specify. A 2003 survey of 39 residency directors from five specialties reported agreement of 80% or greater for only the fundamental competencies of conducting a patient interview, developing a relevant problem list, and conducting a physical examination (excluding pelvic and breast examinations).¹⁹ A more recent survey of 30 residency directors in 10 specialties reported greater consensus. The authors of the latter study recommended

subinternships in both internal medicine (IM) and the intended specialty, plus experiences in critical care, emergency medicine, ambulatory medicine, and an appropriate medical subspecialty. The authors also emphasized the role of the fourth year in student maturation and transition but specifically recommended limiting focused experiences in the intended specialty. In this later study, the competencies of the Accreditation Council for Graduate Medical Education (ACGME) provided a useful framework, familiar to educators at both the medical school and residency levels.¹

Similarly, viewing the fourth year as the culmination of medical school education requires a clear understanding of the objectives to be achieved and competencies to be mastered by graduation. The development of graduation objectives and competencies has been a major focus of policy organizations and medical schools during the last decade,^{20–23} but we found no publications on the unique role of the fourth year in the preparation of the medical graduate. The Liaison Committee on Medical Education (LCME) neither mandates nor recommends specific fourth-year experiences. Nevertheless, as the third year is often focused on required clerkships and the first two years are often dominated by basic sciences, the fourth year may provide the only time for LCME-required experiences such as emergency medicine, geriatrics, and research.²¹

Although one commentator concluded that the preresidency and more holistic perspectives may never be reconciled because of strongly held opinions and political forces, that commentator also stated that substantial common ground exists among educators in the appreciation of medical education as a developmental process and recognition of the sophisticated transitions necessary to prepare for residency.¹² Certainly, the two contrasting approaches cannot be incompatible if schools are to meet the LCME charge to provide both a general professional education and also preparation for residency.²¹

Problems in curricular content and organization

The four general categories in the literature we reviewed concerning the content and organization of the fourth year are recommendations from specialty organizations, “college” and “pathway”

programs, “accelerated” programs integrating the fourth year with internship, and reports of specific fourth-year courses.

Recommendations from specialty organizations. Publications were identified from five specialty organizations regarding the fourth year. From our review, and also from information on the Web, we understand that several specialty organizations, such as the Council of Medical Student Educators in Pediatrics, are in the process of developing recommendations for fourth-year curricula.

- *Family medicine.* The most comprehensive specialty-based recommendations for the fourth year were developed by a national three-stage Delphi process among family medicine residency and clerkship directors. A wide range of important experiences and skills were identified, with priorities established for core skills in clinical problem solving plus practical experience in ambulatory family medicine, emergency medicine, dermatology, obstetrics, and IM.²⁴ In 2007, the Family Medicine Curriculum Resource Project (FMCRRP) published an extensive set of competencies and goals for “postclerkship training” along with recommended educational and assessment strategies and resources.^{25,26} The FMCRRP endorsed incorporating the ACGME core competencies in designing fourth-year curricula but stressed the importance of individualized educational assessment and planning for students.
- *Obstetrics–gynecology.* A 1989 survey of departmental chairs in obstetrics–gynecology overwhelmingly favored a balanced fourth year, including advanced experience in IM, surgery, and pediatrics. Thirty percent of respondents recommended no additional experience in obstetrics and/or gynecology, and 47% reported that one additional experience was sufficient.²⁷ In 1993, the Association of Professors of Gynecology and Obstetrics and the Council on Resident Education in Obstetrics and Gynecology called for a senior curriculum “broad and balanced in general medical education.”²⁸ These recommendations, incorporating the results of surveys of faculty and

Table 1
Factors Enhancing the Academic Quality of Fourth-Year Courses*

Factor	Key features
Course design	<ul style="list-style-type: none"> • Specific goals, measurable objectives, explicit learning strategies, outlined daily activities, and valid evaluation strategies • No “special topics” or “experiential” courses
Course implementation	<ul style="list-style-type: none"> • Orientation: Clarify objectives, expectations, evaluation • Clear verbal and written communication of expectations • Clear schedules, activities, and reporting lines • Adequate faculty, information, clinical and other resources to achieve objectives • Consistent guidance and feedback from faculty, residents, others • Formal feedback during and at end of experience • Documentation of orientation, feedback, and assessments • Regular review of courses to ensure quality of education, adequacy of resources, validity of evaluation
Student evaluation	<ul style="list-style-type: none"> • Based on course objectives • Clear criteria, especially for superior grade • Objective measures whenever appropriate; subjective assessments only if based on direct observation • More than one evaluator of performance • Consistency of evaluation across courses, especially selectives
Expectations of fourth-year students	<ul style="list-style-type: none"> • Distinguished from junior students especially in <ul style="list-style-type: none"> ◦ degree of clinical responsibility ◦ responsibility for mastering knowledge base through personal study ◦ integration of relevant material ◦ sophistication of communications, patient assessment, and documentation skills ◦ ability to provide patient education/teach others ◦ development of professional identity/behaviors
Faculty development	<ul style="list-style-type: none"> • Consensus on course objectives, expectations of students, evaluation criteria and strategies • Consistency among evaluators • Strategies to address potential grade inflation in “audition” courses and “halo effect” when working closely with students
Administration	<ul style="list-style-type: none"> • Advising and mentoring systems • Guidance/policy in planning fourth-year courses • Clear communication of requirements for graduation • Clear policy and arrangements for course scheduling, time away from institution, interviewing, adjusting schedules

* These factors reflect the authors’ views after a review of the literature on the fourth year of medical school.

The focus of the American Surgical Association’s Blue Ribbon Committee Report on Surgical Education in 2004 was resident education, but the report included a call for pilot programs “to partially restructure the fourth year of medical school and develop a surgical prerequisite curriculum” to facilitate the transition into residency.³¹ Medical student education also received very little attention in the subsequent Surgical Council on Resident Education consortium of six organizations dedicated to improving the training of surgeons.³² Most recent articles about surgery have concerned the technical skills of potential residents, but some have noted a pressing need to provide advanced preparation for the surgical internship during the fourth year.³³

- *IM.* The IM subinternship is a pervasive feature of fourth-year courses.³⁴ A review stressed its unique contributions in integration of knowledge, skills, and attitudes acquired in other curricular experiences and in care of the hospitalized patient.³⁵ Whereas IM subinternships are almost universal, the content varies enormously. A national task force has identified 17 core themes.³⁵
- *Emergency medicine.* A 2005 curriculum guide adopted by the six major emergency medicine organizations focused on the design and implementation of an emergency medicine clerkship in the fourth year.³⁶ The recommendations stem from ACGME principles and address competencies necessary to develop the appropriate clinical reasoning skills for the specialty.

Overall, the recommendations from the specialty organizations we reviewed stress the importance of core clinical skills while articulating areas of emphasis for individual specialties. Nevertheless, the preridency syndrome remains pervasive among both students and faculty members, as illustrated by recent advice offered to potential applicants to emergency medicine residencies.³⁷ Specialty organizations and students may feel pressure to adopt more competitive preridency positions as residency capacity is projected to become inadequate to accommodate all U.S. graduates within a decade.³⁸

Colleges and pathways. Several schools have developed internal organizations (often called “colleges”) to facilitate

residents, specified priorities of the general medicine internship plus electives in intensive care, neonatology, and emergency medicine. Additional considerations included ambulatory obstetrics–gynecology, endocrinology, and general surgery.

- *Surgical specialties.* More than 30 years ago, a survey of 72 practitioners recommended experiences in neurosciences, dermatology, anesthesiology, infectious diseases, otolaryngology, and ophthalmology for applicants to ophthalmology residencies.²⁹ A 1989 survey of surgical faculty members and residents at 130 institutions stressed the need for advisors to recommend a balanced fourth year incorporating both general and focused subspecialty experiences.³⁰

In our review, most of the articles on “audition electives” concern surgical residencies. A study of first-year residents in 1999–2000 found that an audition elective did not significantly influence selection to a surgical residency.¹⁵ A 1995 survey of residency faculty concluded that “extramural” electives should be taken only for educational value, not as auditions for residency.¹⁶ That study also reported that elective(s) increased the likelihood of an interview but did not influence ranking or matching to the program. Similarly, a 1995 retrospective analysis cautioned program directors that elective experiences often duplicated other experiences, did not enhance the student’s education, and were associated with grade inflation.¹⁷

mentoring and interaction among faculty members and students with similar career interests. Functions typically include enhancing student acculturation to the specialty, advising on selecting clinical experiences, and assisting in applying for residency. Colleges may be restricted to fourth-year students. Although widespread, few descriptions of colleges have been published.^{39–41} An evaluation of one college program reported that participants felt significantly more connected to faculty members than did nonparticipating classmates.⁴² Other comparisons were not provided between participants and nonparticipants in the same class, but compared with previous classes, participants indicated increased satisfaction with advising and greater confidence in preparation for residency.⁴²

Schools may also have defined tracks or pathways (programs of linked elective and selective courses) with the intent of optimizing preparation for a specialty, a research career,¹⁰ or a specific type of practice, such as in rural areas.⁶³ A full review of such programs is beyond the scope of this report, but most such programs have significant fourth-year components, often incorporating a concentrated practical experience in the area of interest, such as a research project or a rural preceptorship.

Accelerated residency programs. We found reports from five programs combining the fourth year of medical education with the intern year of residency^{43–47}; we also found a 1996 review by the American Board of Family Medicine (ABFM) of its 12 approved accelerated residency programs.⁴⁸ Differences between programs and the relatively small numbers of participants limit conclusions, but the ABFM report concluded that these programs benefited both programs and carefully selected individuals.⁴⁸ Compared with their colleagues, participants in accelerated programs performed better on examinations and clinical assessments and were more likely to have leadership roles in residencies. Individual programs differed in the net impact on applications to the residency and location of eventual practice. Advantages for participants included enhanced clinical skills, active learning, financial savings, and an overall decrease in training time. Disadvantages included loss of medical school elective time, the requirement to make early career

commitments, limited understanding of the educational needs of an accelerated resident by all faculty members, and the need for participants to make important clinical decisions with less training and experience than traditional residents.

The University of Missouri integrated family medicine residency program blends the “track” and integrated residency models but does not shorten the total training time. Students enter the program in their fourth year, receive a tuition stipend, and undertake required core clinical experiences and intern course work before transitioning to the residency. An evaluation comparing outcomes for 40 participants and 168 traditional residents at that school reported that integrated graduates were more likely to assume chief resident roles and to establish practice in the state.⁴⁶

The only report found from an IM accelerated program concluded that participants were equivalent to colleagues in academic and clinical performance and were more likely than their colleagues to practice general IM on completion of residency.⁴⁷

Whatever the educational advantages and disadvantages, the ACGME currently does not endorse the accelerated residency model. The specialty boards for IM and family medicine regard accelerated programs as “successful completed pilot studies,” and no new programs will be recognized unless ACGME policy changes.⁴⁹

Specific fourth-year courses. Senior elective courses in basic sciences, especially pathology and pharmacology, have been established for several decades.^{50–52} A 1998 review documented several “failed attempts” and concluded that addressing basic science in the senior year was more challenging than incorporating clinical experiences into the early years of medical education.⁵² A 2008 review estimated that 19% of U.S. schools have some curricular requirement for a basic science course in the clinical years, predominantly in the fourth year. Courses included seminar series, courses integrating science and clinical practice, and experiences requiring a research or other project.⁵³ The importance of personalizing experiences and making them relevant to the senior student were recently emphasized.⁵⁴ Few schools have

published experiences with senior basic science courses; nevertheless, this is a growing area, especially in multidisciplinary courses allowing students “immersion” and/or research experience in focused areas.⁵⁴

The wide diversity of fourth-year courses described in the literature includes those devoted to advanced clinical skills,^{33,55} professional communication,⁵⁶ and preparation to teach.⁵⁷ In addition, the literature on topics such as preceptorships for rural and/or underserved populations,⁵⁸ service learning, and international health^{59,60} tends to be dominated by fourth-year courses. Finally, longitudinal curricular experiences often result in a “capstone,” or independent learning experience, in the senior year.

Concerns about educational quality

Although no publications specifically addressed the educational quality of fourth-year courses, concerns about unclear course objectives, lack of structured learning experiences, and grade inflation were expressed in several publications and are familiar to faculty and educational administrators. Many fourth-year experiences are defined by the activities to be undertaken rather than the specific skills and knowledge to be gained. In fourth-year courses students typically work within clinical or research teams, resulting in close personal and professional interactions that can easily jeopardize the objective evaluation of student professional performance. Grade inflation can result from the combination of nonspecific course expectations, “the halo effect” of positive personal interactions, and the pressure for high evaluation in “audition” courses.

Discussion and Conclusions

A literature review has significant limitations in informing decisions about the fourth year. Many publications have specific perspectives or are limited to the experiences of one school. In addition, most reports are descriptive, and no educational strategy for the fourth year has been stringently evaluated. The vast majority of information about curricular experiences and outcomes in the fourth year remains unstudied and unpublished. Nevertheless, educators and administrators must make decisions about this large component of medical

student education. Because of different missions, priorities, and resources, medical schools can be expected to take different approaches to designing the fourth year and specifying its content. We believe that attention to purpose, organization, and educational quality is fundamental to this task.

As mentioned earlier, we believe the purpose of the fourth year is to achieve the complementary goals of successfully completing the medical school phase of education and transitioning to residency. Specific objectives for the fourth year should be developed based on the mission and values of each school. We developed the following objectives to structure revision of the fourth year at our institution:

1. To facilitate completion of the predoctoral phase of medical education, students should
 - demonstrate mastery of the competencies required for graduation, and
 - participate in unique experiences that add value to the required curriculum.
2. To transition to the residency phase of medical education, students should
 - assume (under supervision) greater clinical responsibility than a junior student,
 - demonstrate the communications, technical, professional, and other skills expected of entering interns, and
 - complete the residency application process efficiently.

The organization of the fourth year should facilitate achievement of the established objectives, but this is more complex than in other phases of medical education. Typically, the fourth year has a unique structure, combining significant student choice of experiences within an overall framework established by the faculty. Each school must make crucial decisions about the number and types of required and elective courses. Mechanisms must also be established to monitor and manage education throughout the year. The spectrum of organizational designs ranges from well-proscribed tracks or pathways to systems

that optimize student choice. Whether selecting a faculty-directed or more student-centered approach, advising is a prerequisite for fourth-year curricula. Paradoxically, the most intense advising seems to be associated with the more highly structured curricula, whereas students probably need the most guidance when they have a greater choice of courses. The style of advising also poses challenges. Highly focused advising may contribute to the worst features of the preresidency syndrome; conversely, more informal systems may not provide sufficient specific guidance for the most vulnerable students.

A surprising omission from the literature on the organization of the fourth year is accommodating the United States Medical Licensing Examination (USMLE) examinations and the residency application process. One study reported that students devoted a median of 20 days to interviewing for residency and frequently missed medical school commitments for interviews without incurring any adverse educational consequences.⁶¹ In many schools, the time for interviewing is significantly longer and involves substantial travel and expense. In our experience, many faculty believe it is common for students to take time away for interviewing, even from required courses. We have also been told that students may pressure faculty for permission to be absent from courses or even fail to request such permission. Students perceive pressure to apply for residency early because of the widespread belief that early application is associated with “better quality” applicants and an invitation for an interview.⁶² Early residency application requires completing both parts of the Step 2 examinations very early in the fourth year, further complicating the scheduling of fourth-year courses. Uncertainty about scheduling interviews and USMLE examinations may contribute to the popularity of short electives. Although these enable students to obtain academic credit for short gaps of time, the educational value of very short clinical courses is questionable. Because of the potential for disruption of learning and unprofessional behavior (being absent from a course or pressuring faculty for permission to be absent), we believe that the organization of fourth-year courses should overtly incorporate the needs of USMLE examinations and the residency

application process. Local and regional studies are needed to clarify the requirements for these activities at each school.

A much greater emphasis on educational rigor in all fourth-year courses (especially electives) is necessary to address the reputation for academic laxity and grade inflation. All courses should be required to adhere to appropriate academic standards, particularly in setting expectations, conducting evaluations, and awarding grades (see Table 1). It is especially important to ensure comparability of standards when a curriculum requirement may be satisfied by different courses or selectives. For all fourth-year courses, the different expectations of a senior and a junior student should be clarified, as these students are frequently working in the same clinical team. Finally, faculty development is required to address issues such as objectivity, not using grades to encourage students to enter a specific specialty, and achieving comparable grading across similar courses, especially when evaluation is highly dependent on subjective faculty assessment.

The fourth year is a unique phase of medical education worthy of its own goals, objectives, and competencies. Ideally, each school should clearly state the educational goals of the fourth year, and these goals should reflect the mission of the school. The design and evaluation processes for the fourth year should facilitate achievement of goals. A well-designed and implemented fourth year can both provide unique learning experiences and enhance the key transition to the residency phase of education.

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