



# Improving the medical school–residency transition

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## SUMMARY

**Background:** In response to calls to improve the continuum between undergraduate and graduate medical education, many medical schools are creating electives designed to prepare students for residency training. There is a need for data that link improvements from these residency preparation courses to residency itself.

**Objective:** To examine senior medical student performance on the Association of Professors of Gynecology and Obstetrics (APGO) Preparation for Residency Knowledge Assessment before and after an obstetrics and gynaecology residency preparation

elective, and to determine whether the knowledge improvements persisted to the start of the residency.

**Methods:** All 13 students enrolled in the course completed the APGO knowledge assessment on the first and last day of the elective. Three months later, the students were asked to re-take the assessment immediately prior to the start of their residency.

**Results:** There was improvement in mean scores from the pre-test score of 66.4 per cent to the post-test score of 77.4 per cent. At the time of the pre-test, three of the 13 students (23%) had passing scores (70% or

greater), and at the time of the post-test, 11 of the 13 (85%) had passing scores. Nine of the 13 students (69%) completed the APGO knowledge assessment immediately prior to the start of their residency. Those nine students had a mean pre-residency score of 76.4 per cent. Eight of the nine students (89%) passed the pre-residency test.

**Conclusions:** Our data support the value of residency preparation electives for improving knowledge, and suggest that senior medical school electives can help to bridge the continuum between undergraduate and graduate medical education.

## INTRODUCTION

This is a time of great curricular change, at both undergraduate medical education (UME) and graduate medical education (GME) levels. In the USA, the Accreditation Council for Graduate Medical Education (ACGME) Milestones Project facilitated an alignment of UME and GME competencies. The level-1 milestones were defined as the knowledge, skills, attitudes and other attributes expected of an incoming first-year resident or postgraduate learner.<sup>1</sup> This definition highlighted the need for medical schools to formally prepare medical students for GME competencies, and there are data indicating that first-year residents begin training not having consistently met level-1 milestones.<sup>2</sup>

Residency preparation electives have been proposed as a means for medical schools to facilitate this transition from UME to GME. The majority of US medical students match directly into specialty postgraduate training or residency. Medical students start this residency training approximately 1 month after graduation from medical school. At this time, the majority of the literature pertaining to residency preparation electives has been reported from general surgery and surgical subspecialties. Literature from these courses has reported increased student confidence, and improved surgical knowledge and clinical competence.<sup>3-5</sup> Most of these studies have reported short-term benefits when assessed immediately after completion of the courses. There is a need for data that link improvements from medical school residency preparation courses to residency itself.

In 2013, our institution implemented a 4-week obstetrics and gynaecology (OBGYN) residency preparation course for senior medical students. We have

previously described the pilot course, including curriculum development, course content and the positive student feedback received.<sup>6</sup> Since the time of our pilot implementation, the ACGME milestones for OBGYN were defined and released in September 2013. These milestones were created through a joint effort by ACGME, the American Board of Obstetrics and Gynecology (ABOG), and the American College of Obstetricians and Gynecologists (ACOG). The curriculum for our course was updated to address these ACGME OBGYN milestones (for course content mapped to the milestones, see Table 1). In 2014, the Association of Professors of Gynecology and Obstetrics (APGO) developed the standardised Preparation for Residency Knowledge Assessment based on these ACGME milestones. This is a 100-question, web-based, multiple-choice examination created to assess didactic knowledge of the incoming OBGYN interns based on the ACGME Medical Knowledge and Patient Care level-1 milestones.<sup>7</sup> The purpose of this study was to investigate improvements in senior medical student performance on the APGO knowledge assessment before and after completion of the elective. We also examined the retention of knowledge by examining students' performance on the APGO knowledge assessment 3 months later, immediately prior to the start of their residencies.

## METHODS

All fourth-year medical students from our institution applying for OBGYN residencies enrolled and completed the Advanced Clinical Skills in OBGYN course in the spring of 2014. Each of the 28 ACGME OBGYN level-1 milestones mapped to the teaching modality in the course is shown in Table 1. The curriculum is available upon request.

The students completed the APGO Preparation for Residency Knowledge Assessment on the first and last day of the course. A passing score is defined as 70 or above.<sup>7</sup> All students completed the 4-week, 97-hour curriculum of the course. Three months later, the students were asked to retake the APGO knowledge assessment immediately prior to the start of residency. Students were provided with a small financial incentive to complete this pre-residency assessment. Institutional review board exemption was obtained for the analysis of the mean performance scores on the APGO knowledge assessment.

## RESULTS

All 13 students participating in the course completed pre- and post-course testing. There was improvement from the pre-test mean of 66.4 per cent to the post-test mean of 77.4 per cent. At the time of the pre-course test, three of the 13 students (23%) passed (70% or greater), and at the time of the post-course test, 11 of 13 (85%) students passed. Nine students (69%) completed the APGO knowledge assessment immediately prior to the start of residency. Those nine students had a pre-course mean score of 65.4 per cent, a post-course mean score of 77.0 per cent and a pre-residency mean score of 76.4 per cent. Eight of the nine students (89%) passed at the time of the pre-residency test.

## DISCUSSION

Medical educators at the undergraduate and graduate levels are at a crossroads, as medical schools and residency programmes adapt to the new curricular requirements and accreditation systems. Medical schools will likely need to create transition courses to prepare students for residency. Leadership in the field of general surgery have stated that 'it is essential

**Residency preparation electives have been proposed to facilitate this transition from UME to GME**

There should be evidence that shows the benefits are sustained

**Table 1. Obstetrics and Gynecology Level 1 milestones mapped to teaching modality in the Advanced Clinical Skills Course**

Competency	Topic	Level One Milestone	Teaching Modality in Advanced Clinical Skills Course						
			Flipped Classroom	Simulation Cases	Anatomy Dissection	Decision to Incision	Simulated Pages	Didactic	
Patient Care	Antepartum Care and Complications of Pregnancy	Demonstrates basic knowledge of normal obstetrical care and common medical complications seen in pregnancy	X						
	Care of Patients in the Intrapartum Period	Demonstrates basic knowledge of routine/uncomplicated intrapartum obstetrical care including, conduct of normal labor	X	X					
	Care of Patients in the Postpartum Period	Demonstrates basic knowledge of normal postpartum care	X				X		
	Gynecology Technical Skills: Laparotomy	Demonstrates knowledge of basic abdominal and pelvic anatomy							
		Demonstrates basic surgical principles, including use of universal precautions and aseptic technique Positions patient appropriately for surgery			X	X			
	Gynecology Technical Skills: Endoscopy	Demonstrates knowledge of basic abdominal and pelvic anatomy							
		Demonstrates basic surgical principles, including use of universal precautions and aseptic technique Positions patient appropriately for surgery			X	X			
	Peri-Operative Care	Demonstrates knowledge of basic abdominal and pelvic anatomy			X	X			
	Family Planning	Verbalizes basic knowledge about common contraceptive options	X						
Ambulatory Gynaecology	Demonstrates basic knowledge about common ambulatory gynaecologic problems	X							
Care of the Patient with Non-Reproductive Medical Disorders	Demonstrates an understanding of common non-reproductive medical disorders (e.g., chronic hypertension, obesity, depression, osteoporosis)	X							
Medical Knowledge	Health Care Maintenance and Disease Prevention	Demonstrates knowledge of the characteristics of a good screening test	X						
		Demonstrates knowledge of indications and limitations of commonly used screening tests							
	Abdominal/Pelvic Pain	Demonstrates a basic understanding of patients presenting with abdominal/pelvic pain regarding: -risk factors - signs and symptoms						X	
	Abnormal Uterine Bleeding	Demonstrates basic knowledge about what constitutes normal and abnormal uterine bleeding	X						X
		Verbalises the phases of the normal menstrual cycle							
	Pelvic Mass	Demonstrates a basic understanding of patients presenting with a pelvic mass, including: -differential diagnosis -signs and symptoms	X						
Pelvic Floor Disorders	Demonstrates basic knowledge of normal pelvic floor anatomy			X					
First Trimester Bleeding	Demonstrates basic understanding of normal early pregnancy development, including implantation, early embryology, and placental development	X							

that all matriculants to surgery residency successfully complete a preparatory course of blended learning'.<sup>8</sup> If medical schools are going to implement residency preparation courses, there should be evidence that shows the benefits are sustained in

order to justify the necessary faculty staff and institution time and expenses. Our data support the value of these electives by demonstrating apparent improvement and retention of knowledge using a standardised APGO knowledge assessment. Although

the purpose of this study was to assess knowledge retention, it is important to recognise that knowledge is only one of the attributes that is important for residency preparation. There remains a need to further develop assessments that will enable us

to measure skills, attitudes and other attributes that are important for our learners.

This was a pilot study with 13 students from a single institution. This small sample size is a limitation, as is the bias introduced through familiarity by repeated testing with the same instrument. As more medical schools create residency preparation electives, we need to investigate whether or not knowledge gains occur and are sustained with larger numbers of students. We should also examine whether there are differences in knowledge gains and retention for electives that are of varying lengths and formats.

This study adds to the existing medical literature by suggesting that the knowledge retention persisted for 3 months to the start of postgraduate training. Medical schools will need to decide the timing of these types of courses: our data support courses occurring in the spring of students' senior year. Although we did not assess whether the students did any independent reading or studying during the interim period prior to residency, it is possible that

participation in the course and performance on the test may have provided the motivation to continue reading prior to beginning postgraduate training. Future areas of inquiry will need to investigate whether these higher knowledge levels continue into postgraduate training.

Ideally, the curriculum in the senior year of medical school should ease the transition of medical students to residency. This study suggests that we can better prepare medical students with the didactic knowledge needed to achieve the ACGME milestone requirements that are now present at the start of residency.

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