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# A search for entrustable professional activities for the 1<sup>st</sup> year pathology postgraduate trainees

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## Abstract:

**INTRODUCTION:** During the past decade, there has been a paradigm shift in medical education from the problem-based learning to competency-based training. This has forced a rethink on the way we evaluate the residents and finally give them the right to handle patients independently. This study makes the first attempt towards designing competency-based training program for pathology residents by formulating the entrustable professional activities (EPAs) for the 1<sup>st</sup> year pathology residents.

**MATERIALS AND METHODS:** A questionnaire comprising 18 potential EPAs in histopathology and 12 potential EPAs in cytology were circulated among the residents of Pathology Department. The respondents were asked to grade the EPAs on a scale of 0–4 based on how important they considered that activity as EPA. The cumulative score of each EPA was divided by the number of respondents to arrive at the average score. The EPAs with an average score of 3 or more qualified to be shortlisted as consensus EPAs.

**RESULTS:** Five activities each of histopathology and cytopathology had an average score of 3 or above and were shortlisted as EPAs for the 1<sup>st</sup> year pathology postgraduates. Each of these was also mapped to their respective competencies.

**CONCLUSION:** There is an urgent need to restructure the postgraduate pathology curriculum in line with competency-based training. This study is the first step in this direction.

## Key words:

Competency, postgraduate education, problem-based learning

## Introduction

The concept of the problem-based learning first introduced in the 90s has now given way to competency-based training in medical education. The main challenge in implementing competency-based training is in defining the competency. What differentiates competency from an educational objective is that it should include knowledge, attitude and skills of the trainee and not merely his/her ability to reproduce what has been taught.<sup>[1]</sup> It should also be related to professional activities as the ultimate aim of evaluating the competence of the trainee is to entrust him/her with certain critical

professional decisions and activities. Most supervisors trust their intuition when it comes to deciding when the trainee is ready to work independently. The aim of competency-based training is to define and measure these intuitive ideas and use them as real-life measure of trainee competence.<sup>[2,3]</sup>

The present system assumes competence at the end of fixed-length training program based on the candidate's ability to verbally reproduce what has been taught to him and perform to a reasonable level on a predefined platform of assessment.

The ultimate aim of entrustable professional activity (EPA) is to move from fixed length

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training programs to variable length training programs where the end point is defined by these entrustable activities.

Professor Ole Ten Cate has done pioneering work in defining EPAs.<sup>[3]</sup>

The defining attributes of an EPA include:<sup>[3]</sup>

- Are part of essential professional work in a given context
- Must require adequate knowledge, skill, and attitude, generally acquired through training
- Should lead to recognized output of professional labor
- Should usually be confined to qualified personnel
- Should be independently executable
- Should be executable within a time frame
- Should be observable and measurable in their process and their outcome, leading to a conclusion (“well done” or “not well done”)
- Should reflect one or more of the competencies to be acquired.

### Aims and objectives

- To shortlist EPAs for 1<sup>st</sup> year pathology residents by questionnaire method
- To map the selected EPAs to the competencies.

## Materials and Methods

Survey based research methodology was followed. All the junior and senior residents of the Department of Pathology were included in the study, and hence, there was no selection bias. The rationale for including all the residents was to include the opinions of residents with varied experience and seniority. A questionnaire comprising 18 potential EPAs in histopathology and 12 potential EPAs in cytology [Table 1] were circulated among the residents (both junior and senior residents) of Pathology Department. The residents were given a brief overview of EPAs.

The respondents were asked to grade the EPAs on a scale of 0–4 based on how important they consider that activity for a resident (PG student) to be able to perform at the end of 1<sup>st</sup> year of training.

### Statistical analysis

The cumulative score of each activity was divided by the number of respondents to arrive at the mean score. The activities with mean score of 3 or more qualified to be shortlisted as consensus EPAs.

## Results

Of total sixty residents who were given the questionnaire 50 responded. The total score for each activity was divided by the total number of respondents to arrive at the mean score [Table 2].

### Table 1: Questionnaire circulated amongst the junior and senior residents of the Pathology Department

This questionnaire enlists certain activities performed in the Pathology Department. Kindly grade them on a scale of 0-4 based on how important it is for a postgraduate student to be able to perform them well at the end of 1<sup>st</sup> year of training

0 - Not important

1 - Of little importance

2 - Somewhat important

3 - Very important

4 - Mandatory

Histopathology

1. Grossing small specimen

2. Grossing large specimens under supervision

3. Proof reading of typed/hand written histopathology reports

4. Performing pediatric autopsies

5. Grossing large specimens without supervision

6. Performing special stains - acid-fast bacilli and periodic acid Schiff reaction

7. Performing immunohistochemistry

8. Writing a good description of microscopic features without giving final diagnosis

9. Ordering relevant immunohistochemistry

10. Framing a long report according to CAP guidelines

11. Interpreting immunohistochemistry

12. Making a biopsy diagnosis of common dermatological conditions

13. Making a biopsy diagnosis of nonmalignant endometrial aspirates

14. Writing reports of following cases - chronic pyelonephritis, gangrenous bowel, ulcer - perforation small intestine

15. Diagnosing squamous cell carcinoma and adenocarcinoma on small biopsies

16. Frozen section interpretation

17. Correctly identifying mix up of specimen

18. Arriving at a list of differentials based on histological patterns in sarcomas and lymphomas

Cytology

1. Screening gynae Pap smears and correctly identifying metaplastic cells

2. Identifying granulomas

3. Performing FNA on fibroadenomas, ganglion cyst, colloid goiters

4. Performing lymph node aspirates, testicular aspirates and aspirates of fibrotic swellings

5. Correctly identifying mix up of slides

6. Correlating imaging data and cytological features

7. Identifying mesothelial cells and differentiating them from adenocarcinoma in fluids

8. Identifying trichomonas, candida, and bacterial vaginosis in gynae Pap smears

9. Correctly identifying acid fast bacilli

10. Performing Pap stain

11. Processing urine sample and ascitic fluid for malignant cell cytology

12. Correctly identifying a lesion not amenable to repeat aspiration and advising the clinician to do a biopsy

FNA = Fine-needle aspiration, CAP = College of American Pathologists

The five activities out of 18 which had an average score of 3 or more (in histopathology) were:

1. Grossing small specimens
2. Grossing large specimens under supervision
3. Proofreading of typed/handwritten reports
4. Writing a good description of microscopic features without giving final diagnosis
5. Making a biopsy diagnosis of nonmalignant endometrial aspirates.

The five activities out of 12 which had an average score of 3 or more (in cytopathology) were [Table 3]:

1. Screening gynae Pap smears and correctly identifying metaplastic cells
2. Identifying granulomas
3. Performing fine-needle aspiration on fibroadenomas, ganglion cyst, colloid goitres

**Table 2: Scores given by the respondents to the histopathology activities listed in the questionnaire and the average scores for each activity**

Serial number	Questions	Score 0	Score 1	Score 2	Score 3	Score 4	Average score
1	Grossing small specimens	0	0	3	13	34	3.62
2	Grossing large specimens under supervision	0	3	9	26	12	3.00
3	Proofreading of typed/handwritten reports	4	2	11	14	19	3.00
4	Performing pediatric autopsies	13	16	17	4	0	1.24
5	Grossing large specimens without supervision	15	17	14	4	0	1.14
6	Performing special stains - acid-fast bacilli stain and periodic acid Schiff reaction	0	3	24	14	9	2.58
7	Performing immunohistochemistry	1	11	21	12	5	2.18
8	Writing a good description of microscopic features without giving final diagnosis	0	2	5	21	22	3.26
9	Ordering relevant immunohistochemistry	1	13	25	11	0	1.92
10	Framing a long report according to CAP guidelines	4	13	19	11	3	1.92
11	Interpreting immunohistochemistry	1	11	24	13	1	2.04
12	Making a biopsy diagnosis of common dermatological conditions	1	7	18	21	3	2.36
13	Making a biopsy diagnosis of nonmalignant endometrial aspirates	1	2	6	25	16	3.06
14	Writing reports of following cases - chronic pyelonephritis, gangrenous bowel, ulcer - perforation small intestine	1	5	18	19	7	2.52
15	Diagnosing squamous cell carcinoma and adenocarcinoma on small biopsies	0	3	15	18	14	2.86
16	Frozen section interpretation	9	18	16	7	0	1.42
17	Correctly identifying mix up of specimen	2	3	23	15	7	2.44
18	Arriving at a list of differentials based on histological patterns in sarcomas and lymphomas	3	9	19	17	2	2.12

CAP = College of American Pathologists

**Table 3: Scores given by the respondents to the cytopathology activities listed in the questionnaire and the average scores for each activity**

Serial number	Questions	Score 0	Score 1	Score 2	Score 3	Score 4	Average score
1	Screening gynae Pap smears and correctly identifying metaplastic cells	0	1	7	20	22	3.26
2	Identifying granulomas	0	1	2	7	40	3.72
3	Performing FNA on fibroadenomas, ganglion cyst, colloid goiters	1	1	4	20	24	3.30
4	Performing lymph node aspirates, testicular aspirates, and aspirates of fibrotic swellings	2	9	19	18	2	2.18
5	Correctly identifying mix up of slides	2	2	22	19	5	2.46
6	Correlating imaging data and cytological features	3	4	29	13	1	2.10
7	Identifying mesothelial cells and differentiating them from adenocarcinoma in fluids	1	4	19	20	6	2.52
8	Identifying trichomonas, candida and bacterial vaginosis in gynae Pap smears	0	3	6	26	15	3.06
9	Correctly identifying acid fast bacilli	0	1	1	20	28	3.50
10	Performing Pap stain	1	2	11	20	16	2.96
11	Processing urine sample and ascitic fluid for malignant cell cytology	1	4	21	19	5	2.46
12	Correctly identifying a lesion not amenable to repeat aspiration and advising the clinician to do a biopsy	3	14	19	10	4	1.96

FNA = Fine-needle aspiration

4. Identifying trichomonas, candida, and bacterial vaginosis in gynae Pap smears
5. Correctly identifying acid-fast bacilli.

The shortlisted activities were mapped to the five general competencies [Table 4].

## Discussion

This study is the first of its kind undertaken in a pathology department to attempt to define EPAs in pathology. In other specialties such as internal medicine,<sup>[4]</sup> psychiatry,<sup>[5]</sup> and pediatrics<sup>[2]</sup> similar attempts have been made. EPAs are a means to translate competencies into clinical practice. The Accreditation Council for Graduate Medical Education (ACGME) is a private nonprofit organization that evaluates and accredits medical residency programs throughout the United States. The outcome project run by ACGME identified six domains of competency on which the council would focus to improve medical education. Over time these domains have come to be known as general competencies and include patient care, medical knowledge, professionalism, systems-based practice, practice-based learning and improvements, and interpersonal and communication skills. EPAs require multiple competencies in an integrated fashion.<sup>[6]</sup>

The Graduate Medical Education Regulations 1997 of the Medical Council of India for the first time mentioned the term “competent” in its institutional goals. The

reforms suggested in the Vision 2015 document include measuring the outcomes of medical education in terms of competencies.<sup>[7]</sup> However, the question of integrating the competency based evaluation to the current assessment programs of medical students remained unanswered. Hence, a lot needs to be done to deliver competency-based medical education in India.<sup>[8]</sup>

The five activities which achieved the consensus of the residents in histopathology are very important stepping stones in postgraduate training. Grossing of small specimens is very crucial step in histopathology processing of specimens. Utmost care needs to be given to correctly label and measure the specimens and ink the very small specimens likely to be lost. As an EPA it can be easily assessed by giving a target of zero error to all 1<sup>st</sup> years and defining parameters for acceptable and unacceptable errors by the postgraduate. Similarly, grossing large specimens under supervision can be assessed by the resident’s ability to take adequately thin sections.

The typed or handwritten report needs to be checked by residents for grammatical errors before they are printed and go for final signatures by the faculty. It not only teaches the resident how to frame reports but also develops proofreading skills which will help him/her later in the career in avoiding typographical errors. By the end of the 1<sup>st</sup> year of training, the residents should be able to accurately describe the histopathological features

**Table 4: Mapping the entrustable professional activities to competencies**

Serial number	EPA	Patient care	Medical knowledge	Practice based learning and improvement	Interpersonal and communication skill	Professionalism	Systems based practice	Personal and professional development
1	Grossing small specimens	+	-	+	-	+	-	-
2	Grossing large specimens under supervision	+	+	+	-	+	+	+
3	Proof reading histopathology typed/hand written reports	+	+	+	-	+	-	-
4	Writing a good description of microscopic features without giving final diagnosis	-	+	+	-	+	-	+
5	Making a biopsy diagnosis of nonmalignant endometrial aspirates	+	+	+	-	+	+	+
6	Screening gynae Pap smears and correctly identifying metaplastic cells	+	+	+	-	+	-	+
7	Identifying granulomas	+	+	+	-	+	-	+
8	Performing FNA on fibroadenomas, ganglion cyst, colloid goiters	+	+	+	+	+	-	-
9	Identifying trichomonas, candida and bacterial vaginosis in gynae Pap smears	+	+	+	-	+	-	+
10	Correctly identifying acid fast bacilli	+	-	+	-	+	-	-

EPA = Entrustable professional activity, FNA = Fine-needle aspiration, +=Linked, -=Not linked

though the final diagnosis may be out of his/her reach. This would train the resident in approaching the case in a systematic manner. It should be easy to assess the skills of the resident for this EPA. Nonmalignant endometrial aspirates can be diagnosed based on a well-defined set of criteria and form a bulk of gynecological specimens in any institution. A 1<sup>st</sup> year trainee should be able to correctly diagnose most of these specimen.

Cytopathology can be challenging for a novice who has just started training. Since Pap smears are routinely screened in most laboratories, they can be used to train the eyes of the pathologist for assessing the cytological features. Metaplastic cells are usually confused by beginners with various intraepithelial lesions. Hence, correctly identifying metaplastic cells can be a useful starting point. Since tuberculosis is rampant in India, it would be fruitful to train 1<sup>st</sup> years in diagnosing granulomas in aspirates.

Performing an aspirate is an equally important skill. A 1<sup>st</sup> year trainee can start by aspiration of colloid goiters, fibroadenomas and ganglion cyst. Assessment of this EPA is also straightforward as the number of inadequate aspirates can be counted and appropriate cutoffs devised.

Diagnosing common gynecological infections such as trichomonas, bacterial vaginosis, and candida in Pap smears and correct identification of an acid-fast bacillus on Ziehl-Neelsen stain are also important skills which should be taught early in training.

The list of EPAs gives us a starting point for implementation of competency-based education in postgraduate pathology teaching. The next step would be to define the appropriate methods and evaluation schemes for these EPAs so that they can be implemented in the Pathology Department.

The 1<sup>st</sup> year in the 3 year postgraduate program is usually a transition phase during which an MBBS graduate learns to perform many key tasks pertaining to his area of specialization. Since the student is in his/her early stages of training defining the professional activities which can be entrusted to a 1<sup>st</sup> year postgraduate student is both important and challenging. Defining these EPAs would also help the students set targets for themselves to achieve at the end of the 1<sup>st</sup> year of training. It would reduce to some extent the confusion in the minds of the

1<sup>st</sup> year by giving them well-defined targets and telling them what they should focus.

In the current set up, the faculty intuitively define these targets for the 1<sup>st</sup> years to achieve. This study was an attempt to bring an element of objectivity in defining these entrustable activities and also bring about awareness among the residents regarding this paradigm shift in education. Different departments in academic institutions can devise their own EPAs for different stages of training of postgraduates till national guidelines are formulated for our country. This would at least start the process of taking our postgraduate medical education system from the problem-based learning to competency based training.

## Conclusion

There is an urgent need to restructure our postgraduate curriculum on the lines of competency based education. This study is the first step in defining the EPAs for pathology postgraduates.

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## Conflicts of interest

There are no conflicts of interest.

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