

## The Learning of 7th Year Medical Students at Internal Medical – Evaluation by Logbooks

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### Abstract

**Introduction:** The purpose of this study was to understand the learning of internal medicine of 7th year medical students through records of the “Learning Passport”. **Materials and Methods:** Between June 2005 and June 2006, data from the learning passport (a type of logbook) of 207 7th year medical students at the Department of Internal Medicine, National Taiwan University Hospital (NTUH) were collected. **Results:** Among the 19 symptoms/signs listed in the logbook, a large number of students did not learn well on low back pain, skin rash, oedema, oliguria and anxiety/depression; only a few students rated themselves as knowledgeable about anxiety/depression, malaise, skin rash, headache and anorexia. Among the 16 diseases listed, a large number of students did not learn well on chronic obstructive pulmonary disease, stroke, hypertension, coronary artery disease and cirrhosis; only a few students rated themselves as knowledgeable about shock, respiratory failure, consciousness disturbance, sepsis and renal failure. Among the 21 physical examination skills listed, a large number of students did not learn well on the male genitalia, eyes, cognitive status, mental state and the digital rectal examination; only a few students rated themselves as fully competent about cognitive status, mental state, eyes, neurology examination and ENT examination. Among the 11 laboratory skills and image interpretation skills listed, a large number of students did not learn well on blood smear, Gram’s stain and specimen sampling; only a few students rated themselves as fully competent about the interpretation of brain computed tomographic (CT) scan, blood smear and Gram’s stain. Among the 12 procedures and therapeutic skills listed, a large number of students did not learn well on observation of lumbar puncture, basic cardiopulmonary resuscitation (CPR) and aseptic procedure; only a few students rated themselves as fully competent about basic CPR and transfusion management. **Conclusions:** The weak points of intern training conducted by the Department of Internal Medicine, NTUH were revealed by analysis obtained from their logbooks. Thus, we need to strengthen the learning of the interns in these specific parts and assess their performance based on the use of portfolios.

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**Key words:** Clinical skills, Evaluation, Interns

### Introduction

In 1945, Taihoku (Taipei) Imperial University was renamed the National Taiwan University and the Japanese teaching system was replaced with a system implemented by the Ministry of Education of the Republic of China. The 7-year curriculum in the School of Medicine, College of Medicine and the National Taiwan University was divided into 3 parts, i.e. pre-med for the first 2 years, basic sciences for the next 2 years, and clinical medicine for the last 3 years. The 3 clinical years consisted of 2 years of clerkship and a final year of rotating internship with 12 weeks in

Internal Medicine, 12 weeks in Surgery, 6 weeks in Paediatrics, 6 weeks in Gynaecology/Obstetrics and electives.<sup>1</sup>

The minimal essential requirements of clinical competencies for medical graduate have been defined in many countries. The American Association of Medical Colleges (AAMC) has suggested that the goal of medical education would be to produce physicians who are altruistic, knowledgeable, skilful and dutiful.<sup>2</sup> The Institute for International Medical Education has developed global minimum essential requirements for medical education

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that are grouped into 7 broad educational domains: (i) Professional values, attitudes, behaviour and ethics; (ii) Scientific foundation of medicine; (iii) Communication skills; (iv) Clinical skills; (v) Population health and health systems; (vi) Management of information; and (vii) Critical thinking and research.<sup>3</sup>

The AAMC Task Force on the Clinical Skills Education of Medical Students recommends that the selection of opportunities for clinical skill learning in undergraduate medical education be organised using 4 clinical education perspectives: generic, problem-based, discipline specific, and continuum of care. There are 3 broad categories of generic clinical skills: communication skills, mental and physical examination skills, and basic clinical testing and procedural skills.<sup>4</sup>

In 2004, a set of minimal required clinical competencies for medical graduates in Taiwan was developed, which included 34 examination skills, 5 image interpretation skills, 8 laboratory and interpretation skills, 25 procedural skills, 20 therapeutic skills, 4 clinical communication skills and 7 types of clinical attitudes.<sup>5,6</sup> In August 2003, the Department of Health, Taiwan officially promoted the Postgraduate Year Residency Program (PGY). All newly recruited, first-year residents must receive 3 months of training – in general internal medicine, general surgery and community medicine for 1 month each plus 36 hours of basic training.

Traditionally, the 7<sup>th</sup> year students, also known as “interns” in Taiwan assume so many routine patient care duties, such as record keeping, perform procedures and administration of intravenous medications, that they do not have the time to develop their fundamental clinical skills. General medicine training programme for internship has been implemented since June 2005. Logbooks and portfolios have been used as a method of student assessment.<sup>7-9</sup> The learning passport, a type of logbook, was used to evaluate the learning progress of all interns in Taiwan. The students had their own passport for each department such as internal medicine, surgery, paediatrics, and gynaecology/obstetrics. The logbook in internal medicine included records on competency in diagnosing symptoms/signs and the performance of clinical skills and self evaluation after finishing the course.

The aims of this study were (i) to understand the learning progress of the interns in the Department of Internal Medicine through records of the “Learning Passport”, and (ii) to elucidate the relationship between direct care rate and the scores of medical interns.

## Materials and Methods

Between June 2005 and June 2006, data from the learning passport of 207 7<sup>th</sup> year medical students at the Department

of Internal Medicine, National Taiwan University Hospital (NTUH) were collected. The logbook has records of the learning of 19 symptoms and signs, 16 diseases and states, 21 physical examination skills, 11 laboratory skills and image interpretation, and 12 procedures and therapeutic skills. The students were asked to evaluate themselves after finishing the course of Internal Medicine. There was an examination in Internal Medicine, mostly paper and pencil test, at the last week. The medical students were also evaluated by multi-source feedback (MSF). The feedback was given by the attending physician, chief resident and nurse leader at the internal medicine ward. The final scores of the medical students at Internal Medicine consisted of 80% MSF scores and 20% examination scores.

## Statistics

Analysis of variance (ANOVA) was used to analyse the correlation between direct care rate and the scores of medical students.  $P < 0.05$  was considered statistically significant.

## Results

Among the 19 symptoms/signs listed, a large number of students did not learn enough well on low back pain, skin rash, oedema, oliguria and anxiety/depression; while only a few students learned anxiety/depression, vomiting, oedema, oliguria, and low back pain by direct care under supervision. A few students rated themselves as knowledgeable about anxiety/depression, malaise, skin rash, headache and anorexia (Table 1). Among the 16 diseases listed, a large number of students did not learn well on chronic obstructive pulmonary disease (COPD), stroke, hypertension, coronary artery disease (CAD) and cirrhosis; while a few students learned cellulitis, COPD, stroke, CAD and shock by direct care. A few students rated themselves as knowledgeable about shock, respiratory failure, consciousness disturbance, sepsis and renal failure (Table 2). Among the 21 physical examination skills listed, a large number of students did not learn well on the male genitalia, eyes (fundus), cognitive status, mental state and digital rectal examination. Only a few students rated themselves as fully competent in the cognitive status, mental state, eyes (fundus), neurology examination and ENT examination (Table 3).

Among the 11 laboratory skills and image interpretation skills listed, a large number of students did not learn well on blood smear (18%), Gram's stain (12%), specimen sampling (9%) and skin test (8%). Only a few students rated themselves as fully competent in the interpretation of brain computed tomographic (CT) scan (33.3%), blood smear (34.3%), Gram's stain (36.2%), abdominal X ray (36.2%), chest X-ray (38.6%) and specimen sampling (39.6%). Among the 12 procedures and therapeutic skills

Table 1. The 7<sup>th</sup> Year Medical Students' Learning for the Symptoms and Signs

Items	Methods of learning			Self evaluation			
	Direct care	Other methods	Did not learn	Fully competent	Partly competent	Not competent	Not applicable
Fever	83% (171)	17% (35)	0% (1)	36.7% (76)	34.8% (72)	4.3% (9)	24.2% (50)
Malaise	78% (162)	18% (37)	4% (8)	25.6% (53)	45.4% (94)	3.4% (7)	25.6% (53)
Headache	73% (151)	22% (46)	5% (10)	26.6% (55)	43% (89)	2.9% (6)	27.5% (57)
Anemia	84% (173)	16% (34)	0% (0)	36.7% (76)	34.3% (71)	3.9% (8)	25.1% (52)
Palpitation	66% (136)	28% (57)	7% (14)	27.5% (57)	42% (87)	4.3% (9)	26.1% (54)
Chest Pain	79% (164)	19% (40)	1% (3)	34.3% (71)	35.7% (74)	3.9% (8)	26.1% (54)
Dyspnea	74% (153)	23% (48)	3% (6)	35.3% (73)	36.2% (75)	2.4% (5)	26.1% (54)
Abdominal pain	72% (150)	22% (45)	6% (12)	33.8% (70)	36.2% (75)	5.3% (11)	24.6% (51)
Body weight loss	77% (160)	17% (35)	6% (12)	28.5% (59)	43.5% (90)	2.4% (5)	25.6% (53)
Anorexia	75% (155)	21% (44)	4% (8)	26.6% (55)	44% (91)	3.9% (8)	25.6% (53)
Vomiting	57% (118)	40% (83)	3% (6)	30.9% (64)	35.7% (74)	6.8% (14)	26.6% (55)
Jaundice	82% (169)	14% (29)	4% (9)	35.7% (74)	36.2% (75)	2.4% (5)	25.6% (53)
Diarrhea	71% (148)	26% (53)	3% (6)	31.9% (66)	39.1% (81)	2.4% (5)	26.6% (55)
Edema	61% (127)	30% (63)	8% (17)	35.7% (74)	34.3% (71)	3.9% (8)	26.1% (54)
Oliguria	62% (128)	30% (63)	8% (16)	30.9% (64)	40.1% (83)	2.9% (6)	26.1% (54)
Low back pain	63% (130)	28% (58)	9% (19)	29% (60)	38.6% (80)	5.3% (11)	27.1% (56)
Arthralgia	64% (132)	31% (64)	5% (11)	28.5% (59)	43% (89)	1.4% (3)	27.1% (56)
Skin rash	68% (140)	24% (49)	9% (18)	25.6% (53)	44% (91)	2.4% (5)	28% (58)
Anxiety/Depression	38% (79)	54% (112)	8% (16)	24.2% (50)	44.4% (92)	3.9% (8)	27.5% (57)

Table 2. The 7<sup>th</sup> Year Medical Students' Learning for the Diseases

Items	Methods of learning			Self evaluation			
	Direct care	Other methods	Did not learn	Fully competent	Partly competent	Not competent	Not applicable
Shock	57% (119)	40% (82)	3% (6)	23.2% (48)	44.4% (92)	4.8% (10)	27.5% (57)
Cons. disturbance	70% (144)	28% (57)	3% (6)	26.6% (55)	42.5% (88)	3.9% (8)	27.1% (56)
Stroke	47% (98)	45% (93)	8% (16)	30.4% (63)	39.6% (82)	3.4% (7)	26.6% (55)
Sepsis	83% (171)	17% (35)	0% (1)	28.5% (59)	40.6% (84)	3.4% (7)	27.5% (57)
Diabetes mellitus	83% (171)	16% (34)	1% (2)	37.2% (77)	36.2% (75)	1.4% (3)	25.1% (52)
Hypertension	62% (128)	32% (67)	6% (12)	36.7% (76)	34.8% (72)	2.9% (6)	25.6% (53)
CAD	55% (113)	41% (84)	5% (10)	34.3% (71)	35.7% (74)	4.3% (9)	25.6% (53)
CHF	70% (144)	29% (59)	2% (4)	32.4% (67)	39.1% (81)	3.9% (8)	24.6% (51)
Pneumonia	64% (133)	33% (69)	2% (5)	35.7% (74)	33.3% (69)	4.3% (9)	26.6% (55)
COPD	40% (83)	49% (101)	11% (23)	33.8% (70)	37.7% (78)	2.4% (5)	26.1% (54)
Resp. failure	63% (130)	35% (73)	2% (4)	25.6% (53)	42.5% (88)	4.3% (9)	27.5% (57)
GI bleeding	66% (136)	30% (63)	4% (8)	35.7% (74)	36.2% (75)	2.9% (6)	25.1% (52)
Cirrhosis	65% (134)	30% (63)	5% (10)	35.3% (73)	37.2% (77)	2.4% (5)	25.1% (52)
Renal failure	77% (159)	21% (43)	2% (5)	29.5% (61)	39.6% (82)	4.8% (10)	26.1% (54)
UTI	59% (123)	36% (75)	4% (9)	39.6% (82)	30.9% (64)	3.4% (7)	26.1% (54)
Cellulitis	37% (76)	63% (131)	0% (0)	36.2% (75)	33.8% (70)	2.9% (6)	27.1% (56)

CAD: coronary artery disease; CHF: congestive heart failure; Cons.: consciousness; COPD: chronic obstructive pulmonary disease; GI: gastrointestinal; Resp: respiratory; UTI: urinary tract infection

Table 3. The 7<sup>th</sup> Year Medical Students' Learning for the Physical Examination

Items	Methods of learning		Self evaluation			
	Direct care	Did not learn	Fully competent	Partly competent	Not competent	Not applicable
General appearance	97% (200)	3% (7)	44.4% (92)	30% (62)	0.5% (1)	25.1% (52)
Vital signs	97% (201)	3% (6)	48.3% (100)	26.6% (55)	0.5% (1)	24.6% (51)
Body weight and height	96% (199)	4% (8)	49.8% (103)	25.1% (52)	0.5% (1)	24.6% (51)
Consciousness	97% (200)	3% (7)	42% (87)	32.9% (68)	0% (0)	25.1% (52)
Skin	95% (197)	5% (10)	41.1% (85)	32.9% (68)	1% (2)	25.1% (52)
Head and face	92% (191)	8% (16)	39.6% (82)	34.3% (71)	1% (2)	25.1% (52)
Eye (fundus)	84% (174)	16% (33)	30% (62)	37.2% (77)	7.2% (15)	25.6% (53)
ENT	92% (190)	8% (17)	32.4% (67)	40.1% (83)	1.9% (4)	25.6% (53)
Neck	94% (195)	6% (12)	42% (87)	31.9% (66)	1% (2)	25.1% (52)
Lymph nodes	96% (199)	4% (8)	42% (87)	31.9% (66)	0.5% (1)	25.6% (53)
Chest	97% (201)	3% (6)	41.5% (86)	32.9% (68)	0.5% (1)	25.1% (52)
Cardiovascular	96% (198)	4% (9)	42.5% (88)	31.9% (66)	0% (0)	25.6% (53)
Abdomen	98% (202)	2% (5)	44.9% (93)	29% (60)	0.5% (1)	25.6% (53)
Back	91% (188)	9% (19)	40.1% (83)	33.8% (70)	0% (0)	26.1% (54)
Male genitalia	83% (172)	17% (35)	33.3% (69)	37.2% (77)	2.4% (5)	27.1% (56)
Digital rectal exam	89% (184)	11% (23)	37.2% (77)	34.3% (71)	2.4% (5)	26.1% (54)
Extremities	95% (196)	5% (11)	42% (87)	30.9% (64)	1.4% (3)	25.6% (53)
Musculoskeletal	90% (186)	10% (21)	37.7% (78)	32.9% (68)	2.9% (6)	26.6% (55)
Neurology exam	94% (194)	6% (13)	31.4% (65)	42.5% (88)	0.5% (1)	25.6% (53)
Mental state	88% (183)	12% (24)	29% (60)	41.1% (85)	3.4% (7)	26.6% (55)
Cognitive status	86% (179)	14% (28)	27.1% (56)	44% (91)	2.9% (6)	26.1% (54)

ENT: ear, nose, throat; Exam: examination

listed, a large number of students did not learn well on observation of lumbar puncture (49%), basic cardio-pulmonary resuscitation (CPR) (18%), aseptic procedure (15%), intramuscular or subcutaneous injection (12%), and observation of endotracheal tube insertion (11%); while a few students rated themselves as fully competent in basic CPR (28%), transfusion management (35.7%), aseptic technique (45.4%) and intramuscular or subcutaneous injection (45.9%).

The methods of learning of these 19 symptoms and signs, and 16 diseases and states were divided into direct care under supervision and other methods. There were a total 202 students at the Department of Internal Medicine. The students were divided into 4 groups according to the number of direct care in these 35 items. Group 1 had the least number of direct care, while group 4 had the highest number of direct care. The scores in these 4 groups showed no significant differences (Table 4).

## Discussion

From our results, the 7th year medical students had not

learned well on several types of symptoms, diseases and clinical skills. Moercke and Eika<sup>10</sup> reported that the responders in their study did not master 4 groups of skills: medical emergency procedure (27 skills), casualty procedures (22 skills), gynaecology and obstetrics (19 skills) and procedures that could be learned in general practice (35 skills). Almost 40% of the respondents reported that students were not taught sufficiently about clinical skills in a survey of medical students' and graduates' perceptions of the effectiveness of their medical school curriculum.<sup>11</sup> Raghoobar-Krieger et al<sup>12</sup> analysed the use of logbooks by students at the Department of Internal Medicine and found that medical students in hospitals in the Netherlands received broad experience (76% to 131%) of the required diseases.

In this study, the answer rate for the learning experiences was much higher than the answer rate for self-evaluation. About a quarter of the cohort did not have self-evaluation for the competencies. In a national survey of Irish interns, the responsive rate was 65%.<sup>13</sup> The study from Raghoobar-Krieger et al showed inconsistencies in recording disease in

Table 4. The Relation Between the Direct Care Rate and the Scores in 7<sup>th</sup> Year Medical Students

Group	Student no.	Mean	SD	ANOVA
MSF score				
1	50	87.80	2.21	<i>P</i> = 0.22
2	57	87.10	2.54	
3	44	87.42	2.59	
4	51	88.00	2.31	
Examination score				
1	50	78.69	8.49	<i>P</i> = 0.76
2	57	77.32	9.24	
3	44	76.77	8.74	
4	51	77.90	10.05	
Total score				
1	50	85.82	2.62	<i>P</i> = 0.35
2	57	85.14	2.87	
3	44	85.24	2.86	
4	51	85.96	2.79	

ANOVA: analysis of variance; MSF: multi source feedback;  
No.: number; SD: standard deviation

a logbook by students compared to doctors. In particular, diseases which are present at a department are under-reported by students.<sup>14</sup> Supervision and feedback are important mechanisms to optimise the students' knowledge of (i) all diseases encountered and (ii) the use of logbook.<sup>14</sup> The student logbooks should remain an important feature. Students will become responsible for both recording and charting their own clinical experiences.<sup>15</sup>

The limitations of logbooks are (i) the accuracy of students' reporting and faculty grading are difficult to ascertain; (ii) the minimum number of procedures to be performed and cases to be seen are often set arbitrarily and are not validated against performance in the future; (iii) the number of procedure performed and patients seen do not necessarily correlate with competence achieved; and (iv) unlike portfolios, there is no scope for personal goal setting and reflection.<sup>8</sup>

To reduce the gap between an intended curriculum and the learned curriculum, a well-planned curriculum must provide the students not only with explicit objectives, but also with structured opportunities for practising the required clinical skills, and timely feedback about the mastery of their skills. Besides, the use of standardised patient technology is an effective adjunctive method for addressing the challenges involved in teaching and assessing a variety of skills in undergraduate medical education.<sup>16</sup>

Entering residents have variable medical school experiences and different knowledge and skill levels. In 2001, the University of Michigan Health System created the Postgraduate Orientation Assessment (POA) which is an 8-station, objective structured clinical examination for new residents. The POA provides a feasible way to identify important gaps in learning between medical schools and residencies.<sup>17</sup>

Our results showed that the students' scores were unrelated to the learning by direct care at internal medicine. There were several possible explanations. Firstly, the examinations were mostly paper and pencil tests which hardly assess "shows how" ability. Secondly, there may be a halo effect on MSF. Wimmers et al<sup>18</sup> reported that an increased number of patient encounters did not directly lead to improved competency in medical students. Beck et al<sup>19</sup> reported that knowledge-based examination performance could not be predicted by the volume of patients seen. Caccamese et al<sup>20</sup> reported that conference attendance by internal medicine residents is unrelated to their performance on the in-training examination.

The AAMC Task Force on the Clinical Skills Education of Medical Students recognises that clinical skill mastery is developmental. As the new clinician is exposed to an incrementally challenging skills curriculum, he or she has an opportunity to progressively master that set of skills that is important for postgraduate training and which is basic to clinical performance competency throughout their subsequent career.<sup>4</sup>

The weak points of intern training conducted in the Department of Internal Medicine, NTUH were revealed by analysis obtained from their logbooks. We need to provide the students with the opportunities to learn by direct care in these items which a lot of students had not learnt. A portfolio requires mentoring and frequent student feedback to facilitate reflective learning. We need to modify our learning passports to evaluate the interns by portfolios in addition to the logbooks. Besides that, we will assess the students by more OSCE rather than just paper and pencil test. We will check the learning passports of interns when they apply for residency. The teachers will need to be trained to develop the skill of teaching in a mentoring style and give timely feedback to the students.

In conclusion, the weak points of intern training conducted in the Department of Internal Medicine, NTUH were revealed by analysis obtained from their logbooks. We need to strengthen the learning of interns in these particular areas and assess their performance based on the use of portfolio.

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