

# The Pedagogical Value of a Student-run Community-based Experiential Learning Project: The Yong Loo Lin School of Medicine Public Health Screening

Liang En Wee,<sup>1</sup> Wei Xin Yeo,<sup>1</sup> Clifton M Tay,<sup>1</sup> Jeannette J M Lee,<sup>2</sup> *MBBS, FRCGP, MD*, Gerald C H Koh,<sup>2</sup> *MBBS, MMed, FCFP*

## Abstract

**Introduction:** We assessed the pedagogical value of a student-led community-based experiential learning project called the Public Health Screening (PHS) run by medical and nursing students of the National University of Singapore's Yong Loo Lin School of Medicine (NUS YLLSoM). **Materials and Methods:** We conducted a cross-sectional study using a self-administered anonymised questionnaire on medical and nursing students who participated in PHS using the Fund for the Improvement of Postsecondary Education (FIPSE) Survey Instrument. Participants also gave an overall score for their learning experience at the PHS. **Results:** The participation rate was 93.1% (576/619) for medical students and 100% (37/37) for nursing students. All participants gave the PHS learning experience a high rating (median = 8 out of maximum of 10, inter-quartile range, 7 to 9). A majority of participants felt that PHS had helped them to improve across all domains surveyed. For medical students, those in preclinical years and females were independently more likely to feel that PHS had helped them to improve in communication skills, teamwork, ability to identify social issues, taking action, and gaining and applying their knowledge than those in clinical years and males. Improved ability to interact with patients ( $\beta=1.64$ , 95%CI, 1.01-2.27), appreciation of challenges to healthcare faced by Singaporeans from lower income groups ( $\beta=0.93$ , 95%CI, 0.49-1.37), thinking of others ( $\beta=0.70$ , 95%CI, 0.04-1.37) and tolerance of different people ( $\beta=0.63$ , 95%CI, 0.17-1.10) were strongly associated with the overall rating score. **Conclusion:** PHS was a positive learning experience in a wide range of domains for all students involved. This suggests that student-organised community-based experiential learning projects have potential educational value for both medical and nursing students.

Ann Acad Med Singapore 2010;39:686-91

**Keywords:** Medical education, Student-led, Voluntarism and skills

## Introduction

Experiential learning brings medical students out of the comfort zone of learning in their classrooms to acquire and apply knowledge and skills in an immediate and relevant setting. By linking theory and practice, experiential education differs from the traditional education in that it actively engages students in experiences that have benefits and consequences. Students are given the opportunity to make discoveries themselves instead of relying on others' experiences.<sup>1</sup> Such experiential learning projects can also serve the twin aims of medical education and providing a much needed service to the community.<sup>2-5</sup>

The Medical Students' Society (MedSoc) of the National University of Singapore's Yong Loo Lin School of Medicine

(NUS YLLSoM) initiated a community service project called the Public Health Screening (PHS) in 2000 that offers participating students a chance for experiential learning. Since its inception, it has been run by medical students with nursing students joining in when the Alice Lee Centre for Nursing Studies became a part of NUS YLLSoM in 2006. In the Public Health Screening (PHS), medical and nursing students conduct free health screenings that are open to walk-in members of the public. These screenings are located in high human traffic areas within public housing estates (e.g. shopping centres, bus interchanges) and more than 2000 people are screened annually. The PHS focuses on 3 components: the patient's lifestyle (e.g. diet, exercise, smoking and alcohol consumption), current medical history

<sup>1</sup> Yong Loo Lin School of Medicine, National University of Singapore, National University Health System, Singapore

<sup>2</sup> Department of Epidemiology and Public Health, Yong Loo Lin School of Medicine, National University of Singapore, National University Health System, Singapore

Address for Correspondence: Dr Gerald Choon-Huat Koh, Block MD3, #03-20, 16 Medical Drive, Department of Epidemiology and Public Health, Yong Loo Lin School of Medicine, National University of Singapore, National University Health System, Singapore 117597.

Email: ephkohch@nus.edu.sg

and outstanding medical issues, and screening for chronic diseases (i.e. hypertension, diabetes, hyperlipidemia and colorectal and cervical cancers). At the end of the screening session, students provide advice and counsel to modify unhealthy lifestyles and, together with registered doctors and nurses, refer patients to primary care physicians for follow-up whenever necessary. In the process, students learn both hard skills such as performing clinical procedures and soft skills such as communication, ethics and empathy. Over the years, the PHS has become an educational opportunity to provide a window into patient care and patient interaction, especially for preclinical medical students as PHS is often their first exposure to patient interaction in a real life setting. Currently, the educational value of such experiential learning projects for Singaporean medical and nursing students is still unknown. We assessed the pedagogical value of PHS to NUS YLLSoM students to obtain insights into the learning they may derive from such projects.

### Materials and Methods

We conducted a cross-sectional study using a self-administered anonymised questionnaire on all medical and nursing students who participated in Public Health Screening (PHS) in August 2009. The questionnaire was developed by the authors over 3 months via face-to-face and online discussions. We also reviewed current literature on the pedagogical value of experiential learning projects. The questionnaires were developed mainly from the Fund for the Improvement of Postsecondary Education (FIPSE) Survey Instrument.<sup>6</sup> It contains a total of 7 domains: leadership skills, communication skills, teamwork, critical thinking skills, ability to identify social issues, action skills and ability to see consequences. One of the components, The Ability Scale (AS), was previously used to measure the learners' subjective evaluation of skills acquired from a community service learning programme in Taiwan.<sup>7</sup> We modified some of the questions for local usage (e.g. referring to Singaporeans instead of Americans). We were also interested in assessing 2 additional domains: gaining and application of knowledge and whether the PHS taught students specific clinical skills (e.g. performing procedures such as blood pressure taking) so questions examining these areas were included in our questionnaire. All questions used a 4-point Likert scale (agree, unsure but tend to agree, unsure but tend to disagree and disagree) but we collapsed each pair of responses into 2 categories (agree vs disagree) for analysis. Finally, students were asked to give an overall rating score for their learning experience at the PHS on a scale of 1 to 10, with 1 being the worst and 10 being the best. They were asked to complete the questionnaire immediately after their allocated shift during the PHS. Ethics approval to conduct the study was obtained from the NUS Institutional Review Board and participation was entirely voluntary.

### Statistical Analysis

Descriptive statistics were computed for medical students and nursing students. For medical students, chi-square analysis was used to compare between genders and between pre-clinical (1st and 2nd year) and clinical (3rd to 5th year) students. As all nursing students who participated in the PHS were female and were either from 1st or 3rd year, we compared female students between 1st year nursing and medicine, and between 3rd year nursing and medicine, thus controlling for gender and year of study. The average (median) overall rating of the learning experience from PHS compared between groups using Mann-Whitney U Test. We used logistic regression to determine the independent demographic factors associated with each learning domain and backward linear regression to determine the main learning domains which were independently associated with the final overall rating of the PHS learning experience. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS, Version 17.0, USA) and statistical significance was set at the conventional  $P < 0.05$ .

### Results

The majority of the students who participated in the PHS also completed the survey instrument (participation rate = 93.1% (576/619) for medical students and 100% (37/37) for nursing students). The profile of the student participants is detailed in Table 1. The gender distribution for medical students was almost equal but all nursing student respondents were female. For medical students, a larger proportion was preclinical students (59.9%) and for nursing students, only students from 1st and 3rd year were represented.

For medical students, there were significant differences in the pedagogical value of PHS by previous clinical exposure and gender (Table 2). Compared to clinical students, pre-clinical students were more likely to feel that PHS had helped them to improve in the areas of leadership, communication

Table 1. Profile of Study Population

Characteristic	Students, n (%)		
	Medical (n = 576)	Nursing (n = 37)	Total (n = 613)
Gender			
Male	318 (55.2)	0 (0.0)	318 (51.9)
Female	258 (44.8)	37 (100)	295 (48.1)
Year of Study			
1 <sup>st</sup>	189 (32.8)	23 (62.2)	212 (34.6)
2 <sup>nd</sup>	156 (27.1)	0 (0.0)	156 (25.4)
3 <sup>rd</sup>	124 (21.5)	14 (37.8)	138 (22.5)
4 <sup>th</sup>	79 (13.7)	N.A	79 (12.9)
5 <sup>th</sup>	28 (4.9)	N.A	28(4.6)

Table 2. Pedagogical Value of Public Health Screening (PHS) for Medical Students

Domains	n (%) who agreed	Preclinical vs clinical		Females vs males	
		OR (95% CI)	P value	OR (95% CI)	P value
<b>Leadership skills</b>					
Feel responsible for others in the community	502 (87.2)	1.81 (0.70-4.67)	0.231	1.28 (0.49-3.35)	0.810
Improve my leadership skills	386 (67.0)	1.82 (1.22-2.72)	0.004	1.18 (0.79-1.76)	0.474
<b>Communication skills</b>					
Participate in community affairs	478 (83.0)	1.86 (0.94-3.68)	0.080	1.64 (0.80-3.35)	0.223
Develop communication, listening and negotiation skills	487 (84.5)	2.55 (1.14-5.68)	0.026	3.72 (1.39-9.98)	0.005
<b>Teamwork</b>					
Think of others	459 (79.7)	2.17 (1.26-3.71)	0.006	4.87 (2.42-9.82)	<0.001
Appreciate teamwork and co-operation among peers	477 (82.8)	2.08 (1.06-4.06)	0.039	2.36 (1.12-4.96)	0.026
Be tolerant of different people	468 (81.3)	2.68 (1.43-5.02)	0.002	2.75 (1.36-5.55)	0.005
Respect different opinions	462 (80.2)	1.35 (0.75-2.42)	0.365	2.76 (1.40-5.41)	0.002
Compromise	447 (77.6)	1.35 (0.80-2.28)	0.282	1.39 (0.77-2.25)	0.350
Comprehend the moral and ethical issues in health care	348 (60.4)	1.10 (0.76-1.60)	0.630	1.41 (0.96-2.06)	0.085
<b>Ability to see consequences</b>					
Think about the future	399 (69.3)	1.84 (1.22-2.78)	0.004	1.45 (0.95-2.22)	0.092
<b>Critical thinking skills</b>					
Think critically	415 (72.0)	1.25 (0.80-1.96)	0.355	1.45 (0.91-2.29)	0.136
<b>Ability to identify social issues</b>					
Identify social issues and concerns	411 (71.4)	1.10 (0.71-1.71)	0.734	2.51 (1.55-4.07)	<0.001
<b>Action skills</b>					
Take action	469 (81.4)	1.98 (1.07-3.65)	0.029	1.73 (0.91-3.30)	0.119
Build confidence & take on new responsibilities	445 (77.3)	2.20 (1.30-3.71)	0.003	2.53 (1.41-4.53)	0.001
<b>Gaining of knowledge</b>					
Appreciate and identify gaps or deficiencies in healthcare system	380 (66.0)	1.64 (1.10-2.44)	0.018	1.68 (1.12-2.54)	0.015
Appreciate challenges to healthcare faced by poorer Singaporeans	421 (73.1)	1.94 (1.25-3.01)	0.004	3.02 (1.84-4.97)	0.000
Appreciate my own health, living condition	423 (73.4)	1.62 (1.01-2.57)	0.055	2.54 (1.52-4.25)	0.000
Improve knowledge on long-term management of chronic diseases	362 (62.8)	1.47 (1.00-2.14)	0.052	1.46 (0.99-2.14)	0.067
<b>Application of knowledge</b>					
Improve my ability to interact with patients	453 (78.6)	1.55 (0.93-2.59)	0.111	4.33 (2.26-8.30)	<0.001
Improve my ability to interact with patient's family/relatives	385 (66.8)	1.62 (1.09-2.41)	0.019	1.69 (1.12-2.55)	0.011
Be more confident in counselling patients to adopt healthy lifestyles	397 (68.9)	1.36 (0.90-2.04)	0.171	1.64 (1.07-2.49)	0.022
Clearly understand criteria for recommending screening tests	412 (71.5)	1.59 (1.04-2.44)	0.037	2.48 (1.56-3.94)	<0.001
Appreciate need to extend psychosocial help to patients	367 (63.7)	1.40 (0.96-2.06)	0.093	1.89 (1.27-2.80)	0.002
Be more confident in encouraging patient compliance	405 (70.3)	1.50 (0.99-2.27)	0.068	1.77 (1.15-2.73)	0.011
Improve my ability to make a clinical diagnosis	318 (55.2)	0.96 (0.67-1.38)	0.853	1.52 (1.05-2.19)	0.028
Improve my ability to carry out clinical procedures	334 (58.0)	1.00 (0.69-1.45)	1.000	1.80 (1.24-2.62)	0.002

skills, teamwork, ability to see consequences, taking action; appreciating gaps and deficiencies in the healthcare system and challenges to healthcare faced by Singaporeans from the lower income groups; and thereby giving them the opportunity to apply their knowledge in interaction with the

patient's family or relatives and recommending patients to undergo the appropriate screening tests. Females were more likely than males to agree that the PHS had helped them to acquire skills in the domains of communication skills, teamwork, identifying social issues, taking action, and in

the gaining and application of knowledge domains. For the domains in which there were significant differences both by gender and clinical exposure, logistic regression modeling showed that their effects were independent of each other.

We did not compare nursing students by gender because there were no male nursing participants. However, the majority of nursing students who participated felt that PHS had helped them to improve and learn in all areas, with most agreeing that the PHS had helped them to clearly understand the criteria for recommending patients to undergo screening tests and develop communication, listening and negotiation skills (100%), and the least agreeing that the PHS had helped them to improve their knowledge on long-term management of patients with chronic diseases (59.5%). More 1st year nursing than 1st year medicine female students agreed that the PHS had helped them to learn how to comprehend the moral and ethical issues in healthcare (OR, 1.49, 95% CI, 1.28-1.74,  $P=0.001$ ) and to compromise during teamwork (OR, 1.23, 95% CI, 1.12-1.37,  $P=0.020$ ), whereas more 3rd year medicine than 3rd year nursing female students felt that the PHS had helped them to appreciate the challenges to healthcare faced by the lower income groups (OR, 5.75, 95% CI, 1.59-20.87,  $P=0.009$ ) and improve their knowledge on long-term management of patients with chronic diseases (OR, 6.17, 95% CI, 1.67-22.75,  $P=0.005$ ).

All participants gave strongly positive overall rating for the PHS (median = 8 out of maximum of 10, inter-quartile range [IQR] = 7-9). For medical students, there were significant differences in the rating of the PHS learning experience by clinical exposure: Preclinical students rated PHS higher than clinical students (median = 8 [IQR = 7-9] vs median = 8 [IQR = 6-8],  $P<0.001$ ). For nursing students, 1st year students rated the educational experience of PHS higher than 3rd year students (median = 9 [IQR = 8-9] vs median = 6 [IQR = 6-8],  $P<0.001$ ). When 1st year nursing students were compared against 1st year medical female students, there were no differences in the overall PHS rating. However, the difference between 3rd year nursing and 3rd year medical female students was significantly different (median = 6 [IQR = 6-8] vs median = 8 [IQR = 7-8],  $P=0.018$ ).

With regards to which responses to individual questions were independently associated with the final overall rating of PHS, improved ability to interact with patients ( $\beta=1.64$ , 95% CI, 1.01-2.27), appreciation of challenges to healthcare faced by the lower income groups ( $\beta=0.93$ , 95% CI, 0.49-1.37), thinking of others ( $\beta=0.70$ , 95% CI, 0.04-1.37) and tolerance of different people ( $\beta=0.63$ , 95% CI, 0.17-1.10) were strongly associated with the final overall rating.

## Discussion

Overall, majority of medical students felt that the PHS

had helped them to improve and learn in all areas. Uniquely, the PHS is an experiential learning project where students are responsible for all levels of the project, from design to organisation and implementation. This would explain why all students felt that it had helped them to acquire leadership skills and equipped them with the ability to take action, in addition to skills that they learned from the health screening itself (e.g. communication skills, teamwork). Where the PHS stood out was in the domains of communication skills, teamwork and action skills, close to 80% of participants reported gains. Conversely, this experiential learning project was less effective in teaching participants how to make a clinical diagnosis and carry out clinical procedures (55% to 58%), which was natural as the primary emphasis of the PHS was more on patient interaction. The learning experiences from such projects would thus supplement, not supplant, the traditional pedagogical methods, and experiential learning should be seen as a means of giving medical students the opportunity to acquire valuable skills that are not easily taught in a lecture-based setting, such as communication skills, being a team player, and self-confidence.

It appears that among Singapore medical students, females were more confident in learning the “softer” skills such as counselling the patient on lifestyle changes, encouraging patient compliance, knowing when the patient needed psychosocial help and empathizing with patients. Our findings echo a study by Kataoka et al<sup>8</sup> which found that female Japanese medical students were more empathetic than their male counterparts and another study on Singaporean medical students which found that females were more patient-centred.<sup>9</sup> Similarly, amongst Swedish undergraduate medical students, females had learnt more about communications skills in medical school compared to their male counterparts.<sup>10</sup>

Generally, in our study, the preclinical students had a better learning experience than clinical students. In particular, preclinical students especially felt that the PHS had helped them to gain knowledge about gaps/deficiencies in the local healthcare system, and understand the challenges that the lower income groups faced in obtaining access to healthcare. This was slightly different from the findings of Kataoka et al<sup>8</sup> and Cheong SK et al,<sup>11</sup> who reported that for Asian medical students’ attitudes towards various aspects of patient care either increased or had no difference, respectively, in relation to the amount of time in medical school. However, our findings were similar to studies from Western medical schools which suggested that attitudes were less positive amongst upper-year medical students.<sup>12-14</sup> A likely explanation is that clinical students who had more exposure to patients and patient care during their clinical rotations in the hospital felt that PHS had less to teach them. On the other hand, PHS was a surrogate for

early clinical exposure and interaction with patients for pre-clinical students and thus they had relatively more to learn from it.

The learning experience for both medical and nursing students was surprisingly similar, with only a few differences. A possible reason could be because of the close cooperation between nursing and medical students who were allocated the same tasks and had to work side by side, leading to the achievement of similar learning outcomes for both groups of students. Nevertheless, our finding suggests that student-initiated experiential learning projects like the PHS are useful in the education of both medical and nursing students.

Given that experiential-learning projects with a community service component have value in undergraduate medical education, one way towards the improvement of the educational experience could be to consider the possibility of incorporating such projects into a service-learning framework.<sup>1</sup> In such a framework, the educational component would be formally integrated into coursework and student reflection would be more structured, involving some level of faculty guidance.<sup>15-17</sup> Drawing on experience elsewhere, this has the potential to increase student motivation and levels of communication between the teachers and the future clinicians, by letting students become partners in curriculum development and evaluation.<sup>18,19</sup> However, a possible tradeoff might be that with greater faculty involvement, some of the opportunities for students to learn organisational skills like leadership and action skills might be reduced. This transition would also hinge on the availability of faculty and senior doctors to act as mentors and facilitators in guiding the students' reflections and development. The future role of experiential-learning projects in undergraduate medical education in Singapore would thus have to evolve with this constraint in mind.

A limitation of our study was that as we did not collect longitudinal data on the long-term outcomes of this experiential-learning project, the pedagogical gains may not be sustainable. Furthermore, learning outcomes were self-reported and not objectively tested, and thus subjective. As participation in PHS was purely voluntary, those who participated were probably a self-selected group who was more likely to report a positive learning experience. However, because a significant proportion of the student body participated in PHS (especially for those in pre-clinical years with participation rates of 60% to 70%), the results reported are likely to be representative of the student body at large.

## Conclusion

In conclusion, the PHS was a positive learning experience

in a wide range of domains for all students involved. In particular, this experiential learning project was particularly effective in teaching empathy and concern for the community-improvement in these aspects was strongly associated with students' overall rating of the PHS experience. This suggests both that the PHS was an effective tool in teaching empathy and concern for the community, and that the medical/nursing students highly valued their learning in these areas. This indicates that student initiated and organised community-based experiential learning projects have potential values in meeting the educational needs of medical and nursing students, not just to learn clinical competencies but also to acquire softer skills such as appreciation of the challenges faced by the lower income groups, leadership and pro-activeness. We hope that the lessons learned by these students from the PHS would encourage them to continue playing a proactive role in serving the community after graduation.<sup>20</sup>

## Acknowledgement

*We thank all the students from the National University of Singapore Yong Loo Lin School of Medicine who participated in Public Health Screening and the study, and the Public Health Screening Organising Committee for supporting this study. We would also like to thank Dr Adeline Seow for her support and advice on the study.*

## REFERENCES

1. Cashman SB, Seifer SD. Service Learning—an integral part of undergraduate public health. *Am J Prev Med* 2008;35:273-8.
2. Sheu LC, Toy BC, Kwahk E, Yu A, Adler J, Lai CJ. A model for interprofessional health disparities education: student-led curriculum on chronic hepatitis B infection. *J Gen Intern Med* 2010;25:S140-5.
3. Cené CW, Peek ME, Jacobs E, Horowitz CR. Community-based teaching about health disparities: combining education, scholarship, and community service. *J Gen Intern Med* 2010;25:S130-5.
4. Haq CL, Cleeland L, Gjerde CL, Goedken J, Poi E. Student and faculty collaboration in a clinic for the medically underserved. *Fam Med* 1996;28:570-4.
5. Peek ME. An innovative partnership to address breast cancer screening among vulnerable populations. *Educ Health (Abingdon)* 2007;20:52.
6. Eyler J, Giles DE. *Where's the Learning in Service-Learning?* San Francisco: Jossey-Bass. 1999.
7. Leung KK, Liu WJ, Wang WD, Chen CY. Factors affecting students' evaluation in a community service-learning program. *Adv Health Sci Educ* 2007;12:475-90.
8. Kataoka HU, Koide N, Ochi K, Hojat M, Gonnella JS. Measurement of empathy among Japanese medical students: psychometrics and score differences by gender and level of medical education. *Acad Med* 2009;84:1192-7.
9. Lee KH, Seow A, Luo N, Koh D. Attitudes towards the doctor-patient relationship: a prospective study in an Asian medical school. *Med Educ* 2008;42:1092-9.

10. Hoppe A, Persson E, Birgegård G. Medical interns' view of their undergraduate medical education in Uppsala: an alumnus study with clear attitude differences between women and men. *Med Teach* 2009;31:426-32.
  11. Cheong SK, Wong TY, Koh GC. Attitudes towards the elderly among Singapore medical students. *Ann Acad Med Singapore* 2009;38:857-61.
  12. Crandall SJ, Davis SW, Broeseker AE, Hildebrandt C. A longitudinal comparison of pharmacy and medical students' attitudes toward the medically underserved. *Am J Pharm Educ* 2008;72:148.
  13. Crandall SJ, Volk RJ, Loemker V. Medical students' attitudes toward providing care for the underserved. Are we training socially responsible physicians? *JAMA* 1993;269:2519-23.
  14. O'toole TP, Hanusa BH, Gibbon JL, Boyles SH. Experiences and attitudes of residents and students influence voluntary service with homeless populations. *J Gen Intern Med* 1999;14:211-6.
  15. Haq C, Grosch M, Carufel-Wert D. Leadership Opportunities with Communities, the Medically Underserved, and Special Populations (LOCUS). *Acad Med* 2002;77:740.
  16. Brill JR, Jackson TC, Stearns MA. Community medicine in action: an integrated, fourth-year urban continuity preceptorship. *Acad Med* 2002;77:739.
  17. Young S, Bates T, Wolff M, Maurana CA. Service-learning in healthy aging for medical students and family medicine residents. *Educ Health (Abingdon)* 2002;15:353-61.
  18. Toker A, Urkin J, Bloch Y. Role of a medical students' association in improving the curriculum at a faculty of health sciences. *Med Teach* 2002;24:634-6.
  19. Albritton TA, Wagner PJ. Linking cultural competency and community service: a partnership between students, faculty, and the community. *Acad Med* 2002;77:738-9.
  20. Brill JR, Ohly S, Stearns MA. Training community-responsive physicians. *Acad Med* 2002;77:747.
-