

# Financial burden and financial aid for medical students in Singapore: a national survey across all three medical schools

Yeong Tze Wilnard Tan<sup>1</sup>, MBBS, Andrew Arjun Sayampanathan<sup>2</sup>, MBBS, Kannan Chidambaram<sup>3</sup>, MBBS, Yun Qing Koh<sup>1</sup>, MBBS, Jie Ming Nigel Fong<sup>2</sup>, MBBS(Hons), Jinrong Ivan Low<sup>1</sup>, MBBS, Chew Lip Ng<sup>3</sup>, MBBS, MRCSed, Paul Ananth Tambyah<sup>3</sup>, MD

**INTRODUCTION** Singapore has had three medical schools since 2013. We undertook a cross-sectional quantitative national survey to determine the financial impact of medical education on medical students in Singapore.

**METHODS** All 1,829 medical students in Singapore were invited to participate in this study. Information on demographics, financial aid utilisation and outside work was collected and analysed.

**RESULTS** 1,241 (67.9%) of 1,829 students participated in the survey. While the overall proportion of students from households with monthly incomes < SGD 3,000 was only 21.2% compared to the national figure of 31.4%, 85.4% of medical students expected to graduate with debts > SGD 75,000. There were significant differences in per capita incomes among the schools, with 54.5%, 23.3% and 7.8% of Duke-NUS Medical School (Duke-NUS), NUS Yong Loo Lin School of Medicine (NUS Medicine) and Lee Kong Chian School of Medicine (LKCMedicine) students, respectively, reporting a per capita income of < SGD 1,000 ( $p < 0.001$ ). There were significant differences in financial support: 75.0%, 34.1% and 38.8% of Duke-NUS, NUS Medicine and LKCMedicine students, respectively, received financial aid ( $p < 0.001$ ). The top reasons for not applying for aid included a troublesome application process (21.4%) and the perception that it would be too difficult to obtain (21.0%).

**CONCLUSION** Students in the three medical schools in Singapore differ in their financial needs and levels of financial support received. A national approach to funding medical education may be needed to ensure that financial burdens do not hamper the optimal training of doctors for Singapore's future.

Keywords: medical education, medical schools, national survey

## INTRODUCTION

Since 2013, Singapore has had three medical schools. Medical education in Singapore dates back to 1905 when one medical school supplied the country's needs for more than 100 years. Medical students worldwide face the threat of increasing tuition fees,<sup>(1,2)</sup> and Singapore is no exception (Table I). In academic year (AY) 2015/2016, the nation's two local undergraduate medical schools announced a higher annual increment in tuition fees compared with other courses.<sup>(3)</sup> In National University of Singapore (NUS), a typical undergraduate pays a total of SGD 31,800 for a four-year course, but a medical undergraduate has to pay SGD 127,000 of tuition fees for the five-year course, after subsidies.

The ever-increasing medical school tuition fees have contributed to growing debt among medical students.<sup>(4)</sup> A study by Ng et al<sup>(4)</sup> in 2007, which surveyed medical students from NUS Yong Loo Lin School of Medicine (NUS Medicine), found that 31.1% of medical students took loans to pay for tuition fees and would graduate with significant debt. Studies conducted outside Singapore have shown that this financial debt influences the current mental health of medical students as well as their career decisions, lifestyle choices and willingness to work in underserved sectors of society.<sup>(5-9)</sup> Students who do not complete their medical studies for reasons such as poor academic results,

**Table I. A five-year trend of tuition fees per annum for an MBBS degree in Yong Loo Lin School of Medicine (Singapore citizens).<sup>(3)</sup>**

Academic yr	Full tuition fee (SGD)	Government tuition grant (SGD)	Amount payable by student (SGD)
11/12	109,510	89,000	20,510
12/13	116,100	94,360	21,740
13/14	123,050	100,000	23,050
14/15	129,200	105,000	24,200
15/16	135,650	110,250	25,400

poor fit for a medical career and professionalism-based reasons are also greatly affected, as they face not only great debt but also liquidation damages in view of their service obligations.

To ameliorate the impact of rising medical school tuition fees, various financial assistance schemes – in the form of scholarships, bursaries and loans – have been made available to medical students (Appendix).<sup>(10-17)</sup> The support provided by each financial assistance scheme varies and is offered to students depending on their household income, previous academic grades, citizenship status and medical school.

Despite the existence of these financial assistance schemes, several reports have reported a disproportionate distribution of medical students based on socioeconomic backgrounds. The study performed by Ng et al<sup>(4)</sup> found that a significant proportion

<sup>1</sup>Department of Medicine, Tan Tock Seng Hospital, <sup>2</sup>Division of Medicine, Singapore General Hospital, <sup>3</sup>Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

**Correspondence:** Dr Tan Yeong Tze Wilnard, Resident, Department of Medicine, Tan Tock Seng Hospital. 11 Jalan Tan Tock Seng, Singapore 308433. wilnardtyt@gmail.com

of students from NUS Medicine originate from higher-income households. This has raised concerns about the equity of access and the profession's wider ability to understand and solve major community health issues in the future.<sup>(2)</sup>

Since the 2007 study,<sup>(4)</sup> there has been no study comparing the financial burden and extent of financial aid among the three medical schools currently present in Singapore. Singapore currently has two undergraduate medical schools, namely Lee Kong Chian School of Medicine (LKCMedicine), which is part of Nanyang Technological University (NTU), and NUS Medicine, and one graduate medical school, Duke-NUS Medical School (Duke-NUS). Both NUS Medicine and Duke-NUS are part of NUS. This paper aims to provide an update on the financial status of medical students from all three medical schools in Singapore. We also explore the financial support available to medical students in each school.

## METHODS

A quantitative survey was conducted on all medical students in Singapore from Duke-NUS, LKCMedicine and NUS Medicine. Questionnaires were distributed to all medical students in 2014. A participant information sheet was provided to all potential participants in this study. An in-person briefing regarding the study was provided to all participants before the invitation to participate.

The questionnaire was developed to elucidate the financial situation of medical students across Singapore. Demographic

data, together with information regarding household income, general expenses, and the impact of tuition fees and other expenses related to medical education, was collected. Anonymity of the participants was ensured for the purpose of participant confidentiality. Students were required to indicate only their year of study but not their names or personal identification numbers.

All data collected was analysed using IBM SPSS Statistics version 22.0 (IBM Corp, Armonk, NY, USA), using chi-square test to determine significance in differences between groups. A p-value < 0.05 was considered statistically significant.

This study received institutional review board (IRB) approval from both NUS (IRB-13-533) and NTU (IRB-2014-07-015). A participant information sheet was provided, but no signed consent form was collected. At no point were participants asked to reveal their names or other identifiable information; only anonymised data was collected.

## RESULTS

A total of 1,829 medical students were enrolled in the three schools at the point of data collection in 2014, with 252 (13.8%), 132 (7.2%) and 1,445 (79.0%) medical students in Duke-NUS, LKCMedicine and NUS Medicine, respectively. A total of 1,241 medical students (average response rate 67.9%) provided valid responses to our survey, consisting of 156 medical students from Duke-NUS, 129 medical students from LKCMedicine and 956 medical students from NUS Medicine (Table II). An adequate response rate was garnered from the three schools, with a good spread of respondents from across the various classes where possible. The Class of 2019 for Duke-NUS had not matriculated at the time of survey distribution.

In terms of household income, our results indicated that a significant proportion of medical students came from affluent families, with 54.4% of medical students coming from households with a monthly income > SGD 7,000 (Table III). On the other hand, 21.2% of medical students were from households with a monthly income < SGD 3,000. The proportion of Duke-NUS students coming from a household where the per capita income was < SGD 1,000 was 54.5%, compared to 23.3% in NUS Medicine and 7.8% in LKCMedicine (p < 0.001).

**Table II. Distribution of respondents across the schools.**

Class of	No. (%)			
	NUS Medicine (n = 956)	LKC-Medicine (n = 129)	Duke-NUS (n = 156)	Total (n = 1,241)
2015	127 (13.3)	NA	29 (18.6)	156 (12.6)
2016	158 (16.5)	NA	34 (21.8)	192 (15.5)
2017	249 (26.0)	NA	34 (21.8)	249 (20.1)
2018	199 (20.8)	54 (41.9)	59 (37.8)	199 (16.0)
2019	223 (23.3)	75 (58.1)	NA	223 (18.0)

NA: not applicable

**Table III. Household income distribution across the schools.**

Income (SGD)	No. (%)			
	NUS Medicine (n = 956)	LKCMedicine (n = 129)	Duke-NUS (n = 156)	Total (n = 1,241)
<b>Total household</b>				
Retired	23 (2.4)	3 (2.3)	4 (2.6)	30 (2.4)
< 3,000	182 (19.0)	8 (6.2)	73 (46.8)	263 (21.2)
3,000–5,000	96 (10.0)	5 (3.9)	28 (17.9)	129 (10.4)
5,000–7,000	109 (11.4)	16 (12.4)	19 (12.2)	144 (11.6)
> 7,000	546 (57.1)	97 (75.2)	32 (20.5)	675 (54.4)
<b>Per capita</b>				
Retired	23 (2.4)	3 (2.3)	4 (2.6)	30 (2.4)
< 1,000	223 (23.3)	10 (7.8)	85 (54.5)	318 (25.6)
> 1,000	643 (67.3)	111 (86.0)	57 (36.5)	811 (65.4)
Unavailable	67 (7.0)	5 (3.9)	10 (6.4)	82 (6.6)

**Table IV. Total student debt to be paid upon graduation.**

Student debt (SGD)	No. (%)			
	NUS Medicine (n = 349)	LKCMedicine (n = 45)	Duke-NUS (n = 120)	Total (n = 514)
< 25,000	10 (2.9)	0 (0.0)	5 (4.2)	15 (2.9)
25,000–49,999	9 (2.6)	3 (6.7)	8 (6.7)	20 (3.9)
50,000–74,999	30 (8.6)	3 (6.7)	4 (3.3)	37 (7.2)
75,000–99,999	105 (30.1)	2 (4.4)	13 (10.8)	120 (23.3)
> 100,000	192 (55.0)	37 (82.2)	90 (75.0)	319 (62.1)
Unavailable	3 (0.9)	0 (0)	0 (0)	3 (0.6)

**Table V. Means of financial support.**

School	No. (%)					
	Receiving financial aid			Study loan		
	Yes	No	Unavailable	Yes	No	Unavailable
NUS Medicine	326 (34.1)	620 (64.9)	10 (1.0)	349 (36.5)	598 (62.6)	9 (0.9)
LKCMedicine	50 (38.8)	78 (60.5)	1 (0.8)	45 (34.9)	83 (64.3)	1 (0.8)
Duke-NUS	117 (75.0)	39 (25.0)	0 (0)	120 (76.9)	36 (23.1)	0 (0)
Total	493 (39.7)	737 (59.4)	11 (0.9)	514 (41.4)	717 (57.8)	10 (0.8)

**Table VI. Barriers to application of financial aid.**

Reason	NUS Medicine (n = 765)	LKCMedicine (n = 93)	Duke-NUS (n = 33)	Total (n = 891)
No need to apply	502 (65.6)	63 (67.7)	13 (39.4)	578 (64.9)
Too troublesome to apply	174 (22.7)	3 (3.2)	14 (42.4)	191 (21.4)
Don't want to disclose financial details	31 (4.1)	1 (1.1)	11 (33.3)	43 (4.8)
Too little assistance	24 (3.1)	0 (0)	7 (21.2)	31 (3.5)
Difficult to obtain	157 (20.5)	19 (20.4)	11 (33.3)	187 (21.0)

**Table VII. Work and its related impact.**

	No. (%)			
	NUS Medicine	LKCMedicine	Duke-NUS	Total
<b>Have to work (tuition)</b>	138 (14.4)	13 (10.1)	10 (6.4)	161 (13.0)
Negatively affects studies	51 (37.0)	4 (30.8)	7 (70.0)	62 (38.5)
Does not negatively affect studies	83 (60.1)	8 (61.5)	3 (30.0)	94 (58.4)
Unavailable	4 (2.9)	1 (7.7)	0 (0)	5 (3.1)
<b>Do not have to work</b>	818 (85.6)	116 (89.9)	146 (93.6)	1,080 (87.0)

The tuition fees per annum at Duke-NUS, LKCMedicine and NUS Medicine for AY 2015–2016 (Singapore citizens) were SGD 43,050, SGD 32,700 and SGD 25,400, respectively.<sup>(3,17-19)</sup> Students obtained financial support from work, tuition fees grants or study loans. The amount of student debt they expected to pay upon graduation is shown in Table IV. Comparing the number of medical students who received financial assistance among the three medical schools in Singapore, 75.0% of medical students from Duke-NUS received financial aid of some sort. On the other hand, only 34.1% and 38.8% of medical students from NUS Medicine and LKCMedicine received financial aid, respectively ( $p < 0.001$ ) (Table V).

The barriers to application of financial aid were analysed (Table VI). A total of 71.8% ( $n = 891$ ) of all medical students surveyed did not apply for financial aid. Out of these students, the

ones who did not need to apply were excluded. The remaining 35.1% of students did not apply for financial aid despite needing to do so. The majority of students who did not apply for financial aid were from NUS Medicine. The top two reasons given for not applying were: (a) financial aid was too troublesome to apply for (21.4% of medical students; the main reason for students from NUS Medicine and Duke-NUS) and (b) financial aid was too difficult to get (21.0% of medical students; the main reason for students from LKCMedicine).

Regarding the need to work, 14.4% of students from NUS Medicine were noted to engage in some form of work, as compared to 10.1% of LKCMedicine and 6.4% of Duke-NUS students (Table VII). 70.0%, 37.0% and 30.8% of Duke-NUS, NUS Medicine and LKCMedicine students; respectively, who worked stated that their work negatively affected their studies.

## DISCUSSION

The medical education landscape in Singapore has changed considerably in the last five years. Medical tuition fees and the extent of financial support provided to students via financial assistance schemes (Appendix) vary across the three medical schools. In this study, we aimed to investigate the financial status of medical students in the three Singapore medical schools and the impact of financial aid schemes in reducing the burden of medical school fees.

Our results in Table III indicate that a significant proportion of medical students came from affluent families, with 54.4% of medical students from households with a monthly income > SGD 7,000. This is comparable to the national figure of 51.8%.<sup>(20)</sup> On the other hand, 21.2% of medical students came from households with a monthly income < SGD 3,000. Correspondingly, 31.4% of Singaporeans came from households with a monthly income < SGD 3,000.<sup>(20)</sup> This shows that the lower-income group is underrepresented in medical schools in Singapore, a trend that has also been observed in medical schools abroad.<sup>(2,21-24)</sup> A plausible reason is that medical school tuition fees are significantly higher than that of many other courses, which may deter students from lower-income families. This is undesirable, as the high cost of tuition fees should not deter deserving students from an opportunity to attend medical school.<sup>(1,2,22)</sup> There may also be other factors contributing to this that are beyond the scope of this study.

Underrepresentation of low-income students can lead to a loss of socioeconomic diversity among medical students in Singapore. Although no formal studies have been conducted locally, this has been a concern internationally.<sup>(2,24)</sup> Some concerns include doctor-patient communication,<sup>(24-26)</sup> as doctors tend to be better equipped to care for patients of the same socioeconomic status (SES).<sup>(25,26)</sup> Some physicians report more anxiety, frustration, and less interest and comfort when interacting with patients of lower SES.<sup>(26)</sup> In addition, a study performed by Cantor et al<sup>(26)</sup> reports that physicians of lower SES provide an unusually high share of service to disadvantaged communities. Hence, it has been suggested that such issues can be mitigated by recruiting more medical students from the lower SES groups.

To relieve some of the burden of tuition fees, a variety of financial aid schemes have been offered to medical students (Appendix). Our study showed that 39.7% of medical students received some form of financial aid from the university (Table V). This was not uniform across the medical schools: 75.0% of medical students from Duke-NUS received financial assistance, whereas only 34.1% and 38.8% of medical students from NUS Medicine and LKCMedicine, respectively, received financial aid. Although the distribution of financial aid among the medical schools seems disproportionate, it correlates with our findings that a larger proportion of medical students from Duke-NUS came from lower-income households (including those from developing countries) compared to students from the other two medical schools (Table III). Furthermore, students in Duke-NUS pay the highest medical tuition fees and may also have incurred additional debt from their undergraduate studies.

Despite the wide range of financial assistance schemes available, 85.4% of medical students in Singapore expected to graduate with a debt of more than SGD 75,000 (Table IV), including students who took loans to finance their medical studies. The need to borrow to finance university-based medical education is a trend observed in numerous countries.<sup>(1,2,4,5,7,21)</sup> With increasing amounts of debt incurred, repayment of educational loans is becoming more difficult as well.<sup>(1,6)</sup> Higher debt levels have been linked to lower quality of life, increased emotional exhaustion, burnout and even decreased humanism.<sup>(2,6,7)</sup> In fact, the prospect of high debts owing to the cost of medical education to students has resulted in numerous potential applicants not entering medical school in other settings.<sup>(1,2)</sup> This is a plausible explanation for the underrepresentation of lower-income groups in our local medical student population as well. Medical school debt also has an impact on the career choices of junior doctors who need to clear their debt while establishing families and households.<sup>(27)</sup>

Comparing the three schools in terms of total income and per capita income, Duke-NUS students were shown to be from lower-earning households (Table III). The proportion of Duke-NUS students who were from a household whose per-capita income was less than SGD 1,000 was 54.5%, compared to 23.3% of NUS Medicine and 7.8% of LKCMedicine students. In contrast, 75.2% of LKCMedicine students came from households whose total income exceeded SGD 7,000, as compared to 57.1% of NUS Medicine students and 20.5% of students from Duke-NUS. It is possible that Duke-NUS students were older and, hence, likely to have older parents who were retired, were living on their own or were staying with their own families. This implies that aid could be directed towards helping students offset not only their medical school fees but also other costs such as living expenses, because only 1.3% of Duke-NUS students were staying in an NUS-based residential facility as compared to 9.4% of NUS Medicine students and 75.2% of LKCMedicine students.

In the sample surveyed, Duke-NUS had the highest proportion of international students, 37.0%, as compared to 1.2% in NUS Medicine and none in LKCMedicine. This could be the reason behind the significantly lower household income of students from Duke-NUS and their higher rate of debt to clear. Unlike medical students who are Singaporean and Singapore permanent residents, foreign medical students do not have equal access to the tuition grant provided by the Ministry of Education, which significantly relieves the financial burden incurred by medical students. For instance, foreign students can only borrow up to an equivalent of 90% of the tuition fees of a Singapore citizen. Considering that the tuition fees for foreign students are higher, this leaves a significant gap in the availability of support for foreign students.

Despite these caveats, our findings show that more can be done to help medical students who require financial aid. Although more than 90% of the medical students were aware of the existence of the various financial assistance schemes, a significant proportion of medical students still incur heavy loans from commercial sources to finance their medical education (Table V).

The results of our study concur with data from the United States, which revealed that the top reason for not applying for financial aid was students thinking that they would not qualify for financial aid, while the second reason was the process of application being too complicated.<sup>(28)</sup> We could perhaps introduce more automation into financial aid processes, as family income data from the Inland Revenue Authority of Singapore and Central Provident Fund Board is available to government agencies, to help students overcome some of the obstacles to accessing financial aid.

Our study revealed that some students from all three medical schools engaged in some form of work (Table VII). In many cases, work negatively affected their studies. This suggests that many students were working out of necessity. Possible reasons include the need to support themselves and their families financially and clearing their debt early. The prevalence of working among medical students may be indicative of the gaps in financial assistance provided to needy students. It should, however, be noted that Duke-NUS, which has the highest proportion of students from the lower-income group and the highest proportion of students on some form of financial assistance scheme, had the lowest proportion of working students. This could be due to the compressed curriculum in Duke-NUS (a four-year programme compared to the five-year programme of the undergraduate schools) that may have contributed to Duke-NUS medical students' inability to spend time on external work to raise funds for living expenses or tuition. In light of the above observations, provision of financial assistance to financially challenged medical students can go a long way to reduce the financial burden placed upon students who need to work to make ends meet. It is arguably even more helpful for students who may be constrained by their circumstances and unable to work.

We recognise that our study had certain limitations. These include reporting bias arising from the use of self-reports in our questionnaire, recall bias from recollecting information such as past expenses and the previous impact of expenses on medical education, and the absence of responses from senior medical students at LKCMedicine, as it had recently opened at the time of the study. It is hoped that future studies can consider looking into the limitations of our study and overcome them with improved methodological design. This includes improvement in the process of recruitment of participants (especially senior students), developing a more robust questionnaire to identify more socioeconomic factors that may influence financial burden and working with schools to obtain a more robust list of financial aid available to students. Nevertheless, to our knowledge, this is the first study to investigate the financial situation of students of all medical schools in Singapore since the first intake at Duke-NUS and LKCMedicine in 2007 and 2013, respectively.

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## SUPPLEMENTARY MATERIAL

The Appendix is available online at <https://doi.org/10.11622/smedj.2020085>.

## REFERENCES

- Jolly P. Medical school tuition and young physicians' indebtedness. *Health Aff (Millwood)* 2005; 24:527-35.
- Dorsey ER, Nincic D, Schwartz JS. An evaluation of four proposals to reduce the financial burden of medical education. *Acad Med* 2006; 81:245-51.
- Yang C. Local universities increase fees, citing rising operating costs. In: *The Straits Times* [online]. Available at: <http://www.straitstimes.com/singapore/education/local-universities-increase-fees-citing-rising-operating-costs>. Accessed December 26, 2015.
- Ng CL, Tambyah PA, Wong CY. Cost of medical education, financial assistance and medical school demographics in Singapore. *Singapore Med J* 2009; 50:462-7.
- Weinstein L, Wolfe H. A unique solution to solve the pending medical school tuition crisis. *Am J Obstet Gynecol* 2010; 203:19.e1-3.
- Rohlfing J, Navarro R, Maniya OZ, Hughes BD, Rogalsky DK. Medical student debt and major life choices other than specialty. *Med Educ Online* 2014; 19:25603.
- Brazeau CM, Schroeder R, Rovi S, Boyd L. Relationships between medical student burnout, empathy, and professionalism climate. *Acad Med* 2010; 85(10 Suppl):S33-6.
- West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA* 2011; 306:952-60.
- Kwong JC, Dhalla IA, Streiner DL, et al. Effects of rising tuition fees on medical school class composition and financial outlook. *CMAJ* 2002; 166:1023-8.
- Office of Admissions, National University of Singapore. Bursaries. Available at: <http://www.nus.edu.sg/oam/financial-aid/bursaries>. Accessed December 26, 2015.
- Office of Admissions, National University of Singapore. Loans, Subsidies & PSEA. Available at: <http://www.nus.edu.sg/oam/financial-aid/loans-subsidies-psea>. Accessed December 26, 2015.
- Duke-NUS Medical School. Financial aid. Available at: <https://www.duke-nus.edu.sg/admissions/tuition-scholarships/financial-aid>. Accessed December 26, 2015.
- Lee Kong Chian School of Medicine, Nanyang Technological University. Scholarships and financial aid. Available at: <http://www.lkcmmedicine.ntu.edu.sg/Admissions/Pages/Scholarships--Financial-Aid.aspx>. Accessed November 9, 2015.
- Nanyang Technological University. Financial Assistance. <http://www.ntu.edu.sg/Freshmen/FreshmenGuide/FinancialMatters/Pages/FinancialAssistanceSchemes.aspx>. Accessed November 9, 2015.
- Nanyang Technological University. Undergraduate admissions: scholarships for freshmen – Singapore citizens and permanent residents. Available at: <https://admissions.ntu.edu.sg/UndergraduateAdmissions/Pages/FreshmenSingaporeSPR.aspx>. Accessed November 9, 2015.
- The Association of Banks in Singapore. Prime lending rates. Available at: <https://www.abs.org.sg/prime-lending-rates>. Accessed December 27, 2015.
- Duke-NUS Medical School. Tuitions and scholarships: tuition fees, scholarships and financial aid. Available at: <https://www.duke-nus.edu.sg/admissions/tuition-fees-scholarships-financial-aid>. Accessed November 9, 2015.
- Nanyang Technological University. Annual Tuition Fee for AY2015-16. Available at: [https://www3.ntu.edu.sg/oad2/GA\\_R/AY2015-2016%20Research%20Fees\\_Final.pdf](https://www3.ntu.edu.sg/oad2/GA_R/AY2015-2016%20Research%20Fees_Final.pdf). Accessed December 26, 2015.
- National University of Singapore. Undergraduate Students: Tuition Fee Per Annum. Available at: <http://www.nus.edu.sg/registrar/info/ug/UGTuitionCurrent.pdf>. Accessed May 20, 2020.
- Department of Statistics, Singapore. Key Household Income Trends, 2014. Available at: [https://www.nas.gov.sg/archivesonline/data/pdfdoc/20150223002/hh\\_income\\_press\\_release.pdf](https://www.nas.gov.sg/archivesonline/data/pdfdoc/20150223002/hh_income_press_release.pdf). Accessed May 20, 2020.
- Mashta O. Tuition fee changes may scupper government plans to widen access to medical school. *BMJ* 2010; 341:c7214.
- Greysen SR, Chen C, Mullan F. A history of medical student debt: observations and implications for the future of medical education. *Acad Med* 2011; 86:840-5.

23. Magnus SA, Mick SS. Medical schools, affirmative action, and the neglected role of social class. *Am J Public Health* 2000; 90:1197-201.
24. Burrow GN. Medical student diversity--elective or required? *Acad Med* 1998; 73:1052-3.
25. Dungal L. Physicians' responses to patients: a study of factors involved in the office interview. *J Fam Pract* 1978; 6:1065-73.
26. Cantor JC, Miles EL, Baker LC, Barker DC. Physician service to the underserved: implications for affirmative action in medical education. *Inquiry* 1996; 33:167-80.
27. Fong JM, Tan YTW, Sayampanathan AA, et al. Impact of financial background and student debt on postgraduate residency choices of medical students in Singapore. *Singapore Med J* 2018; 59:647-51.
28. Kantrowitz M. Analysis of why some students do not apply for financial aid. Published April 27, 2009. Available at: <http://www.finaid.org/educators/20090427CharacteristicsOfNonApplicants.pdf>. Accessed November 14, 2015.

## APPENDIX

Financial assistance schemes available in the various medical schools.<sup>(3,10,12-14)</sup>

Title	Value	Eligibility	Interest rates	Term of payment
<b>Financial assistance schemes available to medical students in all three medical schools in Singapore</b>				
SAF Medicine Scholarship	100% of tuition fees*	<ul style="list-style-type: none"> <li>Open to Singaporeans or PRs intending to take up citizenship</li> <li>Must be undertaking an undergraduate medical course in either NUS Medicine or LKCMedicine</li> </ul>	NA	6-year bond with SAF
SMA Medical Students' Assistance Fund (bursary)	Living allowance of SGD 5,000 per AY	Open to Singaporeans or PRs	NA	NA
CPF Education Scheme	Up to 100% of tuition fees. Up to 40% of the amount in a parent's or guardian's CPF Ordinary Account.	Full-time university students	Interest repayment starts one year after graduation (4.25% p.a. as of December 2015, according to DBS Bank) <sup>(18)</sup>	Maximum repayment period is 12 years
Tuition fee loan	Up to 90% of tuition fees	<ul style="list-style-type: none"> <li>Full-time university students</li> <li>Singaporean or PR</li> </ul>	Interest payment begins after graduation (4.25% p.a. as of December 2015, according to DBS Bank) <sup>(18)</sup>	Maximum repayment period is 20 years
Mendaki Tertiary Tuition Fee Subsidy (TTFS)	50% - 100% of tuition	<ul style="list-style-type: none"> <li>Needy Malay undergraduates</li> <li>Singaporean</li> <li>Monthly household income not exceeding SGD 1,500</li> </ul>	NA	NA
CDC/CCC Bursary	SGD 3,600 per award	Singapore citizens whose monthly per capita household income $\leq$ SGD 950	NA	NA
MOE Bursary	SGD 1,300 or SGD 2,600 depending on per capita income	Singapore citizens whose monthly per capita household income is not more than SGD 1,900	NA	NA
<b>Financial assistance schemes made available to NUS students only (NUS Medicine and Duke-NUS, unless specified)</b>				
NUS bursaries	Varies from SGD 1,050 to 100% of tuition fees; may also provide living allowance	Open to financially needy students	NA	NA

Scholarships administered by NUS/NUS Medicine/Duke-NUS	100% of tuition fees*	Students who demonstrate all-rounded excellence	NA	NA
NUS Study Loan	Subdivided into a number of schemes. Up to 20% of tuition fees, with or without a living allowance of SGD 3,600 p.a.	<ul style="list-style-type: none"> <li>Monthly per capita income less than SGD 2,700 (for international students) and SGD 1,200 (for Singapore citizens and PRs)</li> <li>Tuition fee loan and/or CPF Education Scheme and/or MENDAKI TTFS already covered 90% of tuition fee</li> </ul>	Interest payment begins 6 months after graduation or upon securing employment (4.25% p.a. as of December 2015, according to DBS Bank) <sup>(16)</sup>	Maximum repayment period is 20 years
NUS Student Assistance Loan	Varies according to the individual's financial circumstance	Needy undergraduates who are in receipt of, or have been offered, an NUS bursary	Interest-free	Varies from 3 to 5 years
<b>Financial assistance schemes available to NTU students only</b>				
Scholarships administered by NTU and LKC Medicine	100% of tuition fees*	Undergraduates who demonstrate all-rounded excellence	NA	NA
NTU bursaries	Up to 100% of tuition fees; may also provide living allowance	<ul style="list-style-type: none"> <li>All financially needy students pursuing their first undergraduate programme in NTU</li> <li>Gross monthly per capita household income <math>\leq</math> SGD 1,900</li> </ul>	NA	NA
NTU Study Loan	<ul style="list-style-type: none"> <li>Up to 10% of the subsidised tuition fee payable by Singaporeans</li> <li>May also opt to apply for a living allowance loan of SGD 1,200, SGD 2,400 or SGD 3,600 per AY</li> </ul>	<ul style="list-style-type: none"> <li>Monthly per capita income less than SGD 2,700 (for international students) and SGD 1,200 (for Singapore citizens and PRs)</li> <li>Tuition fee loan and/or CPF Education Scheme and/or MENDAKI TTFS already covered 90% of tuition fee</li> </ul>	Interest payment begins 6 months after graduation or upon securing employment (4.25% p.a. as of December 2015, according to DBS Bank) <sup>(18)</sup>	Maximum repayment period is 20 years

\*With other benefits not specified, e.g. book allowance, accommodation subsidies, etc. AY: academic year; CDC/CCC: Community Development Council/Citizens' Consultative Committee; CPF: Central Provident Fund; Duke-NUS: Duke-NUS Medical School; LKC Medicine: Lee Kong Chian School of Medicine; MOE: Ministry of Education; NA: not applicable; NTU: Nanyang Technological University; NUS Medicine; National University of Singapore Yong Loo Lin School of Medicine; p.a.: per annum; PR: permanent residents; SAF: Singapore Armed Forces