

**ONLINE FIRST – ACCEPTED ARTICLES**

Accepted articles have been peer-reviewed, revised and accepted for publication by the *SMJ*.

They have not been copyedited, and are posted online in manuscript form soon after article acceptance. Each article is subsequently enhanced by mandatory copyediting, proofreading and typesetting, and will be published in a regular print and online issue of the *SMJ*.

Accepted articles are citable by their DOI upon publication.

**Joining the frontline against the COVID-19 pandemic:  
perspectives and readiness of graduating medical students**

Joo Wei Chua<sup>1,2,3,4</sup>, MBBS, MRCP, Isaac Kah Siang Ng<sup>5</sup>, MBBS, Zhaojin Chen<sup>6</sup>, MSc,  
Desmond B Teo<sup>2,4,7</sup>, MBBS, MRCP

<sup>1</sup>Fast Programme, <sup>2</sup>Chronic Programme, Alexandra Hospital, Singapore, <sup>3</sup>Division of Respiratory and Critical Care Medicine, Department of Medicine, National University Hospital, Singapore, <sup>4</sup>Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, <sup>5</sup>Ministry of Health Holdings, Singapore, <sup>6</sup>Biostatistics Unit, Yong Loo Lin School of Medicine, National University of Singapore, <sup>7</sup>Division of Advanced Internal Medicine, Department of Medicine, National University Hospital, Singapore

**Correspondence:** Dr Joo Wei Chua, Consultant, Division of Respiratory and Critical Care Medicine, Department of Medicine, National University Hospital, 5 Lower Kent Ridge Road, Singapore 119074. [joo\\_wei\\_chua@nuhs.edu.sg](mailto:joo_wei_chua@nuhs.edu.sg)

---

**Singapore Med J 2021, 1–21**

<https://doi.org/10.11622/smedj.2021155>

Published ahead of print: 24 October 2021

More information, including how to cite online first accepted articles, can be found at: <http://www.smj.org.sg/accepted-articles>

## INTRODUCTION

The current COVID-19 pandemic has led to profound ramifications on economies,<sup>(1)</sup> psychological and social health<sup>(2)</sup> that may last longer than its end, with exponential mortalities<sup>(3)</sup> and morbidities that threaten to cripple national healthcare systems with every passing day. Faced with the surge in healthcare demands and burgeoning needs to staff frontlines, health ministries and medical schools around the world have responded in various manners. While direct patient contact was initially suspended for many medical students,<sup>(4)</sup> final year students in some countries were allowed to skip<sup>(5)</sup> or bring forward<sup>(6)</sup> their final medical examinations, and graduation for many others were accelerated<sup>(7,8)</sup> in order to bolster the healthcare workforce. For graduating medical students who would otherwise be celebrating their attainment of a significant milestone, they became caught in a watershed moment at the start of their medical careers. While many are excited at the opportunity to make a difference and help their medical colleagues in the frontline,<sup>(9)</sup> there are inevitable significant concerns within the minds of these graduating students.<sup>(10)</sup> How prepared are these aspiring doctors and what do they think of such a whirlwind transition? Amidst the backdrop of the COVID-19 pandemic, we sought to assess the knowledge, attitudes and readiness of a cohort of graduating medical students in Singapore.

## METHODS

Following Institutional Review Board (NUS-IRB reference number S-20-077) approval, a cross-sectional study was conducted on 293 final year medical students at the Yong Loo Lin School of Medicine, National University of Singapore (NUSMed), on completion of their final Bachelor of Medicine and Bachelor of Surgery (MBBS) examinations.

A survey questionnaire was developed, with reference to similar studies performed in the 2009 H1N1 pandemic,<sup>(11,12)</sup> to assess the knowledge, attitudes and readiness of the

graduating medical students towards the current COVID-19 pandemic. In addition to the above domains, relevant sociodemographic data was collated and a free-response question was included for suggestions on how the medical school can better prepare students for future pandemics. The question types included multiple choice questions, checkbox, dichotomous Yes/No questions, Likert scale and open-ended question.

A self-administered printed survey questionnaire (Supplementary Figure I) was distributed to all fifth year medical students from NUSMed who completed their final examinations on 29<sup>th</sup> March 2020. Participation in this study was entirely voluntary, with the return of a completed questionnaire constituting implied consent to participate.

At the time of survey, it was two months after the first confirmed case of COVID-19 in Singapore,<sup>(13)</sup> with a case count of 844 COVID-19 cases and 3 deaths.<sup>(14)</sup> The Ministry of Health (MOH) had by then raised its Disease Outbreak Response System Condition (DORSCON) level to Orange, signifying that the COVID-19 disease is severe and spreads easily from person to person but is still being contained in Singapore.<sup>(15)</sup>

Statistical analyses were subsequently performed using STATA/SE 14 (College Station, Texas, USA). Questions were summarised by mean and standard deviation, median and range, and frequency and percentage where appropriate. Fisher's exact test and multivariable logistic regression were used to study association between student perceptions and post-pandemic career outlook, assuming a two-sided test with 5% significance level. Open-ended responses were collated into common themes.

## **RESULTS**

A total of 293 out of 297 graduating medical students from NUSMed completed the survey, constituting a 98.7% response rate. The mean age of our study cohort was 24 years, with 53.2%

males. A majority of the students (94.5%) obtained their information about COVID-19 from local news sources, followed by MOH (66.9%) and the medical school (37.5%) (Table I).

The median score of knowledge was 4. Most students knew the cause of the current pandemic (99.7%) and mode of transmission (99.0%). However, 31.4% answered incorrectly for the COVID-19 mortality in the country of origin (China) and 19.0% did not know the correct diagnostic test to use.

The median score of readiness was 4. Most students (99.3%) knew the requirement to notify MOH with a confirmed COVID-19 diagnosis, and 98.6% were aware that good hand hygiene can prevent its transmission. However, 91.1% did not know the appropriate mask to use while in close contact with a high-risk symptomatic patient and 30.0% did not know the type and size of mask to use in such encounters (Table II).

99.0% students felt that Singapore's healthcare system has done well in managing the current pandemic compared to other countries and 82.9% were inspired by their interaction with healthcare personnel working in the pandemic. 92.8% perceived that the medical school had taken necessary precautions to safeguard their interests, 90.4% felt that the contingency plans instituted by the school were adequate in minimising disruption to their learning and 86.3% felt that they were updated in a timely manner on the measures implemented by the school. Lastly, 92.5% expressed confidence that the training they received in medical school would prepare them for work in the pandemic.

In addition, most students (96.6%) would still study Medicine given the chance to choose again and 93.5% would continue training in areas involving clinical work. 25.8% and 42.5% of the students were also inspired to consider training in infectious diseases and engaging in research respectively (Supplementary Figure II).

On univariable analysis, medical students who perceived that the school has taken necessary precautions to safeguard their interests were significantly less likely to regret their

choice of study and/or avoid clinical work in future (adjusted OR 0.27, 95% CI 0.09-0.83,  $p = 0.022$ ).

Furthermore, students who were inspired by their interaction with healthcare personnel during the current pandemic were significantly more likely to consider engaging in research work, (adjusted OR 4.52, 95% CI 2.08-9.85,  $p < 0.001$ ) and further training in infectious diseases (adjusted OR 7.36, 95% CI 2.19-24.69,  $p = 0.001$ ) (Supplementary Table I).

59.7% participants responded to the open-ended question on suggestions for the medical school to prepare students better for future pandemics. The three most common themes that emerged included a call for practical teaching pertaining to operational readiness (mask fitting, simulation, hospital protocols) (45.1%), didactic instruction on pandemic principles (including infectious diseases and public health aspects) (14.9%) and psychosocial strengthening (teamwork, workplace environment and sharing of experiences by healthcare workers) (13.7%) (Table III).

## **DISCUSSION**

A total of 293 graduating medical students from NUSMed were profiled on their knowledge, attitudes and perspectives towards the COVID-19 pandemic. Most students demonstrated a high level of knowledge on COVID-19, with a median score of 4 out of 5. This is a heartening result given that the survey was conducted barely two months after the World Health Organization (WHO) declared COVID-19 to be a Public Health Emergency of International Concern,<sup>(16)</sup> during which many unknowns about the infection existed. Most students (94.5%) derived their COVID-19 related information from local news sources, followed by the MOH website (66.9%) and medical school (37.5%). In a highly interconnected world where misleading news may confound the already uncertain climate, it is vital that government bodies, healthcare and educational institutions continue to actively provide objective and up-to-date

information about the pandemic through these major news channels from which medical students derive their trusted information.

Although a high level of knowledge was demonstrated by the students on the COVID-19 pandemic, there were inadequate aspects of operational readiness pertaining to the appropriate choice of personal protective equipment, as 91.1% did not know the appropriate mask to don when reviewing high-risk symptomatic patients and 30.0% did not know the type and size of mask to wear when working in the pandemic. This was corroborated by the open-ended feedback, where nearly half of the collated responses called for further practical training. Just as there is a pressing need to bolster frontline manpower, it is just as important to ensure that graduating medical students are confidently equipped to be safe doctors in the pandemic. Although students have been mask-fitted in their pre-clinical years, revisions in infection control and appropriate mask use before the start of clinical years and work can help. These would be reinforced by respective hospital orientation programmes that include application of pandemic principles and simulation sessions that junior doctors would be enrolled into in due time.

Furthermore, a sizeable proportion (14%) of respondents mentioned the need for strengthening of psychosocial support amidst this pandemic. This is not surprising as frontline healthcare workers are reportedly at higher risk of developing mental health distress.<sup>(2,17,18)</sup> Interestingly, a recent study showed that residents deployed to high-risk areas had lower perceived levels of stress than those who were not,<sup>(19)</sup> which could also have reflected a higher level of psychological preparedness among the high-risk group. Helping junior doctors develop a personal resilience plan to anticipate, plan and deter mental challenges with positive coping strategies,<sup>(20)</sup> facilitating peer support and access to a mental health consultant,<sup>(21)</sup> and introducing actionable micropractices to implement during the day, such as wellness self-checks and naming of emotions<sup>(22)</sup> are practical steps that can reduce mental distress in the

course of their duty. Mindfulness is another effective mental health strategy that is reported to reduce stress and anxiety levels among students.<sup>(23)</sup> As psychiatric morbidities have been demonstrated in healthcare workers years after previous pandemics,<sup>(24)</sup> the importance of integrating mental health strengthening programs in our local medical curriculum and beyond cannot be overstated.

Finally, in terms of post-pandemic career outlook, students who perceived that the medical school has taken necessary precautions to safeguard their interests during the pandemic were less likely to express regret on their choice of study or intent to avoid clinical work in future. This reflects the importance of cultivating trust within the medical fraternity, even at the student level, where negative attitudes and self-doubt during a pandemic could be averted by healthcare and educational institutions demonstrating care and concern for the well-being of those under their charge. This could take the form of good communication on plans instituted by the healthcare institution, as well as regular engagement between supervisors and their junior staff to tackle emerging issues in a timely manner. In addition, we found that medical students who were inspired by healthcare workers during the COVID-19 pandemic were more likely to be interested in infectious diseases training and research work in future. This shows that the challenging global pandemic could also present an opportunity for healthcare workers to renew their passion for the job when they witness courageous and inspiring actions of their colleagues and seniors during the pandemic.

A key limitation of this cross-sectional study is that it admittedly lacks the ability to establish temporal relationships between studied variables. Nonetheless, within the confines of this unprecedented pandemic, we believe that this study serves as a preliminary guide to highlight pertinent issues for local educational and healthcare institutions to consider when preparing future batches of medical students for work in both the ongoing COVID-19 and future pandemics.

These are extraordinary times with extraordinary needs. Insofar as we are prepared to empower the graduating medical students to respond to the emergent needs, as seniors and colleagues, we also have a duty to prepare them well for their onboarding and ensure their continued well-being. Drawing wisdom from a quote by the French microbiologist, Louis Pasteur, “Chance favours the prepared mind”, we believe that graduating medical students will be better poised in our concerted battle against COVID-19, when they can be further prepared for this fight. Perhaps it starts with us listening to what they have to say.

### **ACKNOWLEDGEMENTS**

The authors are grateful to the NUSMed graduating class of 2020 for their enthusiastic participation in this survey and for responding to the call of our time.

### **REFERENCES**

1. International Monetary Fund. World Economic Outlook, April 2020: The Great Lockdown. Available at: <https://www.imf.org/en/Publications/WEO/Issues/2020/04/14/weo-april-2020>. Accessed May 6, 2020.
2. World Health Organization. Mental health and psychosocial considerations during the COVID-19 outbreak. Available at: <https://www.who.int/publications-detail/WHO-2019-nCoV-MentalHealth-2020.1>. Accessed May 6, 2020.
3. World Health Organization. WHO coronavirus disease (COVID-19) dashboard. Available at: <https://covid19.who.int/>. Accessed May 6, 2020.
4. Whelan A, Prescott J, Young G, Catanese VM, McKinney R. Guidance on Medical Students’ Participation in Direct Patient Contact Activities. Available at: <https://lcme.org/wp-content/uploads/filebase/April-14-2020-Guidance-on-Medical-Students-Participation-in-Direct-Patient-Contact-Activities.pdf>. Accessed May 11, 2020.



5. Di Donato V, McKenzie S. Fresh out of medical school, young Italian doctors are being fast-tracked to the coronavirus frontline. In: CNN [online]. Available at: <https://edition.cnn.com/2020/03/30/europe/italy-young-doctors-coronavirus-intl/index.html>. Accessed May 11, 2020.
6. Virtual Results Day marks momentous day for RCSI Medicine students. In: RCSI University of Medicine and Health Sciences [online]. Available at: <https://www.rcsi.com/dublin/news-and-events/news/news-article/2020/04/virtual-results-day-marks-momentous-day-for-rcsi-medicine-students>. Accessed May 11, 2020.
7. Murphy B. COVID-19: States call on early medical school grads to bolster workforce. In: American Medical Association [online]. Available at: <https://www.ama-assn.org/delivering-care/public-health/covid-19-states-call-early-medical-school-grads-bolster-workforce>. Accessed May 11, 2020.
8. Harvey A. Covid-19: medical students and FY1 doctors to be given early registration to help combat covid-19. *BMJ* 2020; 368:m1268.
9. Gallagher TH, Schleyer AM. “We signed up for this!” - student and trainee responses to the COVID-19 pandemic. *N Engl J Med* 2020; 382:e96.
10. Abrams A, Ducharme J. Meet the medical students becoming doctors in the middle of a pandemic. In: TIME [online]. Available at: <https://time.com/5820046/medical-students-covid-19/>. Accessed May 11, 2020.
11. Herman B, Rosychuk RJ, Bailey T, et al. Medical students and pandemic influenza. *Emerg Infect Dis* 2007; 13:1781-3.
12. Yap J, Lee VJ, Yau TY, Ng TP, Tor PC. Knowledge, attitudes and practices towards pandemic influenza among cases, close contacts, and healthcare workers in tropical Singapore: a cross-sectional survey. *BMC Public Health* 2010; 10:442.
13. Ministry of Health, Singapore. Confirmed imported case of novel coronavirus infection

- in Singapore; multi-ministry taskforce ramps up precautionary measures. Available at: <https://www.moh.gov.sg/news-highlights/details/confirmed-imported-case-of-novel-coronavirus-infection-in-singapore-multi-ministry-taskforce-ramps-up-precautionary-measures>. Accessed May 11, 2020.
14. Ministry of Health, Singapore. Summary of confirmed cases. In: press releases highlights. March 29, 2020. Available at: [https://www.moh.gov.sg/docs/librariesprovider5/default-document-library/annex-\(29-march\)](https://www.moh.gov.sg/docs/librariesprovider5/default-document-library/annex-(29-march)). Accessed May 11, 2020.
  15. Government of Republic of Singapore. What do the different DORSCON levels mean. Available at: <https://www.gov.sg/article/what-do-the-different-dorscon-levels-mean>. Accessed May 11, 2020.
  16. World Health Organization. Archived: WHO timeline - COVID-19. April 27, 2020. Available at: <https://www.who.int/news/item/27-04-2020-who-timeline---covid-19>. Accessed May 11, 2020.
  17. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open* 2020; 3:e203976.
  18. Tan BYQ, Chew NWS, Lee GKH, et al. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. *Ann Intern Med* 2020; 173:317-20.
  19. Chew QH, Chia FL, Ng WK, et al. Psychological and coping responses to COVID-19 amongst residents in training across ACGME-I accredited specialties in Singapore. *Psychiatry Res* 2020; 290:113146.
  20. Schreiber M, Cates DS, Formanski S, King M. Maximizing the resilience of healthcare workers in multi-hazard events: lessons from the 2014-2015 Ebola response in Africa. *Mil Med* 2019; 184(Suppl 1):114-20.

21. Albott CS, Wozniak JR, McGlinch BP, et al. Battle buddies: rapid deployment of a psychological resilience intervention for health care workers during the COVID-19 pandemic. *Anesth Analg* 2020; 131:43-54.
22. Fessell D, Cherniss C. Coronavirus disease 2019 (COVID-19) and beyond: micropractices for burnout prevention and emotional wellness. *J Am Coll Radiol* 2020; 17:746-8.
23. Warnecke E, Quinn S, Ogden K, Towle N, Nelson MR. A randomised controlled trial of the effects of mindfulness practice on medical student stress levels. *Med Educ* 2011; 45:381-8.
24. Schwartz R, Sinsky JL, Anand U, Margolis RD. Addressing postpandemic clinician mental health: a narrative review and conceptual framework. *Ann Intern Med* 2020; 173:981-8.

**Table I. Sociodemographic Data**

<b>Characteristics</b>	<b>Total (N = 293)</b>
<b>Age in years, mean <math>\pm</math> SD (range)</b>	24 $\pm$ 0.87 (22-27)
<b>Gender, n (%)</b>	
Male	156 (53.2)
Female	137 (46.8)
<b>Source of COVID-19 Information, n (%)</b>	
Local News Stations	277 (94.5)
Straits Times	234 (79.9)
TODAYonline	78 (26.6)
Channel News Asia	211 (72.0)
Social Media	84 (28.7)
Medical Peers / Doctors	104 (35.5)
Medical School	110 (37.5)
Ministry of Health Website	196 (66.9)
Others	16 (5.5)
<b>Perceived risk of getting COVID-19 Infection, n (%)</b>	
Low	52 (17.9)
Moderate	173 (59.5)
High	52 (17.9)
Do not know	14 (4.8)
Missing	2

**Table II. Knowledge and Readiness of Graduating Medical Students on COVID-19 Pandemic**

<b>Question, n (%)</b>	<b>Total (N = 293)</b>
<b>Knowledge Questions</b>	
<b>What is the cause of the current pandemic?</b>	
Severe acute respiratory syndrome (SARS)	0 (0)
Middle East respiratory syndrome coronavirus (MERS-CoV)	0 (0)
Coronavirus disease 2019 (COVID-19)	292 (99.7)
H1N1 influenza	1 (0.3)
I do not know	0 (0)
<b>The infection can be transmitted:</b>	
Blood borne from human to human	0 (0)
Via droplets from human to human	289 (99.0)
Vector borne from insects to humans	0 (0)
Faecal-oral route from human to human	1 (0.3)

I do not know Missing	2 (0.7) 1
<b>The mortality from this infection within the country of origin is:</b> 0.1-0.2% 2-3% 10-20% 30-40% I do not know	58 (19.8) 201 (68.6) 23 (7.8) 5 (1.7) 6 (2.0)
<b>The infected patient typically presents with:</b> Lower urinary tract symptoms Seizures An upper respiratory tract infection Vomiting I do not know Missing	41 (14.1) 0 (0) 248 (85.5) 0 (0) 1 (0.3) 3
<b>The infection can be diagnosed by:</b> A good clinical history and features of pneumonia on physical examination and chest radiograph (CXR) Blood serology Urine culture Nasopharyngeal swab PCR I do not know Missing	42 (14.5) 8 (2.8) 0 (0) 234 (81.0) 5 (1.7) 4
<b>Readiness Questions</b>	
<b>It is a requirement to notify the Ministry of Health (MOH) of a positive diagnosis of the infection in a patient during the pandemic.</b> True False I do not know	291 (99.3) 1 (0.3) 1 (0.3)
<b>During the pandemic, I would put on a surgical mask before I proceed to clerk a newly admitted patient from the A&amp;E who presents with only upper respiratory tract symptoms and who has come into close contact with his friend who was recently hospitalized for pneumonia.</b> True False I do not know	264 (90.1) 26 (8.9) 3 (1.0)
<b>I know the type and size of mask to use if required during the pandemic.</b> True False I do not know	205 (70.0) 29 (9.9) 59 (20.1)

<b>Asymptomatic personnel who have been in close contact with a patient diagnosed with the infection would be issued with a Quarantine Order during the pandemic.</b> True False I do not know Missing	 245 (83.9) 28 (9.6) 19 (6.5) 1
<b>Good hand hygiene can prevent transmission of the infection in the pandemic.</b> True False I do not know	 289 (98.6) 4 (1.4) 0 (0)

**Table III. Suggestions for Medical School to Prepare Students Better for Future Pandemics**

<b>Themes, <i>n</i> (%)</b>	<b>Total (N = 175)</b>
<b>Practical training of operational readiness</b> (hospital protocols, mask fitting, simulation training, clinical competency)	79 (45.1)
<b>Didactic teaching</b> (pandemic principles, public health, infectious disease)	26 (14.9)
<b>Psychosocial strengthening</b> (teamwork, workplace environment, HCWs sharing of past experiences)	24 (13.7)
<b>Better communication from medical school and hospitals</b> (information transparency, regular updates)	14 (8.0)
<b>Current training is adequate</b>	13 (7.4)
<b>Irrelevant responses</b>	19 (10.9)

**APPENDIX****Supplementary Figure I**

**KNOWLEDGE AND ATTITUDES OF GRADUATING MEDICAL STUDENTS  
DURING A PANDEMIC IN SINGAPORE**

Kindly note that the term “pandemic” refers to the outbreak of an infection (mentioned under Section Two Question 1) that has affected many countries, including Singapore, since 31<sup>st</sup> December 2019. It has led to the declaration of DORSCON Orange in Singapore in February 2020.

**SECTION ONE**

*Please tick the relevant box which indicates your response.*

No.	Question	Response
1.	What is your gender?	<input type="checkbox"/> Male <input type="checkbox"/> Female
2.	What is your age?	_____ years old
3.	What do you think is your risk of getting the infection during the pandemic?	<input type="checkbox"/> High <input type="checkbox"/> Moderate <input type="checkbox"/> Low <input type="checkbox"/> I do not know
4.	Where did you derive your source of reliable information about the pandemic? <i>(Please indicate your top 3 answers.)</i>	<input type="checkbox"/> The Straits Times <input type="checkbox"/> TODAYonline <input type="checkbox"/> CNA (Channel NewsAsia) <input type="checkbox"/> Social Media (Facebook, Mothership, etc.) <input type="checkbox"/> Peers <input type="checkbox"/> Updates from the Yong Loo Lin School of Medicine, NUS <input type="checkbox"/> Ministry of Health <input type="checkbox"/> Doctors <input type="checkbox"/> Others. Please specify: _____
5.	Did you interact with anyone who was diagnosed with the infection during the pandemic?	<input type="checkbox"/> Yes <input type="checkbox"/> No

**SECTION TWO**

*Please indicate the best answer above the line on the right.*

No.	Question	Answer
1.	What is the cause of the current pandemic? A. Severe Acute Respiratory Syndrome (SARS) B. Middle East Respiratory Syndrome Coronavirus (MERS-CoV) C. Coronavirus disease 2019 (COVID-19) D. H1N1 Influenza E. I do not know	<u>C</u>
2.	The infection can be transmitted: A. blood borne from human to human B. via droplets from human to human C. vector borne from insects to humans D. faecal-oral route from human to human E. I do not know	<u>B</u>
3.	The mortality from this infection within the country of origin is: A. 0.1-0.2% B. 2-3% C. 10-20% D. 30-40% E. I do not know	<u>B</u>
4.	The infected patient typically presents with: A. Lower urinary tract symptoms B. Seizures C. An upper respiratory tract infection D. Vomiting E. I do not know	<u>C</u>
5.	The infection can be diagnosed by: A. A good clinical history and features of pneumonia on physical examination and chest radiograph (CXR) B. Blood serology C. Urine culture D. Nasopharyngeal swab PCR E. I do not know	<u>D</u>



**SECTION THREE**

Please tick the box which best represents your response.

No.	Question	Response			
		Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree
1.	Having experienced the pandemic in Singapore, I would not study Medicine if I were given the choice again.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	I believe that my medical school has taken necessary precautions to safeguard the best interests for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	I am confident that the training that I have gone through in medical school would be able to prepare me to start work in this time of pandemic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	The pandemic has prompted me to avoid further training in areas involving clinical work where possible in future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	The contingency plans instituted by the medical school have been adequate in ensuring that my learning is not disrupted in a major way despite the pandemic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	The pandemic has inspired me to consider engaging in research work in the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	I have been kept updated in a timely manner on the measures that the medical school has set in place during the pandemic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	The pandemic has inspired me to consider further training in Infectious Diseases in the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	I am inspired by my interactions with healthcare personnel who have worked during the pandemic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Compared to other countries, Singapore's healthcare system has done well in managing the pandemic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION FOUR**

Please shade the box which best represents your response.

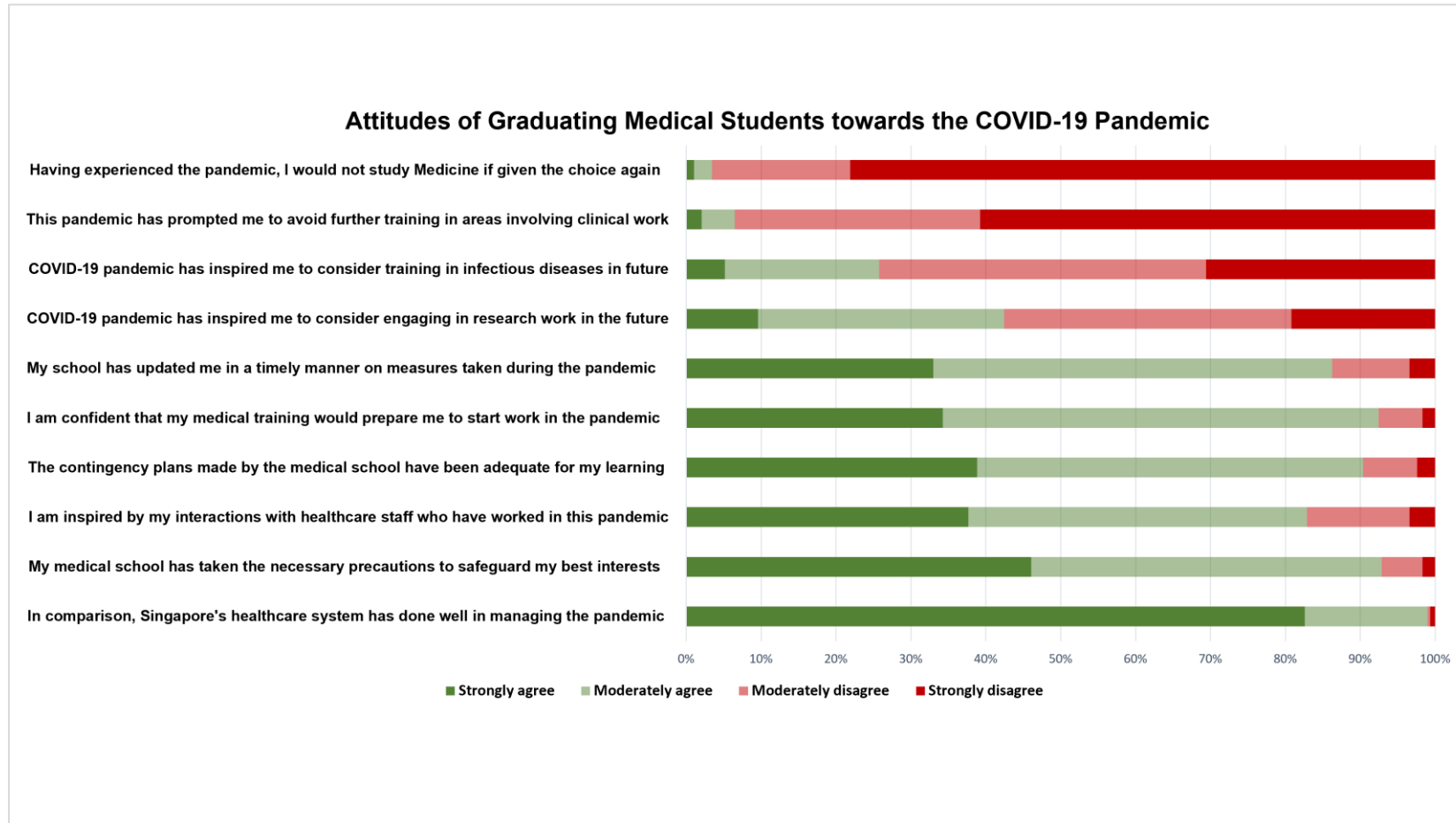
No.	Question	Answer
1.	It is a requirement to notify the Ministry of Health (MOH) of a positive diagnosis of the infection in a patient during the pandemic.	<input checked="" type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> I do not know
2.	During the pandemic, I would put on a surgical mask before I proceed to clerk a newly admitted patient from the A&E who presents with only upper respiratory tract symptoms and who has come into close contact with his friend who was recently hospitalised for pneumonia.	<input type="checkbox"/> True <input checked="" type="checkbox"/> False <input type="checkbox"/> I do not know
3.	I know the type and size of mask to use if required during the pandemic.	<input checked="" type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> I do not know
4.	Asymptomatic personnel who have been in close contact with a patient diagnosed with the infection would be issued with a Quarantine Order during the pandemic.	<input checked="" type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> I do not know
5.	Good hand hygiene can prevent transmission of the infection in the pandemic.	<input checked="" type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> I do not know

**SECTION FIVE**

Please provide your thoughts to this question:

"How can the medical school prepare me better as a future doctor for a pandemic?"

Supplementary Figure II



**Supplementary Table I. Association between Student Perceptions of Medical School and Healthcare Personnel during COVID-19 Pandemic and Future Career Outlook**

<b>Regrets choosing to enter medical school and/or will avoid clinical work in future</b>							
		<b>Disagree (n = 268)</b>	<b>Agree (n = 25)</b>	<b>Unadjusted OR (95% CI)</b>	<b>p value</b>	<b>Adjusted OR<sup>#</sup> (95% CI)</b>	<b>p value</b>
<b>Necessary precautions have been taken by the medical school to safeguard interests of students</b>	<b>Disagree</b>	16 (6.0)	5 (20.0)	0.25 (0.08-0.99)	0.024	0.27 (0.09-0.83)	0.022
	<b>Agree</b>	252 (94.0)	20 (80.0)				
<b>Confident of clinical training received in medical school</b>	<b>Disagree</b>	19 (7.1)	3 (12.0)	0.56 (0.15-3.20)	0.417	0.56 (0.15-2.14)	0.400
	<b>Agree</b>	248 (92.9)	22 (88.0)				
<b>Contingency plans by the school have been adequate to ensure the continuity of medical education</b>	<b>Disagree</b>	24 (9.0)	4 (16.0)	0.52 (0.16-2.26)	0.280	0.53 (0.17-1.70)	0.289
	<b>Agree</b>	242 (91.0)	21 (84.0)				
<b>Kept updated on measures by the school during the pandemic</b>	<b>Disagree</b>	33 (12.4)	7 (28.0)	0.36 (0.13-1.12)	0.060	0.40 (0.15-1.06)	0.066
	<b>Agree</b>	233 (87.6)	18 (72.0)				
<b>Inspired by interactions with healthcare personnel during the pandemic</b>	<b>Disagree</b>	43 (16.1)	7 (28.0)	0.49 (0.18-1.49)	0.161	0.54 (0.21-1.41)	0.210
	<b>Agree</b>	224 (83.9)	18 (72.0)				

<b>Inspired to consider engaging in research work in future</b>							
		<b>Disagree (n = 168)</b>	<b>Agree (n = 124)</b>	<b>Unadjusted OR (95% CI)</b>	<b>p value</b>	<b>Adjusted OR# (95% CI)</b>	<b>p value</b>
<b>Necessary precautions have been taken by the medical school to safeguard interests of students</b>	<b>Disagree</b>	15 (8.9)	6 (4.8)	1.93 (0.68-6.24)	0.252	2.01 (0.75-5.38)	0.162
	<b>Agree</b>	153 (91.1)	118 (95.2)				
<b>Confident of clinical training received in medical school</b>	<b>Disagree</b>	17 (10.1)	5 (4.1)	2.66 (0.90-9.45)	0.072	2.65 (0.94-7.50)	0.066
	<b>Agree</b>	151 (89.9)	118 (95.9)				
<b>Contingency plans by the school have been adequate to ensure the continuity of medical education</b>	<b>Disagree</b>	18 (10.8)	10 (8.1)	1.39 (0.58-3.50)	0.547	1.42 (0.63-3.21)	0.399
	<b>Agree</b>	148 (89.2)	114 (91.9)				
<b>Kept updated on measures by the school during the pandemic</b>	<b>Disagree</b>	23 (13.8)	17 (13.8)	1.00 (0.48-2.09)	1.000	1.09 (0.55-2.16)	0.811
	<b>Agree</b>	144 (86.2)	106 (86.2)				
<b>Inspired by interactions with healthcare personnel during the pandemic</b>	<b>Disagree</b>	41 (24.6)	9 (7.3)	4.16 (1.88-10.12)	< 0.001	4.52 (2.08-9.85)	< 0.001
	<b>Agree</b>	126 (75.5)	115 (92.7)				

<b>Inspired to consider further training in infectious diseases in future</b>							
		<b>Disagree (n = 216)</b>	<b>Agree (n = 75)</b>	<b>Unadjusted OR (95% CI)</b>	<b>p value</b>	<b>Adjusted OR# (95% CI)</b>	<b>p value</b>
<b>Necessary precautions have been taken by the medical school to safeguard interests of students</b>	<b>Disagree</b>	16 (7.4)	5 (6.7)	1.12 (0.37-4.05)	1.000	1.17 (0.41-3.32)	0.774
	<b>Agree</b>	200 (92.6)	70 (93.3)				
<b>Confident of clinical training received in medical school</b>	<b>Disagree</b>	18 (8.3)	4 (5.4)	1.59 (0.50-6.67)	0.611	1.57 (0.51-4.87)	0.435
	<b>Agree</b>	198 (91.7)	70 (94.6)				
<b>Contingency plans by the school have been adequate to ensure the continuity of medical education</b>	<b>Disagree</b>	23 (10.7)	5 (6.7)	1.68 (0.59-5.86)	0.371	1.72 (0.63-4.72)	0.292
	<b>Agree</b>	192 (89.3)	70 (93.3)				
<b>Kept updated on measures by the school during the pandemic</b>	<b>Disagree</b>	28 (13.1)	11 (14.7)	0.88 (0.40-2.07)	0.699	0.97 (0.45-2.09)	0.935
	<b>Agree</b>	186 (86.9)	64 (85.3)				
<b>Inspired by interactions with healthcare personnel during the pandemic</b>	<b>Disagree</b>	47 (21.9)	3 (4.0)	6.71 (2.04-34.66)	< 0.001	7.36 (2.19-24.69)	0.001
	<b>Agree</b>	168 (78.1)	72 (96.0)				

# Adjusted OR of the variable was obtained by multivariable logistic regression adjusted for age and gender.