

Dr See Kay Choong

Biosketch

Dr See completed Advanced Specialty Training in both Respiratory Medicine and Intensive Care Medicine in Singapore. He has special interests in artificial intelligence and machine learning, cardiopulmonary physiology, critical care ultrasonography, and healthcare quality improvement.

Current appointments

1. Head & Senior Consultant, Division of Respiratory & Critical Care Medicine, Department of Medicine, National University Hospital
2. Senior Consultant, National University Cancer Institute, Singapore
3. Associate Designated Institutional Official (Quality in Education & Research), Residency Program, National University Health System (NUHS)
4. Assistant Professor, Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore (NUS)
5. Postgraduate Education Director, Department of Medicine, National University Hospital
6. Vice-President, Society of Intensive Care Medicine, Singapore
7. Chair, Lung Cancer Awareness Campaign Committee, Singapore Cancer Society
8. Editorial Board Member, *Acute and Critical Care*

Education and Fellowships

1. Bachelor of Medicine & Bachelor of Surgery, National University of Singapore
2. Member, Royal College of Physicians, UK
3. Fellow, Royal College of Physicians, Edinburgh
4. Master of Public Health, Harvard School of Public Health, US
5. Master of Health Professions Education, Maastricht University, The Netherlands
6. European Diploma of Intensive Care Medicine
7. Specialist Accreditation in Respiratory Medicine, Singapore
8. Specialist Accreditation in Intensive Care Medicine, Singapore
9. Fellow, College of Chest Physicians, US

Publications

1. See KC, Leong JL, Tan HK. Otogenic lateral sinus thrombosis--a case report. *Ann Acad Med Singapore* 2000 Nov; 29(6):753-6.
2. See KC, Tay SK, Low PS. Diagnosing and prognosticating acute meningitis in young infants within 24 hours of admission. *Ann Acad Med Singapore* 2001 Sep; 30(5):503-9.
3. See KC, Phua J, Lee KH. Severe sepsis and septic shock in adult patients: an approach to management and future trends. *Int J Artif Organs*. 2006 Feb; 29(2):197-206.
4. See KC, Than HA, Tang T. Enterobacter sakazakii Bacteraemia with Multiple Splenic Abscesses in a 75-year old Woman: A Case Report. *Age Ageing*. 2007 Jul 23.
5. See KC, Lee M, Mukhopadhyay A. Delay in onset of metabolic alkalosis during regional citrate anti-coagulation in continuous renal replacement therapy with calcium-free replacement solution. *Ann Card Anaesth*. 2009 Jul-Dec;12(2):122-6.
6. Phua J, See KC, Chan YH, Widjaja LS, Aung NW, Ngerng WJ, Lim TK. Validation and clinical implications of the IDSA/ATS minor criteria for severe community-acquired pneumonia. *Thorax*. 2009 Jul;64(7):598-603. Epub 2009 Apr 21.

7. Phua J, Ang YL, [See KC](#), Mukhopadhyay A, Santiago EA, Dela Pena EG, Lim TK. Noninvasive and invasive ventilation in acute respiratory failure associated with bronchiectasis. *Intensive Care Med.* 2010 Jan 6.
8. [See KC](#), Phua J, Mukhopadhyay J. Monitoring of extubated patients: are routine arterial blood gas measurements useful and how long should patients be monitored in the intensive care unit? *Anaesth Intensive Care* Jan 2010.
9. Chong HW, [See KC](#), Phua J. Thyroid Storm with Multi-Organ Failure Reversed by Antithyroid Drugs: A Case Report. *Thyroid* Feb 2010.
10. Mukhopadhyay J, [See KC](#), et al. Effect of a blood conservation device in patients with preserved admission hemoglobin in the intensive care unit. *Anaesth Intensive Care* May 2011.
11. [See KC](#), Lee P. Pregnancy and the Lung. *ACCP Clinical Pulmonary Medicine NetWork* 16 June 2011.
12. Phua J, Kee AC, Tan A, Mukhopadhyay A, [See KC](#), Aung NW, Seah AS, Lim TK. End-of-life care in the general wards of a Singaporean hospital: an Asian perspective. *J Palliat Med.* 2011 Dec; 14(12):1296-301. Epub 2011 Nov 7.
13. [See KC](#), Lee P. Advances in the diagnosis of pleural disease in lung cancer. *Ther Adv Respir Dis.* 2011 Dec;5(6):409-18. Epub 2011 Jun 22.
14. Phua J, [See KC](#), Khalizah HK, Low SP, Lim TK. The utility of the electronic information resource UpToDate for clinical decision making at bedside rounds. *Singapore Med J* Feb 2012
15. [See KC](#), Christiani DC. Normal values and thresholds for the clinical interpretation of exhaled nitric oxide levels in the U.S. General Population: Results from NHANES 2007-2010. *Chest* Jan 2013.
16. [See KC](#), Jamil K, Chua AP, Phua J, Khoo KL, Lim TK. The effect of a pleural checklist on patient safety in the ultrasound era. *Respirology* Apr 2013.
17. Phua J, Ngerng WJ, [See KC](#), Tay CK, Kiong T, Lim HF, Chew MY, Yip HS, Tan A, Khalizah HJ, Capistrano R, Lee KH, Mukhopadhyay A. Characteristics and outcomes of culture-negative versus culture-positive severe sepsis. *Crit Care.* 2013 Sep 12;17(5):R202.
18. [See KC](#), Phua J, Yip HS, Yeo LL, Lim TK. Identification of concurrent bacterial infection in adult patients with dengue. *American Journal of Tropical Medicine & Hygiene* Aug 2013.
19. [See KC](#), Ong V, Teoh CM, Ooi OC, Widjaja L, Mujumdar S, Phua J, Khoo KL, Lee P, Lim TK. Bedside Pleural Procedures by Pulmonologists & Non-Pulmonologists: A Three-Year Safety Audit. *Respirology* Feb 2014.
20. [See KC](#), Ong V, Ng J, Tan RA, Phua J. Basic Critical Care Echocardiography by Pulmonary Fellows: Learning Trajectory and Prognostic Impact using a Minimally-Resourced Training Model. *Crit Care Med* 2014.
21. [See KC](#), Tan KL, Lim TK. The Script Concordance Test for Clinical Reasoning: Reassessing its Utility and Potential Weakness. *Medical Education* 2014.
22. [See KC](#), Phua J, Mukhopadhyay A, Lim TK. Characteristics of distractions in the intensive care unit: How serious are they and who are at risk? *Singapore Med J* 2014.
23. Mukhopadhyay A, Leong BSH, Lua A, Aroos R, Wong JJ, Koh N, Goh N, [See KC](#), Phua J, Kowitlawakul Y. Differences in the handover process and perception between nurses and residents in a critical care setting. *J Clin Nurs* 2014.
24. Mukhopadhyay A, Tai BC, [See KC](#), Ng WY, Lim TK, Onsieng S, Ee S, Chua MJ, Lee PR, Loh ML, Phua J. Hospital and long-term outcomes of critically ill elderly patients admitted to an intensive care unit. *Biomedical Research International* 2014.
25. Kowitlawakul Y, Leong BSH, Lua A, Aroos R, Wong JJ, Koh N, Goh N, [See KC](#), Phua J, Mukhopadhyay A. Observation of Handover Process in an Intensive Care Unit (ICU): Barriers and Quality Improvement Strategy. *International Journal for Quality in Health Care* 2015.
26. [See KC](#), Mukhopadhyay A, Lau S, Tan S, Lim TK, Phua J. Shock in the first 24h of intensive care unit stay: Observational study of protocol-based fluid management. *Shock* 2015.

27. [See KC](#), Phua J, Lim TK. Trigger Factors in Asthma and Chronic Obstructive Pulmonary Disease: A Single-Center Cross-Sectional Survey. *Singapore Med J* 2015.
28. [See KC](#), Lim TK, Phua J, Dan YY, Lim TK. Quantifying A Culture Of Respect: Prevalence And Impact Of Negative Experiences In An Academic Medicine Department. *Medical Education* 2015.
29. [See KC](#), Mukhopadhyay, Lim TK, Phua J. Reply to Dr. Anja Jaehne - Shock in the first 24h of intensive care unit stay: Observational study of protocol-based fluid management. *Shock* 2015.
30. [See KC](#), Ong V, Wong SH, Leanda R, Santos J, Taculod J, Phua J, Teoh CM. Lung ultrasound training: Curriculum implementation and learning trajectory among respiratory therapists. *Intensive Care Medicine* 2015.
31. Tan MY, Low JM, [See KC](#), Aw MM. Comparison of sleep, fatigue and burnout in Post-Graduate Year 1 (PGY1) residents and faculty members - A prospective cohort study, *The Asia-Pacific Scholar* 2016.
32. [See KC](#), Eng P, Chin TM. Lung cancer in Singapore. *Singapore Cancer Society Focus Publication* 2016.
33. [See KC](#), Lim TK, Kua EH, Phua J, Chua GSW, Ho KY. Stress and Burnout Among Physicians: Prevalence And Risk Factors In A Singaporean Internal Medicine Program. *Ann Acad Med Singapore* 2016.
34. [See KC](#), Peng SY, Phua J, Sum CL, Concepcion J. Nurse-Performed Screening for Post-Extubation Dysphagia: A Retrospective Cohort Study in Critically-Ill Medical Patients, *Critical Care* 2016.
35. [See KC](#), Lim TK. Shooting for the Bull's Eye in Septic Shock [commentary on HYPERS2S trial], *J Thorac Dis* 2017.
36. [See KC](#). Delivering E-lectures effectively and efficiently using Google Drive™, *Med Teach* 2017.
37. [See KC](#). Response to: E-lectures and online learning: Not a replacement for live teaching. *Med Teach* 2017.
38. [See KC](#), Song XY, Aung HT. Effect of extended visiting hours on physician distractions in the ICU: a before-and-after study, *Critical Care* 2017.
39. [See KC](#), Ng J, Siow WT, Ong V, Phua J. Prognostic Impact of Basic Critical Care Echocardiography Screening in Patients with Acute Respiratory Distress Syndrome. *Annals of Intensive Care* 2017.
40. Low JM, Tan MY, [See KC](#), Aw MM. Sleep, activity and fatigue reported by postgraduate year 1 residents: a prospective cohort study comparing the effects of night-float versus traditional overnight on-call, *Singapore Med J* 2018.
41. [See KC](#), Ong V, Tan YL, Sahagun J, Taculod J. Chest Radiography versus Lung Ultrasound for Acute Respiratory Distress Syndrome Identification: A retrospective observational study, *Critical Care* 2018.
42. [See KC](#), Estaras M, Capistrano R, Wong SH, Sahagun J, Taculod J. Bougie-in-Channel Intubation Technique, *Critical Care* 2018.
43. [See KC](#). The Diagnosis and Differential Diagnosis of Asthma in Adolescents and Adults, *Singapore Family Physician* 2018.
44. Dalakoti M, [See KC](#). Successful use of intra-aortic balloon pump in sepsis-induced cardiomyopathy: A case report. *IHJ Cardiovascular Case Reports (CVCR)* 2018.
45. [See KC](#), Chua JW, Versteegen D, van Merriënboer JJG, van Mook W. Focused Echocardiography: Dyad versus Individual Training in an Authentic Clinical Context. *Journal of Critical Care* 2018.
46. [See KC](#) et al. Professional burnout among physicians and nurses in Asian intensive care units: a multinational survey. *Intensive Care Med* 2018.
47. [See KC](#), Estaras M, Capistrano R, Wong SH, Sahagun J, Taculod J. Reply to Xue et al, for Bougie-in-Channel Intubation Technique, *Critical Care* 2018.
48. Van den Boom W, Hoy M, Sankaran J, Liu M, Chahed H, Feng M, [See KC](#). The Search for Optimal Oxygen Saturation Targets in Critically Ill Patients: Observational Data from Large ICU Databases. *Chest* 2020.

49. See KC. Conservative Oxygen Therapy During Mechanical Ventilation in the ICU. PracticeUpdate website. Available at: <https://www.practiceupdate.com/content/conservative-oxygen-therapy-during-mechanical-ventilation-in-the-icu/92105/65/20/1>. Accessed December 05, 2019.
50. See KC, Sahagun J, Taculod J. Defining patient-ventilator asynchrony severity according to recurrence. *Intensive Care Med* 2020.
51. Liew MF, Siow WT, MacLaren G, See KC. Preparing for COVID-19: Early experience from an intensive care unit in Singapore. *Critical Care* 2020.
52. Liew MF, Siow WT, Yau YW, See KC. Safe patient transport for COVID-19. *Critical Care* 2020.
53. See KC. Liberal or Conservative Oxygen Therapy for Acute Respiratory Distress Syndrome. PracticeUpdate website. Available at: <https://www.practiceupdate.com/content/liberal-or-conservative-oxygen-therapy-for-ards/97780/65/20/1>. Accessed March 27, 2020.
54. Siow WT, Liew MF, Shrestha BR, Muchtar F, See KC. Managing COVID-19 in resource-limited settings: critical care considerations. *Critical Care* 2020.
55. Van den Boom W, Hoy M, Sankaran J, Liu M, Chahed H, Feng M, See KC. Reply to "Protective Oxygen Therapy" for Critically Ill Patients: A call for Automated Oxygen titration! (correspondence for The Search for Optimal Oxygen Saturation Targets in Critically Ill Patients: Observational Data from Large ICU Databases). *Chest* 2020.
56. Liu SQ, See KC, Ngiam KY, Leo AC, Sun XZ, Gunther E, Feng ML. Reinforcement Learning for Clinical Decision Support in Critical Care: A Systematic Review. *JMIR* 2020.
57. Dashraath P, Wong JLI, Su LL, See KC, Fisher D. Coronavirus Disease 2019 (COVID-19) and Pregnancy: Responding to a Rapidly Evolving Situation. *Obstetrics & Gynecology* 2020.
58. Kee A, Ko R, Capistrano R, Dajac M, Taculod J, See KC. Transfer of skills for difficult intubation after videolaryngoscopy training: a randomized simulation study. *Critical Care* 2020.
59. Siow WT, Tang SHT, Agrawal RV, Tan AYH, See KC. Essential ICU drug shortages for COVID-19: What can frontline clinicians do? *Critical Care* 2020.
60. Ho WTV, Tee C, See KC. Drug interactions with potential antivirals used for COVID-19 in older persons. *Geriatrics & Gerontology International* 2020.
61. See JHJ, See KC. Admission diagnoses and their impact on smoking cessation rates: a brief report from a multi-centre inpatient smoking cessation programme. *Journal of Preventive Medicine and Public Health* 2020.
62. See KC, Sahagun J, Taculod J. Identification of focal ARDS using PF ratio: a cross-sectional study *Critical Care* 2020.
63. Ibrahim I, Kuan WS, Tan YQ, See KC. Asynchronous platform for a resident research showcase. *Med Educ* 2020.
64. Lau YH, Fong WK, Loh SCH, Siddiqui S, Tan CK, Tan JJE, Tien C, See KC. Point-of-care ultrasound training among intensivists in Singapore: a multicentre survey. *Ann Acad Med Singapore* 2020.
65. Chen JY, See KC. Artificial intelligence for COVID-19: A rapid review. *JMIR* 2020.
66. See KC. Acute cor pulmonale in patients with acute respiratory distress syndrome: a comprehensive review. *World J Crit Care Med* 2021.
67. See KC, Sahagun J, Cove ME, Sum CL, Bimbo G, David C, Misanes S, Abastillas E, Taculod J. Managing patient-ventilator asynchrony with a twice-daily screening protocol: A retrospective cohort study. *Australian Critical Care* 2021.
68. Lim WY, See KC. POCUS in cardiac arrest and its therapeutic implications. *J Ultrasonography* 2021.
69. Fong C, Tan C, Tan D, See KC. Safety of thoracentesis and tube thoracostomy in patients with uncorrected coagulopathy: a systematic review and meta-analysis. *Chest* 2021.
70. Lim WY, See KC. Predictors of obstructive sleep apnea misclassification when using total bed time versus total sleep time. *Scientific Reports* 2021.
71. Tan SMY, Zhang Y, Chen Y, See KC (co-corresponding and co-senior author), Feng ML. Association of fluid balance with mortality in sepsis is modified by admission hemoglobin levels: a large database study. *PLoS One* 2021.

72. Ng J, Chan HP, Kee ACL, Khoo KL, [See KC](#). Transitioning to combined EBUS EUS-B FNA for experienced EBUS bronchoscopist. *Diagnostics* 2021.
73. Kansal A, Dhanvijay S, Li A, Phua J, Cove ME, Ong WJD, Pua SH, Ng V, Tan QL, Manalansan JS, Zamora MSN, Vidanes MC, Sahagun JT, Taculod J, Tan AYH, Tay CK, Chia YW, Sewa DW, Chew MY, Lew SJW, Goh S, Tan JJE, Ramanathan K, Mukhopadhyay A, [See KC](#). Predictors and outcomes of high-flow nasal cannula failure following extubation: A multi-centre observational study *Ann Acad Med Singapore* 2021.
74. Fong C, Tung B, Ng J, Singh D, Lin WQ, [See KC](#). Malignant Arrhythmia in a COVID-19 Patient with A Structurally Normal Heart. *Singapore Med J* 2021.
75. Ho V, Goh G, Tang XR, [See KC](#). Under-recognition and under-treatment of thirst among general floor inpatients requiring nasogastric tubes and who are kept nil-by-mouth: an observational study. *Scientific Reports* 2021.

Awards & grants

1. 4th NUH-Faculty of Medicine, NUS Annual Scientific Meeting Certificate of Merit for the Undergraduate Research Award (July 2000)
2. Dean's List NUS Medicine (July 2000)
3. ENT Bookprize (2000)
4. Singapore Thoracic Society (STS) Fellows' Presentation Winner (18 Jan 2008)
5. Merit Prize "Pitch for Funds" Round (20 May 2009)
6. Department of Medicine Academic Research Grant
7. University Medicine Cluster Teaching Award 29 Jul 2010 for BDS (Dental) Year 3 Medicine Teaching
8. NUHS Residents Choice Award 25 April 2011
9. Smoking Cessation grant 2011-2021
10. Academic Medicine Development Award 2011/2012 (Individual)
11. Academic Medicine Development Award 2014 (Team)
12. NUHS Innovation and Creativity in Education III grant: ADROIT - Advancing Diagnostic Reasoning Of IM Trainees (5 Sep 2014)
13. NUHS Innovation and Creativity in Education III grant: RBS - Resilience Burnout Stress (5 Sep 2014)
14. NUHS Innovation and Creativity in Education III grant: TUF - Thoracic Ultrasound For Residents (5 Sep 2014)
15. Pre-Employment Clinical Training (PECT) grant, 2015-2017
16. NUH Outstanding Collaborating Physician Award 2015
17. NUHS Residency Residents Choice Award, 22 May 2015
18. Outstanding Award, Quality & Safety Seminar 18 Nov 2015, National University Hospital, Singapore
19. Research Residency Program grant (2016-2019)
20. NUHS Residency Residents Choice Award, 20 May 2016
21. NUH Prestige Award 2018, National University Hospital, Singapore
22. New-Investigator Grant (co-investigator), NMRC, Singapore 2017
23. 1st Runner Up (ICU Category). NUS-NUHS-MIT Healthcare AI Datathon 2018
24. Critical Care and Respiratory Medicine Outreach Program (CROP) 2019-2020 grant
25. Champion (ICU Category). NUS-NUHS-MIT Healthcare AI Datathon 2019
26. Outstanding Tutor Award for AY1819 Phase 5 Med SIP Programme
27. NUH VDO Excellence Award, 2 Jan 2020
28. Champion and Crowd's Favorite Presentation, NUS-NUHS-MIT Healthcare AI Datathon 11-13 Dec 2020