

Supplementary Table S1. Approach to resumption of paediatric liver and kidney transplantation in tandem with nationwide regulations¹⁻⁶

(7 February 2020–13 June 2021)

	National safe-management measures and healthcare activities allowed	Hospital-wide measures	Paediatric liver and kidney transplant candidates (in addition to national and hospital measures)	Number of paediatric liver and kidney transplants in National University Hospital
Initial period from the 1 st confirmed case until the circuit breaker	New visitors with travel history to China not allowed into or transit through Singapore.	-Notification, isolation and testing of suspect cases -Healthcare staff self-monitor for symptoms and report for testing and isolation -PPE policy for staff at different locations in the hospital -PAPR training of healthcare staff -Separate paediatric clinical management guideline for suspect cases	No organ transplant activity	0
Circuit Breaker (Heightened safe-distancing measures) (7 April 2020–1 June 2020) (2 incubation cycles)	-Significant reduction in movement and interaction at public places -All leisure spots closed -Home-based learning, work from home -Essential services remain open such as healthcare, financial, cleaning, water/energy/environment-related -Compulsory mask-wearing in public places/when out of home	- As above - AND -Temperature screening and management of visitors if > 37.5°C -Temperature self-check and management for all healthcare staff if > 37.5°C -Clinical management workflow for adults and children presenting with respiratory symptoms to emergency department -Screening measures for inpatients -Compulsory masks for healthcare staff, patients and visitors -PPE for aerosol generating procedures -Separate isolation wards for suspect cases -Dedicated wards and intensive care unit rooms for COVID-19 patients -Dedicated negative pressure operating room (pandemic OT)	Urgent organ transplants allowed nationwide; we deferred paediatric liver and kidney transplants until after this phase	0

		-Segregation of each department into separate teams to cater to different services- intermixing not allowed -Restricted movement of healthcare staff between institutions unless clinical exigency		
Phase 1 (Safe Re-opening) (2 June 2020–18 June 2020)	-Limited re-opening of schools and businesses -All leisure spots closed -Resumption of healthcare services based on medical necessity. If safe, then treatment for stable and well patients was deferred. -Only one visitor/patient at a time from the same household or one other household	-Prevention measures as above -Strict PPE guidelines for healthcare workers inside operating room -Additional guidelines for aerosol-generating procedures	-Urgent organ transplants allowed including from living donors (with permission from Ministry of Health) -D-7 and D-2 COVID swabs for both living donors and recipients -Screening questionnaire to parents/caregivers prior to coming to hospital for admission -Screening protocols for donors and recipients in case of respiratory symptoms	1 (kidney)
Phase 2 (Safe Transition) (19 June 2020–27 December 2020)	-No more than 50% workforce allowed to return to a given workplace -Re-opening of dine-in, all students return to school; gradual re-opening of institutes of higher learning -Gradual re-opening of fitness centres/cinemas/public libraries/attractions with restrictions on occupancy	-Screening of inpatients for potential exposure to clusters -Treatment of medically urgent cases prioritised over non-urgent cases -Teleconsultations for outpatients -Deferment of elective surgeries -Split-team arrangements continued	-Postponement of transplants until 3 weeks after resolution of respiratory symptoms and COVID-19 negative -Segregation of transplant team into 2 groups; each capable of continuing transplant activity on its own	4 (2 kidneys and 2 livers)
Phase 3 (Safe Nation) (28 December 2020–7 May 2021)	-Resumption of most healthcare services with prioritisation given to medically necessary treatment -Easing of visitor restrictions subject to overall visitor cap	-COVID-19 vaccination programme for healthcare workers -Update workflows on risk-assessment of contacts following exposure to COVID-19 patients; discharge criteria	-No intermixing between groups, thereby maintaining capacity in the event that one member/group is affected and quarantined -PPE (e.g. N95 masks, googles for aerosol generating procedures such as intubation for anaesthesia) inside operation theatre	2 (1 kidney and 1 liver)
Phase 2 (Heightened Alert) (8 May 2020–13 June 2021)	-No more than 50% of workforce may return to workplace -Restrictions on occupancy in leisure places -Postponement of non-elective surgeries/admissions to release inpatient beds/resources -Day-surgeries allowed to continue in a calibrated manner	-Enhanced surveillance – routine swab testing of all healthcare staff -Staff vaccination programme -Heightened PPE precautions during the “back to phase 2” especially for aerosol generating procedures		1 kidney

D-2: within 2 days prior to transplant; D-7: 7 days prior to transplant; OT: operation theatre; PAPR: powered air-purifying respirator; PPE: personal protective equipment

¹ Ministry of Health, Singapore. End of circuit breaker phased approach to resuming healthcare services, 22 May 2020. Available at: <https://www.moh.gov.sg/news-highlights/details/end-of-circuit-breaker-phased-approach-to-resuming-healthcare-services>. Accessed on 10 June 2021.

² Ministry of Health Singapore. Reaching everyone for active citizenry @ home. A Safe Singapore in 3 Phases, 19 May 2020. Available at: <https://www.reach.gov.sg/read/a-safe-singapore-in-3-phases>. Accessed on 12 June 2021.

³ Ministry of Health, Singapore. Circuit Breaker to Minimise Further Spread of COVID-19, 3 April 2020. Available at: <https://www.moh.gov.sg/news-highlights/details/circuit-breaker-to-minimise-further-spread-of-covid-19>. Accessed on 12 June 2021.

⁴ Thampi S, Yap A, Fan L, et al. Special considerations for the management of COVID-19 pediatric patients in the operating room and pediatric intensive care unit in a tertiary hospital in Singapore. *Paediatr Anaesth* 2020; 30:642-6.

⁵ Chua AQ, Tan MMJ, Verma M, et al. Health system resilience in managing the COVID-19 pandemic: lessons from Singapore. *BMJ Glob Health* 2020;5: e003317.

⁶ Lee VJ, Chiew CJ, Khong WX. Interrupting transmission of COVID-19: lessons from containment efforts in Singapore. *J Travel Med* 2020;27: taaa039.