Table S1. Discrete event simulation model entities and assumptions

Area	Description	Entry (deterministic)	Exit (deterministic)	Stochastic Activity (randomly selected from distribution described)	Source of Parameter Data	Assumptions
Community Assessment Hub	Frontline community assessment Triage and decision for hospitalisation	60% of new cases via telephone triage • 5.73% critically severe • 22.48% severe • 71.78% non-severe	All critically severe & severe referred to ED 20% of non-severe referred to ED at random to reflect hospitalisation for other needs	Not explicitly modelled	Mathematical spreadsheet model Subject matter expertise	Patients with severe or critical/severe disease may attend either the hub or ED for clinical assessment. All patients triaged to the hub with critical/severe disease will be suitable for hospitalisation. Some patients with non-severe disease will require further assessment in secondary care.
Emergency Department (ED)	Community hub & self-presenting patients. All cases enter hospital here. All 3 acute sites modelled as single entity	40% of new cases self-directed or via paramedic teams • 5.73% critically severe • 22.48% severe • 71.78% non-severe	All patients with severe & critically severe disease referred to AMU 20% of patients with non-severe disease referred to AMU	Length of stay Log-normal distribution: • Mean 2hrs • Standards dev 30mins	Mathematical spreadsheet model Subject matter expertise	Some community hub referrals will be discharged from ED All critically severe patients will be transferred to AMU (no impact on resource use or activity timing) Four-hour standard of care for ED attendances is upheld Unlimited capacity to see new arrivals in the ED

Acute Medical Assessment Unit (AMU)	Urgent medical care beyond ED. Containment to confirm COVID status 3 separate facilities modelled as one entity • 64 COVID resources • 32 non-COVID resources	All COVID patients enter through the ED All non-COVID patients enter through ED or community via GP referral service	COVID • 25% of severe/non-severe discharged home Non-COVID • 5% transferred to AMU COVID area • 75% transferred to non-COVID general ward bed • 20% discharged directly	Length of Stay in AMU • Normal distribution • Mean 36hrs • Standard dev 12hrs Non-COVID activity Poisson distribution Rate 1.5	Local collected data of COVID and non-COVID activity Subject matter expertise	All patients remain in AMU until COVID results available (<48hrs) Patients requiring critical care transferred immediately on leaving AMU No capacity to see COVID patients in non-COVID areas
General Ward Beds	Level 0 and 1 Basic respiratory support 3 separate facilities in the region modelled as one entity • 400 COVID resources • 651 non-COVID resources	Surviving patients stepped down from critical care. Patients admitted from AMU	• 94% Discharge home • 6% Death	Length of stay • Direct admissions Log-normal distribution Mean 219hrs Standard dev 192hrs • Step-down critical care Weibull distribution α 1.125 β 169.6 Min 48hrs	International data [7–11] Locally available data Subject matter expertise	No delay to discharge once identified Same length of stay for COVID and non-COVID patients
Critical Care	Level 2 and 3 Advanced respiratory support	AMU only	• 50% Step down to general ward bed • 50% Death	Length of stay • Survivors Weibull α 1.57 β 130.13 Min 12hrs	International data [7–11] ICNARC audit [17] Locally available data	Patients will have only one episode of critical care before death or step-down Length of stay for survivors & non-survivors equivalent

	3 separate facilities modelled as one entity • 80 COVID (incl. surge) • 7 non-COVID			• Non-survivors - Weibull α 1.584 β 221.05 Min 6hrs	Subject matter expertise	Flexibility to increase non-COVID activity