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UK government's COVID-19 advisor describes a bleak mid winter

The London School of Hygiene and Tropical Medicine (LSHTM), one of the UK government's academic advisors on COVID-19, has published a report on the outlook now that the Omicron variant has arrived[1]. It paints a pretty grim picture. It argues that Omicron cases are growing in the UK so fast that the level of infections is doubling every 2 to 3 days. This is reminiscent of the early days of the pandemic in March 2020. But, the growth rate of infections back then involved a new virus introduced into a completely susceptible population with no immunity. Now, Omicron has arrived in a population with a very high level of immunity from vaccinations, boosters and prior infections. This suggest that Omicron has both a higher intrinsic infectiousness (the basic reproduction number) and an ability to significantly evade immunity protection. If this persists, then the LSHTM argues that restrictions on mobility and mixing could be needed which broadly match those put in place at the turn of 2020/2021 to deal with the Alpha variant. One important caveat to the LSHTM's conclusions is that it assumes that the virulence of the Omicron variant is the same as the virulence of the Delta variant. To the extent that Omicron infections are milder, the pressure on the healthcare system would be reduced.

Given the large number of uncertainties about the properties of the Omicron variant, the LSHTM presents four scenarios which differ in terms of the degree of vaccine escape and the efficacy of the booster program (Table 1). We outline the results in Table 2, where the pressure on the healthcare system is expressed in terms of peak daily COVID-19 hospital admissions in January 2022. Assuming no further government interventions or changes in individual behavior, the LSHTM's most optimistic scenario projects peak daily hospitalizations of 2,410 in January 2022 (52% of the all-time peak of 4,582 seen in January 2021). The LSHTM's most pessimistic scenario projects peak daily hospital admissions of 7,190 in January 2022 (around 1.6 times the all-time peak of 4,582 seen in January 2021). In three of the four scenarios, daily hospital admissions peak in January 2022 close to or above the all-time peak seen in January 2021. This would not be a situation that could be tolerated, prompting further restrictive measures from the government.

Importantly, the LSHTM assumes that the virulence of the Omicron variant is the same as the virulence of the Delta variant. But, evidence from South Africa suggests that Omicron infections are milder than Delta infections. Milder infections would result in fewer hospital admissions and shorter stays in hospital. Table 3 presents our assessment of the impact of reduced virulence for the LSHTM's most pessimistic scenario in terms of hospital bed occupancy by COVID-19 patients at the end of January 2022 (expressed as a percentage of the all-time peak seen in January 2021). Under the LSHTM's most pessimistic scenario, bed occupancy by COVID-19 patients at the end of January 2022 would be slightly higher than the peak seen in January 2021. If there were to be a 50% decline in the hospitalization rate (from 1.75% for Delta infections to 0.875% for Omicron infections) then bed occupancy by COVID-19 patients at the end of January 2022 would be 56.7% of the peak seen in

[1] Modelling the potential consequences of the Omicron SARS-CoV-2 variant in England, R. Barnard et al, LSHTM

January 2021. If, in addition, the duration of the stay in hospital declined from 8 days to 3 days, then bed occupancy by COVID-19 patients at the end of January 2022 would be 33.6% of the peak seen in January 2021. This would be manageable without further restrictions.

The LSHTM scenarios highlight the role of increased transmissibility of the Omicron variant. In this were the only property of the Omicron variant it would be hard to avoid lockdown measures. But these could well be avoided if the virulence of the Omicron variant is much lower than the virulence of the Delta variant. Our calculations illustrate how much lower virulence needs to be to in order to avoid lockdown measures this winter.

Table 1: LSHTM vaccine efficacy assumptions

% efficacy against infection

	AZ primary			mRNA primary		
		mRNA booster			mRNA booster	
	Primary	BL	BH	Primary	BL	BH
Delta	63.0	91.4	95.9	80.0	91.4	95.9
Omicron (low vaccine escape)	34.7	65.9	79.2	44.1	65.9	79.2
Omicron (high vaccine escape)	19.0	44.1	60.4	24.1	44.1	60.4

Source: LSHTM. Primary refers to two doses of the vaccine. BL is a booster dose with low efficacy, BH is a booster dose with high efficacy.

Table 2: LSHTM scenario outcomes peak hospital admissions January 2022

	Daily hospital admissions	% of all-time peak
Low vaccine escape		
Low efficacy booster	4350	95
High efficacy booster	2410	52
High vaccine escape		
Low efficacy booster	7190	160
High efficacy booster	4500	98

Source: LSHTM. All-time peak for daily hospital admissions was 4582 on 12 Jan 2021.

Table 3: Scenarios with lower virulence for Omicron variant

	COVID bed occupancy at the end of January 2022, % of all-time peak
LSHTM most pessimistic scenario	106.9
LSHTM most pessimistic scenario + 50% decline in hospital admissions rate	56.7
LSHTM most pessimistic scenario + 50% decline in hospital admissions rate + shorter duration of hospital stay	33.6

Source: J.P. Morgan and LSHTM