This result is noteworthy, because for the past 3 decades, the Pitt Bacteraemia Score has been considered the gold standard by which to measure acute severity of illness and predict mortality in patients with bloodstream infections.[8]

By contrast with the established scoring systems for sepsis (ie, Sequential Organ Failure Assessment [SOFA], quick SOFA, APACHE II) and pneumonia (ie, Pneumonia Severity Index, CURB, CURB-65), which focus exclusively on host factors, the new BLOOMY scores showed that pathogen species and resistance also have an effect on mortality. This addition is another important advantage of the BLOOMY scores, which thus bridge the gap between a rather host-centred view of intensivists and a more pathogen-focused view of microbiologists; an excellent example of the value of an interdisciplinary infectious diseases approach for these patients.

The BLOOMY scores have disregarded only one easily measured risk factor: the patient respiratory rate. Increased respiratory frequency is very easy to detect clinically, without a laboratory, and has been proven to be an important predictive parameter, not only in all scoring systems for pneumonia,[6] but also in scoring systems for cross-system sepsis.[9] It is highly likely that including this parameter would have further increased the performance of the BLOOMY scores.

Nevertheless, the study authors have provided important data that might help to stimulate further research in bloodstream infections, not only to assess mortality in the short term, but also mortality in the long term. Further studies in infectious diseases need to systematically capture long-term mortality risk and causes of death after hospital discharge. Only then can the scientific infectious diseases community identify the underlying pathomechanisms and use them to develop new diagnostic and therapeutic strategies that will cure, in the long term, patients with bloodstream infections. The development of the BLOOMY scores is an important step on this path.

We declare no competing interests.

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WHO SAVE LIVES: Clean Your Hands campaign

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Hand hygiene improvement is a crucial part of effective infection prevention and control; therefore, it is a priority for patient and health worker safety. However, hand hygiene compliance in health-care settings remains suboptimal globally.[1] WHO recommends the implement action of an effective multimodal hand hygiene improvement strategy that includes five elements: system change, training and education, monitoring and feedback, reminders in the workplace and communications, and safety climate and culture change.[2]

Systematic reviews have shown an inter-relation between safety culture, infection prevention and control processes, and health care-associated infection reduction.[3,4] Improving the safety climate of organisations has been associated with enhanced hand hygiene compliance and improved patient outcomes, including health care-associated infection reduction, in particular of vancomycin-resistant enterococcus, *Staphylococcus aureus*, and central line-associated bloodstream infections.

Using the hand hygiene self-assessment framework[5] to assess the implementation of the WHO multimodal hand

	Call to action
Health workers	Lead by example and encourage others to clean their hands
Infection prevention and control practitioners	Engage health workers to be part of new hand hygiene initiatives
Quality and safety leads	Work with infection prevention colleagues to support hand hygiene improvement
Facility managers	Promote a quality and safety culture to ensure clean hands
Policy makers	Prioritise resources, training, and programmes on hand hygiene
People who use health care	Get involved in local hand hygiene campaigns and activities

Table: **May 5, 2022, WHO SAVE LIVES: Clean Your Hands campaign calls to action**

For more on **World Hand Hygiene Day** see https://www.who.int/campaigns/world-hand-hygiene-day/2022

See **Online** for appendix

hygiene improvement strategy in health-care facilities worldwide, the Institutional Safety Climate element repetitively scored the lowest, suggesting that progress in improving safety climate has been slower across and within regions when compared with the four other elements of the multimodal hand hygiene improvement strategy.[6,7] Therefore, it seems crucial to direct attention to safety climate and culture change to ensure hand hygiene improvement. Safety climate, safety culture, and organisational culture are often used interchangeably, but their concepts are distinct. Organisational culture refers to the deeply embedded norms, values, beliefs, and assumptions shared by members within an organisation.[8] Safety culture considers leadership and health workers' attitudes and values related to the perception of risk and safety. Safety climate is a subset of overall organisational climate that refers to employees' perceptions about the extent to which the organisation values safety (for patients, health workers, and the environment).[9] The Institutional Safety Climate as part of the hand hygiene multimodal hand hygiene improvement strategy refers to the environment and perceptions of patient safety issues in a health-care facility in which hand hygiene improvement is given high priority and valued at all levels of the organisation.[10] This includes the perception and belief that resources are provided and available to ensure hand hygiene, particularly at the point of care. In summary, when a health facility's quality and safety climate or culture values hand hygiene and infection prevention and control, both patients and health workers feel protected and cared for. To prioritise clean hands at the point of care at the right times using the right agent and technique, people at all levels, including those using health-care facilities, should focus on the importance of hand hygiene to save lives and act as key players in promoting the appropriate behaviours and attitudes towards it.

In light of the importance of this element and given the poor progress made in the past 20 years, World Hand Hygiene Day on May 5, 2022, promotes institutional safety climate and culture change as a priority for hand hygiene improvement by adopting the slogan: Unite for safety—clean your hands (appendix). WHO calls all key stakeholders to participate actively (table).

Health-care facilities can use the hand hygiene self-assessment framework[5] to track the progress of hand hygiene implementation, including safety climate and culture change, evaluating improvement over time. This tool also helps to develop an action plan to ensure long-term sustainability. Factors ultimately required to create and support an environment that raises awareness about patient safety and quality of care while ensuring that hand hygiene best practices are prioritised at all levels include a team dedicated to the promotion and implementation of hand hygiene in the facility, leadership commitment and active participation, promotional activities, champions and role models, engagement of patients and patient organisations, and institutional targets, accountability, and reporting. Additionally, self-efficacy and individual accountability should be supported in the organisation as well as nurturing of role models and champions at every level.

We call on the international community to get involved in the World Hand Hygiene Day 2022 and work together to accelerate progress across health services. Reaffirm your commitment, unite, talk, and work together on hand hygiene for future progress, sustainability, and, ultimately, improved quality and safer care. Unite for safety—clean your hands!

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Assortative mixing among vaccination groups and biased estimation of reproduction numbers

Assortative mixing, wherein there is more mixing within infection risk groups than would be expected to occur at random, has long been known to affect epidemic dynamics. A classic example comes from sexually transmitted diseases, for which assortative mixing within groups that have different levels of sexual activity increases the initial growth rate of the infection and the basic reproduction number (R_0) compared to the same population with more random choices of sexual partners.[1] Assortative mixing within age groups has also been shown to affect dynamics and statistical inference for diseases spread through respiratory droplets,[2] which motivates the widespread use of age-structured contact matrices in epidemic models. More recent studies[3,4] have shown that assortative mixing with respect to vaccination status can affect outbreak sizes and estimates of vaccine efficacy in network-based epidemic models.

We hypothesised that assortative mixing among vaccination groups (vaccinated and unvaccinated) might be a source of bias in population-level estimates of the effective reproduction number (*R*) for the delta (B.1.617.2) variant of SARS-CoV-2. With a fixed total rate of contact between individuals, a lower *R* is required to explain a given incidence of new infections when unvaccinated individuals preferentially contact other unvaccinated individuals. The prevalence of vaccination varies greatly across rural and urban areas as well as other social groupings within which assortative mixing is likely. According to Ohio Department of Health (ODH) data,[5] the prevalence of vaccination among adults in Ohio, USA, counties ranges from slightly under 20% to slightly under 70%, with an overall prevalence of approximately 55%. To explore the potential impact of assortative mixing on estimation of *R* we modified an age-stratified Susceptible-Exposed-Infected-Removed model of SARS-CoV-2 transmission in the state of Ohio to allow for assortative mixing within vaccination groups. This model was parameterised and fit using data from the ODH,[5] the Centers for Disease Control and Prevention (CDC),[6] and the United States Census Bureau.[7] The contact matrix for age groups and some other parameters were taken from Prem and colleagues[8] and Bubar and colleagues.[9] The model *R* is the spectral radius of the next-generation matrix.[9]

To make the rate of between-group contact ρ (≤1) times the rate of within-group contact, we multiply each within-group contact rate β_{ii} by α and each between-group contact rate β_{ij} by $\rho\alpha$. The factor α ensures that the total rate of contact is not changed, and it is found by solving the following equation, in which n_0 is the number of unvaccinated individuals and n_1 is the number of vaccinated individuals.

$$\alpha\binom{n_0}{2}+\alpha\binom{n_1}{2}+\alpha\rho n_0 n_1=\binom{n_0+n_1}{2}$$

For a sufficiently large n that ${}_nC_2 \approx n^2 \div 2$, we get

$$\alpha=\frac{(n_0+n_1)^2}{n_0^2+2\rho n_0 n_1+n_1^2}.$$

As intended, this gives us α=1 when ρ=1.

For several choices of ρ, we fit ODH daily reported incident cases using a Bayesian inference approach in