

**PREDICTORS OF PROTECTIVE  
BEHAVIOURS TO PREVENT THE COMMUNITY  
SPREAD OF SARS-COV-2:**

**Who does not accept  
or adhere, why and  
in what context?**

**Project Summary**

**April 2023**

## UNICEF Innocenti – Global Office of Research and Foresight

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## London Metropolitan University Performance with Purpose Research Centre

London Metropolitan University's Performance with Purpose Research Centre is located within the Guildhall School of Business and Law. The Centre focuses on research that addresses real societal challenges, such as inclusion, social value and equity, and applies business and management techniques to support effective organizational performance in tackling social problems. The research team was led by Dr. Stephen Hills and included Dr. Justin Webb, Dr. Anna Baker, Dr. Somayeh Pouransari and Alexandros Semertzi. For more information please visit: [www.londonmet.ac.uk/research/centres-groups-and-units/performance-with-purpose-research-centre](http://www.londonmet.ac.uk/research/centres-groups-and-units/performance-with-purpose-research-centre)

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## Background

Non-pharmaceutical interventions (NPIs) played a critical role in reducing transmission rates and the impact of COVID-19 ahead of the arrival of effective COVID-19 vaccines, which was expected to be the beginning of the end of the COVID-19 pandemic. However, as vaccine availability has increased in much of the world, challenges remain related to acceptance and uptake of COVID-19 vaccines, compounded by global inequities in vaccine access and the emergence of new variants. As such, NPIs continue to be an important tool in slowing and preventing the spread of SARS-CoV-2. This series of rapid evidence assessments (REA) seeks to understand the existing evidence about who delays or refuses COVID-19 vaccination, and who does not adhere to NPI measures, why and in what contexts, to inform tailored policies and interventions that support vaccination acceptance and adherence to NPI measures.

## Research questions

1. Who is more likely to delay or refuse vaccination, why and in what context?
2. Who is more likely to not adhere to social distancing measures, why and in what context?
3. Who is more likely to not adhere to mask wearing measures, why and in what context?
4. Who is more likely to not adhere to self-isolation measures, why and in what context?

## Conceptual framework

The COM-B model (Michie et al. 2011) proposes that there are three components which play a pivotal role in producing behaviour and which, therefore, can be modified to change it. According to the model, in order to perform a behaviour, an individual must feel that they are physically and psychologically capable of performing it, have the physical and social opportunity to perform it, and the motivation to perform it such that they want or need to carry out the behaviour more than competing ones.

## Methodology

Systematic searches of the literature were undertaken to identify empirical research in journal articles written in English, published up to and including 30 June 2021, which investigated factors associated with: (i) COVID-19 vaccine hesitancy or resistance; (ii) social distancing adherence; (iii) mask wearing adherence; and (iv) self-isolation adherence. Keywords and search strings were designed and tested to capture these foci, and systematic searches were undertaken in PubMed Central, Web of Science and Google Scholar, which returned: (i) 1,394 studies about vaccine hesitancy; (ii) 561 studies about social distancing adherence; (iii) 179 studies about mask wearing adherence; and (iv) 30 studies about self-isolation adherence. The returned articles underwent title, abstract and full text screening against the inclusion and exclusion criteria before a quality appraisal determined the final list of: (i) 56 unique studies about vaccine hesitancy; (ii) 29 unique studies about social distancing adherence; (iii) 16 unique studies about mask wearing adherence; and (iv) seven unique studies about self-isolation adherence, to be included in this REA. These studies underwent thematic analysis to establish the factors associated with vaccine hesitancy, social distancing

non-adherence, mask wearing non-adherence and self-isolation non-adherence, using the COM-B model as a theoretical framework. Next, the evidence was segmented by region, cultural groups and income of countries to establish the contexts in which the factors were predictive of vaccine hesitancy, social distancing non-adherence, mask wearing non-adherence and self-isolation non-adherence.

## Who is more likely to not adhere to, delay or refuse vaccination and to not adhere to social distancing, mask wearing and self-isolation measures?

Table 1: Demographics associated with non-adherence to protective behaviours during the COVID-19 pandemic

	Vaccine hesitancy	Non-adherence to social distancing measures	Non-adherence to mask wearing measures	Non-adherence to self-isolation measures
Age	Younger age groups are more likely to be vaccine hesitant [55% of studies, 26 out of 47]	Younger age groups are more likely to be social distancing non-adherent [59% of studies, 13 out of 22]	Age is not associated with mask wearing adherence [64% of studies, 7 out of 11]	Age is not associated with self-isolation adherence [60% of studies, 3 out of 5].
Sex/gender	Females are more likely to be vaccine hesitant [69% of studies, 31 out of 45]	The relationship between sex/gender and social distancing adherence is inconclusive	Males are more likely to be mask wearing non-adherent than females [55% of studies, 6 out of 11].	Sex/gender is not associated with self-isolation adherence [67% of studies, 4 out of 6].
Education	The relationship between education and vaccine hesitancy is inconclusive	Level of education is not associated with social distancing adherence [54% of studies, 7 out of 13].	Those who are less educated are more likely to be mask wearing non-adherent [57% of studies, 4 out of 7].	
Income	People with lower income are more likely to be vaccine hesitant [57% of studies, 12 out of 21]	Income is not associated with social distancing adherence [75% of studies, 6 out of 8]	Income is not associated with mask wearing adherence [50% of studies, 2 out of 4].	
Race/ethnicity	Members of Black ethnic groups are most likely to be vaccine hesitant [65% of studies, 11 out of 17]	Race/ethnicity is not associated with social distancing adherence [71% of studies, 5 out of 7]	Individuals who identify as Black are most likely to wear a mask [60% of studies, 3 out of 5]	
Marital status	Unmarried people are more likely to be vaccine hesitant [63% of studies, 5 out of 8]			

Living area	Whether someone is a rural or urban dweller is not associated with vaccine hesitancy [62% of studies, 5 out of 8]	Whether someone is a rural or urban dweller is not associated with social distancing adherence [100% of studies, 4 out of 4]	Whether someone is a rural or urban dweller is not associated mask wearing adherence [50% of studies, 2 out of 4]	
Having children	Whether someone has children or not is not associated with vaccine hesitancy [50% of studies, 5 out of 10]			
COVID-19 infection	Previously having had COVID-19 is not associated with vaccine hesitancy [83% of studies, 5 out of 6]			
Essential worker status		Essential workers are more likely to be social distancing non-adherent [75% of studies, 3 out of 4]		

**Key**

	Relationship between demographic and protective behaviour is evident.
	Relationship between demographic and protective behaviour is inconclusive.
	No relationship between demographic and protective behaviour is evident.
	No or insufficient evidence of a relationship between demographic and protective behaviour.

As is evident from Table 1, demographics did not consistently predict non-adherence to protective behaviours during the COVID-19 pandemic. Indeed, the only non-isolated predictive finding is that younger age groups are more likely to be vaccine hesitant [55 per cent of studies] and social distancing non-adherent [59 per cent of studies]. Although a non-isolated finding (i.e., consistent for two protective behaviours), age was not associated with mask wearing adherence [64 per cent of studies] or self-isolation adherence [60 per cent of

studies]. Therefore, across all four protective behaviours, the relationship between age and protective behaviours is inconclusive. The only other non-isolated findings were for demographics that were not predictive. Income was not associated with social distancing or mask wearing adherence, although people with lower income are more likely to be vaccine hesitant. Whether someone is a rural or urban dweller is not associated with vaccine hesitancy, social distancing adherence or mask wearing adherence.

## Why are people more likely to not adhere to, delay or refuse vaccination and to not adhere to social distancing, mask wearing and self-isolation measures?

**Psychological capability:** Our psychological capability to perform a behaviour.

**Table 2: Psychological capabilities associated with non-adherence to protective behaviours during the COVID-19 pandemic**

	Vaccine hesitancy	Non-adherence to social distancing measures	Non-adherence to mask wearing measures	Non-adherence to self-isolation measures
COVID-19 knowledge	People with less COVID-19 knowledge or who believe COVID-19 conspiracy theories are more likely to be vaccine hesitant [73% of studies, 8 out of 11]	People with less COVID-19 knowledge or who believe COVID-19 conspiracy theories are more likely to be social distancing non-adherent [80% of studies, 4 out of 5]		
Social media	Users of social media for COVID-19 information are most likely to be vaccine hesitant [83% of studies, 5 out of 6]			
Mental health		The relationship between mental health and social distancing adherence is inconclusive		

### Key

	Relationship between psychological capability and protective behaviour is evident.
	Relationship between psychological capability and protective behaviour is inconclusive.
	No relationship between psychological capability and protective behaviour is evident.
	No or insufficient evidence of a relationship between psychological capability and protective behaviour.

People with **less COVID-19 knowledge** or who believe COVID-19 conspiracy theories are more likely to be both vaccine hesitant [73 per cent of studies] and social distancing non-adherent [80 per cent of studies]. Related to this, it was also found that users of social media for

COVID-19 information are most likely to be vaccine hesitant [83 per cent of studies].

**Social opportunity:** External social opportunities required to make performing a behaviour possible, such as social pressures, cultural rules and expectations, and cultural perceptions.

**Table 3: Social opportunities associated with non-adherence to protective behaviours during the COVID-19 pandemic**

	Vaccine hesitancy	Non-adherence to social distancing measures	Non-adherence to mask wearing measures	Non-adherence to self-isolation measures
Political ideology	Right-wing or conservative voters are more likely to be vaccine hesitant [70% of studies, 7 out of 10]	Right-wing or conservative voters are more likely to be social distancing non-adherent [80% of studies, 4 out of 5]	Right-wing or conservative voters are more likely to be mask wearing non-adherent [100% of studies, 5 out of 5]	
Perceived social normative pressure		Those who perceive less social normative pressure are more likely to be social distancing non-adherent [60% of studies, 3 out of 5]	Those who perceive less social normative pressure to wear a mask are more likely to be mask wearing non-adherent [86% of studies, 6 out of 7]	

**Key**

	Relationship between social opportunity and protective behaviour is evident.
	Relationship between social opportunity and protective behaviour is inconclusive.
	No relationship between social opportunity and protective behaviour is evident.
	No or insufficient evidence of a relationship between social opportunity and protective behaviour.

**Right-wing or conservative voters** are more likely to be vaccine hesitant [70 per cent of studies], social distancing non-adherent [80 per cent of studies] and mask wearing non-adherent [100 per cent of studies]. This represents the factor that most consistently predicts protective behaviour adherence during the COVID-19 pandemic. Those who

perceive less **social normative pressure** to engage in protective behaviours are more likely to be social distancing non-adherent [60 per cent of studies] and mask wearing non-adherent [86 per cent of studies].



**Reflective motivation:** The reflective and internal processes by which we evaluate existing situations, influencing our decision-making and thus our behaviours.

**Table 4: Reflective motivations associated with non-adherence to protective behaviours during the COVID-19 pandemic**

	Vaccine hesitancy	Non-adherence to social distancing measures	Non-adherence to mask wearing measures	Non-adherence to self-isolation measures
Perceived vaccine safety	People who perceive the vaccine to be less safe or to cause side effects are more likely to be vaccine hesitant [100% of studies, 16 out of 16]			
Perceived efficacy	People who perceive the vaccine to be less effective are more likely to be vaccine hesitant [80% of studies, 4 out of 5]		People who perceive mask wearing to be less effective are more likely to be mask wearing non-adherent [60% of studies, 3 out of 5]	
Perceived vulnerability	People who perceive themselves to be less vulnerable to COVID-19 are more likely to be vaccine hesitant [79% of studies, 11 out of 14]		The relationship between perceived vulnerability to COVID-19 and mask wearing adherence is inconclusive	
Perceived susceptibility	People who perceive themselves to be less susceptible to catching COVID-19 are more likely to be vaccine hesitant [54% of studies, 7 out of 13]	The relationship between perceived susceptibility to COVID-19 and social distancing adherence is inconclusive	People who perceive themselves to be less susceptible to catching COVID-19 are more likely to be mask wearing non-adherent [80% of studies, 4 out of 5]	
Trust in healthcare professionals	People who have less trust in healthcare professionals are more likely to be vaccine hesitant [100% of studies, 6 out of 6]			

Trust in government	People who have less trust in the government are more likely to be vaccine hesitant [83% of studies, 5 out of 6]			
Perceived behavioural control		People who perceive themselves to have less control over their social distancing are more likely to be social distancing non-adherent [100% of studies, 5 out of 5]	People who perceive themselves to have less control over their mask wearing are more likely to be mask wearing non-adherent [75% of studies, 3 out of 4]	

**Key**

	Relationship between reflective motivation and protective behaviour is evident.
	Relationship between reflective motivation and protective behaviour is inconclusive.
	No relationship between reflective motivation and protective behaviour is evident.
	No or insufficient evidence of a relationship between reflective motivation and protective behaviour.

There are three non-isolated reflective motivation factors that are predictive of protective behaviours non-adherence. People who **perceive the protective behaviour to be less effective** are more likely to be vaccine hesitant [80 per cent of studies] and mask wearing non-adherent [60 per cent of studies]. People who perceive themselves to have **less control over the protective behaviour** are more likely to

be social distancing non-adherent [100 per cent of studies] and mask wearing non-adherent [75 per cent of studies]. People who perceive themselves to be **less susceptible to catching COVID-19** are more likely to be vaccine hesitant [54 per cent of studies] and mask wearing non-adherent [80 per cent of studies], although the relationship was inconclusive for social distancing.

## Policy implications

By conceptualizing factors as capabilities, opportunities and motivations that influence behaviour (COM-B, NICE 2014), it is possible to use the Behaviour Change Wheel to select the most effective intervention functions and implementation strategies to change behaviour, as determined by a synthesis of 19 behaviour change frameworks (NICE 2014; Craig et al. 2008). Decision-makers should work through the steps of the Behaviour Change Wheel, considering the behaviour that they are trying to influence, the capabilities, opportunities and motivations of their populations to enact the desired behaviour, and the intervention functions and implementation strategies that are feasible.

What follows are examples of approaches that could be taken. However, to influence behaviour, it should be remembered that behaviour change is fluid and context-specific. Furthermore, understanding behaviours is not a one-time task and should be repeated regularly. Successful behaviour change approaches will require multiple layers of intervention, using a combination of physical, social and psychological approaches. All stakeholders should be involved in the development of an intervention strategy. Ongoing monitoring and evaluation should continuously guide decision-making throughout the development and implementation process.

### Psychological capability

According to the Behaviour Change Wheel, psychological capabilities for behaviour change can be influenced by education (i.e., increasing knowledge or understanding), training (i.e., imparting skills) and enablement (i.e., reducing barriers and increasing means beyond education, training and environmental restructuring). Considering that the predictive factor is low COVID-19 knowledge, it follows that the most relevant intervention function from these options is education to increase knowledge and understanding of COVID-19, which could be implemented through service provision (i.e., delivering a service) and/or a communications and marketing approaches.

**Education:** *Empower individuals to be able to think critically about information, so to be able to distinguish fact from fiction.*

**Service provision:** Schools could place an emphasis on teaching critical thinking, engaging with the themes of power, personal freedom, agency, citizen against state and loss of traditional lifestyle, which conspiracy theories revolve around.

**Communications and marketing:** Social marketing campaigns could be used to educate populations, using quality information presented by reliable and respected sources.

## Social opportunity

According to the Behaviour Change Wheel, social opportunities for behaviour change can be influenced by modelling (i.e., provision of an example for people to aspire to), which can be implemented through communications and marketing (i.e., using print, electronic, telephonic or broadcast media). Enablement, environmental restructuring (i.e., changing the physical or social context) or restrictions (i.e., using rules to reduce opportunity) are also possible intervention functions that could be utilized.

**Modelling:** *Right-wing and conservative leaders, especially when not in government, could model protective behaviours during a pandemic.*

**Communications and marketing:** Leaders should use their social media to broadcast that they have received the vaccine, and are keeping socially distanced, wearing a mask and self-isolating when presenting symptoms or testing positive for a virus.

## Reflective motivation

According to the Behaviour Change Wheel, motivations for behaviour change can be influenced by education (i.e., increasing knowledge or understanding), persuasion (i.e., using communication to induce positive or negative feelings or stimulate action), incentivization (i.e., creating the expectation of a reward) and coercion (i.e., creating the expectation of a punishment or cost).

To address the barrier of perceived low efficacy of protective behaviours, of the intervention function options provided by the Behaviour Change Wheel, persuasion (i.e., using communication to induce positive or negative feelings or stimulate action) – implemented through communications and marketing (i.e., using print, electronic, telephonic or broadcast media) – could be selected.

**Persuasion:** *People could be persuaded of the efficacy of protective behaviours.*

**Communications and marketing:** Timely communication about the effectiveness of protective behaviours, such as vaccines against new COVID-19 variants, is critical to maintain confidence in protective behaviours. Also, the different ways that protective behaviours function should be communicated. For example, vaccines can protect against transmission of a virus and against hospitalization and death from the resulting disease. Where virus variants result in vaccines being less effective in limiting transmission, populations should be persuaded to receive a vaccine on the basis of the effectiveness of a vaccine in protecting against hospitalization and death. Also, populations should be persuaded that masks are effective both in terms of source control to block exhaled virus and filtration for wearer protection. Real-world data, rather than trial data, should be used wherever possible to ensure communications are more meaningful.

To address the barrier of perceived low susceptibility to catching COVID-19, of the intervention function options provided by the Behaviour Change Wheel, persuasion (i.e., using communication to induce positive or negative feelings or stimulate action) – implemented through communication and marketing (i.e., using print, electronic, telephonic or broadcast media) – could be useful intervention functions.

**Persuasion:** *People should be persuaded that they are not as insusceptible as they believe.*

**Communications and marketing:** Regular and meaningful communication of infection rates

Perceived low control of protective behaviours could be the result of restrictions or limitations to the physical environment, a reduction in the physical opportunity, resulting in perceived control over behaviour. Therefore, environmental restructuring (i.e., changing the physical or social context) – implemented through environmental and social planning (i.e., controlling the physical and social environment) – and enablement (i.e., reducing barriers and increasing means beyond education, training and environmental restructuring) – implemented through service provision (i.e., delivering a service) and guidelines (i.e., recommend or mandate practice) – could be influential.

**Environmental restructuring:** *Perceived protective behavioural control can be increased as a consequence of changing physical and social contexts.*

**Environmental and social planning:** To support social distancing, the number of people permitted to access certain locations should be restricted, so that there remains space for individuals to have control over their social distancing. Also, barriers should be used to separate people, and one-way systems implemented to increase control over social distancing. Environmental cues, such as signs, should be used to remind people to wear masks.

**Enablement:** *Removing barriers to protective behaviours enables people to engage in protective behaviours.*

**Service provision:** To enable vaccine uptake, health services should present easy and convenient opportunities to receive a vaccine. For example, using pop-up vaccination sites at convenient locations and smoothing out the registration process for an appointment make it easier to get a vaccine, as well as making it easier to book and cancel appointments online. To enable mask wearing, free-of-charge masks should be provided at entrances to locations where mask wearing is required or advised. Self-isolation can be enabled by increasing the capacity of delivery services for essential goods, such as groceries and medicine.

**Guidelines:** Employers can enable social distancing adherence by providing their employees with the option of working from home. Technology should be used to facilitate working from home for more types of work. For example, prior to the pandemic, legal work with confidential documents was restricted to the office, but technology solutions are available which protected the confidentiality of digitally accessed documents to allow law professionals to work from home during the pandemic.

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