Effectiveness of non-pharmaceutical interventions (NPIs) as implemented in the UK during the COVID-19 pandemic: a rapid review of experimental, epidemiological and mathematical modelling studies

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Aims

- To assess the evidence on NPIs as implemented in the UK, to support policy-makers to prepare for future pandemics.

Key findings / Conclusion

- Our study was the first to assess the available evidence on the effectiveness of NPIs in the UK. We found few studies with high internal validity, the rest were highly heterogeneous with most NPI categories providing very low certainty or inconclusive evidence of a protective effect. These results do not necessarily reflect a lack of effectiveness of packages of NPIs implemented in the UK but highlight the need to strengthen evaluation of public health interventions.
- We need to improve evidence generation to support future pandemic decision-making. This could for example by achieved by developing 'sleeper' study platforms and protocols which can be activated during an epidemic or pandemic, facilitate processes for incorporating rapid data governance and ethical approvals, or the delivery of rapid adaptive trials for the simultaneous testing of various NPI.

Background

- During the first year of the COVID-19 pandemic, NPIs were the only preventive methods available to governments, health systems and populations.
- They were mainly implemented as a combination of measures although the types of NPIs as well as how and when they were implemented varied across countries which make the assessment of the evidence of individual NPIs challenging.

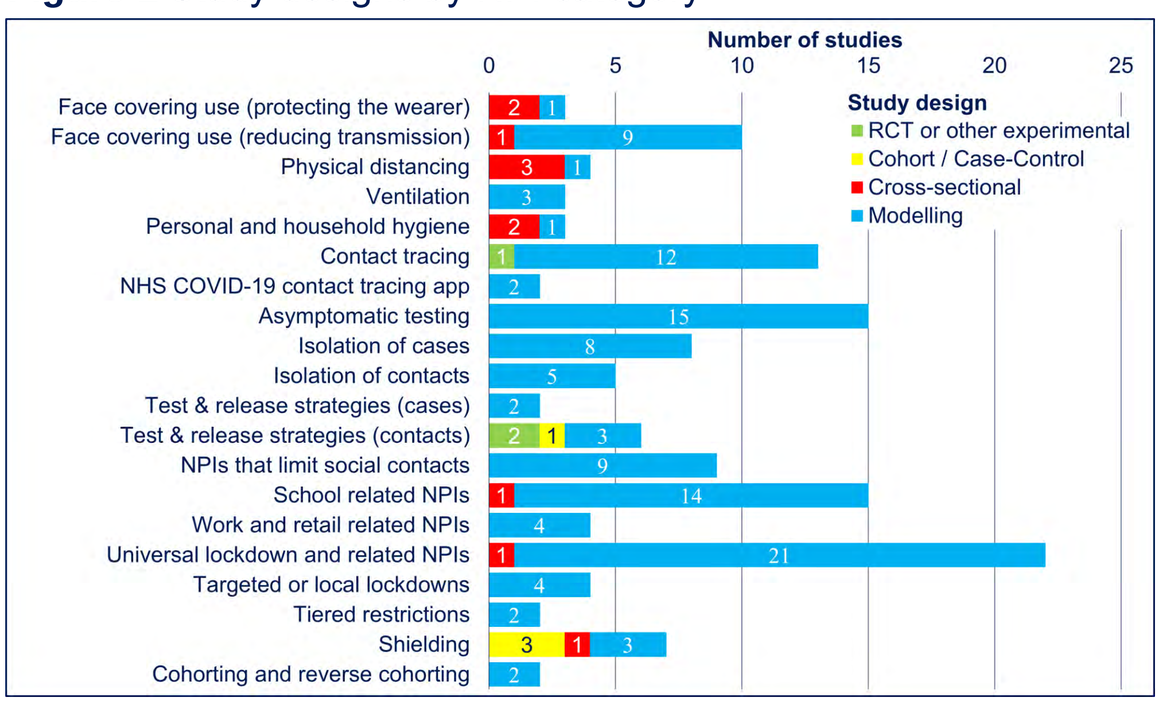
Methods

- We systematically searched MEDLINE, EMBASE, NIH Covid Portfolio and Corona Central for all UK interventional, observational, and mathematical modelling studies published between March 2020 and January 2024 reporting on NPI effectiveness (as measured by COVID-19 cases, transmission, hospitalisation, and mortality). A modified synthesis without meta-analysis approach was taken to analyse the following domains for each NPI and outcome: methodological quality, study relevance, consistency of results across studies, and assessment of precision.

Results

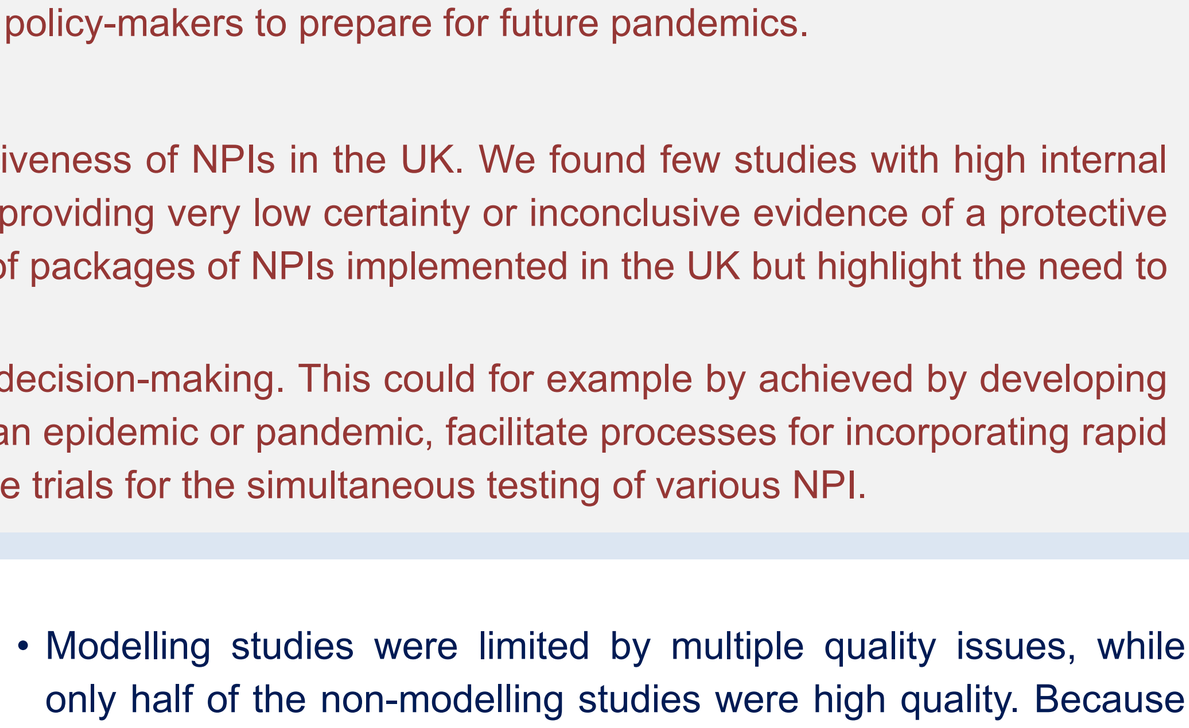
- Ninety-seven (85 modelling, nine observational, and three interventional) studies reported on COVID-19 cases, hospitalisations, deaths or transmission across 20 NPI categories.

Figure 1 Study designs by NPI category



- Modelling studies were limited by multiple quality issues, while only half of the non-modelling studies were high quality. Because of study heterogeneity, we synthesised the evidence on the direction, but not the size of effect.

Figure 2 Summary of findings by NPI category



- The evidence for test & release strategies for the contacts of positive cases, school related NPIs and the universal lockdown was suggestive of a protective effect. For the remaining NPI categories there was very low or inconclusive certainty of the evidence to support their effectiveness.

Figure 3 Synthesis of evidence by NPI category

Certainty of evidence	NPIs
Very high / High	None
Moderate	Test & release strategies (contacts)
Inconclusive	Face covering use (reducing transmission), Physical distancing, Personal and household hygiene, Contact tracing, Shielding,
Low	School related NPIs, Universal lockdown
Very low	Face covering use (protecting the wearer), Ventilation, NHS contact tracing app, Asymptomatic testing, isolation of cases, Isolation of contacts, Test & release strategies (cases), NPIs that limit social contacts, Work and retail related NPIs, Targeted or local lockdown, Tiered restrictions, Cohorting