Independent report

Optimising the COVID-19 vaccination programme for maximum short-term impact

Updated 26 January 2021

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This publication is available at https://www.gov.uk/government/publications/prioritising-the-first-covid-19-vaccine-dose-jcvi-statement/optimising-the-covid-19-vaccination-programme-for-maximum-short-term-impact

Summary

- There has been a rapid increase in COVID-19 cases in the UK in December 2020
- Two vaccines now have MHRA Regulation 174 authorisation (Pfizer-BioNTech and AstraZeneca)
- Rapid delivery of the vaccines is required to protect those most vulnerable
- Short-term vaccine efficacy from the first dose of the Pfizer-BioNTech vaccine is calculated at around 90%
- Short-term vaccine efficacy from the first dose of the AstraZeneca vaccine is calculated at around 70%, with high protection against severe disease
- Given the high level of protection afforded by the first dose, models suggest that initially vaccinating a greater number of people with a single dose will prevent more deaths and hospitalisations than vaccinating a smaller number of people with 2 doses
- The second dose is still important to provide longer lasting protection and is expected to be as or more effective when delivered at an interval of 12 weeks from the first dose

Introduction

A new variant of COVID-19 has been identified in the UK, which has been associated with an increase in COVID -19 cases. Given this, the Joint Committee on Vaccination and Immunisation (JCVI) has considered options for increasing the short-term impact of the vaccination programme.

Considerations

When considering vaccination schedules JCVI often considers first principles, and regularly advises schedules which differ from the marketing authorisation. In every case, the advice of JCVI is aimed at maximising protection in the population.

Published efficacy between dose 1 and 2 of the Pfizer vaccine was 52.4% (95% confidence interval (CI) 29.5 to 68.4%). Based on the timing of cases accrued in the phase 3 study, most of the vaccine failures in the period between doses occurred shortly after vaccination, suggesting that short-term protection from dose 1 is very high from day 10 after vaccination. Using data for those cases observed between day 15 and 21, efficacy against symptomatic COVID-19 was estimated at 89% (95% CI 52 to 97%).

The level of protection gained from a single dose of the AstraZeneca vaccine was assessed in an exploratory analysis. Vaccine efficacy from 22 days post dose 1 was 73% (95% CI 48.79 to 85.76). High protection against hospitalisation was seen from 21 days after dose 1 until 2 weeks after the second dose, suggesting that a single dose of the AstraZeneca vaccine will provide high short-term protection against severe disease. Protective immunity from the first dose likely lasts for a duration of 12 weeks.

With most vaccines an extended interval between the prime and booster doses leads to a better immune response to the booster dose. There is evidence that a longer interval between the first and second doses promotes a stronger immune response with the AstraZeneca vaccine.

There is currently no strong evidence to expect that the immune response from the Pfizer-BioNTech and AstraZeneca vaccines differ substantially from each other.

The rate of vaccine delivery in the UK is currently limited by vaccine supply rather than by workforce capacity. An extended interval between vaccine doses together with initial prioritisation of the first vaccine dose would increase the flow of vaccine supply in the short term. This will allow for more first doses to be delivered to more people earlier.

Conclusion

Given the epidemiology of COVID-19 in the UK in late 2020 there is a need for rapid, high levels of vaccine uptake among vulnerable persons.

The committee supports a 2-dose vaccine schedule for the Pfizer-BioNTech and AstraZeneca vaccines. Given the data available, and evidence from the use of many other vaccines, JCVI advises a maximum interval between the first and second doses of 12 weeks for both vaccines. It can be assumed that protection from the first dose will wane in the medium term, and the second dose will still be required to provide more durable protection.

The committee advises initially prioritising delivery of the first vaccine dose as this is highly likely to have a greater public health impact in the short term and reduce the number of preventable deaths from COVID-19.