The Science of Masking to Control COVID-19

cdc.gov/coronavirus
Laboratory Assessment of Cloth Masks Effectiveness:
Source Control (exhalational) and Filtering Protection (inhalational)

- **Source control (exhalational) to block respiratory particles entering the environment**
  - Multi-layer cloth masks substantially block particles < 1-10 microns
  - These comprise greatest fraction of particles and increase with speech volume
  - Reductions as high as 50-70% with some cloth masks, on par with surgical masks

- **Filtering protection (inhalational) to block wearer from inhaling particles in air**
  - Cloth masks can filter inhaled particles but less effectively than as source control
  - Substantial variation due to experimental design and interpretation
  - Improvements possible with more layers, multiple materials
    - Opportunity for innovation
Multiple Epidemiologic Investigations Document the Effectiveness of Masking

- **High-risk exposure event**
  - Universal masking in hair salon where 2 ill stylists attended to 139 clients; no infections developed in 67 clients subsequently tested
  - Use of face covering onboard the USS Theodore Roosevelt during an outbreak was associated with a 70% reduced risk of infection

- **Retrospective case-control study of exposed contacts**
  - Always wearing a mask before and during high-risk exposures reduced risk of infection by 70%

- **Household surveys**
  - Household mask use before index case developed symptoms reduced infection risk 79%

- **Air travel**
  - With masking, no infections transmitted on multiple flights with infected passengers
Jurisdictional Declines in New Diagnoses Associated With Organizational/Political Leadership Directives for Universal Masking

- 7 published reports examined changes in diagnoses or deaths with mask mandates
  - MGH Brigham (MGB) System
  - Jena city, Germany
  - Arizona state, United States
  - 15 states*, United States (two analyses)
  - Canada, national
  - United States, national

- All observed reductions in new COVID-19 diagnoses (n=6) or deaths (n=3) following mandates for universal masking

* Also included D.C. and controlled for major COVID-19 mitigation policies as time-varying (closure of K–12 schools, county-level or statewide shelter-in-place orders, nonessential business closure, closure of restaurants for dining in, closure of gyms or movie theaters

Valid as of November 16, 2020
The Science of Masking to Control COVID-19: Summary

- Cloth masks reduce community exposure to SARS-CoV-2
- Cloth masks offer both source control and personal protection
  - The relationship is likely complementary and possibly synergistic
  - Community benefit derives from the combination of these effects
  - Individual benefit increases with increasing community mask use

- Wearing masks by both the infected and uninfected person gives the uninfected person the most protection
  - “Masking can protect you and works best for you when everyone does it”
  - “When you wear a mask, you protect others as well as yourself”

- Universal masking policies can help avert the need for shutdowns
  - Especially if combined with other non-pharmaceutical interventions such as social distancing, hand hygiene, and adequate ventilation
The Science of Masking to Control COVID-19: References

Slide 1

Slide 2

Slide 3
For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.