Which investment on interventions against COVID-19 pandemic is worth its cost?

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Various public health measures have been taken by governments and health authorities to prevent and control pandemics across time. The benefit of investing in any health condition should outweigh the costs of not investing in it. The objective of this evidence brief to review studies conducted on economic evaluation of public health measures against COVID-19 and influenza pandemics published from 1998-2020 to provide an input for policy recommendation for Ethiopia.

Key findings

Cost effectiveness of the interventions

• Stockpiling and treatment

- Stockpiling of drugs for therapeutic use on high-risk patients, for use in the post-exposure short-term prophylaxis of all close contacts, and treatment of index patient, has been shown to be cost-saving.
- Stockpiling for pre-exposure long-term prophylaxis of an entire cohort of patients is less cost-effective if case fatality ratio of the pandemic is less than 0.6%.
- It is cost-effective to stockpile drug for treatment of sick patients at a reproductive rate of 1.8, and 20-40% population illness rate, and if the actual risk is less than 37% for 30 years, and only if more than 60% of the sick population would take the antiviral drugs.
- Testing all symptomatic patients and treating those only with positive test results was reported to be less cost-effective when compared to treating all symptomatic patients for a pandemic influenza disease.
- The addition of school closure was only cost-effective for pandemics with a CFR of more than 1% and R0 between higher than 1.6 and 2.1 according to different studies.
- For stockpiling drugs and vaccines, the antiviral treatment of those clinically infected was shown to be the most cost-effective approach, followed by pre-pandemic vaccination, and then the combination of both antiviral treatment and pre-pandemic vaccination when compared to a small stockpile of antiviral drugs for prophylaxis of case contacts and the treatment of clinical cases and vaccine administration after six months.
- At a 1% influenza mortality rate, and moderate infectivity (R0 of 2.1 or greater), and 60% population compliance; a combination of adult and child social distancing, school closure, and antiviral treatment and prophylaxis was found to be cost-effective.
- Overall, treatment of patients with antiviral drugs were found very cost-effective.
- All the studies reviewed estimated that the stockpiling of antiviral agents for treating patients have only optimal economic benefits.

• Vaccination

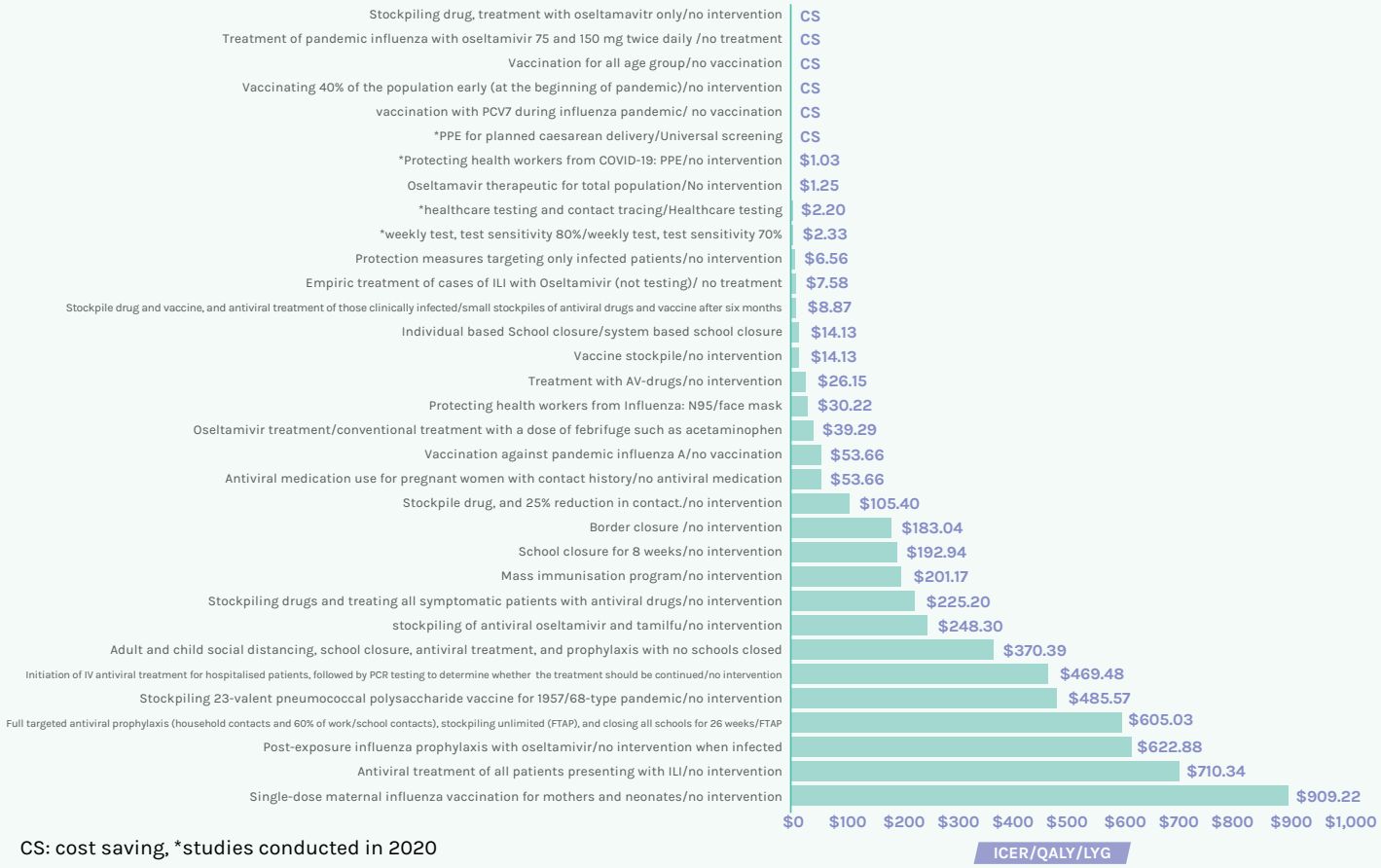
- For the influenza pandemic, the early availability of the vaccine before the peak time of the pandemic determines its economic value.
- Vaccinating high-risk groups was shown to be highly cost-effective, followed by extending the vaccination to schools and then low-risk groups.
- Vaccinating the low-risk group was also shown to be cost-effective when compared to no intervention.
- When compared to seasonal prophylaxis, vaccination of the total population is preferred.
- Vaccinating all population is cost-effective only if the vaccine cost is low.
- The cost-effectiveness of vaccination strategies is sensitive to the risk of death, overall size of the epidemic, cost of vaccines, model assumptions, hospitalization rates and costs, and case-fatality ratios, the number of vaccine doses needed, illness rates, and timing of vaccine delivery.

Policy Brief

Other interventions

- Combination of antiviral prophylaxis for those with contact history and school closure is considered more efficient when compared to full targeted antiviral prophylaxis.
- A combination of healthcare testing, contact tracing, use of isolation centre, and mass symptom screening was found to be cost-effective for a pandemic with a reproduction number above 1.5 or a 0.1% prevalence of the disease.
- Most of the studies were also cost-effective from the societal perspective indicating a higher net societal benefit for the pandemic prevention and control strategies.

ICER of the interventions in (US$ 100 per QALY/LYG) in 2019



CS: cost saving, *studies conducted in 2020

Conclusion

- Most of the interventions were cost-effective under various scenarios while school closure was cost-effective only if the case fatality ratio.
- The level of the pandemic's infectivity and severity were the key drivers of the cost-effectiveness of both pharmaceutical and non-pharmaceutical interventions.

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Study Report: An economic evaluation of Influenza and COVID -19 pandemic prevention and control interventions: a systematic review

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