VALUE IN HEALTH ▮ (2016) ▮▮▮–▮▮▮

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/jval

Value for Money in H1N1 Influenza: A Systematic Review of the Cost-Effectiveness of Pandemic Interventions

Hélène Pasquini-Descomps, MSc[1,2,*], *Nathalie Brender, PhD*[1], *David Maradan, PhD*[1,2]

[1]*Haute École de Gestion Genève (Geneva School of Business Administration), HES-SO University of Applied Sciences Western Switzerland, Carouge, Switzerland;* [2]*University of Geneva, Switzerland*

ABSTRACT

Background: The 2009 A/H1N1 influenza pandemic generated additional data and triggered new studies that opened debate over the optimal strategy for handling a pandemic. The lessons-learned documents from the World Health Organization show the need for a cost estimation of the pandemic response during the risk-assessment phase. Several years after the crisis, what conclusions can we draw from this field of research? **Objective:** The main objective of this article was to provide an analysis of the studies that present cost-effectiveness or cost-benefit analyses for A/H1N1 pandemic interventions since 2009 and to identify which measures seem most cost-effective. **Methods:** We reviewed 18 academic articles that provide cost-effectiveness or cost-benefit analyses for A/H1N1 pandemic interventions since 2009. Our review converts the studies' results into a cost-utility measure (cost per disability-adjusted life-year or quality-adjusted life-year) and presents the contexts of severity and fatality. **Results:** The existing studies suggest that hospital quarantine, vaccination, and usage of the antiviral stockpile are highly cost-effective, even for mild pandemics. However, school closures, antiviral treatments, and social distancing may not qualify as efficient measures, for a virus like 2009's H1N1 and a willingness-to-pay threshold of $45,000 per disability-adjusted life-year. Such interventions may become cost-effective for severe crises. **Conclusions:** This study helps to shed light on the cost-utility of various interventions, and may support decision making, among other criteria, for future pandemics. Nonetheless, one should consider these results carefully, considering these may not apply to a specific crisis or country, and a dedicated cost-effectiveness assessment should be conducted at the time.

Keywords: cost-benefit, cost-effectiveness, H1N1 influenza, pandemic, value for money.

Copyright © 2016, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.

Introduction

The last influenza pandemic, known as the 2009 H1N1 crisis, was a very interesting challenge to global risk governance. Being the first pandemic to occur under the World Health Organization's new International Health Regulation [1], it triggered within American, European, and Asian countries a set of various interventions such as airport screenings, antiviral stockpiling, vaccination campaigns, bans on public events, and school closures.

Decisions on which interventions to undertake were made according to the recommendations of expert committees following each countries' national and regional plans. However, as the H1N1 virus proved to be relatively mild, the deployment of strategies sometimes tailored for more lethal viruses left an impression of "overreaction," especially in Europe. This controversy was magnified by the financial crisis [2].

Indeed, it has become increasingly difficult for governmental policymakers to defend their decisions to their publics without including economic evaluations of those interventions, even in an emergency context. However, such information might not have been available at the time of the H1N1 crisis. For example, the cost-effectiveness of some interventions, such as school closures, was unknown. In addition, studies on cost-effectiveness published before 2009 usually accounted for a case-fatality rate of at least 10 times higher than the recently estimated H1N1 case-fatality ratio (CFR) of 0.02% [3].

As a consequence, the lessons-learned documents from the H1N1 pandemic often mention the necessity to reassess "the cost-effectiveness of the strategy during the risk evaluation and response process: "a methodology for measuring the economic costs of interventions and the overall pandemic should be taken into account during pandemic preparedness" [4]. Post-2009, researchers acknowledged this demand and published additional cost-effectiveness studies on the pandemic interventions, including school closures.

The objective of this study was to systematically review significant articles, post-2009, that evaluate the cost-effectiveness of the interventions administered during the A/H1N1 pandemic. This type of systematic review of studies ranging from 2004 to 2011 has been performed previously [5]. Our

* *Address correspondence to:* Hélène Pasquini-Descomps, Haute École de Gestion de Genève, HES-SO University of Applied Sciences Western Switzerland, Route de Drize 7, Carouge GE 1227, Switzerland.

E-mail: helene.pasquini-descomps@hesge.ch.

1098-3015$36.00 – see front matter Copyright © 2016, International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Published by Elsevier Inc.

http://dx.doi.org/10.1016/j.jval.2016.05.005

Table 1 – Influenza pandemic interventions and related cost studies included in our review.

Category	Pandemic interventions/public measures	Studies included in our review
Surveillance	Disease surveillance networks	Wang et al., 2012 [16]
Planning	Emergency preparedness planning/drills	–
	Prevention behavior programs	–
Stockpiling	Stockpiling antiviral medicine	Carrasco et al., 2011 [20]
	Stockpiling low-efficacy vaccine	–
Trade and travel restriction	Travel restriction	–
	Border scanning	–
	Close borders to people	–
	Close borders to goods	–
	Ground airplane travel	–
	Tracking exposed people	Wang et al., 2012 [16]
Quarantine	Quarantine existing cases (household quarantine)	Perlroth et al., 2010 [22]
	Quarantine hospital	Dan et al., 2009 [23]
Antiviral	Antiviral treatment	Lee et al., 2010 [26]
		Lee et al., 2011 [25]
		Nagase et al., 2009 [27]
		Lavelle et al., 2012 [28]
		Perlroth et al., 2010 [22]
	Antiviral prophylaxis	Perlroth et al., 2010 [22]
Vaccination	Low-efficacy/seasonal/PCV vaccine distribution	Rubin et al., 2010 [38]
	High-efficacy vaccine (targeted to specific agent) production and distribution	Brouwers et al., 2009 [32]
		Beigi et al., 2009 [35]
		Durbin et al., 2011 [33]
		Sanders et al., 2010 [36]
		Khazeni et al., 2009 [34]
		Prosser et al., 2011 [31]
		Wang et al., 2012 [16]
Hospitalization	Observation	–
	Respiratory assistance	–
Social distancing	School closure	Brown et al., 2011 [40]
		Halder et al., 2011 [41]
		Perlroth et al., 2010 [22]
	Stay at home (self-isolation)	Perlroth et al., 2010 [22]
	Business closure	–
	Ban on public gathering	–
	Public transportation ban	–
Hygiene recommendation	Facemask	Tracht et al., 2012 [49]
	Prevention behavior recommendation	–
Animal-to- human transmission	Animal culling	–
	Food restriction	–

A dash mark ("–") indicates that no studies were found matching our selection criteria for this intervention.
PCV, pneumococcal vaccine.

study, however, includes articles from 2009 to 2014, and it brings two new elements: First, we systematically convert the results to a cost-utility measure to allow for comparisons among studies. Second, we graphically present the results of the studies in their contexts of severity and infectivity. This framework enables policymakers to easily understand which cost-utility measures are relevant for a specific pandemic scenario [6]. In addition, our review helps to identify which pandemic interventions are still missing an economic evaluation, which we hope will raise the interest of researchers for further studies in the domain.

Methods

Data

We searched for recent economic studies on H1N1 pandemic interventions using the following protocol: In December 2014, we performed a systematic search in the MEDLINE database via PubMed (January 1, 2009–December 31, 2014) and in EBSCO Business Source Premiere (January 1, 2009–December 31, 2014). The search terms were "cost(s)," "effectiveness," "benefit," and "H1N1" in various combinations and also in conjunction with terms from the interventions' categories, such as "surveillance" (see Table 1). In addition, reference lists of relevant publications on this topic were screened, including the references of the previous systematic review [5]. A total of 87 studies were identified.

Study Selection

The resulting articles were manually sorted by the research team on the basis of their titles and abstracts to include only the following:

1. Peer-reviewed academic studies published in English.
2. The year of publication should be post-2009 and/or include an

Download English Version:

https://daneshyari.com/en/article/5104708

Download Persian Version:

https://daneshyari.com/article/5104708

Daneshyari.com