VERSÃO ORIGINAL

THE MANAGEMENT OF A (H1N1) PANDEMIC: AN ALTERNATIVE VIEW

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ABSTRACT

The purpose of this paper is to analyse the commercial non-sanitary interests of the management of the pandemic influenza preparedness in the Global North and how this preparedness for the pandemic could be an additional burden for the countries of the Global South. Moreover, this paper examines the complexity of scientific outreach to society through the media in the case of serious epidemic outbreaks.

Keywords:

H1N1 Pandemic; World Health Organization; Media.

INTRODUCTION

Journalists are frequently criticized and branded as irresponsible, exaggerated and sensationalist when reporting on natural disasters or serious epidemic outbreaks. However, reflecting on the communication of the A (H1N1) pandemic[1], there seemed to be greater understanding among the press and the media than among the so called "scientists" from the international organizations, and health ministries from industrialized countries. Since June–July 2009, journalists

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(1) According to World Health Organization (WHO) a Pandemic alert Phase 5 is characterized by human-to-human spread of the virus into at least two countries in one WHO region. Pandemic phase 6 (the highest stage), is characterized by community level outbreaks in at least one other country in a different WHO region. WORLD HEALTH ORGANIZATION. *Current WHO phase of pandemic alert for Pandemic (H1N1) 2009*. Available at: <http://www.who.int/csr/disease/swineflu/phase/en>. Accessed in: Sept. 4th, 2012. H1N1 pandemic was first described by WHO in April 2009; in 10 August 2010, the Director-General of the World Health Organization, Margaret Chan, announced the end of the H1N1 pandemic.

started asking questions that scientists and public authorities were not able to answer. Today, three years later, journalists may have been right in formulating these questions and concerns that led to external independent evaluations, such as the ones conducted, for instance, by the European Council[2] and the French Parliament.[3]

First of all, it is important to recall that a third of the world's population has no regular access to medicines, and there are thousands of people who are dying every day because of this situation.[4] According to the Joint United Nations Program on HIV/AIDS (Unaids), 20 million people in developing countries should be receiving antiretroviral treatment, but only 5.2 million[5] are receiving ARV's. This means that many of the 15 million patients without access today will die in the next two-four years if there is no radical change.

I. THE STOCKPILING OF OSELTAMIVIR[6]

In the case of avian influenza H5N1, since 2005, there was stockpiling of the medicine Oseltamivir (Chart 1)[7] whose effectiveness was not proven, and for an illness that had not even arrived yet (as never seen before in the history of medicine). These medicines are now in stock for about 20% to 50% of the population in several developed countries. However, these stocks will have to be destroyed because they are going to expire in the coming years.

These events started in 2005 with the threat of the avian influenza caused by the H5N1 virus. If we look at the history of public health through the 20th century, we will see that there have been hundreds of variants of influenza viruses. However, apart from the A (H1N1), which is of swine origin, how many of them

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(2) CASSEL, Ingri. H1N1 pandemic scam cost $billions worldwide. European Parliamentary Assembly holds public hearing to investigate "what went wrong". *Idaho* Observer, Strasbourg, France. Feb. 10th, 2010. Available at: <http://www.proliberty.com/observer/20100234.html>. Accessed in: July 26th 2012.

(3) ASSEMBLÉE NATIONALE. Rapport. *Au nom de la Commission d'enquête sur la manière dont a été programmée, expliquée et gérée la campagne de vaccination contre la grippe* A(H1N1). Available at: <http://www.assemblee-nationale.fr/13/rap-enq/r2698.asp>. Accessed in: July 26th 2012.

(4) According to WHO "Nearly nine million children under five years old die every year, many of them from conditions that could be treated with safe, effective medicines WORLD HEALTH ORGANIZATION. *Medicines*: medicines for children. Fact Sheet n. 341, June 2010. Available at: <http://www.who.int/mediacentre/factsheets/fs341/en/index.html>. Accessed in: July 26th 2012.

(5) UNAIDS. *Global Report* 2010. Available at: <http://www.unaids.org/globalreport/Global_report.htm>. Accessed in: July 26th 2012.

(6) Oseltamivir is an antiviral drug, marketed under the trade name Tamiflu.

(7) WORLD HEALTH ORGANIZATION. *Donation of three million treatments of oseltamivir to WHO will help early response to an emerging influenza pandemic*. Aug. 24th 2005. Available at: <http://www.who.int/mediacentre/news/releases/2005/pr36/en/>. Accessed in: July 27th 2012.

have actually caused human infections? The answer is only four[8].

Chart 1 - Comparison of International Oseltamivir/Zanamivir Stockpiling Trends

Country (population in million)	Size and composition of stockpile	Uses	Comment
Canada (33)	~ 25% of population NAS: 50.7 M doses Oseltamivir 5 M doses Zanamivir plus other federal and PT stockpiles (~80M total)	Early treatment; rapid containment; outbreak control; post-exposure prophylaxis in Phase 4/5	Private stockpiles may be present for pre-exposure prophylaxis
United States (304)	25% of population (goal 35%) almost all Oseltamivir	Early treatment; rapid containment (prophylaxis to be covered by private stockpiling)	Endorsing private stockpiling; has well-established shelf-life extension program
United Kingdom (61)	25% population; recent commitment to increase to 50% population (32.8M) 2/3 Oseltamivir 1/3 Zanamivir	Early treatment – enough for severe pandemic and small amount for pre- exposure prophylaxis	Post-exposure prophylaxis in households under consideration; looking at alternatives for expiring stock
France (62)	50% of population (may share with other EU countries) 240 M doses oseltamivir 90 M doses Zanamivir	Early treatment; pre-exposure prophylaxis in Phase 4/5	Stock began to expire in 2008; looking at shelf-life extension
Japan (127)	23% of population, target is 45% (may share with Thailand and other Asian countries) 240M doses Oseltamivir 90 M doses Zanamivir	Largely early treatment	Has a shelf-life extension program

Source: Global Health Security Action Group Pandemic Influenza Planning and Preparedness Survey, Canada, 2008

(8) CENTER FOR DISEASE CONTROL AND PREVENTION. Transmission of Influenza A Viruses Between Animals and People. Subtypes that have caused widespread illness in people either in the past or currently are H3N2, H2N2, H1N1, and H1N2. Available at: <http://www.cdc.gov/flu/avian/gen-info/transmission.htm>. Accessed in: Nov. 11th 2012.

On the avian influenza H5N1, the scientists informed the media that it was highly pathogenic. In August 2005, the Chief of Cabinet of the World Health Organization (WHO) Director General's office announced in a press release that 150 million people in the world could die due to this possible pandemic. In October of the same year, only two months later, the WHO said that the number could be just 20 million people. In January 2006, it was announced that it could be approximately between 2 and 7.4 million. In October 2010, the WHO reported just 331[9] deaths (representing the past 9 years since the first death) with most concentrated in Indonesia and Vietnam[10]. Most common illnesses have a higher mortality rate than that of H5N1.

With such a disparity in expected and observed outcomes, one must ask how the original estimates for number of deaths were calculated? When the WHO predicted that between 2 and 7.4 million people would die, the answer that epidemiologists presented was that this calculation was made based on historical experience. According to the recorded historical experiences, we can see that in the Spanish flu (H1N1) of 1918-1920, approximately 40 million people had died globally. For the Asian flu of 1957-1958, 2 million people had died. For the more recent Hong Kong flu H3N2 in 1968-1969, one million people had died. If that is the historical experience, the WHO mortality estimation for the H5N1 of 2 to 7.4 million people still unclear.

The Oseltamivir was developed by the American company Gilead Sciences[11], which gave an exclusive license to the Swiss company Roche in 1996, for the period of validity of the patent, which is 20 years[12]. In 2000, much before the pandemic threat, Roche considered the possibility of withdrawing this medicine from the market due to the low sales volumes worldwide. In general terms, Oseltamivir is like a more sophisticated aspirin, serving to solely attack flu-like symptoms and diminish them.

On 27 October 27th 1999, the Food and Drug Administration (FDA) issued the first approval of the treatment for type A and B influenza without any complications.

On November 20th, 2000, the prophylaxis indications were extended by the US FDA, precisely one year after talks began about the possible epidemic

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(9) WORLD HEALTH ORGANIZATION/GIP. *Cumulative number of confirmed human cases of avian influenza H5N1 reported to WHO, 2003-2011*. Aug. 19th 2011. Available at: <http://www.who.int/influenza/human_animal_interface/EN_GIP_20110819CumulativeNumberH5N1casesN.pdf>. Accessed in: July 27th 2012.

(10) Indonesia reported 146 and Vietnam 59. WORLD HEALTH ORGANIZATION/GIP. *Cumulative number of confirmed human cases of avian influenza H5N1 reported to WHO, 2003-2011*, cit.

(11) One of the main shareholders of this pharmaceutical company, as revealed in several media news at that time, was Donald Rumsfeld, who acted as general manager until 2001, when he was appointed as United States Secretary of Defense. The English press mentioned that when the US decided to constitute a stock of Oseltamivir, Rumsfeld had to abandon the room of the Secretaries Council due to the possible conflict of interests that his presence in the meeting could represent.

(12) From the filing date of the patent application.

and pandemic risk of avian influenza. However, the question was how the indications could be extended without any opportunity of carrying out clinical trials for proving if this medicine could prevent the infection and spread of the disease?

In 2004, the WHO recommended the stockpiling of Oseltamivir.[13] In France, for example, a stock for 50% of the population was made, a situation that was never seen before in relation to other diseases. Stockpiling was also made in many developing countries following WHO recommendations.

These stocks will be destroyed soon or in the next years. the Oseltamivir stockpiling penalized the developing countries. Developed countries got a huge stock of raw materials, which have a validity of 10 to 15 years more than the finished product, which has only five years of validity. Most of the developing countries received the finished product with a validity of five years that, in good storing conditions, could be extended one or two years maximum. However, when the expiration date arrives, these medicines will have to be destroyed.

On the constitution of a stock (stockpiling), the Center for Disease Control and Prevention (CDC) in Atlanta, United States, published a study suggesting that "Despite the steep initial outlay, governments would save money by stockpiling the antiviral drug Oseltamivir as a hedge against a future influenza pandemic."[14] The study, based on mathematical modelling, argued that since there was a flu pandemic at least once every 80 years, governments could save more than $3.50 for every $1 they invested in the drug.

In August 2005, the WHO announced that it received three million doses of Oseltamivir from Roche[15] in order to constitute a stock and, later, the recommendation of establishing stocks appeared in the form of a manual and a guide from the WHO.

This shows an interesting commercial strategy from Roche. After supplying the three million doses to the WHO, the Director General of this institution, Margareth Chan, was thankful[16] for the donation, implying that the WHO started the stock piling. The next morning, at a meeting of the ministries of health of the European Union, there was a ratification of the importance of having a stock,[17] using the example that the WHO (the world reference agency for health) had already started stockpiling.

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(13) WORLD HEALTH ORGANIZATION. *WHO interim guidelines on clinical management of humans infected by influenza A (H5N1)*. Geneva: WHO, 2004.

(14) Journal published by the U.S. Centers for Disease Control and Prevention. August 2005.

(15) WORLD HEALTH ORGANIZATION. *Donation of three million treatments of oseltamivir to WHO will help early response to an emerging influenza pandemic*, cit.

(16) Id. Ibid.

(17) In relation to the national antiviral stockpile in 30 European countries that are members of EISS. All countries except Ukraine had a stockpile of the neuraminidase inhibitor (NAI) Oseltamivir. European Influenza Surveillance Scheme Co-ordination Centre, Netherlands Institute for Health Services Research (NIVEL), Utrecht, Netherlands.a.meijer@nivel.nl. EURO Surveillance: Bulletin Europeen sur les Maladies Transmissibles. *European Communicable Disease Bulletin*, v. 12, n. 4, p. E3-4, 2007.

In this context, a lot of questions emerge. Why have a stock of Oseltamivir instead of a stock for antiretroviral drugs? Why not talk about an AIDS pandemic? Why not prepare the world for AIDS in the same way as for pandemic influenza A (H1N1)? Why and how was the efficacy of existing drugs announced before knowing the result of human clinical trials? There was no time for developing those clinical trials. When the stockpiling started, there was very little reference to the possible resistance. Today, we know that there have been serious resistance[18] problems which indicate that this medicine should not have been massively distributed, taking into account the quick development and appearance of resistance[19]. No reference was made by national or international health authorities, about the problems and implications of the resistance in a case of massive use.

In Japan, there were several cases of suicide among young people between ages 14 and 25 who were under treatment with Oseltamivir.[20]

The FDA, WHO and Roche had various comments after the stockpiling had occurred. The FDA clearly affirmed that they did not consider any aspect related to the preparedness in relation to avian pandemic or the A H1N1.[21]

On the other hand, the WHO asserted that "evidence suggests that some antiviral drugs, notably Oseltamivir, can reduce the duration of viral replication and improve prospects of survival"[22]. Several documents from WHO referred to Oseltamivir as the one and only effective medicine against the possible avian pandemic. Related to this last point, it is worth clarifying that it is questionable whether it was the only effective medicine; it was a rushed statement since the transmission among humans had not developed yet. It was known that there was some effectiveness of the medicine in common seasonal flu, but for this new type of influenza, though there was some sensitivity in the in vitro experience,

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(18) BAZ, Mariana; ABED, Yacine; PAPENBURG, Jesse; BOUHY, Xavier; HAMELIN, Marie-Ève; BOIVIN, Guy. Emergence of Oseltamivir-Resistant Pandemic H1N1 Virus during Prophylaxis. *The New England Journal of Medicine*, n. 361, p. 2296-2297, Dec. 2009.

(19) See: MOSCANA, Anne. Global Transmission of Oseltamivir-Resistant Influenza. *The New England Journal of Medicine*, n. 360, p. 953-956, Mar. 2009.

(20) "In March 2007 the Japanese authorities advised against prescribing Oseltamivir (Tamiflu, Roche) to adolescents aged 10-19 years.1 This unusually severe measure resulted from the separate suicides of two 14 year olds who jumped to their deaths while taking Oseltamivir; 52 other deaths (14 in children or adolescents) have been associated with the same drug. So far, similar action has not followed in Europe. When a regulatory authority warns doctors not to prescribe a drug but decides not to retract its marketing authorisation, prescribers and patients are entitled to be concerned and a little confused." MAXWELL, Simon R. J. Tamiflu and neuropsychiatric disturbance in adolescents. BMJ 2007; 334:1232. doi: 10.1136/bmj.39240.497025.80. June 14th 2007. Available in: <http://www.bmj.com/content/334/7606/1232>. Acessed in 29 nov. 2012.

(21) UNITED STATES. Food and Drug Administration. Available at: <http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm107838.htm>. Accessed in: July 31th 2012.

(22) WORLD HEALTH ORGANIZATION. *Avian Influenza*. Fact sheet. Apr. 2011. Available at: <http://www.who.int/mediacentre/factsheets/avian_influenza/en/index.html>. Accessed in: July 31th 2012.

medical trials had not yet been carried out. Nevertheless, Roche's website calls the medicine "one of the most important medicines currently available to fight both seasonal and pandemic influenza".[23]

II. SEVERITY WAS NOT CONSIDERED

The estimated number of deaths due to common seasonal flu every year is approximately 500,000 cases per year.[24] 18,449 deaths[25] were reported by the WHO as caused by A (H1N1). As reported by the media and scientific literature the most serious concern was that the severity and mortality of the disease was not considered in the decision for the announcement of phase 6 of the pandemic.[26]

A new study published in the *Lancet*[27] has estimated the death toll from 2009's H1N1 pandemic to be 15 times higher than originally reported by the WHO. While 18,449 deaths from the flu virus were confirmed in 2009, authors suggest that as many as 500,000 may have died. After explaining the statistical model used to count possible deaths in developing countries, the article concludes that it will be necessary to improve the global response to possible future pandemics and to develop the capacity to produce enough influenza vaccines for the African continent and South East (Asia). In some countries of the North more than 90 per cent of the vaccine was not used and had to be destroyed, as we will discuss later. It is said that statisticians are individuals that "torture" figures until they confess the truth.

In September 2010, the WHO Director General announced the end of the pandemic and hence the publication of statistics also came to an end. The question here is why completely stop the reporting of statistics when it would be much better to keep on monitoring the disappearance of the virus, so that we could actually know that the pandemic was completely over?

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(23) ROCHE. *Media release*. Basel, April 26th, 2007. Available at: <http://www.roche.com/med-cor-2007-04-26>. Accessed in: July 31th 2012.
(24) LA VANGUARDIA. *Una nueva ola de gripe A podría llegar a finales de invierno o en primavera, según la OMS*. Barcelona, 17 dez. 2009. Available at: <http://www.lavanguardia.com/vida/20091217/53847502323/una-nueva-ola-de-gripe-a-podria-llegar-a-finales-de-invierno-o-en-primavera-segun-la-oms.html>. Accessed in: September 4th 2012.
(25) WORLD HEALTH ORGANIZATION. *Pandemic (H1N1) 2009* – update 112. Weekly update. Geneva, Aug. 6th, 2010. Available at: <http://www.who.int/csr/don/2010_08_06/en/index.html>. Accessed in: July 31th 2012.
(26) WALSH, Bryan. The H1N1 Flu: is this a Pandemic, or Isn't It? *Time Health*, June 10th, 2009. Available at: <http://www.time.com/time/health/article/0,8599,1903712,00.html#ixzz1aqtkyNLl>. Accessed in: July 31th 2012.
(27) DAWOOD, Fatimah S. et al. Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation: a modeling study. *The Lancet Infectious Disease*, v. 12, n. 9, p. 687-695, Sept. 2012. Available at: <http://www.thelancet.com/journals/laninf/article/PIIS1473-3099(12)70121-4/fulltext>. Accessed in: July 31th 2012.

Regarding the communication of statistics and cases, there was something that seemed somehow indecent and embarrassing. The WHO established something like an operating room in Geneva with people working shifts that provided surveillance on death and harm from the flu 24 hours a day. There were live broadcasts on a case by case basis around the world. What was the justification for this quick communication? Where was the problem in waiting 24 or 48 hours to disseminate the information while it was known that the mortality rate was actually very low since the beginning? Deaths caused by high killer diseases are usually reported by the WHO once a year.

III. HOW SOME EUROPEAN CALCULATED THE REQUIRED NUMBER OF VACCINES

Following the same logic in the management of the pandemic, let us analyse how some European countries (highly sophisticated countries that could afford all the necessary planning) calculated the required number of vaccines in order to face the pandemic.

Chart 2 - Government purchases of vaccines for H1N1

COUNTRIES	Population (million)	No. vaccines purchased (million)
GERMANY	82	50
BELGIUM	10	12.6
SPAIN	47	37
FRANCE	60	94
ITALY	60	48
NETHERLANDS	16	34
SWITZERLAND	7	13

Various sources

Germany, with 82 million inhabitants, bought 50 million vaccines. Why? Belgium, with 10 million inhabitants, bought 12.6 million doses. France is a very interesting case, since with 60 million inhabitants it purchased 94 million doses of the vaccine, while Switzerland and Holland, bought the double of doses in relation to the size of their population.[28]

(28) VELASQUEZ, Germán. Cuánto costó la "vacuna contra la H1N1"? *Mémoire des luttes*, 26 Oct. 2010. Available at: <http://www.medelu.org/Cuanto-costo-la-vacuna-contra-la>. Accessed in: 31 jul. 2012.

In the French case, the parliament carried out an investigation about the management of the pandemic. This enquiry questioned the Ministry of Health about the purchase of the 94 million vaccines[29]. The justification was that the population would possibly have needed a second dose. Still, the amount purchased seems arbitrary—more than enough to provide every citizen with a single dose, yet not nearly enough to provide each with a double dose. When the pandemic ended, the official information from the French Ministry of Health indicated that only 6 million people had received the vaccine.

In the beginning, it was announced that excess doses from developed countries would be donated to poor countries, but some countries from the Global South indicated no intention of receiving this gift as influenza was not a dire health risk given the high temperatures (30-35 degrees Celcius in most African countries) where the possibilities of developing influenza are much lower compared with the North.

In relation to Oseltamivir, as we said before, there were no human clinical trials to justify the prophylaxis in the case of the A (H1N1) pandemic. The scientists informed the media that the virus had a high mutation capacity and suggested that the mutation could become much worse. However, they did not mention that this influenza could self-extinguish, as had happened with other types of avian influenza before, most notably the Holland H7N7 Dutch flu outbreak in 2003[30] and the case of A (H1N1), which apparently diminished its intensity and practically disappeared.

There has been an incredible waste, in the United States for instance, 40 million vaccines against swine influenza worth about 260 million dollars were incinerated.[31] Only 6 % of the vaccines purchased by the French government for the H1N1 were used. The remaining doses will have to be destroyed. Difficult to understand the public health reasons for the massive purchases of A H1N1 vaccines by the governments of the North.

As reported by *Deborah Cohen* and *Philip Carter*[32], some of the experts advising the WHO on the pandemic had declarable financial ties with drug

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(29) LA FRANCE achète 94 millions de vaccins contre la grippe A. *L'Express*, Paris, 16 July 2009. Available at: <http://www.lexpress.fr/actualite/sciences/sante/la-france-achete-94-millions-de-vaccins-contre-la-grippe-a_774833.html>. Accessed in: July 31th 2012.

(30) H7N7 Dutch Avian Flu Outbreak (2003) Associated with Human Conjunctivitis and Fatal Case of Acute Respiratory Distress Syndrome in Exposed Veterinarian Who Did Not Take Tamiflu or Receive Vaccination. *Bio Report*, Illinois, n. 345, 2 Apr. 2006.

(31) "Million doses of H1N1 pandemic flu vaccine expired on Wednesday and had to be destroyed, according to the US Department of Health and Human Services. Millions more are still in storage and will expire at various times next year." DUDA, Kristina. Millions of Doses of H1N1 Vaccine Destroyed. *About.com.* 2 July 2010. Available at: <http://coldflu.about.com/b/2010/07/02/millions-of-doses-of-h1n1-vaccine-destroyed.htm>. Accessed in: July 31th 2012.

(32) COHEN, Deborah; CARTER, Philip. Conflicts of interest. WHO and the pandemic flu "conspiracies". *British Medical Journal*, 3 June 2010. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/20525679>. Accessed in: July 31th 2012.

companies that were producing antivirals and influenza vaccines. According to *Cohen* and *Carter*, the WHO's guidance on the use of antivirals in a pandemic was authored by an influenza expert who, at the same time, was receiving payments from Roche, the manufacturer of Oseltamivir (Tamiflu), for consultancy work and lecturing.(33)

FINAL CONCLUSIONS

There was confusion and a complex mix of interests of different, and sometimes opposite, actors. The first group of actors: the WHO and the national sanitary authorities legitimately intended to protect the population using clear public health values and perspectives. Despite the mistakes that were made like, for example, they did not inform that washing hands with alcohol based solutions was something useless, to wash hands with soap and clean water, is enough. Millions of dollars were wasted trading those kinds of substances.

The second group: the governments and political leaders, who perhaps did not have public health concerns as the priority but maybe, were more interested to protect or promote themselves from the political point of view. In Europe, for example, the ghost of the issue of the contaminated blood is still alive, a situation in which some high government officials were charged in the court.

The third group of actors: the pharmaceutical (and para-pharmaceutical) industries were obviously led by their own commercial interests.

According to the Council of Europe report "The handling of the H1N1 pandemic: more transparency needed", relations and inter-actions between these three groups were not always clear at the national and international level complicating the management of the A (H1N1) pandemic.(34)

In conclusion, there were both positives and negatives from the pandemic response. On the positive, there was a process of sanitary education on a worldwide level without precedent. In a few days/hours, the health authorities and the media sent a clear message: there was a danger and there was a risk. This worked perfectly.

It was also demonstrated that in case of global risk, there are available resources as huge amounts of money were spent during this event a market of

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(33) Id. Ibid.
(34) FLYNN, Paulo. The handling of the H1N1 pandemic: more transparency needed. *Report Social Health and Family Affairs Committee*, United Kingdom: Counsel of Europe, 23 Mar. 2010. Available at: <http://assembly.coe.int/CommitteeDocs/2010/20100329_MemorandumPandemie_E.pdf>. Accessed in: July 31th 2012.

400 billion U.S. dollars[35] was created for the vaccine, without taking into account the alcohol based solutions and the masks, among other cheaper alternatives.

On the negative end, the concept of vaccination was put at risk. The most important therapeutic tool in public health is the capacity of preventing a disease, and we do not know yet the consequence of this lapse. There were messages that were improperly spread, and here we can see again the problem of communication between the media and the scientific community; for example, in France and Spain the health workers refused the vaccine[36], and this was registered in the front page of many journals. The workers of a hospital said, "I will not take the vaccine"[37].The messages pose as a very harmful influence on future public opinion regarding vaccination and related public health responses.

Finally, the WHO, the ministries of health in several countries and some scientific communities were implicated for poor decision making in the face of a public health crisis[38], resulting in a significant loss of credibility. There is an unanswered question about how the authority of the WHO and health ministries was affected and how this loss of credibility is going to influence the ability to address similar problems in the future.

Countries of the Global North spent billions of US dollars, but the losers in this situation are clear the patients in developing countries who are dying every day because the lack of access to the medicines they need.

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(35) "'Vaccine makers could produce 4.9 billion pandemic flu shots per year in the best-case scenario', Margaret Chan, Director-General, World Health Organization (WHO), quoted by Reuters, 21 July 2009). Wealthier countries such as the U.S. and Britain will pay just under $10 per dose [of the H1N1 flu vaccine]. … Developing countries will pay a lower price. [circa $400 billion for Big Pharma] (Business Week, July 2009)". CHOSSUDOVSKY, Michel. The Worldwide H1N1 Swine Flu Pandemic…, 4 Aug. 2009. *Global Research.* NWO Observer. Available at: <http://nwoobserver.wordpress.com/2009/08/04/the-worldwide-h1n1-swine-flu-pandemic/>. Accessed in: July 31th 2012.

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(37) WYDERKO, Kasia. Francia rechaza la vacuna contra influenza AH1N1. *Noticieros Televisa*, 12 nov. 2009.

(38) FLYNN, Paulo. op. cit.

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