Justice in Global Pandemic Influenza Preparedness: An Analysis Based on the Values of Contribution, Ownership and Reciprocity

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Indonesia's December 2006 decision to stop sending influenza virus specimens to the World Health Organization's (WHO) Global Influenza Surveillance Network (GISN)[1]—a longstanding complex network composed of WHO Collaborating Centers, Reference Laboratories and National Influenza Centers—captured international attention. At the time, the H5N1 subtype of the influenza A virus was predicted to be the basis for the next pandemic. Indonesia, the country most afflicted by the virus, was accused of putting the rest of the world in peril by withholding samples that were vital to the development of an effective vaccine (Fidler, 2007). Indonesia justified its actions by claiming that they were in protest of the injustice of GISN.

Eventually, Indonesia resumed sending virus specimens to GISN. Its actions meanwhile stimulated negotiations to improve the workings of GISN by developing and implementing a more just framework for 'sharing influenza viruses and other benefits' (WHA, 2007). After four arduous years of debate and negotiation, a new framework for virus and benefit sharing known as the 'pandemic Influenza Preparedness Framework' (PIPF) was approved by member states at the World Health Assembly (WHA) meeting in May 2011.

However, the larger project of ensuring justice in global pandemic influenza preparedness (PIP) is far from in hand. Implementing the PIPF carries not only political, institutional, logistical, technological and financial challenges but also moral challenges. This is largely because, to date, there has been no convincing account of justice in global PIP. While we do not aim to provide a comprehensive account of justice in global PIP, we will show that three moral values—the values of ownership, contribution and reciprocity—have a critical role to play in such an account. We will argue that these values are key to understanding the moral failings of GISN and, in turn, that they are of great relevance to our moral evaluations of the recently implemented PIPF. Too often the ownership interests and contributions of developing countries are undervalued or ignored. Our article works against this trend, arguing that developing countries can and do make significant contributions to global PIP and that they are deserving of equal return for reasons of reciprocity. In this way, we advance a categorically different sort of claim than those found in standard discussions of international justice, which tend to account for the world's poor because they are in need or because they have been harmed.

We divide our article into three parts. First, we briefly recount the 'Indonesian case'. In the second part of the article, we develop three lines of normative argument—based on the values of ownership, contribution and reciprocity—against GISN before the adoption of the PIPF.[2] While we derive these value-based arguments from claims made by representatives of the Indonesian government during the controversy, here we aim to present them in a more fulsome way. We show that whereas the arguments from ownership, contribution and reciprocity fail in isolation, in concert, they work together to support Indonesia's claims that Indonesia was owed an equal share in the benefits of GISN and that, in turn,

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GISN was unjust. Thirdly, looking forward, we use these values to evaluate the newly agreed upon PIPF. Here, we suggest that the values of ownership, contribution and reciprocity are of continuing relevance to the implementation of the PIPF because they allow us to properly assess the framework in light of considerations of justice, fairness and equality. We focus on the Standard Material Transfer Agreements that are part of the PIPF. We suggest that these agreements fail to give proper consideration to the values of ownership, contribution and reciprocity and, as a result, that the PIPF is fundamentally unjust.

We believe that examining the moral foundations of a just framework for global PIP is of critical importance: it not only builds the case for why a more equitable and just framework for benefit sharing should be developed and implemented but also gives us an indication of which among the various paths forward is most morally appropriate. Our analysis thus aims to fill a 'moral' gap that exists in the current policy discourse surrounding global PIP.

Sequence of Events

Numerous commentators have documented the Indonesian case (Irwin, 2010). Our intention in revisiting some of the particulars here is to set the stage for discussing three lines of argument based on the values of ownership, contribution and reciprocity in part two of the article. We divide our review of the Indonesian case into two periods, before and after Indonesia decided to stop sharing influenza virus specimens with GISN.

Before the Standoff

In February 2004, influenza reemerged among Indonesian fowl. Lacking in-country capacity to distinguish between influenza strains, Indonesia provided GISN scientists with virus specimens. In July 2005, the first human case of H5N1 in Indonesia was confirmed by GISN scientists. Through 2005 and 2006, the number of H5N1 human cases began to grow in Indonesia and many other parts of South-East Asia. Indonesia shared by far the largest number of virus specimens with GISN laboratories, including the US Centers for Disease Control and Prevention in Atlanta, Georgia, as well as Hong Kong University (see Figures 1 and 2).[3]

At the time, the WHO had already established the conditions of exchange of virus specimens and the resulting knowledge between GISN members and countries from which the specimens were sourced. Designated 'WHO Reference laboratories' that receive virus specimens were to 'seek permission from the originating country/laboratory to co-author and/or publish results obtained from the analyses of relevant viruses/samples', and 'no further distribution of viruses/specimens outside the network of WHO Reference Laboratories [was to occur] without permission from the originating country/laboratory' (Sedyaningsih *et al.*, 2008). With the help of the WHO and developed countries, Indonesia meanwhile built up its influenza virus identification and characterization capacity.

However, a series of incidents frustrated and then halted altogether Indonesia's exchange of virus specimens. Contrary to the WHO's 2005 guidance, scientific presentations and articles were produced using information derived from virus specimens supplied by

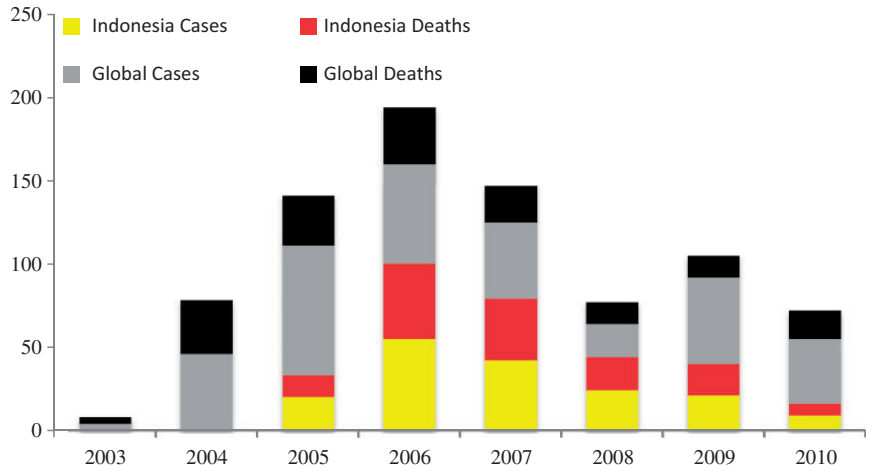

Figure 1. H5N1 influenza-related cases and deaths, 2003–2010.

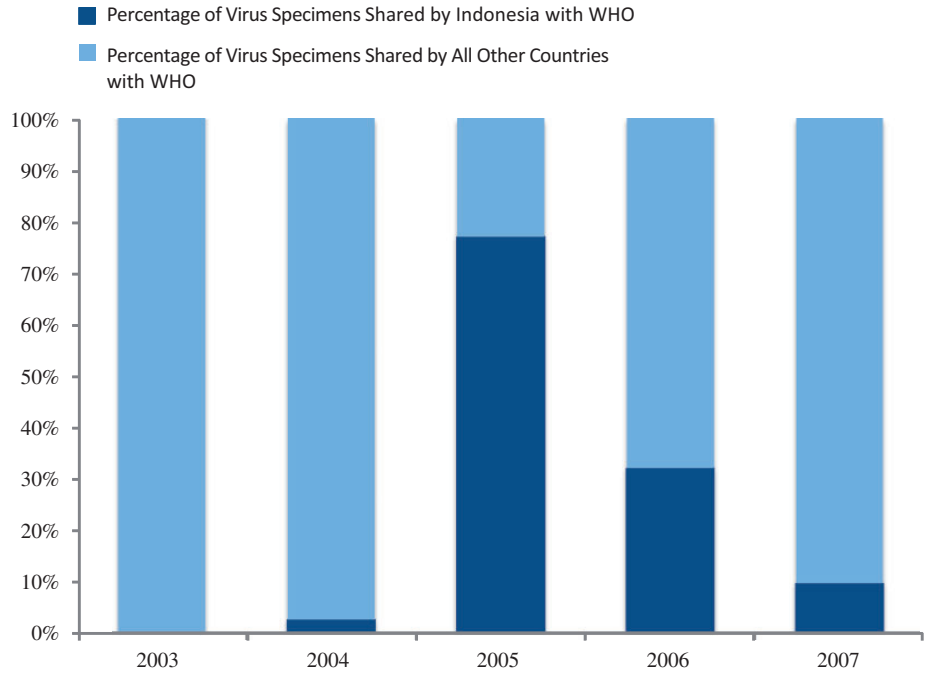

Figure 2. Virus specimen sharing with WHO by Indonesia and all other countries, 2003–2007.

Indonesia with little-to-no notice or genuine offer of coauthorship. Moreover, near the end of 2006, a journalist informed Indonesia's Ministry of Health that an Australia-based company, CSL Ltd., was in the process of developing a vaccine based on a 'seed virus' derived from a virus specimen collected in Indonesia, but sent to GISN laboratories for further analysis (Sedyaningsih *et al.*, 2008).[4] Indonesia feared that CSL's vaccine would be unaffordable given its limited purchasing power compared with other countries. Subsequent reports confirmed that members of GISN routinely shared information derived from virus specimens with firms that were outside of the network without the awareness or permission of source countries, and that some GISN member institutions and private firms filed patent applications using that information (Hammond, 2007; WIPO, 2007).

After the Standoff

Following these developments, Indonesia's then Minister of Health, Siti Fadilah Supari, announced on 20 December 2006 the country's intention to stop sharing virus specimens with GISN. At the time, Indonesia had the highest number of confirmed H5N1 human cases and deaths in the world. As Indonesia followed through on its intention in January 2007, the WHO removed its 2005 guidance about sharing virus specimens from its Web site, stressing instead that countries have a responsibility to share virus specimens, unconditionally, with the WHO so as not to 'inhibit the proper functioning of the GISN . . . and the achievement of the Network's objectives' (Sedyaningsih *et al.*, 2008). WHO officials travelled to Indonesia in February 2007 hoping to persuade through diplomacy, but Indonesia stood its ground and began side negotiations with Baxter International to secure a store of affordable vaccines for its population. A month later, after a meeting attended by representatives from 33 countries, Indonesia countered the WHO's call for responsibility with a rights-based claim, the 'Jakarta Declaration', in which it asserted ownership over virus specimens and, in turn, a right to informed consent before distribution of virus specimens to anyone within or outside of GISN as well as greater benefit sharing from those who availed of its virus specimens (Jakarta Declaration, 2007). Thus, the debate over the balance between risks to the world writ large (posed by Indonesia's stance) and risks to the world's poor (which Indonesia argued GISN failed to address) quickly assumed a legal character. Whereas many in the international community posited that Indonesia was in violation of its obligations to communicate public health information that may constitute a 'public health emergency of international concern'

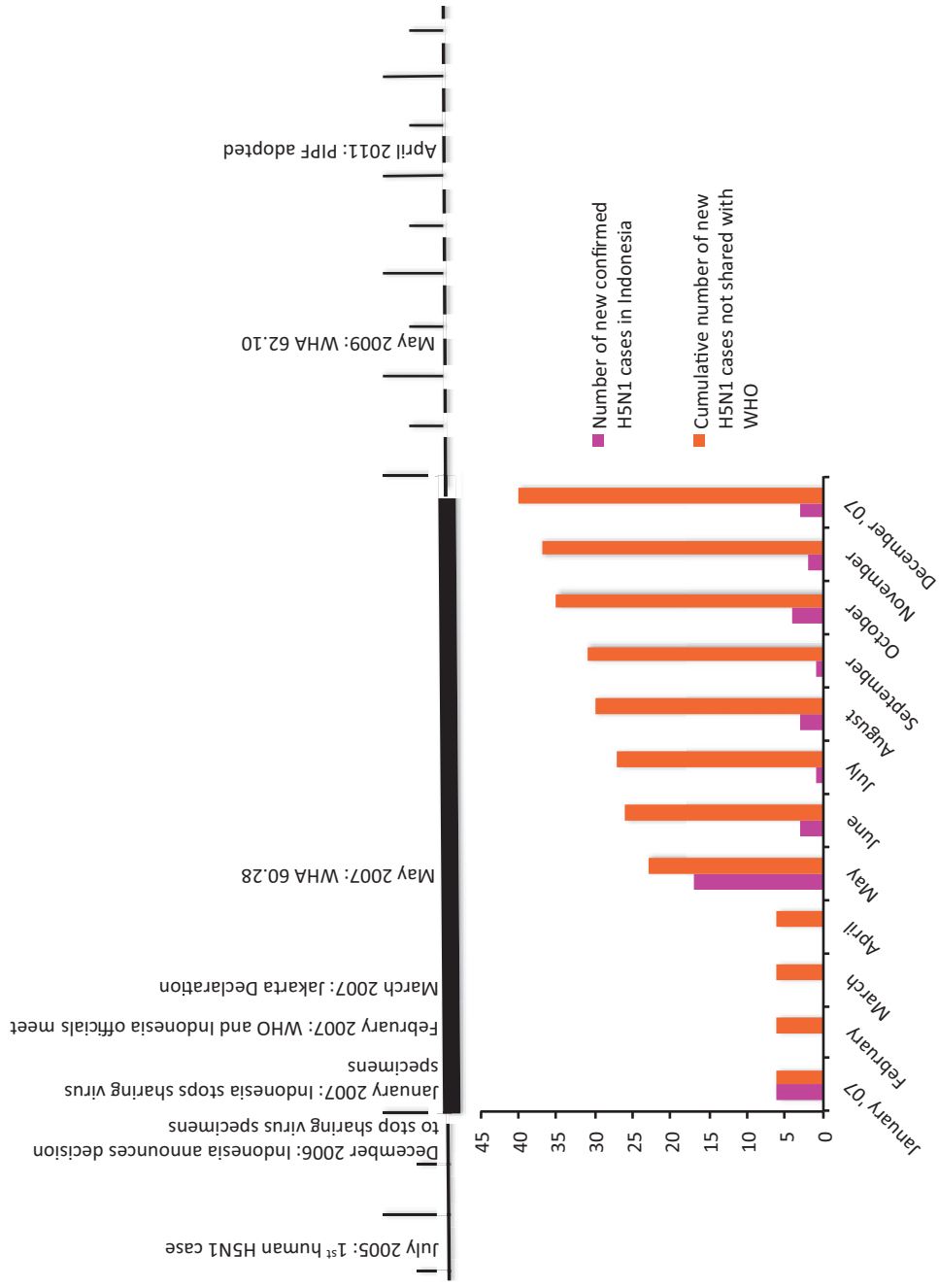

Figure 3. Timeline of events.

under the 2005 *International Health Regulations*, Indonesia asserted its ownership over virus specimens under the *Convention on Biological Diversity* (*CBD*), which accords countries sovereignty over their 'biological and genetic resources'.

As the deadlock extended through 2007, the total of H5N1 cases *not* shared with the international community continued to grow (See Figure 3) (Sedyaningsih *et al.*, 2008). Offers of financial aid (contingent on Indonesia reinstituting its virus sharing) made by developed countries failed to alter Indonesia's position (Fidler, 2008). The WHA passed a resolution (60.28) (WHA, 2007) urging Indonesia and other member states to end the impasse and rehearsing the need for greater benefit sharing with developing countries. However, the resolution stopped short of sorting out competing interests; its preamble simply recognized both the sovereign rights of countries over biological and genetic resources and the importance of timely sharing of influenza virus specimens.

Yet, with time the standoff gradually softened. The spread of H5N1 waned through 2008 and 2009, and a virus specimen tracking system was gradually implemented. Indonesia as well as other countries shifted to a practice of limited virus specimen sharing with GISN, and a new subtype of influenza A—H1N1—cropped up in other regions of the world.

In May 2009, WHA resolution 62.10 was passed, urging member states to conclude the PIPF (WHA, 2009). However, several questions remained unresolved, including the following: (i) What *form* should the framework take? (ii) Should recipients of virus specimens be required to seek the *consent* of the country that provided such specimens before redistributing them to others? (iii) What limits, if any, should be placed on seeking *intellectual property rights*? (iv) What obligations, if any, should be placed on member states and private actors to engage in *benefit sharing*? and (v) how strong should those obligations, limitations and requirements be *worded*?

Wrestling through these five questions consumed another 2 years of international diplomacy and negotiation. By May 2011, when the PIPF was finally concluded, the WHA arrived at an answer for each question. But, as we argue in part three of this article, the PIPF inadequately addresses the underlying normative issues of ownership, contribution and reciprocity. For that reason, we are not optimistic about its ability to effect a more just framework for benefit sharing in the context of global PIP. Before evaluating the PIPF's particulars, though, we turn next to a justice-based assessment of the three values embedded in the foregoing account of the Indonesian case. While we reference the law to the extent that Indonesia or others framed an argument in legal terms, we do not rely on legal authority to resolve the arguments below.

Distributive Justice: Arguments of Ownership, Contribution and Reciprocity

The main concern of distributive justice is the fair allocation of benefits and burdens of social cooperation. Theories of distributive justice attempt to give principles for the fair distribution of such things; they specify a conception of what individuals or groups of individuals are due (or owed). While differences between justice and fairness have been the source of rich philosophical discourse, we hold that the two concepts are fundamentally linked. The Indonesian case illustrates this basic point. According to Indonesia, GISN was unjust because it distributed benefits unfairly: it allowed the most important benefits related to virus sharing, in particular, vaccines that resulted from virus sharing, to accrue among developed countries and left developing countries relatively empty handed.[5] In a global context, Indonesia can be understood as claiming that GISN was in violation of basic principles of distributive justice.

In making its case for this claim, Indonesia appealed to a variety of different values. Specifically, Indonesia's arguments were based on the values of ownership (of virus specimens), contribution (to vaccine research and development and global PIP) and reciprocity (among fellow GISN participants and beyond)—any one of which, according to Indonesia, merited return of greater benefits. As should be apparent from part one of the article, not all actors within and outside of GISN shared Indonesia's understanding of the values of ownership, contribution and reciprocity. The purpose of this part of the article is therefore to consider in depth whether the lines of argument based on these three values support Indonesia's claim for greater benefits. We will show that when considered individually each argument fails to establish Indonesia's claim to greater benefits, but when taken together they successfully establish such a claim.

From Ownership

According to Indonesia, GISN was unjust because it failed to provide adequate return for the virus samples that Indonesia shared with GISN and claimed to own under international law.

The argument behind Indonesia's claims regarding ownership and required return of benefit seems to be this: imagine that you need X for a productive process. If I own X and I give X over to you so that you can use X, then, all other things being equal, you ought to give me something in return for X. In short, the thought is that, in the case where I give X over to you, the mere fact of my ownership of X justifies a return to me. Failing to give me anything in return would be unfair or unjust. Something similar might apply in relation to the Indonesian case. Indonesia owned virus samples and gave these over to GISN so that they could be used to produce an effective vaccine. For this reason, it could be argued that Indonesia was owed something in return for its contribution and that, insofar as GISN did not give Indonesia something in return for its contribution, it was unjust or unfair.[6]

That Indonesia relied on this ownership argument as its primary attack on GISN was understandable: other members of GISN were asserting patent rights over technological things such as genetic sequences of viruses, which, in Indonesia's estimation, would not have been produced but for virus samples that 'belonged' to Indonesia. In the context of vaccine research and development, ownership is, it would seem, the means by which one asserts a claim to the products of a value chain.

While legally suspect,[7] a moral case can be made in support of Indonesia's claims of ownership. It relates to notions of self-ownership and rights of transfer. Virus samples that were shared with GISN by Indonesia came from Indonesian citizens who relinquished virus samples through a morally acceptable process to the Indonesian state. Insofar as all humans are considered to have ownership (in a moral sense) over their bodies, it follows that Indonesian citizens had ownership over the viruses that were within their body. Humans can be thought to have ownership over these viruses because, in the process of infection, viruses become bound with the human bodies that are infected. In the beginning stages of infection, the H5N1 virus enters the human body. It then binds to a human cell (typically in the throat, nose or lungs) and then, having secured access to the nutrients it needs, the virus begins to replicate. The virus literally becomes at one with the body in the process of infection. So, to the extent that humans own their bodies, they own the viruses that are part of their bodies. As virus specimens were collected, either from living or deceased individuals, we can conceive of this right of control as being transferred to the Indonesian state—assuming proper consent was given for that transfer.

However, even if we grant that Indonesia owned the virus samples it turned over to GISN on the basis of this argument, it is not enough to justify a return of benefit to Indonesia. We suggested earlier that, if I own X and I give X over to you so that you can use X, then, all other things being equal, you ought to give me something in return for X. But all other things may not be equal. If, for example, I own X and give it over to you and X is harmful or useless, then I am not owed anything in return for my contribution of X to you. The mere fact that I own X and that I turned X over to you do not in themselves justify a return to me.

Ownership is best understood as a kind of flag or marker: it helps identify who, if anyone at all, should be given return for a contribution to a productive process. If we do decide that a particular contribution should be rewarded, then the fact that *you* have ownership over that contribution suggests that *you* should receive something in return for the contribution. The notion of ownership does not in itself give us any answers to other equally morally important questions regarding how much you are owed in return for your contribution or when you should receive something in return for your contribution in the first place. Some other values or principles must do this work.

From Contribution

Embedded in Indonesia's claims about ownership is a claim for return on the basis of its contribution to productive processes. Without virus specimens collected within its borders both influenza surveillance and the research and development of an effective H5N1 vaccine would have been compromised. For these reasons, Indonesia held that it should be compensated for its contribution. Recall that in 2005 and 2006 Indonesia was by far the largest contributor of virus specimens to GISN (see Figure 2). Even in 2007, the year in which it suspended sharing for several months, it was the fifth largest contributor with 62 specimens sent to GISN [behind Egypt (145), Viet Nam (125), Nigeria (66) and Cambodia (64)] (WHO, 2008).

Contributions can, however, be evaluated in a variety of ways. In the context of GISN, we can imagine at least three ways of evaluating Indonesia's contribution: in terms of necessity; in terms of labor and capital costs; and in terms of ability to contribute. As the preceding

paragraph suggests, Indonesia tied its claims about the significance of its contribution to necessity: its contribution of virus samples was necessary to vaccine production and, in turn, to global PIP.

Developed countries and vaccine manufacturers might, and presumably did through diplomatic channels, challenge this claim. Extremely few virus isolates are selected for vaccine development. Of the 8815 H5N1 virus specimens shared with GISN between 2003 and 2007, only 14 (0.16%) were used for vaccine development, and only one of which emanated from a specimen collected in Indonesia. Virus specimens are a necessary initial input to the process and do require labor and capital costs. But, financing, research, technology, know-how, regulatory oversight and the assumption of risk in the marketplace—most of which are currently supplied by private companies and developed country governments—while also necessary, represent most of the labor and capital costs associated with vaccine research and development. Thus, if we focused on labor and capital cost, Indonesia's contribution would merit little in return.

In our view, though this labor and capital cost-based account is a reasonable answer to Indonesia's contribution argument based on necessity, it is not a complete account of contribution. Focusing on labor and capital costs associated with virus collection versus vaccine research and manufacturing fails to account for fundamental differences in the ability of participants to contribute. Consider an analogy.[8] A group of three people X, Y and Z are hungry for apple pie. Each of them contributes elements that are necessary to the making of the pie. X and Y have significant pie-making resources available to them and are able to contribute more than Z. X contributes all of the ingredients with the exception of cinnamon because he has run out of it. Y, having none of the needed ingredients, contributes the relevant mixing utensils (spoons, bowls, etc.). X and Y also agree to take turns mixing the ingredients. Z, however, is not so fortunate in her access to pie-making resources. Through no fault of her own, she is only able to contribute a teaspoon of cinnamon and is only able to do a few stirs because of arm injuries.

Other things being equal, the pie should be divided in a way that is reflective of or represents the significance of each person's contribution. In deciding how to divide the apple pie, we can either measure the significance of X, Y and Z's contributions in absolute or relative terms. If we focus on the absolute costs of each person's contributions in labor and capital, it is clear that X and Y's contributions are of greater significance than Z's. The labor that X and Y contribute, in terms of mixing, is much more than Z's because Z is able to give only a few stirs. Moreover, the cost of all the other ingredients and the mixing utensils that X and Y contribute is much more than Z's contribution of a teaspoon of cinnamon. In absolute terms, X and Y contribute more than Z. For this reason, X and Y's contributions might be thought to merit a greater share of the pie than Z.

However, if we consider how much each person contributes relative to what they actually have or are able to contribute, then we reach a different conclusion. On this standard, X, Y and Z's contributions are equal. X and Y have significant resources to contribute to the pie-making process. Z does not have significant resources to contribute. Z has much less to contribute than X and Y. However, like X and Y, Z contributes all that she can to the pie-making process. In this respect, X, Y and Z are equal in their contributions. In the absence of a demonstrated ill will, Z's contribution is as significant as X and Y's and, in turn, that Z, like X and Y, is owed an equal share of the pie.[9] This seems fair.

Something similar holds true in the case of Indonesia and its contribution to GISN. Indonesia's contribution is much like Z's in the above analogy. Indonesia did not have the financial, technological and human resources to contribute in other ways to GISN. Collected virus samples were all that it could contribute to GISN and the process of vaccine development and production. For this reason, the contributions that developing countries such as Indonesia made to GISN are as significant as the contributions made by developing countries (who, lacking virus specimens, contribute what they can in the way of technology and know-how, for example). In turn, their contributions warrant a share of the health-related benefits (e.g. vaccines) that result from contribution to GISN that is equal to what developed countries receive.[10]

However, even if we accept, for these reasons, that Indonesia's contribution is significant, this is not enough to establish that Indonesia should be compensated for its virus sample contributions or that failing to do so is unjust. Evaluations of contribution only give us a starting indication of *how much* is owed, *if* return is owed at all. Again, it seems that, if, like other participating countries, Indonesia gave as much as it could to GISN, then Indonesia's contribution is equally significant and, as a result, that Indonesia is owed as much compensation as the other countries. This is a judgment about *how much* Indonesia is owed in return for its contribution. Yet, evaluations about how much Indonesia is owed in return for its contribution, do not in and of themselves tell us whether Indonesia is owed return in the first place. If, for example, Z could only contribute a

bit of poisoned cinnamon, she would not be owed something equivalent in return for her contribution. It seems that return for a contribution is owed only under certain conditions. As of yet, we are still missing an account of when justice requires return of benefit in the first place.

From Reciprocity

Though it is a value that is rarely discussed in the context of global distributive justice, one value or idea that substantiates Indonesia's claims for a fair share of the benefits associated with participation in GISN is the idea of reciprocity.[11] Unlike the previous accounts, the idea of reciprocity gives us an answer to the moral question of when return is owed. The idea of reciprocity is that when others give good to you, you owe them fair return for what they have given you just as, when you give good to others, they owe you fair return for what you have given them. This idea, along with the others about contribution and ownership, supports the conclusion that Z (like X and Y) is owed an equal share of the pie in return for her contribution to the pie-making process. In contributing a few stirs and some cinnamon to the pie-making process, Z gave good to X and Y and she is owed fair return—which, as we have suggested above, is an equal share of the pie—for these contributions.

Social rules should express and foster the idea of reciprocity.[12] This means that social rules must be arranged so that they ensure that fair return is given to those who contribute to a cooperative process. If a set of social rules violate or fail to encourage the conditions of reciprocity, then they fail to meet a minimal standard of justice. For example, some have argued that social rules should be organized so that they give return to people for what they have contributed to society (through submission to a system of laws, social rules or other means) and that any system that fails to do so is unjust.

Taken in conjunction with the other arguments, the idea of reciprocity completes Indonesia's claim to a share of the benefits associated with GISN. We argued earlier that Indonesia's contribution was significant and would merit significant return only if return was owed to Indonesia in the first place. We now have reasons, related to the idea of reciprocity, for thinking that Indonesia was indeed owed return. Reciprocity dictates that Indonesia is owed fair return for the good that it gave to GISN and its participating members. Failing to properly reciprocate Indonesia's contribution would be unfair or unjust.

One might object to this line of argument, however, noting that there are some instances where reciprocity is not owed. It might be argued that reciprocity is not morally required when others are merely doing their duty. Imagine that I am drowning in a pond and that you are the only one who can save me. If you save me, one might argue, I do not owe you something in return for your act of rescue. It would certainly be nice or decent of me to say, 'Thank you', to you or to give you something in return for your efforts, but it is not, strictly speaking, morally required of me. You are doing your duty and, for this reason, nothing is owed to you in return. So, failing to give you something in return for your rescue would neither be unfair nor unjust in this case. On this logic, if a set of social rules fails to encourage reciprocity in such cases, it would not be unfair or unjust.

It might be tempting to argue that something similar applies in the Indonesian case. After all, one might argue, Indonesia had a moral duty to help protect people everywhere, not just those within its own borders, by contributing samples to GISN and that, in sharing its virus samples, Indonesia was merely acting to satisfy this duty. Consequently, one might argue that Indonesia was not owed something in return for its virus sample contributions. Failing to reciprocate would not be unfair or unjust. If this is right, then the fact GISN failed to ensure that Indonesia was given equal return for their contribution would not count as a mark of the unfairness or unjustness of the framework.

We wish to challenge this position. We hold that reciprocity is owed to individuals, even when these individuals are merely carrying out their moral obligation. If you were to save me from drowning and I were to walk away without saying, 'Thank you', we believe that, in doing so, I would have treated you wrongly.

There are two reasons for reaching this conclusion. First, as David Schmidtz notes, rising to the call of duty is an achievement and is something that is owed proper acknowledgment (Schmidtz, 2006). Carrying out our moral obligations often requires thought, effort, time and sacrifice. For these reasons, it is often difficult to carry out our moral obligations toward others. Giving you something in return for carrying out your moral obligation toward me is a way of properly acknowledging the thought, effort, time and so on that you put into carrying out your moral obligation toward me. So, return of benefit is simply something that we owe to those who carry out their moral obligations toward us.

Second, affirmation or respect is an important part of reciprocity. When I say, 'Thank you', or bake you a pie for saving me, I am expressing a proper valuing of you and your contribution (this is true even when your contribution is obligatory). If I failed to reciprocate in such a case,

it would suggest that I do not value the effort or sacrifice that you made in carrying out your moral obligation as I should (again, you put thought, effort and time into saving me and this should be acknowledged). My failing to reciprocate might also suggest or express something about how I feel about you as a person—perhaps that you are not worthy of my esteem, regard or attention. Reciprocity is, thus, an important part of affirming or respecting other individuals. Insofar as all individuals are owed the grounds of respect equally, it would seem then that reciprocity (because of its connection to respect) is something that is also owed to all individuals.

For these two reasons, we believe that Indonesia was owed fair return for its virus sample contributions to GISN, even if Indonesia was merely doing its moral duty in making such contributions and that, insofar as GISN failed to give Indonesia fair return for its contribution, GISN was unjust or unfair.[13]

In summary, our analysis of the three values invoked by Indonesia work in tandem to support the claim that GISN was unjust. Reciprocity is the key value, on our view. The values of ownership and contribution become relevant only when there ought to be reciprocity. Reciprocity gives us an account of *when* a fair return is owed, whereas the values of ownership and contribution delimit *who* and *how much* is owed. If we take these three values into account, then we are led to the conclusion that, because Indonesia gave good, indeed, as much as it could, to GISN, Indonesia was owed as much (benefits) in return as other participants in GISN were and, to the extent that it failed to ensure this, GISN was unjust.

The Pandemic Influenza Preparedness Framework

Up to this point, we have focused on the three values of ownership, contribution and reciprocity precisely because Indonesia raised them to raise a complaint against GISN. In the third and final part of this article, by building on and adding to existing critiques, we illustrate that the PIPF is fundamentally unjust. More specifically, we argue that the PIPF fails to give adequate consideration and expression to the values of ownership, contribution and reciprocity.

Exploring PIPF's Details, Adding to Standard Critiques

After a series of WHA resolutions and failed negotiations, the PIPF was somehow finalized between the January 2011 meeting of the WHO Executive Board and May of the same year (WHA, 2011). The PIPF transforms GISN into the Global Influenza Surveillance and Response System (GISRS), and compared with previous proposals, it reflects more genuine compromise. Contrary to the position they adopted during the negotiations, developing countries agreed to the 'onward transfer' of virus specimens without their prior consent, accepted permissive language (e.g. '*should* not seek . . .') and secured only minimal restrictions on actors' ability to seek intellectual property rights. On the other hand, the contractual form of the obligations—codified in two Standardized Material Transfer Agreements known as SMTA 1 and SMTA 2—appears strong legally, subject to binding arbitration. Under these SMTAs, any entity receiving PIP biological materials (referred to as virus specimens in the foregoing) assumes legally enforceable obligations.

Specifically, SMTA 1 applies to exchanges of PIP biological materials within GISRS, which includes laboratories that have been designated as National Influenza Centers, WHO Collaborating Centers, WHO H5 References Laboratories or Essential Regulatory Laboratories. The terms and conditions of SMTA 1 run with the materials as they are transferred within GISRS laboratories; if the materials are transferred outside GISRS, SMTA 1 stipulates that SMTA 2 will apply to that transfer. Recipients of materials under SMTA 1 must meanwhile inform the WHO of all transfers inside and outside GISRS, and solicit the participation or acknowledge the work of scientists from developing countries. Under SMTA 1, providers or recipients of PIP biological materials are discouraged from seeking intellectual property rights in respect of such materials, but must respect any existing intellectual property rights that may be engaged by their use of PIP biological materials.

SMTA 2 applies to exchanges of PIP biological materials outside of GISRS, which includes public and private laboratories (e.g. universities and private companies) that have not been officially designated as part of GISRS by WHO member states.[14] SMTA is of great importance because, in most cases, biological materials will be transferred outside of GISRS. Several details (e.g. what law governs SMTA 2) are left to the parties to decide at the time of materials transfer, and SMTA 2 is silent with respect to intellectual property rights. However, SMTA 2 requires those outside of GISRS to commit to at least two benefit-sharing obligations, selected from a list of options that includes: giving developing countries 10% of the resulting vaccines and/or anti-virals; selling 10% of these at an affordable price;

or granting manufacturing companies within developing countries licenses to produce vaccines/anti-virals at affordable royalties, or royalty free (Third World Network, 2011; WHA, 2011). Securing industry's tacit acceptance of these benefit-sharing obligations constitutes a significant achievement.

While the passage of the PIPF as part of WHA resolution 64.5 marks an important moment, criticisms of the framework have already emerged (Fidler *et al.*, 2011). First and foremost, these criticisms focus on the nonbinding nature of WHA resolutions on member states, the WHO's questionable capacity to enforce compliance with the PIPF and the absence of mandatory positive obligations for developed countries (Kamradt-Scott *et al.*, 2011; Shashikant, 2011). With respect to the latter, David Fidler and Lawrence Gostin point out that '[t]he framework's most glaring omission is the absence of even "soft" norms encouraging developed countries to make specific equity-enhancing contributions to developing countries, such as donating portions of purchased vaccine' (Fidler *et al.*, 2011). Instead, the PIPF allows developed countries to shift the onus to manufacturers, calling on member states to 'urge' manufacturers to donate pandemic and interpandemic vaccines, to make them more accessible to developing countries through tiered pricing and to engage in technology transfer.[15] These worries—about the WHO's capacity to enforce measures to genuinely improve global health and developed countries failing to accept positive obligations—are fundamental but standard criticisms that have tended to attend any initiative of global health governance or international health diplomacy (Irwin, 2010).

Evaluating the PIPF in light of the normative values of ownership, contribution and reciprocity strengthens such standard critiques by adding a moral dimension.

For instance, considering the PIPF in light of the normative values of ownership, contribution and reciprocity strengthens Fidler and Gostin's claims. They decry developed countries' failure to commit, in the PIPF, to returning benefits to developing countries. However, Fidler and Gostin do not give us an account of why this lack of commitment is a mark of injustice. This is an important gap because building the moral foundations of a just framework for global PIP is of critical importance to collective action: it not only builds the case for why a more equitable and just framework for benefit sharing should be developed and implemented but also gives us an indication of which among the various paths forward is most appropriate. Our account helps to fill this 'moral' gap.

The upshot of our analysis in part two of the article was that ownership ought to do the work of identifying 'who' should benefit (as opposed to telling us how much or when someone or some group should benefit, which the values of contribution and reciprocity, respectively, can answer). If we accept that Indonesia had ownership over what SMTA 1 (and SMTA 2) describes as PIP biological materials, at least in a moral sense, then its claim to ownership ought to be recognized in some way by the PIPF.

However, with the exception of the principles listed at the outset of the PIPF, which repeats the 'sovereign right of States over their biological resources', the PIPF does not cast the interests of PIP biological material providers such as Indonesia in terms of ownership. Instead, the PIPF links providers with the PIP biological materials that they supply through the creation of the 'Influenza Virus Traceability Mechanism'.[16] The tracing mechanism 'is an electronic, internet-based system that records the transfer and movement of PIP biological materials into, within and to parties outside the WHO GISRS' (WHO, 2012b). The purpose of the system is to allow users to see where PIP biological materials have come from and been sent. In this way, the tracing mechanism aims to clearly identify 'who' has contributed biological materials to the GISRS. This, however, is not sufficient to appropriately recognize the ownership interests of developing countries, such as Indonesia, over the biological materials they contribute. Over and above being credited as the source of the materials, the value of ownership requires that contributors, such as Indonesia, be clearly identified as parties 'who' *ought to benefit* from their contribution (assuming anyone should benefit).

Now consider the values of reciprocity and contribution, which tell us how much and when someone should benefit. Countries affected by H5N1 have continued or resumed sharing of *their* virus specimens with GISRS. These countries are exclusively low- and middle-income countries (see Table 1). For the reasons mentioned above, their contributions are absolutely necessary to global PIP and their capacity to contribute to global influenza surveillance and vaccine research and development is limited relative to other countries. So, in turn, on our view, their contributions ought to be viewed, from the perspective of GISRS, as being of significance and meriting fair return. Yet, developed countries, which have been and will be direct recipients and beneficiaries of such contributions, have failed, as Fidler and Gostin note, to ensure the conditions of reciprocity in SMTA 1. They failed to do so by failing to agree to include in the SMTA 1 any specific returns to developing countries for their morally significant contributions.

Table 1. Human cases and deaths attributed to avian influenza

Country	Human cases	Deaths
Azerbaijan[a]	8	5
Bangladesh[b]	7	1
Cambodia[b]	34	28
China[a]	45	30
Djibouti[c]	1	0
Egypt[c]	173	63
Indonesia[c]	193	161
Iraq[c]	3	2
Lao People's Democratic Republic[c]	2	2
Myanmar[b]	1	0
Nigeria[c]	1	1
Pakistan[c]	3	1
Thailand[a]	25	17
Turkey[a]	12	4
Viet Nam[c]	125	62
Total	633	377

Notes: Countries are classified as [a]upper-middle income, [b]low income and [c]lower-middle income countries according to the World Bank. The number of human cases and deaths attributable to H5N1 are current to 5 July 2013 (WHO, 2013).

In short, the lack of commitment from developed countries to benefit sharing in the PIPF is inconsistent with a proper expression of and commitment to the values of ownership, contribution and reciprocity and hence is not consistent with the requirements of justice.

Identifying New Areas of Moral Concern

Evaluating the PIPF in light of the values of ownership, contribution and reciprocity also brings us to new bases for criticism. As we have noted, standard critiques like those of Fidler and Gostin's focus on the absence of obligations placed on developed countries in the PIPF. This critique applies to the PIPF's main text and, in effect, also attaches to SMTA 1 (annexed to the main text) where the obligations on National Influenza Centers and other laboratories designated by member states are articulated.

Yet, this critique does not extend to SMTA 2, which governs transfers of PIP biological materials beyond GISRS insofar as those entities cannot be considered organs of the state. Indeed, Fidler and Gostin largely applaud the particulars of SMTA 2. But attention to the values of ownership, contribution and reciprocity reveals that SMTA 2 contains shortcomings as well. Given that vaccines, anti-virals and diagnostic technologies are far more likely to emerge from academic institutions and private firms working in concert than government-run centers (Stevens *et al.*, 2011), the shortcomings of SMTA 2 are in our view critical to consider.

Consider SMTA 2 from the perspective of ownership. Like SMTA 1, SMTA 2 requires that recipients use the tracing mechanism to identify 'who' contributes biological materials without clearly identifying those same parties as those who ought to benefit from their contributions. However, there is another problem with SMTA 2. SMTA 2 permits those outside the system, such as academic laboratories and members of the vaccine industry to seek intellectual property rights as much as they see fit in exchange for the benefit-sharing commitments in SMTA 2. In other words, SMTA 2 permits outside entities to seek *legal* ownership in relation to biological materials and resulting technologies. To the extent that 'legal ownership' ought to track 'moral ownership', this seems problematic because Indonesia has some moral ownership over the relevant biological materials and, potentially, over the resulting technologies. But this is not given expression in any form in SMTA 2. Moreover, legal ownership, works in practice to identify those who ought to benefit and, at least in theory, to ensure that those identified actually do receive benefits. Again, to the extent that developing countries' interest in ownership is not recognized in the same way as those of outside entities, such as private firms and academic institutions, developing countries are not signaled out as among those who ought to (and will) benefit. There is thus an asymmetry in the recognition of ownership in SMTA 2.

Even though it is not linked with an acknowledgment of developing countries' 'ownership' over contributed biological materials, SMTA 2 does go some way toward recognizing that developing countries ought to be given return of benefit for their contribution by encouraging recipients, outside of GISRS, of biological materials to choose from a list of benefit-sharing options. However, SMTA 2 does not go far enough toward this end. At least two of the suggested options are problematic from the perspectives of contribution and reciprocity. Industry members can choose to give developing countries 10% of the resulting vaccines and/or anti-virals or to sell 10% of these at an affordable price to developing countries. The values of contribution and reciprocity require that the populations of developing countries who contribute to GISRS receive as much benefits from participation as

other participants in the system do. If we are correct in arguing that, because of the equal significance of its contribution, Indonesia is owed a share of benefits that is equal to those of the developer and manufacturer, then these options do not match Indonesia's contribution. For this reason, if vaccine manufacturing capacity exists within a developing country, then encouraging, if not requiring, industry to grant manufacturing companies within developing countries licenses to produce vaccines/anti-virals for an affordable royalty, or royalty free, would be more consistent with the values of contribution and reciprocity.

Again, it seems that the PIPF fails to give proper expression to the values of ownership, contribution and reciprocity and, in turn, fails to meet the requirements of justice.

Conclusion: Values as Part of the Way Forward

We have taken a tour through Indonesia's arguments regarding the injustice of the framework for benefit sharing in global PIP. Our motivation for doing so is that we believe that we can only evaluate the ultimate moral success of new proposals—whether they are genuinely more just—after we are clear about Indonesia's claims regarding the old framework and its reasons for thinking it unjust.

The values of ownership, contribution and reciprocity also have continuing relevance because they not only build the case for why a more equitable and just framework for benefit sharing should be developed and implemented but also because they give us an indication of which among the various paths forward is most appropriate.

For example, the values of ownership, contribution and reciprocity suggest useful means of amending the PIPF. One way for the PIPF to strengthen the ownership interests of those who provide PIP biological materials would be to require, as part of SMTA 1 and 2, all of those who avail of GISRS and develop technologies using such materials to disclose the 'origin' of those materials in any patent applications regardless of whether such disclosure is required as a matter of national law.[17] Doing so would not entitle Indonesia to any particular set of benefits, but it would signal within the four corners of a legal claim of ownership that they are among those who ought to benefit, and benefit equally relative to other contributors.

There are, of course, limits to the work that the values of ownership, contribution and reciprocity can do. These values do not assist developing countries that, by chance, do not contribute to GISRS (because no cases of H5N1 occurred within their borders), yet are without the ability to secure vaccines or anti-virals in the event of an influenza pandemic that spreads among those countries' populations. Further normative work, for example, around solidarity or human rights, needs to be done to provide for countries in that situation. Here, though, we have focused on those developing countries that do contribute via GISRS to global PIP. Too often, even in discussions of global justice, the contributions of developing countries are undervalued or ignored. We have shown that developing countries can and do make significant contributions to global PIP and that they are deserving of equal return—in the form of vaccines and other health technologies—for reasons of reciprocity. This is a categorically different sort of claim than those found in standard discussions of international justice, which tend to account for the world's poor because they are in need or because they have been harmed.[18]

We also do not pretend that focusing on the values of ownership, contribution and reciprocity will in itself overcome the political, financial, logistical and technological challenges to improving global influenza pandemic preparedness. We suspect that in today's political economy, claims of legal ownership will be bifurcated from claims of moral ownership. Likewise, the powerful will likely determine what metric will be used to evaluate contributions to global influenza pandemic preparedness, limiting the returns to those whose inputs are necessary but small, or big but only relative to capacity. And we suspect that notions of reciprocity may work well where communicating information is what is required, but not when scarce tangible goods and resources such as vaccines are involved. Nevertheless, normative analysis of these three values can help resist and counter these realities and catch important problems in policy initiatives such as the PIPF that are otherwise motivated by the pursuit of a more just system of global PIP.

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Conflict of Interest

None declared.

Notes

1. Following the adoption of the PIPF in May 2011, GISN was renamed the GISRS. Because our focus through the first two parts of the article is on the sequence of events and arguments that lead to the adoption of PIPF, we use the term GISN for much of the article.
2. There are, of course, other arguments that may be relevant to the Indonesian case and the problems of global PIP, most notably human rights arguments. Because Indonesia did not make a human rights-based argument, however, we leave this out of our analysis.
3. The information contained in Figure 1 is derived from a variety of sources compiled by the WHO. See WHO, 2012a.
4. According to reports, CSL later produced a vaccine known as Panvax® to be used for Australians in the event of an H5N1 pandemic. In 2008, other companies pledged large donations of vaccines to a WHO stockpile (Rambhia, 2008).
5. Though these will not be our focus, it is important to note that worries about injustice were not the only factors motivating Indonesia's actions. In-depth after-the-fact analyses of the Indonesian saga reveal that nationalism, religion, even political ambition, also figured in the Health Minister's decision to stop sharing virus specimens (Forster, 2009).
6. It is not strictly accurate to say that Indonesia received nothing in return for its participation in GISN. On the contrary, as noted in the first part of the article, aid from the international community enabled Indonesia to increase its influenza surveillance capacity—a benefit that it ostensibly received for its participation in GISN. Indonesia, however, argued that it was owed significantly more in return.
7. As a matter of international law, Indonesia's claim of ownership over influenza virus specimens derived from humans is highly questionable. The *CBD* provides nations with sovereignty over 'biological and genetic resources', which theoretically includes viruses. However, biological and genetic resources isolated from humans have been exempted from the *CBD*'s ambit (CBD, 2005): 'The [Conference of the Parties] [re]affirms that human genetic resources are not included within the framework of the Convention'. Furthermore, extending it to include human pathogenic viruses does not follow from the *CBD*'s primary objects of promoting conservation and biodiversity (Fidler, 2007, 2008; Vezzani, 2010). Note, however, that if 'fair and equitable sharing of benefits from the use of genetic resources', which is included in the CBD's preamble, is construed as a primary object of the convention, then we might conclude differently.
8. The example presented here is much like that found in the classic children's story, *Stone Soup* (Brown, 1947).
9. This seems true even if the apple pie was small and was the only apple pie around (i.e. even if the resulting resources were limited).
10. What exactly counts as 'equal' will likely depend on the context. In the case of vaccine, it may, for example, be relative to population size.
11. Sangiovanni (2007) is among the few works that discuss reciprocity in the context of global distributive justice. Also, while discussions of reciprocity in the literature on global justice are rather rare, members of the media supported the notion of justice as requiring reciprocity. For example, see Surjadjaja, 2007.
12. Though in different ways, Schmidtz (2006), Sangiovanni (2007) and Becker (1986) claim that reciprocity is an essential element of justice.
13. Our claim is not that Indonesia was given nothing in return for its contribution. It was given increased surveillance capacity (see footnote 6). Rather, our claim is that Indonesia was not given enough in return to constitute a fair return.
14. SMTA 2 states 'Recipients are all entities that receive "PIP Biological Materials" from the WHO GISRS, such as influenza vaccine, diagnostic and pharmaceutical manufacturers, as well as biotechnology firms, research institutions and academic institutions'.
15. Pandemic Influenza Preparedness Framework, Articles 6.10–6.13 (WHA, 2011).
16. Pandemic Influenza Preparedness Framework, Article 5.3 (WHA, 2011).
17. Whether to require 'disclosure of origin' in respect of 'genetic resources' is an ongoing area of debate in international patent law and practice. Some countries have made disclosure of origin a mandatory or voluntary component of the patent application process, whereas others, most notably, the USA, have not instituted any such requirement (Sarnoff and Correa, 2006).

18. For examples of the former sort of argument, see Singer (1972), Miller (2004) and Brock (2009). For examples of the latter sort of argument, see Pogge (2008) and Miller (2010).

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