

## IVERMECTIN: A POTENTIAL GLOBAL SOLUTION TO THE COVID-19 PANDEMIC

Recently, a wave of negative results were published from trials on numerous COVID-19 therapies, essentially eliminating any role for remdesivir, hydroxychloroquine, lopinavir/ritonavir, interferon, convalescent plasma, tocilizumab, and mono-clonal antibody therapy.<sup>1-6</sup> One year on, the only therapy considered “proven” as an effective treatment in COVID-19 are the use of corticosteroids in patients with moderate to severe illness.<sup>7</sup>

Since March 2020, our expert panel, the Front Line COVID-19 Critical Care Alliance ([www.flccc.net](http://www.flccc.net)) led by Professor Paul Marik, has continuously reviewed the rapidly emerging basic science, translational, and clinical data in COVID-19 with the aim of ensuring that our MATH+ Hospital Treatment protocol both continuously evolves and stays current. As of October 28<sup>th</sup>, 2020, based on the increasing and recently reported data from a number of published and unpublished trials, we have concluded that the drug Ivermectin, an anti-parasitic drug with increasingly well-known anti-viral<sup>8-16</sup> and anti-inflammatory properties has demonstrated profound activity against COVID-19. Based on these data, we have devised a new prophylaxis and early treatment protocol against COVID-19 which we have named the “**I-MASK+**” protocol which we believe may serve as a global solution to the pandemic. The evidence base in support of this conclusion shows that Ivermectin:

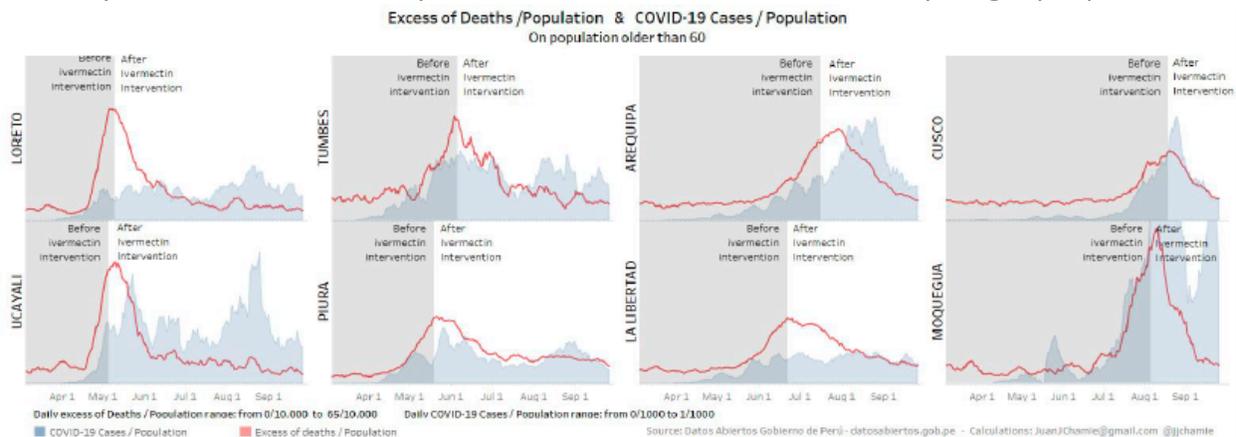
- 1) Inhibits SARS-CoV2 replication, leading to absence of nearly all viral material by 48h in infected cell cultures<sup>17</sup>
- 2) Prevents transmission and development of COVID-19 disease in household members of infected patients<sup>18,19</sup>
- 3) Hastens recovery and prevents deterioration in patients with mild to moderate disease treated early after symptoms<sup>20-25</sup>
- 4) Hastens recovery and avoidance of ICU admission and death in hospitalized patients<sup>25,26</sup>
- 5) Leads to striking reductions in case-fatality rates in regions with population-wide distribution and use<sup>27,28</sup>

Equally critical features of Ivermectin supporting its potential role as a global intervention are that it is FDA approved, inexpensive, easily compounded, well-tolerated, and has an excellent safety profile and long history of use.<sup>29</sup> Further, the drug has an extended duration of activity, and would require as little as one dose a week as a prophylaxis agent, and from 4-6 doses over two days as a therapeutic agent. The data suggests that as little as one or two doses a week taken by a significant proportion of citizens may lead to population-wide protection and reduced transmission in a manner that is easier to achieve, more effective, and less expensive than the still elusive and widely suspect vaccine.<sup>19</sup>

The above listed studies showing the physiologic impacts of Ivermectin therapy in COVID-19 are all referenced below. One study deserves particular attention, posted on the pre-print server Researchgate earlier this month by Dr. Juan Chamie which provides an analysis of

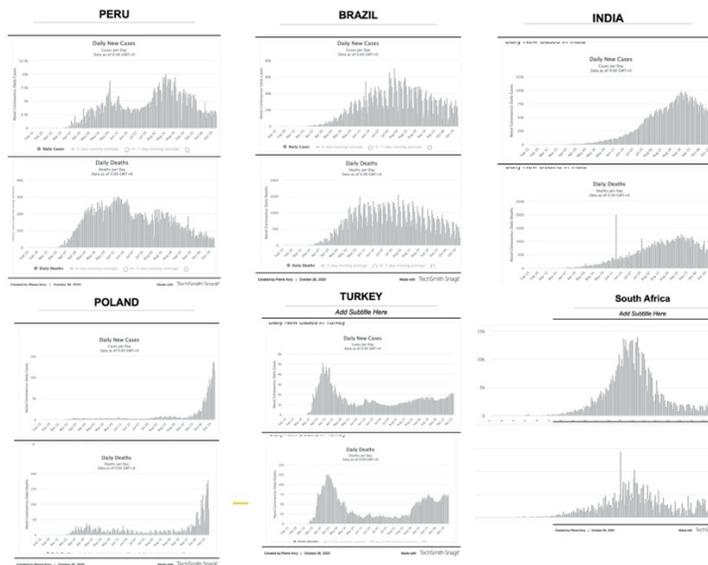
large amounts of real-world epidemiologic data in support of Ivermectin as an effective population-wide intervention in Peru.<sup>27</sup>

Briefly, the study provides population mortality data among 8 regions in Peru before and after the decision of the Peruvian Ministry of Health to recommend and initiate the widespread distribution of hundreds of thousands of doses of Ivermectin for the treatment of COVID-19 patients. The graphic below illustrates a dramatic temporally associated reduction in case fatality rates in patients over 60, a response seen in multiple regions at different times in the pandemic corresponding to the varying initiation of distribution of Ivermectin. By focusing solely on patients over 60, the analyses remove the potential confounding decreases in mortality that could be caused by an increase of infections in healthier, younger people.



In a corroboration of these above data, our group pulled case counts and death rates from several countries including Peru from the highly cited Worldometer COVID-19 global data site.<sup>30</sup> The data from Peru in the below graphic reflect similar impacts, i.e. compared to the other countries which reveal a “mirrored” increase in deaths correlating with each “spike” of cases, in Peru, the large increase in case counts from early August to mid-September instead correlated with first a plateau and then a steady decrease in deaths, even beginning during the massive spike, with death rates now approaching pre-pandemic levels.

## CASES AND DEATHS BY COUNTRY



In a similar “natural experiment” in Brazil, several large cities made the decision to widely distribute “home treatment kits” containing Ivermectin to its citizens, the city of Itajaí offered ivermectin to the entire population (approx. 200,000) and some 120,000 accepted. In May the large city of Macapá opted to treat patients with Ivermectin and Azithromycin, targeting those at risk or who had contact with a possible carrier. The city of Natal with a population of 1 million had recommended Ivermectin for COVID treatment and also for prophylaxis of health staff; after initial legal resistance, 1 million doses were distributed.<sup>28</sup>

The data is for September 14 from the official Brazilian government site (<https://covid.saude.gov.br/>) and the national press consortium, the table shows data mid-September compared to mid-August (most Ivermectin was administered during July). The bolded regions below all had a major city with Ivermectin distribution, the other nearby regions did not.

REGION	STATE	CHANGE IN AVERAGE DEATHS (%) PREVIOUS WEEK COMPARED TO 2 WEEKS AGO (A)	TOTAL COVID RELATED DEATHS	DEATHS/100K
South	<b>Santa Catarina</b>	<b>-36</b>	<b>2529</b>	<b>35,6</b>
	Paraná	-3	3823	35,3
	Rio Grande do Sul	-5	4055	33,4
North	<b>Amapá</b>	<b>-75</b>	<b>678</b>	<b>80,2</b>
	Amazonas	-42	3892	93,9
	Pará	13	6344	73,7
North East	<b>Rio Grande do Norte</b>	<b>-65</b>	<b>2315</b>	<b>66</b>
	Ceará	62	8666	95,1
	Paraíba	-30	2627	65,4

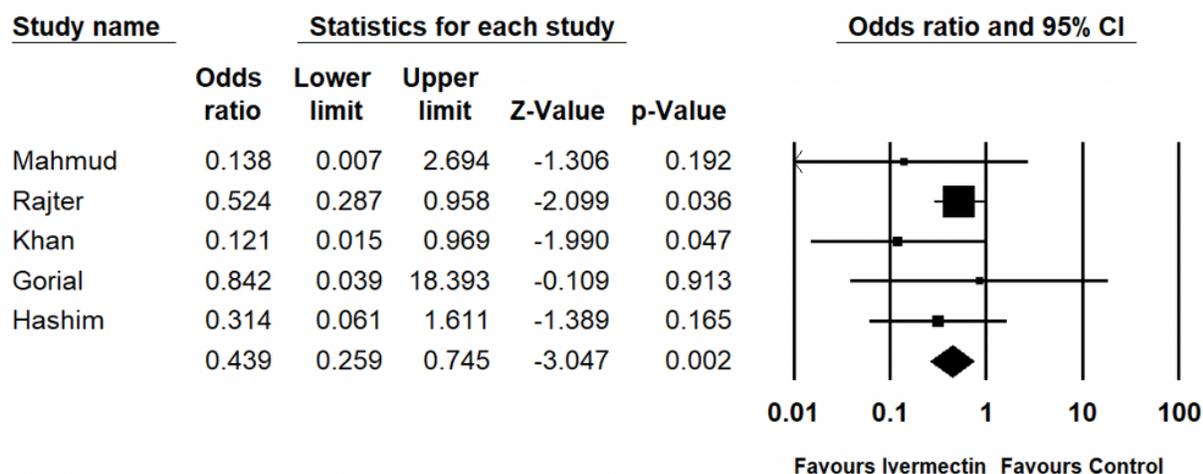
Beyond the death rate reductions found above, case counts also were reduced in the cities compared to neighboring ones without Ivermectin distribution as below:

REGION	CONFIRMED NEW CASES /MONTH	JUNE	JULY	AUGUST	POPULATION 2020 (1000)	% AUGUST/AV JUNE JULY
South	Itajaí	2123	2854	998	223	40%
	Chapecó	1760	1754	1405	224	80%
North	Macapá	7966	2481	2370	503	45%
	Ananindeua	1520	1521	1014	535	67%
North East	Natal	9009	7554	1590	890	19%
	João Pessoa	9437	7963	5384	817	62%

The numerous randomized and observational trials cited above can also be looked at using meta-analysis. Using this technique, a consistent, reproducible, and summary mortality benefit is found which reaches a high degree of statistical significance in favor of Ivermectin treatment as seen below:

## Ivermectin: Meta-analysis

### Deaths



#### Meta Analysis

In conclusion, we find that based on the in-vitro, animal, clinical, and real-world evidence to date, Ivermectin should be considered a highly effective global solution to the COVID-19 pandemic, both in terms of reducing transmission via its disease prophylaxis

capability as well as its anti-viral and anti-inflammatory therapeutic actions in both mild, moderate, and severe disease phases.

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