



They Are not Numbers. They Are Lives!

COVID-19 threatens indigenous peoples in the Brazilian Amazon

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INTRODUCTION

The advance of COVID-19, which has already claimed more than 40 thousand Brazilian lives, has hit the indigenous populations of the Amazon head-on. According to the Special Health Department for Indigenous Peoples (SESAI)¹, of Brazil's Ministry of Health, a total of 2,219 indigenous people were infected with the new coronavirus, with 86 recorded deaths as of June 14, 2020. These figures are also clearly underreported, given that the official count does not consider indigenous victims living in the cities or those who do not receive healthcare and die in the villages.

Indigenous people, regardless of ethnicity, are historically susceptible to exogenous diseases, which have left a trail of death among several of them (Ventura Santos, Ricardo Coimbra Jr., 2005). Therefore, COVID-19 should be in the high-risk group and should receive extra attention (Azevedo et al., 2020). Indigenous populations becoming contaminated due to the invasion of their lands compounds this risk. Gold mining, for example, has been a significant vector of the threat to indigenous peoples (Villén-Pérez et al., In press). A recent study² indicated that some peoples are more-so threatened with COVID-19 infection because of the mining on their lands. The Yanomami people are a prime example of this case, whose infection level could reach 40% among those living in the gold mining areas.

Land grabbing, land invasion, and the subsequent deforestation (Alencar et al., 2020) all present an equally dangerous potential for indigenous populations. In addition to the environmental and cultural degradation that these invasions have historically produced, they now represent a threat to the health of indigenous populations, especially those isolated.

The scenario of infection is severe. The mortality revealed among the indigenous peoples of the Amazon today is the harbinger of a situation that can be catastrophic if an urgent and adequate strategy for treating these populations is not implemented within

¹ Available at: { HYPERLINK "<https://saudeindigena.saude.gov.br/>" \h }. Last accessed on June 15, 2020.

² { HYPERLINK "https://acervo.socioambiental.org/sites/default/files/publications/prov43-2_2.pdf" } Last accessed on June 16, 2020.



these regions. This technical note aims to present more data that help to give dimension to the problem, in this sense, in order to contribute so that solutions are created quickly and efficiently, for the safety of all the indigenous peoples in the region.

METHOD

Two sources of data (confirmed cases and deaths) on novel coronavirus infection among indigenous people were used in this study: official data, released by the Special Health Department for Indigenous Peoples (SESAI)³, of Brazil's Ministry of Health, and maintained by the Coordination of the Indigenous Organizations of the Brazilian Amazon (COIAB) with the indigenous leaders, indigenous health professionals, and organizations from the COIAB Network.

SESAI provides daily-updated epidemiological bulletins, segregated according to the division of the Special Indigenous Sanitary Districts (DSEIs). The information only refers to indigenous people living on indigenous lands (ILs).

In turn, COIAB maintains a task force to complement the information released by SESAI. This effort was necessary because the National Policy for Attention to Indigenous Health Management Guidelines restrict the service to the village populations, without considering the indigenous people who are currently living in cities (Ministério da Saúde, 2004). Since indigenous people are in a risk group regardless of where they live, it is necessary to count those in cities among the indigenous COVID-19 victims. The COIAB network of indigenous leaders registers and reports cases of COVID-19 to a focal point of the Coordination, every day. This information has been collected since the second half of March when the first cases among indigenous people surfaced in the Upper Solimões and Lower Tapajós Rivers.

The information released by COIAB undergoes an internal check that compares the data in the bulletins issued by SESAI with the information passed on by the leaders to ensure no one in the cases reported by SESAI is counted twice. COIAB reports are also complemented with other information: (a) the patient's status (suspected; confirmed; death), (b) name, (c) tribe, (d) age, (e) sex, (f) where they live/where they are being treated, and (g) name of the person responsible for the information. Several records still contain information about the indigenous person's profession and the name of the hospital where they are being treated.

We used the data provided by SESAI and COIAB, eliminating the possibility of being double-counted, to assess the actual COVID-19 infection level among the indigenous people in the Amazon. More specifically, we calculated the incidence rate of confirmed cases of illnesses and deaths among indigenous people per 100 thousand inhabitants. Since the regional indigenous population was estimated using the 2010 census results,

³ Available at: { HYPERLINK "<https://saudeindigena.saude.gov.br/>" \h }. Last accessed on June 1, 2020.

the Brazilian Institute of Geography and Statistics (IBGE) counted 433,363 people in 2012, we have updated the count to the present (2020). Therefore, we have considered a population increase rate of 11.4% registered between 2010 and 2020 (IBGE, 2012), to reach an estimated current indigenous population of 483 thousand. Lastly, we compared the infection and death rates among the indigenous people with those calculated for the states in the North region and all of Brazil, using data extracted from the Coronavirus Brazil Portal⁴.

The infection and deaths were also presented to aggregate the DSEIs (figure 1), which comprise 385 regional indigenous lands, and for the municipalities where the Sanitary Districts are installed. Doing such, made it possible to identify the regions most affected by the disease and with the highest incidence among indigenous people. It should be noted that, according to the last IBGE census (IBGE, 2012), the sizeable indigenous contingent in the Amazon is in the municipality of São Gabriel da Cachoeira in the state of Amazonas (AM), Brazil.

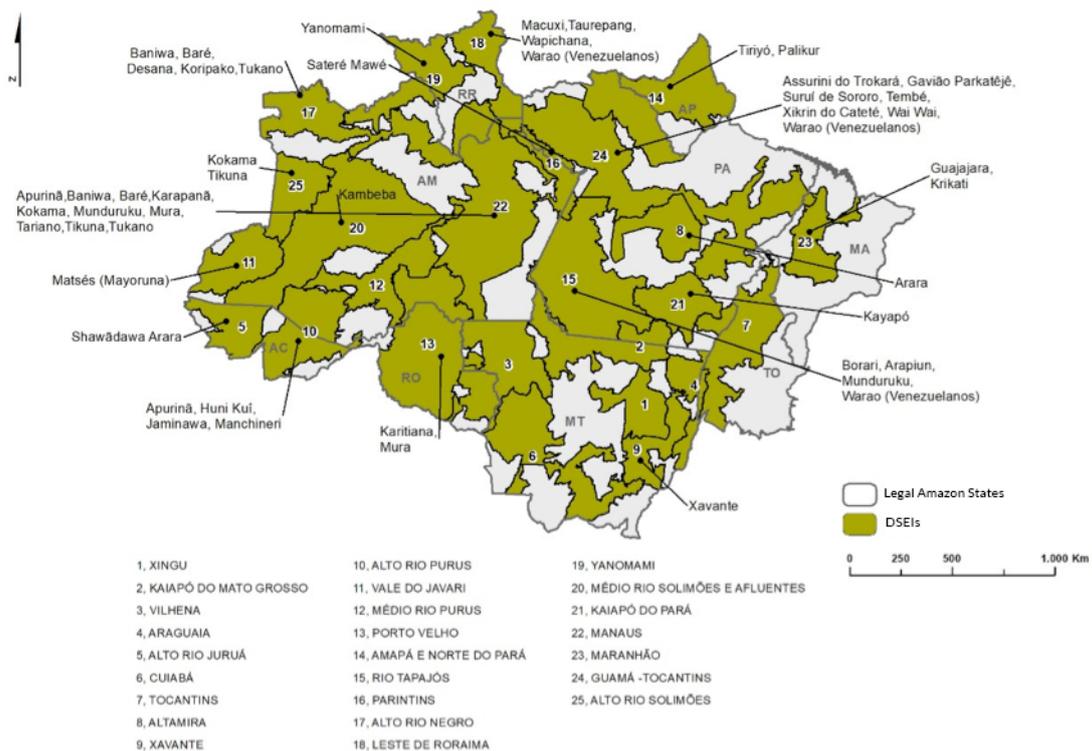


Figure 1. Coverage map of Special Indigenous Sanitary Districts (DSEI)s with incidences of COVID-19. Sources: Brazil's Ministry of Health and COIAB.

We evaluated the number of illegal gold mines (RAISG, 2019), illegally registered rural properties in the Rural Environmental Registry (CAR) as indicative of land grabbing within each IL, and the amount of deforestation within the ILs (deforested area in the

⁴ Available at: { HYPERLINK "<https://covid.saude.gov.br/>" }



last five years, according to PRODES/INPE) to identify the primary external sources that generate the risk of indigenous peoples becoming infected with COVID-19. These three indicators, combined, were used as “proxies” of greater or lesser risk of infection of indigenous populations. In fact, the presence of humans linked to deforestation and mining activities has been considered a vector of disturbance {ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"author":{"dropping-particle":"","family":"Verdum","given":"Ricardo","non-dropping-particle":"","parse-names":false,"suffix":""},"container-title":"Inesc","id":"ITEM-1","issued":{"date-parts":[["2012"]]},"page":"27","title":"As obras de infraestrutura do PAC e os povos indígenas na Amazônia Brasileira","type":"article-journal"},"uris":["http://www.mendeley.com/documents/?uuid=fcbafa1b-0cb5-4422-a809-f43231abf1a6"]},"mendeley":{"formattedCitation":"(Verdum, 2012)","plainTextFormattedCitation":"(Verdum, 2012)","previouslyFormattedCitation":"(Verdum, 2012)"},"properties":{"noteIndex":0},"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}} and vehicle for the infection of indigenous people by various diseases (IACHR, 2019; Ramos, 1993). Only the ILs that presented any record of illegal activities were included in the results and configured on a map that indicates the critical regions of a possible advance of COVID-19 among indigenous people. In this sense, the regions with a high risk of infection from external agents were those that had simultaneous histories of mining, deforestation, and land grabbing. DSEI reported that risk.

RESULTS

COVID-19 cases evolved among indigenous peoples in the Amazon

Cases of COVID-19 have considerably increased among the indigenous population of the Amazon since the disease claimed its first victim on March 19, 2020. Since then, SESAI has registered 2,219 cases, and the COIAB survey recorded 1,443 additional cases, totaling 3,662 confirmed cases (figure 2A), indicating a severe official underreporting of 39%. This underreporting in the number of deaths is a consequence of the official protocol that excludes indigenous residents in the cities, even if temporarily, but that is not the only reason. In this case, SESAI reported 65% (86) of all 249 deaths determined by COIAB up to June 14, 2020 (figure 2B).

Considering the total numbers of confirmed cases (3,662) and deaths (249), the COVID-19 infection rate per 100 thousand inhabitants among the indigenous people is 84% higher than Brazil's rate (figure 3A). It was not higher than the figures for the North region, but it shows a rise in the sharpest curve (figure 3A, table 1). The death rate per 100 thousand inhabitants reveals an even more worrying scenario: it is 150% higher than the Brazilian average. It exceeds the incidence of deaths due to the disease in the North of the country by 20% (figure 3B, table 1). The lethality rate (number of

deaths by the number of confirmed cases) was 6.8% among indigenous people in the Amazon, expressively high compared to those recorded for Brazil (5%) and the Northern region (4.5%) (Table 1).

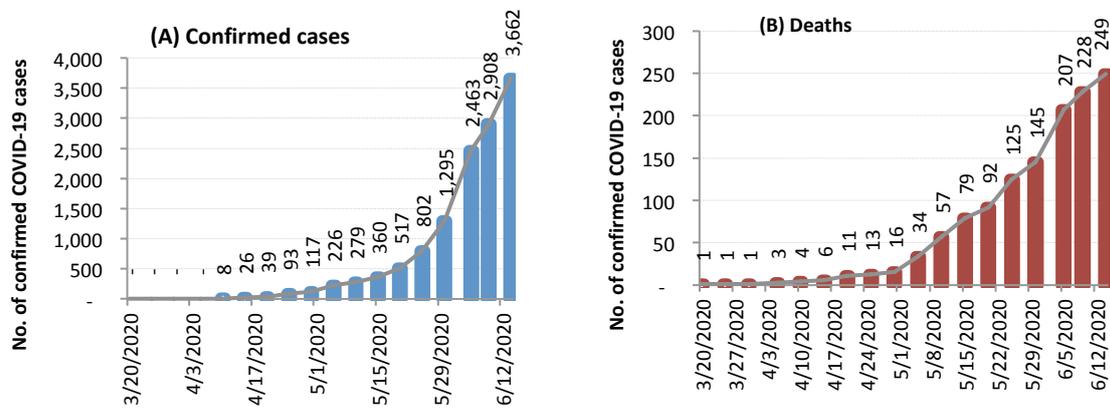


Figure 2. Cumulative total of cases of indigenous people who (A) tested positive for COVID-19, and (B) cumulative number of deaths due to the disease from March 20 to June 14, 2020. Data source: COIAB.

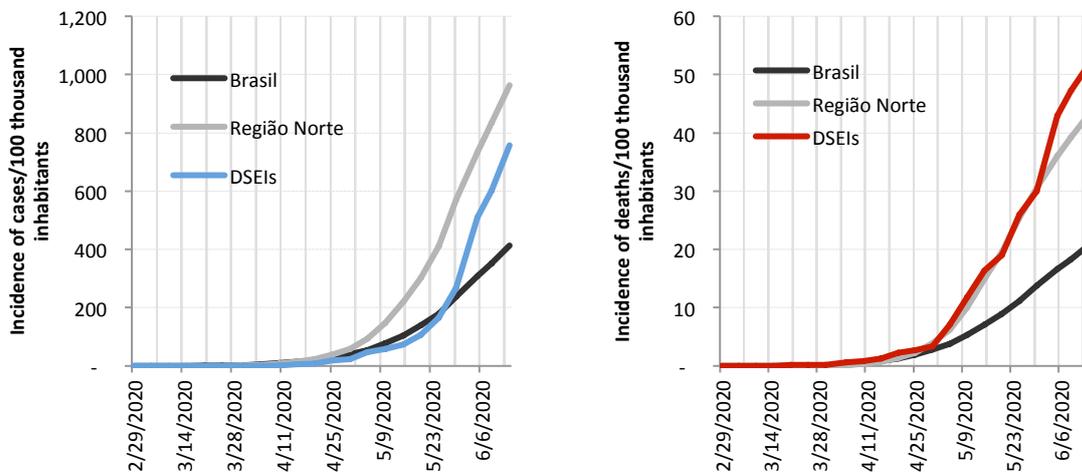


Figure 3. The incidence of cases and deaths per 100 thousand inhabitants of indigenous people due to DSEI in the Amazon compared to the incidence of cases and deaths per 100 thousand inhabitants in the states of the North and Brazil. Data source: COIAB and Brazil’s Ministry of Health

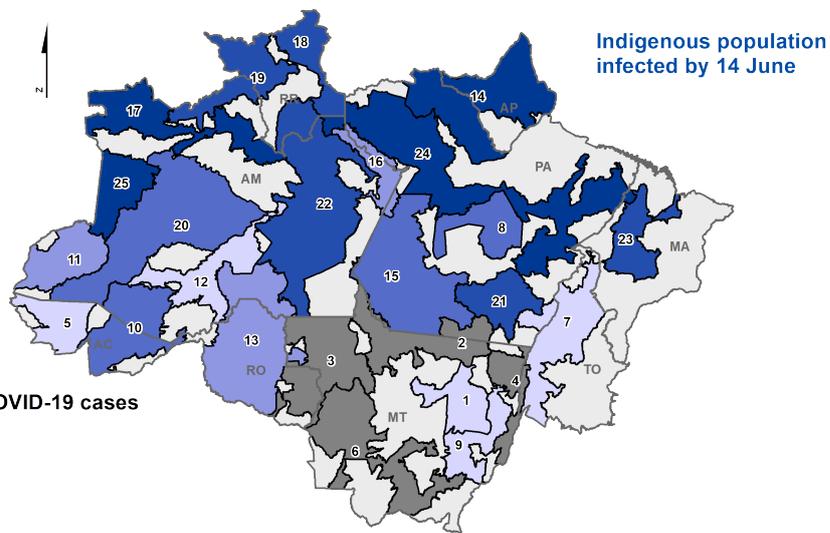
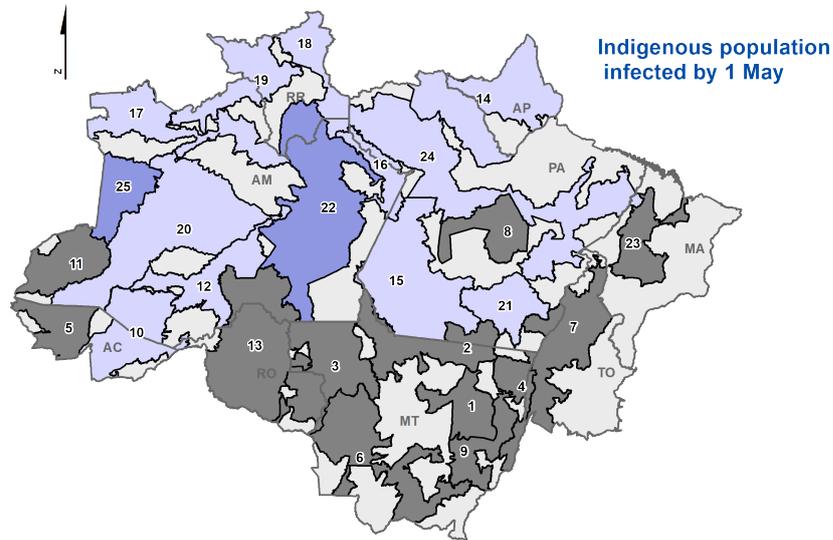
Table 1. The number of confirmed cases and incidence of cases per 100 thousand inhabitants, number of deaths and incidence of deaths per 100 thousand inhabitants, and the lethality rate among the indigenous population of the Amazon, across the North and in Brazil on June 14, 2020. Data source: COIAB and Brazil’s Ministry of Health

No. of cases	No. of deaths	Incidence of cases per 100 thousand	Incidence of deaths per 100 thousand	Lethality rate
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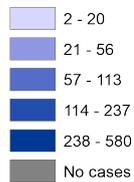


Indigenous Peoples (DSEIs)					
	3,662	249	759	52	6.8%
North region	177,551	7,922	963	43	4.5%
Brazil	867,864	43,332	413	21	5.0%

The geographical distribution of the disease among the indigenous people indicated a rapid advance of infections, considering the set of DSEIs. At the beginning of May 2020, thirteen DSEIs had already registered at least one confirmed case of COVID-19. By the end of the first half of June, records reached 21 of the 26 DSEIs that cover the Legal Amazon region (figure 5). Amapá and North of Pará, Guamá-Tocantins, Upper Negro River, Upper Solimões River, and Maranhão, are among the most affected DSEIs, representing about 65% of the number of COVID-19 cases among indigenous people in the Amazon. This list, added to the DSEI Kaiapó do Pará, Manaus, East of Roraima, Yanomami, and Upper Purus River make up the ten DSEIs with the most confirmed cases of COVID-19, representing 86% of the infected indigenous people in the Amazon up to June 14, 2020 (figure 5, table 2).



Number of COVID-19 cases



- | | | |
|--------------------------|---------------------------|------------------------------------|
| 1, XINGU | 10, ALTO RIO PURUS | 19, YANOMAMI |
| 2, KAIAPÓ DO MATO GROSSO | 11, VALE DO JAVARI | 20, MÉDIO RIO SOLIMÕES E AFLUENTES |
| 3, VILHENA | 12, MÉDIO RIO PURUS | 21, KAIAPÓ DO PARÁ |
| 4, ARAGUAIA | 13, PORTO VELHO | 22, MANAUS |
| 5, ALTO RIO JURUÁ | 14, AMAPÁ E NORTE DO PARÁ | 23, MARANHÃO |
| 6, CUIABÁ | 15, RIO TAPAJÓS | 24, GUAMÁ - TOCANTINS |
| 7, TOCANTINS | 16, PARINTINS | 25, ALTO RIO SOLIMÕES |
| 8, ALTAMIRA | 17, ALTO RIO NEGRO | |
| 9, XAVANTE | 18, LESTE DE RORAIMA | |

Figure 5. Cases of COVID-19 in the indigenous population in the Amazon, distributed by DSEI on May 1st and June 14th Data source: COIAB



The rapid rise in confirmed cases meant a significant increase in the total number of patients in the region, compared to May 1. When looking at the number of deaths, the advance is even more significant. In the first assessment, only six DSEIs had recorded indigenous fatalities, while by the end of the first half of June, this number had increased to 19 DSEIs (figure 6).

Up to the first half of June, deaths caused by COVID-19 have increased nine times compared to May 1 and has reached 42 peoples (figure 7). That number may still rise dramatically in the coming weeks, given that the virus incubation time is five to six days after infection, and an average of two weeks for the disease to evolve and result in death

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The Upper Solimões River, Manaus, and Guamá-Tocantins are among the DSEIs with the highest number of deaths, which together reported more than half of the deaths (53%) among the indigenous population of the Amazon (figure 6, figure 7, table 2).

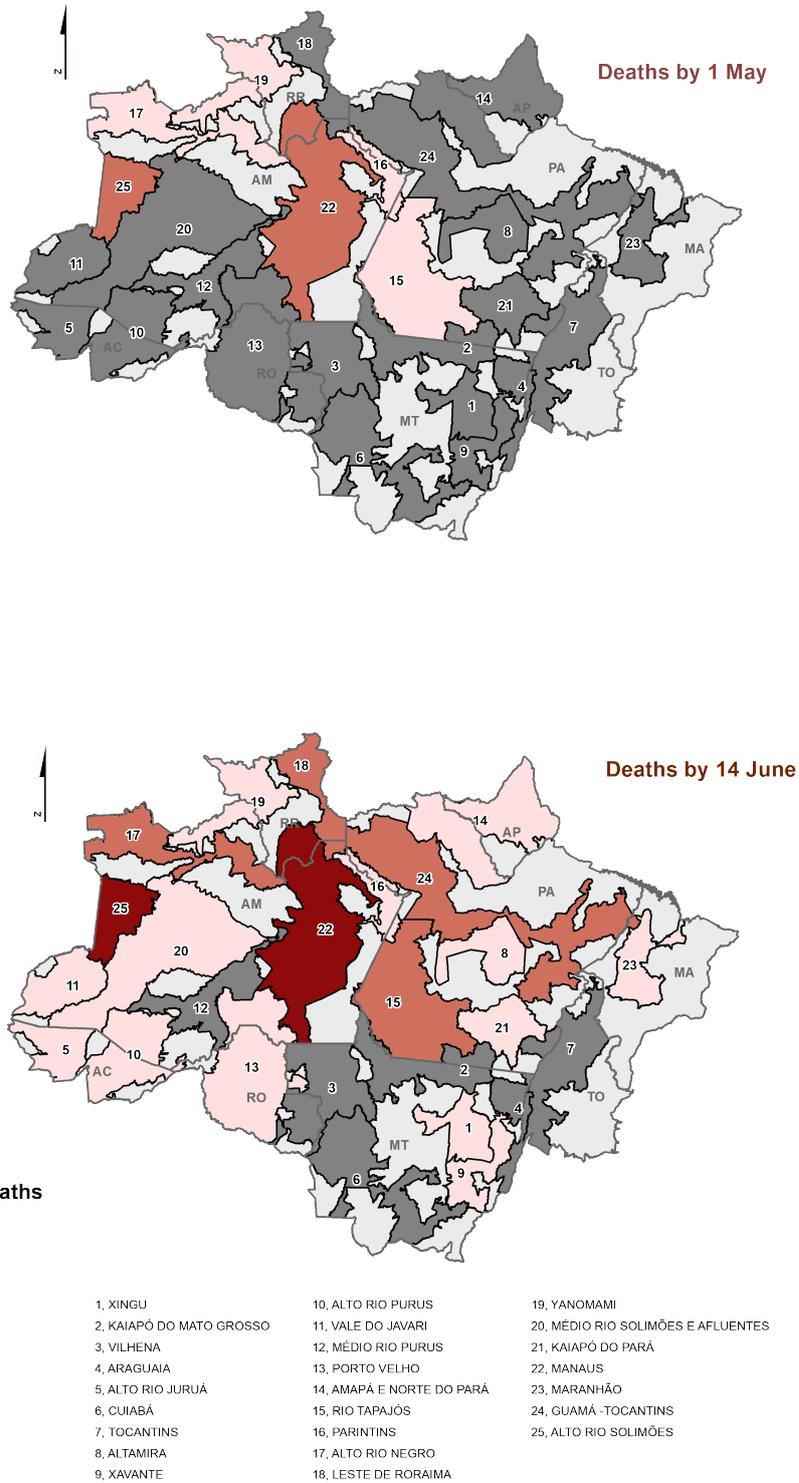


Figure 6. Cases of COVID-19 in the indigenous population in the Amazon, distributed by DSEI on May 1st and June 14th Data source: COIAB

Table 2. Number of DSEI cases and deaths between May 1 and June 14, 2020. Source: COIAB

ID	DSEI name	Confirmed cases 5/1/20	Deaths 5/1/20	Confirmed cases 6/14/20	Deaths 6/14/20
1	XINGU	0	0	4	1
2	KAIAPÓ DO MATO GROSSO	0	0	0	0
3	VILHENA	0	0	0	0
4	ARAGUAIA	0	0	0	0
5	UPPER JURUÁ RIVER	0	0	19	1
6	CUIABÁ	0	0	0	0
7	TOCANTINS	0	0	2	0
8	ALTAMIRA	0	0	105	2
9	XAVANTE	0	0	20	1
10	UPPER PURUS RIVER	1	0	113	8
11	JAVARI VALLEY	0	0	56	1
12	PURUS RIVER – MIDDLE STRETCH	3	0	17	0
13	PORTO VELHO	0	0	45	4
14	AMAPÁ AND NORTH OF PARÁ	1	0	580	2
15	TAPAJÓS RIVER	2	1	92	17
16	PARINTINS	20	1	33	2
17	UPPER NEGRO RIVER	5	1	515	24
18	RORAIMA	1	0	168	26
19	YANOMAMI	3	1	153	8
20	SOLIMÕES RIVER – MIDDLE STRETCH AND TRIBUTARIES	2	0	89	8
21	KAIAPÓ DO PARÁ	3	0	179	6
22	MANAUS	24	9	177	49
23	MARANHÃO	0	0	237	6
24	GUAMÁ-TOCANTINS	5	0	555	30
25	UPPER SOLIMÕES RIVER	51	16	503	53
Total		121	29	3662	249

Indigenous people exposed to external infection agents

The findings in relation to the exposure of indigenous populations to vehicles of external infection through deforestation, mining, and land grabbing/CAR records within ILs indicate that all Amazonian DSEIs suffer some degree of threat. Illegal mining mainly affects the Yanomami and Raposa Serra do Sol indigenous lands, which are part of the Yanomami and East Roraima DSEIS, respectively (figure 8A), and which are among the ten DSEIs with the highest number of cases and deaths (table 2). In both DSEIs, infection cases have soared in recent weeks. While in the first, there were only

three indigenous people infected on May 1, that number rose to 153 in just over one month. Twenty-six leaders have already been lost in the East DSEI of Roraima.

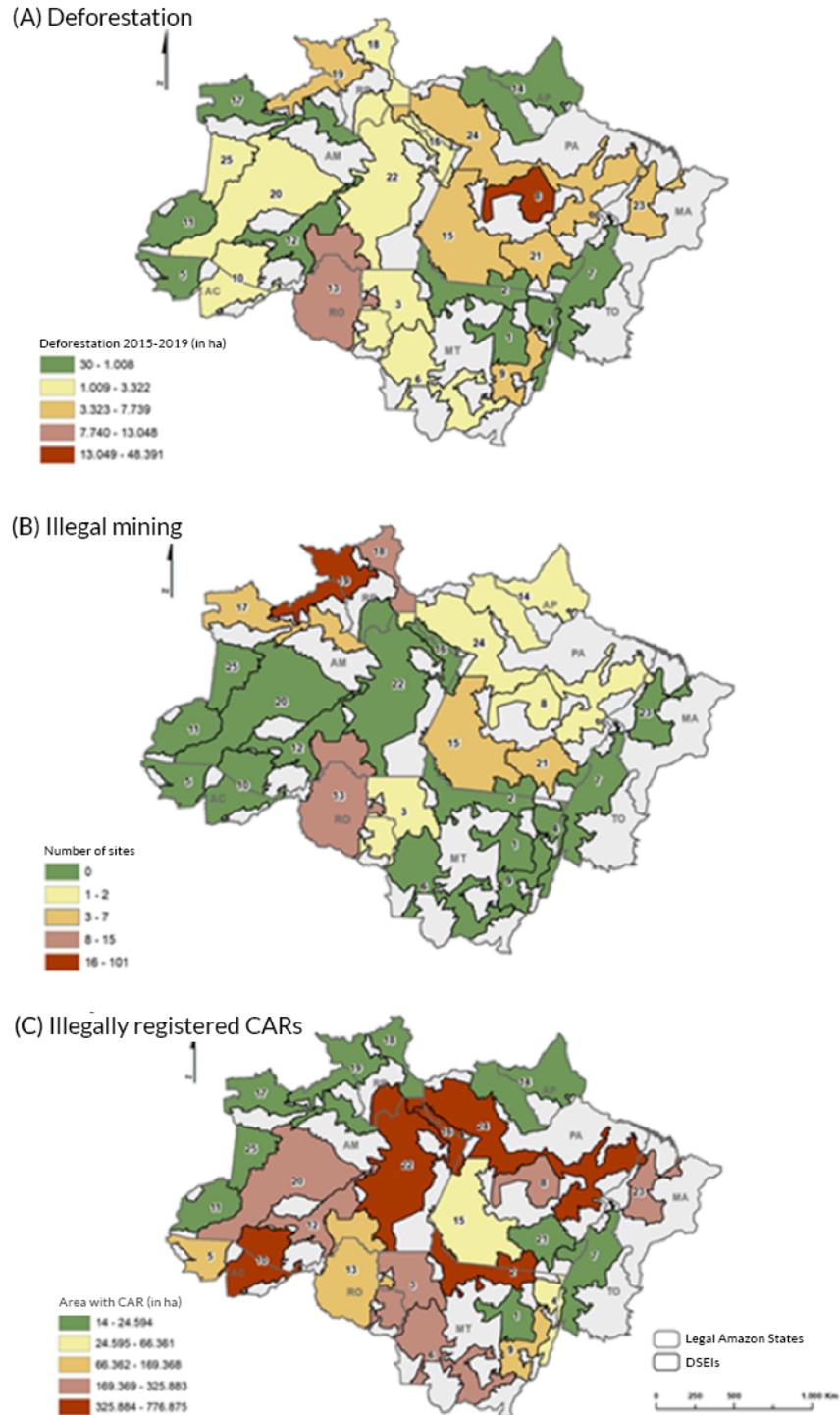


Figure 8. DSEIs (in red) in which ILs are critically affected by (A) the largest recently and illegally deforested area, (B) a large number of illegal gold mines, and (C) the extensive area covered by illegally registered CARs. Data source: Amazon Network of Georeferenced Socio-Environmental Information (RAISG); INPE; CAR/ Brazilian Forest Service.

Cachoeira Seca, Apyterewa, and Ituna/Itatá are the three ILs that had the most substantial increase in a deforested area in the last year⁵. These ILs are located in the Altamira DSEI (figure 8B), and their corresponding deforested areas are 7.5%, 10.4%, and 10.7% of their territories, respectively. The Manaus and Guamá-Tocantins DSEIs cases, both extremely affected by COVID-19 (figure 8C), are similar to those observed in the Altamira DSEI.

The overlapping results on the three maps in figure 8 indicate critical areas, in which ILs are potentially affected by external infection agents (figure 9), DSEIs that house ILs where mining, deforestation, and land grabbing jointly take place. These regions require individual attention, as they are more likely to experience increased exposure to the coronavirus because of external actors. Within the indigenous Amazonian universe, the Yanomami, Manaus, and Guamá-Tocantins DSEIs have already shown high numbers of cases and deaths due to COVID-19, and presented high exposure to external agents, putting pressure on these territories (figure 9).

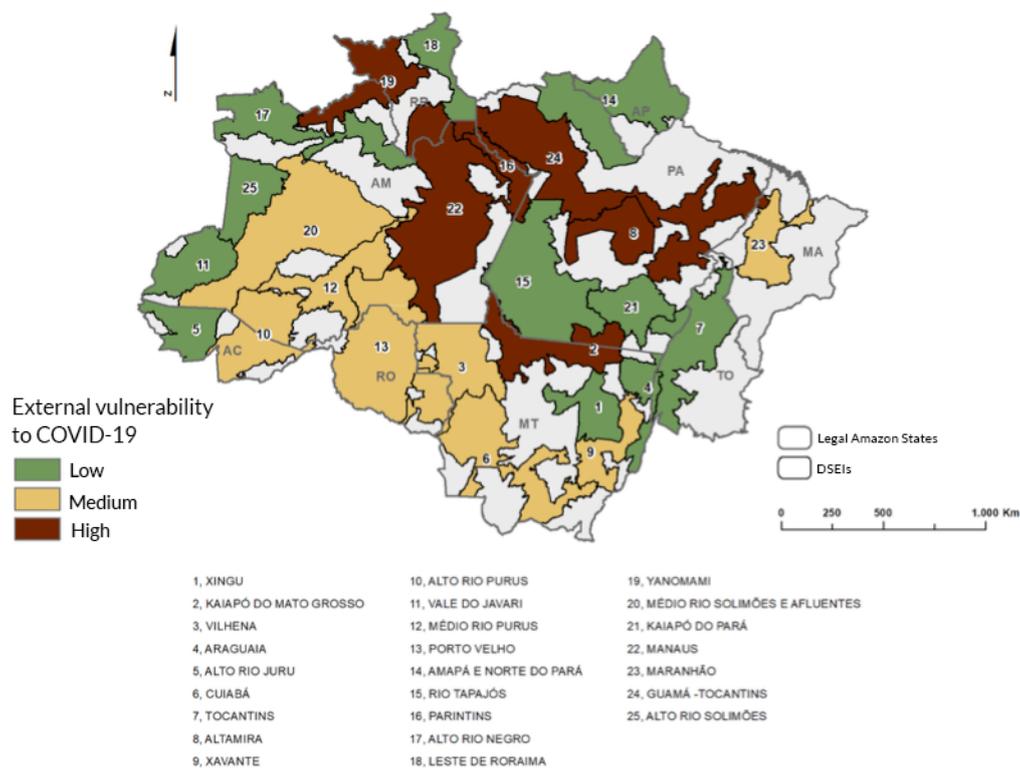


Figure 9. DSEIs that require greater attention to the risk of indigenous populations becoming infected by COVID-19 due to external agents (deforestation, land grabbing, and mining).

⁵ Available at:

{ ["http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/increments"](http://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/increments) \h }

Last accessed on June 9, 2020.



The results presented in figure 9 may also be partially influenced by the proximity to cities and access facilitated by existing infrastructure, such as highways. However, there are exceptions. This seems to be the case with the Upper Solimões River (figure 9) DSEI, where healthcare workers introduced community infection.

DISCUSSION

This technical note indicates that the spread of the new coronavirus among indigenous people in the Amazon is 84% above that registered for the country. The lethality index is also high, close to 8% among indigenous people, compared to 5% in the general population. Therefore, the spread of the disease among this group deserves maximum attention from government agents. As shown in this study, one must also consider the urgency of combating the external sources that infect the indigenous peoples, indicated by deforestation, mining, and land grabbing within these territories. In particular, 30% of the DSEIs (figure 9) show high potential for contagion because they contain all three contagion agents.

The revealed context is, therefore, grave. In addition to the external agents that threaten the health of the indigenous people, there is still a lack of swift medical care, since many who live in their communities have to travel long distances to the nearest hospital for treatment. The average distance an indigenous person travels to receive care at an appropriate medical center is estimated at 462 kilometers, for the state of Amazonas

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SESAI's lack of registered cases of infected indigenous people living in cities is another factor of concern. Underreporting, aggravated by the lacking registration of undiagnosed cases, makes this population even more vulnerable, as it can skew strategies for coping with the disease. Since indigenous peoples form a relevant risk group, all cases must be correctly accounted for, regardless of the patient's location.

The differences found between the official numbers and those recorded by COIAB also indicate a delay in the pace of official notifications. The first case of an indigenous



person's death from COVID-19 occurred on March 19, 2020, but confirmed cases of infected indigenous people did not begin to appear in official records until mid-April. Such a mismatch between registration of confirmed cases and deaths can mask the grim reality of the disease among the indigenous people.

The discrepancy between the infection, mortality, and lethality rates among indigenous people compared to the Brazilian population, in general, is also noteworthy. This situation is of great concern, as it may reflect the low degree of indigenous people's immunity to pathogens exogenous to their environment. For centuries, the interaction between the indigenous communities and the environments where they live has enabled the creation of an "immunological memory" shaped according to the diseases found in the living areas {ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"author":{"dropping-particle":"","family":"Reis","given":"Roberta Aguiar Cerri","non-dropping-particle":"","parse-names":false,"suffix":""},"dropping-particle":"","family":"Albertoni","given":"Lucas","non-dropping-particle":"","parse-names":false,"suffix":""},"container-title":"Revista de Antropologia","id":"ITEM-1","issue":"2","issued":{"date-parts":[["2017"]]},"page":"808 - 831","title":"Questões epidemiológicas e desafios no atendimento aos chamados povos isolados. Uma experiência de contato com os Korubo","type":"article-journal","volume":"9"},"uris":["http://www.mendeley.com/documents/?uuid=82a9336a-326f-4dd1-a287-3d577d5a3f07"]},"mendeley":{"formattedCitation":"(Reis & Albertoni, 2017)","plainTextFormattedCitation":"(Reis & Albertoni, 2017)","previouslyFormattedCitation":"(Reis & Albertoni, 2017)"},"properties":{"noteIndex":0,"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}}. However, this unique balance developed by these communities can be thrown off with people from outside their territories coming within a closer proximity {ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"author":{"dropping-particle":"","family":"Oviedo","given":"Antonio","non-dropping-particle":"","parse-names":false,"suffix":""},"id":"ITEM-1","issued":{"date-parts":[["2018"]]},"number-of-pages":"23","title":"Os povos indígenas isolados e as obras de infraestrutura que ameaçam seus territórios","type":"report"},"uris":["http://www.mendeley.com/documents/?uuid=e21b0a5d-a557-4922-939e-c0a1fca2a999"]},"mendeley":{"formattedCitation":"(Oviedo, 2018)","plainTextFormattedCitation":"(Oviedo, 2018)","previouslyFormattedCitation":"(Oviedo, 2018)"},"properties":{"noteIndex":0,"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}}, either because municipalities grow and end up crossing with IL and infrastructure projects, or by the illegal activities considered in this study. One emblematic case exemplifies this dynamic. In the late 1980s, the Yanomami, whose indigenous land was baptized with the same name, saw their people wane due to mining activities in their territory. In a span of just three years, they lost about 14% of their population due to new diseases being introduced to their



indigenous land, in addition to other impacts generated by the mining activity itself.

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Scenarios like these can be repeated in indigenous territories directly affected by illegal activities, such as deforestation, mining, and land grabbing. Added to this is the fact that rural populations, including indigenous people, are still exposed to respiratory problems due to smoke pollution during the slash and burn period in the region, and from fires linked to the regional deforestation

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The situation becomes even more dramatic as cases of COVID-19 are confirmed in ILs that have indigenous peoples in voluntary isolation. Brazil is the country with the highest concentration of socially isolated people in the world. There are 114 records in the Amazon region alone, 28 of which have already been confirmed by the official indigenous peoples agency {ADDIN CSL_CITATION {"citationItems":[{"id":"ITEM-1","itemData":{"author":{"dropping-particle":"","family":"Ricardo","given":"Fany","non-dropping-particle":"","parse-names":false,"suffix":""},"dropping-particle":"","family":"Gongora","given":"Majoí Fávero","non-dropping-particle":"","parse-names":false,"suffix":""}]},"edition":"1","id":"ITEM-1","issued":{"date-parts":[["2019"]]},"title":"Enclosures and Resistance Isolated Indigenous Peoples in Brazilian Records of Isolated Indigenous Peoples in Brazilian Amazonia","type":"book","uris":["http://www.mendeley.com/documents/?uuid=d1c4a827-48a9-48a5-badd-4586dfd06fca"]},"mendeley":{"formattedCitation":"(Ricardo &



Gongora, 2019)", "plainTextFormattedCitation": "(Ricardo & Gongora, 2019)", "previouslyFormattedCitation": "(Ricardo & Gongora, 2019)", "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}. These people are the most sensitive and vulnerable to infectious diseases {ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"author": [{"dropping-particle": "", "family": "Reis", "given": "Roberta Aguiar Cerri", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "dropping-particle": "", "family": "Albertoni", "given": "Lucas", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "container-title": "Revista de Antropologia", "id": "ITEM-1", "issue": "2", "issued": {"date-parts": ["2017"]}, "page": "808 - 831", "title": "Questões epidemiológicas e desafios no atendimento aos chamados povos isolados. Uma experiência de contato com os Korubo", "type": "article-journal", "volume": "9"}, "uris": ["http://www.mendeley.com/documents/?uuiid=82a9336a-326f-4dd1-a287-3d577d5a3f07"]}], "mendeley": {"formattedCitation": "(Reis & Albertoni, 2017)", "plainTextFormattedCitation": "(Reis & Albertoni, 2017)", "previouslyFormattedCitation": "(Reis & Albertoni, 2017)", "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}. Special care is required for their protection.

The health risk to indigenous peoples during this pandemic will increase even more if the healthcare system for this group continues to have little coverage. According to Ordinance No. 70 of the Ministry of Health, launched in 2004, indigenous healthcare services are aimed only at populations living in villages {ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"author": [{"dropping-particle": "", "family": "MS", "given": "Ministério da Saúde", "non-dropping-particle": "", "parse-names": false, "suffix": ""}], "id": "ITEM-1", "issued": {"date-parts": ["2004"]}, "page": "1-3", "title": "Portaria nº 70, de 20 de janeiro de 2004: Aprova as Diretrizes da Gestão da Política Nacional de Atenção à Saúde Indígena", "type": "article"}, "uris": ["http://www.mendeley.com/documents/?uuiid=c51d1072-f28c-4b00-a217-61641945372e"]}], "mendeley": {"formattedCitation": "(MS, 2004)", "manualFormatting": "(Ministério da Saúde, 2004)", "plainTextFormattedCitation": "(MS, 2004)", "previouslyFormattedCitation": "(MS, 2004)", "properties": {"noteIndex": 0, "schema": "https://github.com/citation-style-language/schema/raw/master/csl-citation.json"}}}, as previously mentioned. However, the last population census already pointed to the growth of the urban indigenous population. In 2010, almost 20% of indigenous people in the Northern region were in cities, which means 61,520 indigenous people are living in an urban context {ADDIN CSL_CITATION {"citationItems": [{"id": "ITEM-1", "itemData": {"ISBN": "978-85-240-3940-9", "abstract": "A primeira divulgação dos resultados definitivos do Censo Demográfico 2010, no que se refere ao indígena, é proveniente do quesito cor ou raça.



Essas informações são oriundas das características que foram investigadas para todos os domicílios do País, e com esses resultados foi possível comparar e analisar três referências censitárias: 1991, 2000 e 2010. Convém esclarecer que os dados dos indígenas nos Censos Demográficos anteriores, 1991 e 2000, eram provenientes do quesito cor ou raça pertencente ao Questionário da Amostra 1. O crescimento de 10,8% ao ano da população que se declarou indígena, no período 1991/2000, principalmente nas áreas urbanas do País, foi atípico. Não existe nenhum efeito demográfico que explique tal fenômeno. Muitos demógrafos atribuíram o fato a um momento mais apropriado para os indígenas, em que estavam saindo da invisibilidade pela busca de melhores condições de vida, mais especificamente, os incentivos governamentais. Segundo Luciano (2006), esse incremento poderia estar associado à melhoria nas políticas públicas oferecidas aos povos indígenas. Sendo assim, independentemente da área geográfica onde estivessem residindo, o Censo Demográfico 1991 revelou que em 34,5% dos municípios brasileiros residia pelo menos um indígena autodeclarado²; no Censo Demográfico 2000, esse número cresceu para 63,5%; e, segundo os dados mais recentes, do Censo Demográfico 2010, atingiu 80,5% dos municípios brasileiros. Esse espalhamento da população indígena foi mais significativo na Região Nordeste, corroborando com o processo da etnogênese³, que ocorreu e vem ocorrendo em muitas regiões do país.

`"author":{"dropping-particle":"","family":"IBGE","given":"Instituto Brasileiro de Geografia e Estatística","non-dropping-particle":"","parse-names":false,"suffix":""},"container-title":"Censo Demográfico 2010","id":"ITEM-1","issued":{"date-parts":["2012"]},"number-of-pages":"232","title":"Os indígenas no Censo Demográfico 2010 primeiras considerações com base no quesito cor ou raça","type":"report"},"uris":["http://www.mendeley.com/documents/?uuid=fc5e49cb-346d-44bd-967e-77493a97a7d2"]},"mendeley":{"formattedCitation":"(IBGE, 2012)","plainTextFormattedCitation":"(IBGE, 2012)","previouslyFormattedCitation":"(IBGE, 2012)"},"properties":{"noteIndex":0},"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} with no right to differentiated healthcare. This criterion needs to change urgently. Just because they live in a city does not automatically exclude indigenous people from the risk group. Your immune memory remains unchanged, regardless of where you live.`

Mortality and lethality rates among the indigenous people observed in this study must be considered. They also reflect the difficulty of providing care for those who live in villages. They do receive care from the Indigenous Health Care Subsystem (SasiSUS), but access to highly complex or emergency healthcare services is limited. The indigenous healthcare organizational structure has 34 DSEIs throughout the country, and they are subdivided according to cultural, geographical, and populational characteristics. The DSEIs count on the Indigenous Peoples' Clinics (CASAI)⁶ to

⁶ However, there are situations in which there is no CASAI to serve the indigenous peoples of a DSEI, such as the Potiguara DSEI. Available at: { HYPERLINK



provide basic assistance to the indigenous peoples in the corresponding regions

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However, the system needs to be updated to improve its service efficiency. Part of this adjustment may result from strategic measures that consider some aggravating factors, such as external infectious agents like those mentioned above. Dynamic infection risk maps, such as the one shown in Figure 9, could be produced to guide emergency care to the populations of high-risk contagion and disease spread.

The arrival of the new virus requires a more incisive and innovative approach in strategies dealing with indigenous-peoples and the inability to respond to the basic healthcare needs of this highly vulnerable group. In this case, the health of thousands of indigenous Brazilians involves not allowing external agents to be permitted to invade their territories, something that seems increasingly “acceptable” by the government and its controlling agencies and stimulated by a gradual weakening of socio-environmental policies.

Recommendations

Based on the results reported in this technical note, we can highlight at least five vital recommendations:

- 1) Moving forward with Bill No. 1142/2020, recently approved by Brazil’s Federal Senate, which proposes emergency actions to serve traditional peoples and



communities. Although COIAB and other indigenous organizations have already expressed dissatisfaction with Article 13, which deals with the possibility of religious missions remaining in an area where there are isolated peoples, it is understood that the effort that has been made there must be implemented. Therefore, it is recommended that the bill be passed urgently and that it follows the technical and scientific guidance currently underway;

2) The official record systems must compute confirmed cases and deaths among indigenous peoples regardless of their place of residence. Understanding the situation of these peoples affected by the pandemic is fundamental for the construction of emergency and long-term policies for the control of pathogens, starting with COVID-19;

3) The actions to prevent and combat infection among the indigenous peoples need to involve a broader strategy that considers the additional risks related to external vectors of infection in the ILs, such as those evaluated in this note (deforestation, mining, and land grabbing), and others such as proximity to cities with a large number of infected people and access to transportation infrastructure. The actions must prioritize the most critical regions and serve the people who are under the most significant threat, in addition to ensuring that healthcare workers do not themselves become vectors of disease transmission⁷;

4) Considering the high mortality rate among indigenous people, it is vital to expand testing in this group, thus obtaining more reliable numbers of the proportion of those affected by the novel coronavirus. It is equally necessary to expand the chain of hospitals and highly complex services that are part of SasiSUS to serve the indigenous peoples of the region more effectively; and

5) It is urgent to resume the respect for indigenous rights and the process of demarcating their lands. Article 231 of the Federal Constitution recognizes “Indians, their social organization, customs, languages, beliefs and traditions, and the original rights over the lands they traditionally occupy, and the Union is responsible for demarcating, protecting, and ensuring respect for all their assets.” The rights guaranteed in the Magna Carta have not been applied in recent years, quite the contrary. The current political discourse brings the opposite notion. It hurt the most fundamental premises when the demarcation process of indigenous lands had its guidelines revised, and legal actions moved towards advancing the implementation of the time frame⁸. Measures of this nature demonstrate the degree of effort that still needs to be made for indigenous peoples to be actual subjects to the law.

⁷ COIAB Public Notice: COVID-19 enters the Indigenous Lands of the Brazilian Amazon and the siege closes in on the isolated indigenous peoples.

⁸ Available at: <http://apib.info/direitos-indigenas/marco-temporal/>. Last accessed on Wednesday, June 17, 2020.



References

- Alencar, A., Moutinho, P., Arruda, V., & Silvério, D. (2020). *Amazônia em chamas - O fogo e o desmatamento em 2019 e o que vem em 2020*.
- Azevedo, M., Damasco, F., Antunes, M., Martins, M. H., & Rebouças, M. P. (2020). Análise de Vulnerabilidade Demográfica e Infraestrutural das Terras Indígenas à Covid-19. In *Caderno de insumos*.
<https://www.abep.org.br/site/index.php/demografia-e-covid-19/1635-analise-de-vulnerabilidade-demografica-e-infraestrutural-das-terras-indigenas-a-covid-19-caderno-de-insumos/>
- IACHR, I.-A. C. on H. R. (2019). Situation of Human Rights of the Indigenous and Tribal Peoples of the Pan-Amazon Region. In *Introduction*.
- IBGE, Instituto Brasileiro de Geografia e Estatística (2012). Os indígenas no Censo Demográfico 2010 primeiras considerações com base no quesito cor ou raça. In *Censo Demográfico 2010*.
https://ww2.ibge.gov.br/indigenas/indigena_censo2010.pdf
<http://biblioteca.ibge.gov.br/visualizacao/livros/liv6687.pdf>
- IBGE, Instituto Brasileiro de Geografia e Estatística (2020). *Pesquisa Regiões de Influência das Cidades – informações de deslocamentos para serviços de saúde*.
- Ministério da Saúde, M. da S. (2004). *Portaria nº 70, de 20 de janeiro de 2004: Aprova as Diretrizes da Gestão da Política Nacional de Atenção à Saúde Indígena* (pp. 1–3). https://bvsms.saude.gov.br/bvs/saudelegis/gm/2004/prt0070_20_01_2004.html
- Moutinho, P.; Alencar, A.; Arruda, V.; Castro, I.; e Artaxo, P. *Amazônia em Chamas - desmatamento e fogo em tempos de covid-19*. Instituto de Pesquisa Ambiental da Amazônia. Brasília, 2020. Disponível em:
<https://ipam.org.br/bibliotecas/amazonia-em-chamas-4-desmatamento-e-fogo-em-tempos-de-covid-19-na-amazonia/>.
- Oviedo, A. (2018). *Os povos indígenas isolados e as obras de infraestrutura que ameaçam seus territórios*.
https://www.socioambiental.org/sites/blog.socioambiental.org/files/nsa/arquivos/isolados_infraestrutura_nota_tecnica_1.pdf
- Ramos, A. R. (1993). O papel político das epidemias: O caso Yanomami. *Série Antropologia*, 21.
- Reis, R. A. C., & Albertoni, L. (2017). Questões epidemiológicas e desafios no atendimento aos chamados povos isolados. Uma experiência de contato com os Korubo. *Revista de Antropologia*, 9(2), 808–831.
- Ricardo, F., & Gongora, M. F. (2019). *Enclosures and Resistance Isolated Indigenous Peoples in Brazilian Records of Isolated Indigenous Peoples in Brazilian Amazonia* (1st ed.).



- Ventura Santos, Ricardo Coimbra Jr, C. E. A. (2005). Cenários e tendências da saúde e da epidemiologia dos povos indígenas no Brasil. In *Epidemiologia e saúde dos povos indígenas no Brasil*.
- Verdum, R. (2012). As obras de infraestrutura do PAC e os povos indígenas na Amazônia Brasileira. *Inesc*, 27.
- Villén-Pérez S., P. Moutinho, C. C. Nóbrega, P. De Marco Jr (no prelo). Brazilian Amazon gold: indigenous land rights under risk. *Elementa*
- Voivodic, M., Yamagushi, G., dos Santos, M., Gesisky, J., & Oliveira, D. (2018). *Mineração na Amazônia Legal e Áreas Protegidas: Situação dos direitos minerários e sobreposições*.
- WHO, W. H. O. (2020). *Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (covid-19)* (Vol. 1, Issue February).
<https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>