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Occupations and the new HEIC job market in the context of the Covid-19 pandemic

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Abstract

This study investigates the new job market in the Health Economic-Industrial Complex (HEIC 4.0) and its influence on occupations. It also discusses the structural characteristics of the HEIC dynamics and the Unified Health System (SUS) sustainability in the pandemic context. Divided into three sections, this article highlights that health occupations are simultaneously impacted by a general social and job market degradation. There are also restrictions imposed on the HEIC modernization process, which is the cornerstone of SUS. In the second section, it focuses on the health care occupation conditions and fragilities, heightened during the pandemic. Finally, it establishes relations between structural movements in the job market and the needs for modernizing HEIC and its impact on the health care working conditions. The HEIC conditions and fragilities seen during the pandemic reflect general issues in Brazil's development pattern.

Keywords: Covid-19. Health Economic-Industrial Complex (HEIC). Unified Health System (SUS). Economic Development. Occupations.

1. The dimension of the structural changes in the Health Economic-Industrial Complex (HEIC), the Unified Health System (SUS) sustainability and occupations

Against the risks of the famine that took over Europe in the interwar period and its impacts on food insecurity during the conflict, there was a wide-ranged food security program in the post-war period in order to manage the future uncertainties. A policy that did not only include the food offer structure, with enormous subsidies from the national governments, as well as the organization of a large network of juxtaposed mechanisms integrating the world trade policy, funding, productivity modernization, technological development, logistics, etc. Evidently, this was fully integrated to the most general welfare state construction movements.

Up to a point, the Covid-19 pandemic posed the biggest challenge to the world since the end of the Second World War. The sanitary crisis, along with the world economy downturn, is putting the national governments' action capacities to the test, including their ability to protect their citizens and provide the necessary inputs according to economic planning and guarantee full health care. More than ideologies, reality imposes the adoption of development strategies that place politics over the economy, the society over the market. This would expose the most suffering nations' virtues and fragilities. In developing countries like Brazil, where there is poverty, inequality, and a disorganized job market founded on low salaries, the historic fragilities of a development process that is hampered by the country's passive entering into the globalization process appear before the current challenges to manage the pandemic. With a superficial interruption in the first decade of the 20th century, it has been four decades of economic stagnation with profound impacts on the country's social and economic structures. Deindustrialization, the regressive productivity structure, the state economic planning apparatus demobilization, and all sorts of embarrassments for the public policies charge their prices on the essential SUS health care attention capacity. This concerns both its integration to the various areas of the Health

Economic-Industrial Complex (HEIC) and the conditions of those who work in production and service.

In a peculiar way, the health occupations are impacted by both the general social and job market degradation and the restrictions imposed to the modernization of the Health Economic-Industrial Complex, which is the cornerstone of the largest universal health system worldwide. The limitation in the access to infrastructure improvements (sanitation, electricity, transport, housing); the unequal regional workforce distribution; the unequal salaries; the weakened labor relations; the proliferation of multiple labor contracts; the limited technological innovation and productivity development capacity; or even low funding to public health; the HEIC occupation conditions and fragilities, especially regarding HEIC 4.0 reveal Brazil's development pattern conditions and fragilities.

2. Occupation conditions and fragilities in the health labor world

The world of work in pandemic times can be divided into two more directly affected groups. The first one is formed by the health professionals who are linked to patient assistance; the second one is formed by the professionals who are not at the front line, but they had their lives changed during the pandemic. This was due to either an increase or decrease in their working hours, their activities being suspended, salary cuts, the need to adapt to remote work, or even losing their jobs.

Having investigated the Brazilian job market as a whole, Barbosa & Prates (2020) presented a study on the workers' vulnerability during the pandemic. It was measured from their employment relationship stability and how essential the sector/line of business where professionals work. This study considers the following employment situations as less stable: independent workers; house cleaners; overall workers; formally hired workers in small companies; and small employers. The more stable employment situations can be found among the following professionals: formally hired workers at medium and large companies; statutory civil servants; the military; and

overall workers in medium and large companies (Barbosa; Prates, 2020).

The health professionals fit the greater stability categories. Firstly, they represent the absolutely essential service at the moment. Despite the fact that their service is a world priority to manage a pandemic of intense and rapid contagion, the health systems responded differently in various countries. They responded according to their founding principles and their strategic differences; their action capabilities regarding the increase in demand; the job market behavior; and the relations between the health service public and private sectors.

We would like to highlight two countries whose health systems are completely opposite and present the largest number of contaminated people and deaths due to Covid-19 worldwide: the USA and Brazil. In general terms, the USA created a market system whose access is linked to health care insurance payment capacity. Brazil created a universal health system with full and equal service. Accessing it does not require direct payment for services, except for the population who seeks, of their own accord, the supplementary, private health service.

Considering this difference in social protection regarding health offered by these two countries, the job maintenance capacity in the health service sector presents quite different behaviors. In the Brazilian health system, dismissals could happen in the case of health insurance company bankruptcy, or hospitals or clinics that lost revenues due to a decrease in the number of clients or services provided. Nevertheless, this is not the main behavior in the sector employability. This was very much due to the Unified Health System power, which serves 80% of the Brazilian population. We are going to review these figures later.

In the USA case, we cannot help but highlight that because of the pandemic, jobs in health care and welfare dropped 10.1%. This means that two million jobs were closed in the first month of the crisis. All these sector segments lost job posts between March and April 2020 in the USA. What caused such a behavior in jobs in the health and welfare sectors during the pandemic? On the one hand, the decrease was caused by 650,000 welfare jobs being closed. Daycare jobs accounted to half of this volume. Moreover, the global 15.2%-drop-in outpatient clinic and health care services was

caused by the strong 52.5%-decrease in dental clinics (-503,000 jobs) and the elimination of almost 500,000 jobs and medical and other health professionals' clinics. In hospitals, 135,000 job posts were closed in April, and another 113,000 jobs in residential nursing facilities were eliminated (Gimenez; Pochmann; Rigoletto, 2020).[1]

A movement in the opposite direction of the North American case is presented in the health job market in Brazil. According to data from the Continuous National Household Sample Survey (PNADC), while there was a 5.2 %-decrease in the employed population number in Brazil, in the three-month period between February and April 2020 compared to the three-month period between November and January 2019-2020, the main job activity group including public administration, defense, social security, education, human health and social services presented a 1.8 %-increase in the number of employed people (IBGE, 2020).

Particularly focusing on the health sector, the data show that people were hired in that period and there is even a scarcity in human resources. Regarding this aspect, Fehn *et al.* (2020) state that the lack of professionals compromises the service capacity. This happens especially in the most complex service level, it manifests unevenly across Brazil's various regions in the public and private sectors, and it is a result of the lacking human resources in the system and the current context, where some professionals either had or will have to be dismissed from work. This may occur due to high contamination risks or preexisting diseases.

With regard to hiring personnel, despite the methodology divergences in

1 Taken from the Bureau of Labor Statistics (BLS, 2020).

the way the following data was found,[2] this study aimed to present the number health establishments. These data is taken from various sources to show the scenario of the period closest to the initial stage of the pandemic in the country, even though it is not possible to precisely evaluate the quantitative growth. According to data from the Federal Council of Medicine (CFM), in May there were 495,641 doctors, while in March there were 413,959 doctors. These data were taken from the National Register of Health Establishments (CNES), but as per the PNADC, there were 387,618. As for university-graduated nurses, in April there were 565,458 workers, as stated by the Federal Council of Nursing (Cofen). In March there were 272,433 doctors, as stated by CNES, but there would be 421,724 doctors, as stated by PNADC. As to vocational school-trained nurses, there were 1,076,786 professionals in March, as stated by PNADC, and 1,740,488 in April, as stated by Cofen (CFM, 2020; COFEN, 2020b; Ministério da Saúde; DataSUS; CNES, 2020; IBGE, 2020).

Table 1 shows the employed population evolution in medical categories, but differentiating generalists from specialists, and nursing categories, differentiating university-graduated practitioners from vocational-school graduated practitioners in the 2019 quarters and the first quarter of 2020. These data were taken from PNADC. There was an increase in the employed people population in the period between 2019 and 2020, except for the specialist doctor population, who presented a slight decrease.

2 The number of professionals' active registers (in this case, CFM and Cofen) is usually greater than the number of employed people (in this case, CNES and PNADC). Many of these professionals may be either away from the job market or in any occupation but doctor/nurse or in other sectors but health. The active council registers include the federal and state councils. In the case of CFM, the main registers (main CRM), not the secondary registers (in other states), are counted. In the Cofen case, both main and secondary registers are counted; thus, a professional could be counted twice or even more times. The employed people data were investigated. In case of CNES, there are employed people declared by the health establishments (services, administration, laboratories). There is also an underreporting problem, and the data refer to the professionals working at health service establishments. To analyze the PNADC database, a sample survey is conducted. The information obtained from it comes from personal statements and reflect the occupation in the main job in the research reference week. Thus, there could also exist statistical underreporting, especially when occupations are analyzed separately. Besides, these data could refer to occupations in several health activities, e. g., manufacturing, trade, services, or even some activity that is unrelated to a specific health sector. They also represent various positions in employment categories, e. g., registered or non-registered employment, employer, independent worker.

Table 1 - Number of people employed (position or function) in the main job in selected categories – evolution between 2019 and the 1st quarter of 2020

Year/Quarter	General doctors (number)	Specialist doctors (number)	Nursing and childbirth professionals (number)	Mid-level nursing and childbirth professionals (number)
2019 / 1st quarter	119,169	318,780	379,751	920,474
2019 / 2nd quarter	110,547	300,548	387,017	943,584
2019 / 3rd quarter	123,012	270,860	395,962	975,078
2019 / 4th quarter	121,754	278,767	390,306	1,028,017
2020 / 1st quarter	127,411	260,207	421,724	1,076,786

Source: IBGE (2020), based on PNADC data. Authors' elaboration.

Many health professionals, especially those in the SUS, have the so-called employment stability since they are federal employees. As to the employment relationship, CNES/Datasus informed that in March, 74% of doctors and 86.5% of nurses (university-graduated workers) were working in the SUS (Ministério da Saúde, DataSUS; CNES, 2020).

The PNADC data show that in the 1st quarter of 2020, regarding employment relationship (position in occupation and employment category), the professionals who have more stability in the market (registered employment relationship in both public and private sectors, military, and statute servants) accounted for 44.8% (generalist doctors), 43.3% (specialist doctors), 87.4% (university-graduated nursing professionals), and 85.2% (vocational school-trained nursing professionals). These data are shown in Table 2. In order to differentiate the public sector from the private sector, most generalist doctors is allocated in the public sector (56.1% of them), as

well as the university-graduated nursing professionals (50.8% of them).[3] Most specialist doctors work in the private sector (67.0% of them). The same thing happens with vocational school-trained nursing professionals (56.4% of them).

Table 2 - Indicators (share in relation to the total) of position in the occupation and job category – occupations (position or function) in the main job selected – 1st quarter of 2020

Position in occupation and job category:* Indicators	**General doctors (%)**	**Specialist doctors (%)**	**Nursing and childbirth professionals (%)**	**Mid-level nursing and childbirth professionals (%)**
Private sector – contracted with or without a formal contract	29.8	33.1	47.7	55.1
Employer	6.5	15.5	0.1	0
Self-employed	7.5	18.4	1.3	1.3
Private sector – total	**43.8**	**67.0**	**49.1**	**56.4**
Public sector – contracted with or without a formal contract	6.1	8.0	14.7	13.2
Public sector – statutory	20.0	25.0	36.1	30.5
Public sector – total	**56.1**	**33.0**	**50.8**	**43.7**

3 Inasmuch as only main work is analyzed in PNADC, the employed person will be counted in only one of the sectors – public or private. However, it is known that health professionals work on multiple contracts in various workplaces. Oftentimes, they work in a hybrid way, in both public and private sectors. This will be investigated further in this study.

Position in occupation and job category:* Indicators	General doctors (%)	Specialist doctors (%)	Nursing and childbirth professionals (%)	Mid-level nursing and childbirth professionals (%)
Private sector employee with formal contract	16.4	14.5	44.6	49.1
Public sector employee with formal contract	8.4	3.8	6.7	5.6
Military and statutory servant	20.0	25.0	36.1	30.5
With job stability	**44.8**	**43.3**	**87.4**	**85.2**
Employer	6.5	15.5	0.1	0
Self-employed	7.5	18.4	1.3	1.3
Private sector – hired without a formal contract	13.4	18.6	3.1	6.0
Public sector – hired without a formal contract	27.7	4.2	8.0	7.6
Total hired without a formal contract	41.1	22.8	11.1	13.6
No job stability	**55.1**	**56.7**	**12.5**	**14.9**

*****Methodological note: Position in occupation and employment category: in the case of PNADC, as only the main job is considered, the person employed will only be counted in one of the sectors – public or private.

Source: IBGE (2020), based on PNADC data. Authors' elaboration.

On the other hand, it must be mentioned that many health professionals have weak contracts that provide them with few rights. They are usually outsourced or hired as legal entities. This is a trend in health services that has grown in the present moment, which calls for new, fast hiring due to the pandemic. According to the PNADC, for the 1st quarter of 2020, the employer

occupation accounted for 6.5% for generalist doctors and 15.5% for specialist doctors. Regarding nursing, these are rare cases and just for university-graduated professionals (0.1%). The independent worker category accounted for 7.5% for generalist doctors and 18.4% for specialist doctors, while university-graduated and vocational-school trained nursing professionals accounted for 1.3%. As to the professionals hired without register both in public and private sectors, they accounted for 41.1% (generalist doctors), 22.8% (specialist doctors), 11.1% (university-graduated nursing professionals), and 13.6% (vocational school-trained nursing professional).

To conclude, the major problems, either of health professional vulnerability or lack of safety, are less related to the lack of employment and income (as this is for most workers), but far more related to working conditions and employment relations. They are being summoned to work at the Covid-19 frontline. At the moment this study is being written, the lack of professionals to work on this mission is a hot topic.

As to working conditions, its scenario includes multiple factors, such as: lack of training or precarious training; low income (especially in the case of nurse technicians and assistants); no sick leave allowed in case of preexisting disease or contamination; no testing for professionals (one must file a suit at the Labor Court to guarantee this right); lack of personal protective equipment (IPEs), or inappropriate IPEs; or inappropriate use of IPEs (oftentimes, professionals must file a suit at the Labor Court to obtain them); lack of hospital beds, equipment, and medicines to provide health care on any level – primary, outpatient clinic, or hospitals; physical and verbal conflicts at the workplace; isolation from professionals' and patients' families; work overload due to the increase in the number of patients and their quick clinical picture evolution; intensive, extensive working hours, frequently at multiple health units and multiple employment relationships that compromise the SUS

health service organization (Redecovida, 2020; Tv Abrasco, 2020).[4]

According to the Ministry of Health (2020), the data accumulated until May on the contagion or suspicion of contagion per professional category, as shown in Table 3, indicate that most professionals subject to contagion are nurse technicians or assistants (34.2%), followed by nurses (16.9%) and doctors (13.3%). The Cofen and the International Council of Nurses (ICN) state that in Brazil there were more deaths of nurses and health professionals due to the Covid-19 pandemic compared to the rest of the world.[5] Until May 27th, the Cofen found 157 nursing professional deaths. They are the ones who are most exposed to the population. This number is greater than the USA (146 deaths) and the United Kingdom (77 deaths) (Dantas, 2020). The Brazilian Collective Health Association (Abrasco, 2020) divulged a study conducted by the São Paulo Doctors' Union (Simesp) and Cofen that found that until June 17th, the number of doctor deaths in Brazil was 139, and the number of nurse deaths was 190. According to updated information until June 26th in the Cofen nursing observatory, this figure increased to 220 nurses (190 confirmed deaths and 30 suspicious ones). This remained the highest rate worldwide (COFEN, 2020a).

4 The multiple employment relationships in the health segment may occur between multiple workplaces, as well as in a hybrid combination between public sector and private sector workplaces, as explained by Scheffer *et al.* (2015), in a study that used the CFM database. According to this study, in 2014 22% of the medical professionals had only one employment relationship; 29.5% of them had two employment relationships, and 48.5% had three or more employment relationships. Nonetheless, the analysis of the sphere where they perform their activities, it was found that "21.6% of the doctors work exclusively in the public sector, while 26.9% of them work exclusively in the private sector." The remaining professionals (51.5% of them) work on both public and private sectors. Adding exclusive work and juxtaposition (simultaneous work in both sectors), 78.4% of doctors work in the private sector, and 73.1% of them work in the public sector" (Scheffer *et al*., 2015, p. 111). That is, there are two juxtaposed movements: 51.5% of doctors simultaneously worked in both public and private sector, and 78% of them had two or more employment relationships. Thus, "the same doctors may work at more than one place and sector" (Scheffer *et al*., 2015, p. 111).

5 "Recent data from the International Council of Nurses - ICN indicate that nearly 90,000 health professionals have already been infected by Covid-19. The average rate of cases among these workers in China was 10%. In Italy rates vary between 9% and 21%, and in Portugal and Spain rates are above 13% and 14%, respectively. In Brazil it is estimated that nearly 40% of the health professionals may go on sick leave due to Covid-19. Up to the second fortnight of May, more than 14,000 Covid-19 cases were confirmed, and more than 100 deaths among nurse professionals in Brazil" (Fehn *et al*., 2020, p. 1).

Table 3 - Health professionals with suspected or confirmed Covid-19 registered in e-SUS Notifica* – accumulated position until May 2020

Brazilian Classification of Occupations (CBO)	Total number	%
Nursing technician or assistant	68,250	34.2
Nurse	33,733	16.9
Doctor	26,546	13.3
Receptionist	8,610	4.3
Another type of health agent	5,013	2.5
Community health agent	4,917	2.5
Operations managers and specialists in companies, departments and health service units	4,888	2.4
Physiotherapist	4,179	2.1
Pharmaceutical	3,444	1.7
Biomedical	3,253	1.6
Others	36,935	18.5
Total	199,768	100

***** e-SUS Notifica identifies the health professional by a specific variable, the Brazilian Classification of Occupations (CBO).

Source: Ministério da Saúde (2020).

Employment relationships have become weakened because of outsourcing and "independent-contractors-only hiring". All of them include a growing lack of rights and social protection. The health professionals who are working under new contracts, signed during the pandemic, do not allow sick leave due to contagion or pensions to their family members in case of death.

To address this issue, on May 21st, the Chamber of Deputies approved passed bill 1826/20, which imposes a R$ 50,000-indemnization to health professionals and those in health-related services, even if they do not perform the end activity, who were infected with Covid-19 at work and were permanently infected. In case of death, this value will be transferred to the worker's spouse or their dependents (this value may be greater if they are under 21 years old). This proposition was forwarded and is pending at the Senate (Piovesan, 2020; Câmara dos Deputados, 2020; Senado Notícias, 2020; Senado Federal, 2020).

Thus, the central problems that affect health occupations are influenced by several factors in association and are specific to this workforce. Some physical problems, contagion, disease lethality, psychiatric conditions (depression, anxiety, insomnia, anguish, stress, exhaustion, fatigue) (Redecovida, 2020; Tv Abrasco, 2020).

Two aspects determine how weak the health service workforce is: the employment relationships and difficulties originated in the material health care precariousness. The precariousness of our productivity base, the restricted conditions for technological development and the difficulties in financial management and underfinancing of the largest unified health system in the world.

An alternative for the current moment is using telemedicine, as stated by Caetano *et al.* (2020). This action was taken in many countries as a means of reducing circulation due to people's seeking health care, reducing contagion risk, promoting access to health in remote areas or an adequate service structure, provide preventive and home care and finally reduce demand at hospitals. The adoption of telemedicine in Brazil at the moment involves the three government levels, with actions in health care, communication/transparency, monitoring, production, and sharing knowledge and professional training. In the private health care sector, some telemedicine activities were regulated and adopted (by the Ministry of Health (MS), the National Supplementary Health Agency (ANS), the CFM, the Regional Council of Medicine (CRM). Some of these activities were restricted

to the pandemic period.[6] According to Fehn *et al.* (2020), the recent regulation of telemedicine must be employed to expand the health workforce as a means of allocating high-risk profile professionals and forming multiprofessional teams with a smaller number of specialists compared to other categories.

However, the possibilities of telemedicine in Brazil despite the inequalities in access to technology must be analyzed. There are issues in equipment, quality internet connection, and qualified professionals. As to municipalities, there are issues in health units, health professionals and the population, and the health underfinancing. Investments must be made available to cover this strategy in SUS. Moreover, this technology must be investigated to think whether the public and private sectors will be affected the same way, or access will be even more unequal.

Incorporating technology 4.0 into the health services will alter services regarding prevention and care, working conditions, and qualification and work skill requirements for the workforce. This could lead to more efficient prevention and care, as well as the dismissal of a part of the workforce due to low qualification and machine substitution. Another consequence would be dehumanized service in the face of a more technological service.

3. Structural relations between modernization of HEIC and health occupational conditions

What happens in the world of work is a response to multiple impositions by the capitalist development pattern in a certain reality and moment. In Brazil, the health occupations are impacted by both a generalized degradation on social and job market levels and the restrictions imposed to the modernization of the Health Economic-Industrial Complex in the past decades. In this period there have been radical financial, patrimonial, technological, and productivity changes.

6 Two Technical Notes were divulged by ANS and CFM, as well as two other relevant notes: HM ordinance no. 467, of March 20th, 2020; Law no. 13989, of April 15th, 2020.

It is known that the offer of sophisticated services in the most varied economy sectors demands for a powerful integration, promoted by a development strategy with an advanced financial and productivity structure. What does this mean? This means that modern job generation in the service sector is founded strong, developed productivity. One cannot imagine creating a modern service sector without founding it on an advanced financial, technological, and productivity base. Or else, one can only imagine services being segmented into sophisticated ones, which are restricted to a small parcel of the society. This would be aided by an ability to import at a time of proliferating precarious services of personal character and material needs typical of a servants' society.

In the contemporary world, there is nothing more sophisticated and modern in the service world than health care. There are multiple demands of high complexity in this world such as humanized basic care professional training that reach neuroscientists at a high-technology research center; information and communication technologies for the health service center to arrive at the farthest locations; an industry equipment able of supporting for all activities; developing artificial intelligence or big data integrated with health. This is the sector that stresses the impossibility of modern, advanced services without a financial, technological, and productivity structure compatible with its requirements.

The world of health in Brazil has profound contradictions. On the one hand, it is based on the largest universal health system in the world, idealized and organized as per the 1988 Constitution. This would foster an advanced health service structure that would range from basic care to the most complex procedures at institutions of international expertise. On the other hand, despite the presence of excellence centers, universities, and research and productivity institutions, a great part of them having been created prior to SUS, this system deals with hard financial, technological, and productivity limitations. They were heightened albeit the absence of a national project of development to manage the globalization issues.

The precarious working and social protection conditions of health occupations despite the confused modernization of HEIC, which were heightened in the current conditions imposed by the Covid-19 pandemic,

expose two sides. One of them is the degradation of workers' quality of living and, especially, those working in health. The other one is the dehumanization of health care work within the largest health system in the world.

In the previous section, we worked on the degradation of working conditions and the pandemic challenges. This degradation is largely due to general characteristics of the Brazilian job market, which is too disorganized, flexible, and pays low salaries. Especially in health services, such degradation is found in a strong regional inequality in the workforce offer, relevant uneven salaries, multiple job employment relationships, strenuous working hours, etc. Other issues are the material scarcity due to a restricted productivity structure and underfinancing of SUS and HEIC as a whole. These needs continue since basic protection equipment ranging from masks to reagents required for mass testing, including health professionals.

Not less important than the degradation of health working conditions is the advancing dehumanization of work in health. In this scenario we have a double movement. The material scarcity and degradation of quality of workers' living are primary conditions for dehumanizing health care, especially what concerns the intensive activities at work, basic care, health units, and hospitals. Moreover, there is a need for isolation and social distancing, which require the creation and incorporation of new ways of providing health care. This would include innovative technologies like telemedicine and stimulate health work dehumanization.

Such health dehumanization process, widely exposed by the severe pandemic conditions, may be crucial to developing and modernizing HEIC structurally. This would be done according to advanced manufacturing patterns and Industry 4.0 in the 21st century capitalism.

What must be considered in the first place? The dehumanization of work in general. The intensive capitalist development, which enables one to produce more using less, increases the workforce power despite nature constraints, and imposes a progressive loss of meaning to human activity. The technical progress is the motor of expansion and refinement of productivity forces, making human work more productive. Meanwhile, the difference between the worker and their creation is emphasized. Work becomes an entity external to the worker. It is an autonomous power that

challenges them in a hostile way, and its objectification transforms human beings into a means for satisfying needs outside of it. "The devaluation of the world of men is in direct proportion to the increasing value of the world of things" (Marx, 2007, p. 29).

Work in health is intricately linked to this problem and it is integrated to HEIC 4.0, whose aim is to protect life and value the world of men in the face of the world of things. Human activity, from basic care to a high-technology laboratory, including the industry and hospitals. Advanced manufacturing and the revolution

4.0 are key to HEIC and health care on a higher level. The sophistication of occupational contents in research, productivity, and services are a part of a desired movement of modernizing the complex towards HEIC 4.0. This would be integrated with a national development project.

However, according to the free game of market forces, incorporating such a superior technological pattern as per the specific conditions of the Brazilian underdevelopment, could widen segmentation of health care with more health occupational polarization[7] and work dehumanization. What does this mean? In a universal, hybrid system, with peculiar relations between the public and private sectors, in a very unequal society, a wider segmentation could emerge due to a radicalized specialization of research and production activities. They are adapted to sophisticated health care for select parts of the high-income population. Also, there is the issue of material scarcity for a large part of the population, which is imposed by a HEIC 4.0 adapted to such segmentation. This segmentation is likely to weaken HEIC as an integrated complex. Instead of HEIC 4.0, a path is being followed towards a fragmented complex that is adjusted to secluding health care.

This movement would cause a growing occupational polarization and a consequent advancement towards dehumanized health services. The occupational polarization is caused by a simultaneous movement of "hyperqualification" of work and occupational "dequalification." Such

7 On occupational polarization, see Kalleberg (2011).

dehumanization is sedimentary as there is a loss of meaning of the occupational activity regarding research, production, and services focused on integral service provided by a unified health system. The effects of well-paid, exclusive hyperqualification and the poorly paid occupational dequalification of health for many would be dehumanizing attention and health work.

The current situation, imposed by Covid-19, reveals the urgent need of the country to advance in HEIC integration and a HEIC 4.0 that is not governed by the free game of market forces. This must be about the expression of a national development project that reflects a positive articulation between the public and private sectors that is subject to a national long-term planning. The superior quality of the occupations derived from a HEIC 4.0 would require university and vocational-school level curriculum redesign. This would be focused on the technical competences demanded by new standards, as well as humanistic training that can educate a worker who partners with development and values the world of men. Developing HEIC 4.0 should focus on building a space for modernizing health, education, research, the productivity structure, and services.

To conclude, the conditions and fragilities of HEIC occupations during the Covid-19 pandemic, especially within HEIC 4.0, expose the conditions and fragilities in Brazil's development pattern. The new world of health work designed by HEIC is in intense transformation and it will demand a significant modernization of the whole health economic-industrial complex now and in the years to come. It will become the framework for humanized, modern services that are adapted to the design of technical and occupational content of a robust health system.

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