

Fátima Sueli Neto Ribeiro^a <https://orcid.org/0000-0002-8201-4806>Tarcísio Márcio Magalhães Pinheiro^b <https://orcid.org/0000-0002-1287-6304>

Epidemiology and the area of Worker's Health

A Epidemiologia e a área de Saúde do Trabalhador

^aUniversidade do Estado do Rio de Janeiro, Instituto de Nutrição. Rio de Janeiro, RJ, Brazil.

^bUniversidade Federal de Minas Gerais, Faculdade de Medicina. Belo Horizonte, MG, Brazil.

Contact:

Fátima Sueli Neto Ribeiro

E-mail:

fatsue@uerj.br

The authors declare that the work has not been subsidized and there are no conflicts of interest.

The authors declare that this study has not been presented at any scientific event.

Abstract

This essay addresses the conflicting relation between the theoretical and applied epidemiological health services instruments, including the difficulties in apprehending the social determination linked to the neoliberal model and workers' subjectivities in their creative process of resisting the model of exploitation of their workforce that characterizes the current world of work. The role of Epidemiology in the following theoretical frameworks of the relations between health and work from the 1970s onward is described and discussed: Occupational Medicine, Occupational Health, and Worker's Health. Despite the criticisms, studies from the beginning of the 2000s showed methodological advances when research turned to a more conservative set of instruments that insufficiently contextualized the social determinations of the work process. Even with legal support in Brazil, the operationalization of Epidemiology at the service of Workers' Health in the Unified Health System still adopts approaches toward measuring risks. Such approaches lie far from the models that apprehend the reflexes of social organization proposed by researchers from Latin America, which are yet to be expressed in the studies and services of Worker's Health in Brazil.

Keywords: epidemiology; occupational health; unified health system; occupational medicine.

Resumo

Este ensaio aborda a relação conflituosa entre o instrumental epidemiológico teórico e o aplicado nos serviços de saúde, incluindo as dificuldades em apreender a determinação social ligada ao modelo neoliberal e às subjetividades do trabalhador no seu processo criativo de resistir ao modelo de exploração da força de trabalho, que caracteriza o atual mundo laboral. É apresentado e discutido o papel da Epidemiologia no âmbito dos marcos teóricos da relação entre saúde e trabalho a partir da década de 1970: Medicina do Trabalho, Saúde Ocupacional e Saúde do Trabalhador. Embora existam críticas, identificou-se avanço metodológico nas publicações até o início dos anos 2000, quando as pesquisas se voltaram para um instrumental mais conservador e insuficiente para contextualizar as determinações sociais do processo de trabalho. No Brasil, ainda que haja suporte legal, a operacionalização da Epidemiologia a serviço da saúde do trabalhador no Sistema Único de Saúde (SUS) ainda adota abordagens voltadas para mensuração de riscos. Tais abordagens se distanciam dos modelos que apreendem os reflexos da organização social, propostos por investigadores da América Latina, os quais ainda não se expressam nas publicações e nos serviços de Saúde do Trabalhador do Brasil.

Palavras-chave: epidemiologia; saúde do trabalhador; sistema único de saúde; medicina do trabalho.

Introduction

This study addresses, in a historical perspective, the conflicting relation between the theoretical and applied epidemiological health services instruments, including the difficulties in apprehending the social determination linked to the neoliberal model and workers' subjectivities in their creative process of resisting the model of exploitation of their workforce that characterizes the current world of work.

Epidemiology is herein understood

*as a scientific discipline or management tool. It is neither innocent, neutral, nor does it hover over the interests of classes and their respective political and ideological projects. As a social practice, it is not free from the determinations that the social structure incur in health practices*¹ (p. 565; our translation).

Its application in Worker's Health demands analyses that necessarily refer to the conflict between capital and labor.

Epidemiology initially treated health problems from the work process as a concern of Occupational Medicine², which identifies and recognizes work-related accidents or diseases and their more immediate repercussions, such as work restriction, absenteeism, self-assessment limited to the perception of health problems—i.e., indicators linked to *stricto sensu* physical limitations—representing an approach that favors the instrumentalization of capital in health. The framework of Occupational Health² operationalizes the analysis of the work environment by investigating risks in the work environment, valuing exposure from the perspective of Occupational Hygiene and Toxicology based on a perspective of human tolerance limits. Under the quantitative epidemiological rationality, indicators, methods, and other quantitative and occasionally qualitative approaches become more complex but contribute little to incorporating social dimensions in health interventions.

With the development of Worker's Health², new categories of analysis³ emerged that understand workers' leading role and knowledge with the support of the instruments of Critical and Social Epidemiology⁴⁻⁶. This new paradigm demands another model to investigate the effects of work on health and life—an Epidemiology that can express the transversal role of work in the socio-physical-environmental dimension of health and life.

Theoretical frameworks of the approaches to the relation between health and work

The risks in the work environment have been described since Hippocrates and detailed by Ramazzini in the 1700s. However, Engels conducted a descriptive study that considered the health-disease process resulting from the capitalist model of production in 1845 regarding the situation of the working class in England.

In the academic environment, epidemiological investigations on the relation between health and work⁷ are linked to Occupational Medicine, Occupational Health, or Worker's Health, which have distinct models^{2,5}. Although Epidemiology has advanced in incorporating social dimensions in the health-disease process, Worker's Health has failed to further the critical reflections of its limits since the beginning of the 2000s.

Epidemiology in Occupational Medicine

The academic research of the 1970s, mobilized by the leading role of Brazil as world champion of occupational accidents and under the multicausal epidemiological model, consecrated two explanatory categories in the logic of worker blaming: unsafe acts and unsafe conditions. Although these categories have now been overcome, they are still frequently used to express epidemiological differences between groups⁸.

In the same context of blaming workers for their injuries, Occupational Medicine develops methodologies with individual explanations for differentiated occurrences between groups without making explicit the role of the capitalist mode of production on the health-disease process. Laurell³ explains that this ideological displacement of the causality of the diseases stems from the social organization around the principle of labor exploitation.

Thus, Occupational Medicine acts as a "scientific" element by corroborating and assisting the use of strategies that transfer to workers' bodies the responsibility of protection against risks and the function of a limit sensor for physical and chemical toxic agents, establishing the limits of exposure in the work environment⁹.

Possas¹⁰ highlights the conception and methods that characterized this traditional epidemiology from an essentially clinical and unilateral perspective. Breihl⁸ argues that

The most modern view of epidemiology recognizes the obsolescence of the classical interpretation of the concept of “attributable risk” and the uselessness of separating environmental and genetic “causes.” Only an “escapist” or “expiatory” logic makes sense in separating the supposed occupational “risks” from non-occupational ones. A dimension that is more appropriate to the Worker’s Health paradigm should start from the determinants at work and combat them, whether or not there is perfect evidence of the magnitude of their association with health deterioration and, in doing so, ensure that research designs and intervention plans respect the integrality of workers’ lives without fragmenting reality or artificially isolating pieces of realities (p. 33; our translation).

Epidemiology in Occupational Health

With the industrial revolution and the scientific organization of work in the 20th century, Taylorism and Fordism isolated workers from the conception of work. The incorporation of new disciplines such as chemistry, social sciences, and psychoanalysis, developed Industrial Hygiene and Ergonomics, strengthening Occupational Safety Engineering¹¹.

During this period, Occupational Health² allied itself to the epidemiological rationality limited to the concept of risk in the multicausal explanation of the diseases, as per Checkoway¹².

Despite the shift in emphasis from the study of characteristic occupational diseases to investigations of broader worker health profiles, the underlying objectives have remained constant. The first objectives are to determine the health consequences of workplace exposures and to make or recommend remedial efforts when indicated. Secondly, [...] the identification of occupational causes of diseases provides the necessary information for setting occupational (and in some cases, nonoccupational) exposure standards so as to reduce risks to “acceptable levels”. (p. 8)

This model, restricted to the calculations of risks isolated from the scenario that produced it, ignores the differences or uniqueness of work over life. Czeresnia¹³ argues that risk in the epidemiological discourse outside the subject from an individualizing perspective of health practices becomes an auxiliary concept of clinical practice.

Multicausal epidemiology, estimating the magnitude of the effect in the affected population and its extrapolation to similar populations, tends to underestimate the uniqueness of the employed population and may overlook the bias of healthy workers or the use of standardized mortality ratios to express the risk of work in the population, which has distinct or unknown exposure patterns.

A consequence of this paradigm refer to the “tolerance limits” expressed in the current Brazilian

legislation by the Ministry of Labor Ordinance no. 3,214, of 1978, and the Regulatory Norms it approved¹⁴, which consider a set of parameters, judged as capable of delimiting the exposure of workers to occupational risks, to protect the integrity of workers. However, these parameters, which are the subject of the disciplines of Occupational Hygiene and Toxicology, are unable to guarantee integrity¹⁵, maintaining the technological model of the productive park without considering modernization or progressive safety measures. Most of the time, they are limited to the recommendation of personal protective equipment and contribute to victims’ blaming.

Such norms gain prominence in the traditional epidemiological rationality. Several studies compare the occurrence of diseases based on the established tolerance limits, i.e., starting from the deductive framework, Epidemiology usually establishes risks of isolated exposures in an artificial estimation process that fails to express the complexity of the environment work.

Moving away from the real world, in which risks mix and overlap with concrete situations of psychosocial burdens and demands, the use of traditional and hegemonic epidemiology “treats the nexus as Cartesian, external relations, which are described as a function of a correlation”⁴ (p. 82). The factors that most strongly express the outbreak of the grievance are treated as uncausal logics and return to the sphere of responsibility of workers or of instances close to them.

Rose¹⁶ summarizes the discussions on the limits of the multicausal epidemiological approach in four groups: (1) the cut-off points that distinguish patients and non-patients in a population are arbitrary most of the time since most biological parameters occur on a *continuum*; (2) the common absence of an exposure threshold below which the risk of becoming ill is zero; (3) most cases originate among low-risk people; and (4) the impact of modest changes in exposure levels on the population as a whole may be greater than that of treating individuals exposed to the highest levels.

Breilh^{4,5} discusses the limits of the traditional epidemiological approach based on causal factors or risk factors, which the author considers a “*philosophical expression that ratifies the positivist notion of a fragmented world.*” The author explains that the academic artifice of isolating factors (risk or exposure) and methodologically converting them into variables is not an inevitable procedure of observation and analysis. This procedure may apply a logic that classifies phenomena as isolated, independent entities that can be fractioned. The notion of variation or variability can be applied to these, such as finding

quantities within a whole using statistical tests (contingency tables, correlations, regressions, attributable fractions). Breilh^{4,5} finds these steps reduce reality, a process aiming to produce cognitive effects of fractioning and disconnecting or connecting isolated phenomena, rather than integrating them into processes and ways of life and social relations. Emphasis is placed on the description, rather than the explanation and understanding of the observed facts/phenomena.

The selection, measurement and correlation of variables fails to exhaust epidemiological observation for the same reasons the questionnaires of a sample survey are insufficient to think about and construct health objects with all their dimensions and simultaneously resorting to the history of the whole and its parts⁴. Following this logic, Breilh^{4,5} highlights the possibility of contingency of a set of causes and effects and, thus, identifying isolated (and hierarchical) “culprits,” excluding the social system with its processes of determination. Thus, it can serve as a logical way to exclude or secondize the social context and its contradictions in the determination of the health-disease process.

Using this logic, studies focused on the disease and its subsequent triggering factors generate indicators that limit the most appropriate sanitary decision to prevent exposure. On the other hand, the investigation that takes as its axis the complex situation of exposure enables us to show the generated cases and the potential for prevention, locating their sources. The alternative of shifting the axis of observation to the reconstruction, for example, of the dimensions of the “exposure history,” as opposed to the statistical associations identified with the disease, promotes other contributions and possibilities for preventive intervention.

Epidemiology and the area of Workers’ Health

The socioeconomic and political transformations of the 1970s were incorporated into Public Health in Latin America, forming a confluence between Epidemiology, Social Sciences and Health Policy and Planning. Workers’ Health, a transversal field of action to public health policies, is based on principles of research-action-intervention and is carried out together with workers—who play a leading role in the carrying out of all procedures aimed at ensuring work as a source of dignified life and full health¹⁷.

The epidemiological perspective limited to aggravations, risks or dangers arising from the environment and the work process followed the hegemonic paradigms of the approach subsumed to the capitalist model. Based on Occupational Medicine,

Epidemiology attributes scientific legitimacy to each of them, adopting rationalities perfectly adapted to the model of labor exploitation.

The specificities of the health-disease relation based on work demand an approach that goes beyond the multicausal explanatory model and that begins to understand the pathological process as a more complex relation in which the perceived potential dangers must be related to historicity, psychic loads, subjectivity, and other socio-psycho-biological-spiritual mediations. The historical process of changing the paradigm from Occupational Medicine and Occupational Health to Workers’ Health in Brazil has definitive milestones, with the production of Tambellini¹⁸ and Basaglia¹⁹, which identify the health-disease process as a structural emergent of working conditions. Thus, the authoritarian and hierarchical biomedical model of analyzing the problem of workers’ health has a theoretical limitation in its essence. A new dimension of health care for the working class emerged with workers taking the leading role in controlling the application of prevention norms and promoting the investigation, elaboration and application of the necessary measures to monitor health and their physical integrity. The perspective of Worker’s Health is the only one that, by freeing itself, also liberates the health of other human beings¹⁹. Although this was announced in the 1970s, in Brazil, the subservient model to the technical hierarchy and information systems still exists, focusing on late illnesses.

The conceptual singularities of the Workers’ Health paradigm, according to Vasconcellos¹⁷, reside in knowledge production linked to public/collective health, with practices that criticize and overcome the biomedical model and hegemony, particularly in traditionally related fields, such as Occupational Medicine and Occupational Health, which is why the author deems that Workers’ Health fails to “*lend them evolution and continuity*,” but configure a paradigmatic rupture.

The traditional epidemiology debated as the hegemonic instrument of Collective Health^{5,20} for Workers’ Health is limiting^{5,21,22}. The authors highlight the registration instruments limited to the disease with an evident nexus, the use of “tolerance limits” as a cut-off point to recognize illnesses, the predominance of quantitative criteria that frame and hierarchize selected factors, ignoring the assumption of the insufficiency of science, the conceptual focus of the precautionary principle²³. These and other problems are associated, according to Correa Filho²¹, with the neoliberal political model in health that “*reduces the use of epidemiological techniques and fragments the source of information and decisions to support egalitarian health policies*” (p. 102).

This theoretical reduction constitutes an old criticism. At the First Brazilian Congress of Epidemiology, Laurell⁶ pointed to the urgency of Epidemiology to express the dramatic health situation caused by the economic and environmental crisis with the imposition of neoliberal projects and the need to formulate alternative proposals in a popular-democratic perspective. This scenario demands a Critical and Social Epidemiology, which proposes the elaboration of a comprehensive explanation of the social production of the collective health-disease process under a theoretical framework that can generate knowledge on socially relevant themes by proposing actions to modify the detected problems and build a social force to enable the desired process of transformation³.

Breilh^{4,5} synthesized the new methodologies that encompass the multidimensional character and the relation between way of life and health in three dimensions (general, particular, and singular) and in critical multiculturalism. Laurell and Noriega³ propose the production process as a central analytical category for understanding work, workloads instead of risk, and wastage instead of diseases.

Spaces or territories must be explored as a potential epidemiological category, highlighting the contradictions between the verticality of hegemonic flows and the perversity of social exclusion processes that can give rise to new languages and codes²⁴. Santos²⁴ considers that the popular world and its deep and daily links with the body-space solidified in the struggle for survival, will constitute counter-purposes aimed at recomposing the meaning and norms of use of objects and techniques according to the interests of local life.

In Ecuador, the Centro de Estudios y Asesoría en Salud uses the notion of processes that are dangerous to occupational health and considers relevant for the analysis everything that can affect the integrity of workers, such as objects, means, organization, division of labor, among others²⁵.

Breilh⁴ warns of the need to distinguish the “compatibility of methods” from the “integration of theories” to associate quantitative and qualitative studies. Complementary and non-antagonistic techniques that are combined in the same investigation, with varied observations, theoretical perspectives, data sources, and methodologies can be adopted, complementing the reciprocal weaknesses.

Breilh’s proposals⁴ are articulated with those of Boaventura Santos²⁶, which evokes an Epistemology of the South²⁶ and highlights a new dimension of analysis of the knowledge instituted in society by an “ecology of knowledges” in which the author questions the legitimacy of the social and ethical value

of modern sciences in colonized territories passively adopted in the routines of health services.

Ribeiro²⁷ and the currently debated proposal for popular surveillance in Brazil describes some of these dimensions.

As a practical strategy for Worker’s Health, Breilh⁴ proposes a matrix of critical processes that “*does not dispense with the technical instruments and all the operational wealth that Epidemiology has accumulated*” (p. 295), but selectively and critically assimilates, under the control of the logics of Boaventura’s absences²⁵, the horizontal exchange between scientific and social knowledge⁵, in this case, workers.

An important critique by Almeida Filho²⁰ analyzes the great development and sophistication of epidemiological drawing techniques since the first manual from 1960 to 1989, but studies maintained the same empiricist and inductivist logic in their fundamental aspects.

In a proposal for the applicability of the aforementioned categories and others to be developed in the individual historical process of each territory, Betancourt²⁵ describes epidemiological monitoring for workers to overcome the conception and practice of epidemiological surveillance. Ribeiro^{22,27} discusses alternative ways of conceiving and systematizing knowledge based on the social reality of workers and suggests models for appropriating a new Epidemiology.

In a recent commentary published in *The Lancet*, Horton²⁸ states that “*public health science is a reductionist enterprise, fragmenting, describing, and reifying narrowly defined causal pathways of disease. It does not explain. It does not mobilise. It does not transform. Epidemiology has torn itself from the roots of society.*” (p. 12).

The paradigm of Worker’s Health, which has yet to be consolidated in practice, also breaks with the hegemony of the biomedical model to explain damages to health, which justifies the slowness of a new epidemiological rationality committed to the social expression of life and to the uniqueness of workers and families. The challenge is to develop indicators that support the deconstruction of colonizing patterns, concepts, and perspectives and that represent a decolonizing perspective.

Epidemiology and Worker’s Health in Brazil

In Brazil, the legal conditions for the adoption of the Worker’s Health paradigm were established in the 1988 Constitution. However, its implementation in

health services has made little progress regarding the Occupational Health model and remains as Reference Centers with the same instruments and practices.

Lieber²³ points out that issues on the relation between health and work can hardly be examined without considering the underlying power relations, translating the political and ideological component necessary for social organization. Therefore, treating circumstances in which “science lacks an answer” presupposes an epistemological approach in which the political nature of the question, rather than the starting point, must configure the point of arrival at the treatment of the problem.

An exploratory essay cross-referenced the descriptors “Epidemiology” and “Worker’s Health” in the national literature found 144 articles, all with the traditional epidemiological methodology²⁹. It retrieved 72 cross-sectional studies, almost all of which were based on the relation between risk factors/exposure and outcome (accident or disease). Only one descriptive study assumed the theoretical framework of Social Epidemiology. In total, 20 studies with secondary data resulted in traditional, conservative, or non-specific recommendations, such as “new studies for further development” and campaigns for prevention or toward the use of personal protective equipment.

Of this material, we highlight the thesis and dissertation review by Santana³⁰, which found the problem of ergonomics and musculoskeletal diseases in 13.9% of its publications; health and risk profile in 9.4%; intervention policies and programs in 12.45%; and association between occupational risks and outcome in 26.82%. In the 1990s, studies on “the participation of workers’ organizations” emerged, but the seven studies identified failed to include epidemiological aspects³⁰.

In 2007, Collective Health still studied absenteeism in the traditional way³¹. There seems to have been a certain theoretical setback, as publications in the 1990s advanced the model of productive restructuring as a determining factor for problems at work³² within the theoretical framework of Critical Epidemiology³³. The 2000s include demand studies³¹ with analyses of risk and sophisticated statistical instruments. Numerous nursing studies on hospital accidents have emerged, but their focus rarely questions work process and organization.

More recent studies in the area refer to the need to integrate administrative records and review the old and new techniques for investigating occupational accidents³⁴ but maintain the quantitative limits for the issue. An approach that associates the epidemiological instrument with the framework of the socioeconomic

determination of the agricultural model in the country refers to Pignati and Machado³⁵.

The Epidemiology manuals dedicate a chapter to Epidemiology and Worker’s Health³⁶, with approaches to the history, legislation, risks, and diagnoses of some diseases or exposures, but fails to problematize, analyze, or instrumentalize the epidemiological method adapted to Worker’s Health.

Related population studies improperly consider the cut-off of an age group (the economically active population) as the denominator par excellence for morbidity and mortality indicators^{31,37} and for the parameters of the National Network of Comprehensive Attention to Workers’ Health (*Rede Nacional de Atenção Integral à Saúde do Trabalhador – RENAST*). It is evident that certain outcomes are likely to occur differently when considering the exposures of workers in different occupational categories.

An important milestone in Brazil is the output of Possas¹⁰, which in the same historical time of the publication of Laurell and Noriega³, and its theoretical, methodological and technical proposal to empirically study the production process in its relation with workers’ health.

Rocha³⁸ describes several methods (epidemiological, ergonomic, toxicological), centering the category of work in the health-disease process contextualized in the Brazilian historical process.

In 1989, Costa³⁹ described the Workers’ Health Program of Northern São Paulo, a service that incorporated the participation of the trade union movement into its genesis. After the 2000s, other books described the experiences of Workers’ Health services in the Unified Health System (SUS), but none could further develop instruments or methodologies beyond Descriptive Epidemiology. Not even the Worker’s Health and Human Ecology course by the Ministry of Health⁴⁰ discussed any indication for overcoming clinical and multicausal epidemiology.

Thus, Epidemiology and the area of Workers’ Health are marked by an ambiguity of the paradigm of workers’ knowledge and the determination of the health-disease process, but the recommendations are limited to Occupational Health.

Brazil neither advances management instruments toward operationalization nor foster Epidemiology beyond Occupational Health, becoming a management tool that fails to interfere with the degrading productive model of workers’ health and life. Thus, finding socioeconomic, racial, sexual or gender vulnerabilities, job insecurity, physical demands or workloads as grouped categories

remains insufficient if the final model results in measures that limit changes to worker's behavior/instruments or to quantitative dimensions that fail to evince the process.

Epidemiology as an empirical technique or a science reduced to the construction of models of constant association and conjunction remains limited to a set of tools to generate limited explanatory models, value judgments, and arbitrate limits of exposure and intervention in the work process, while it could offer valuable instruments to legitimize the exploitative capitalist model of labor, the transformation of health, and social emancipation⁴. It would also be possible to abandon the paradigm of casuistic certainties^{13,16,33} and build arguments in the unpredictability of reality^{5,13,21,22,26,27} in the apprehension of testimonies and narratives of experiences and knowledge.

Workers' Health, which epistemologically assumes the confrontation with the capitalist model and the permanent and close link between health action and political action, with workers as subjects and protagonists, must incorporate a new epidemiological rationality in this paradigm and advance with its instruments and methods.

The current paradox between the high technological availability and the absence of discussion of the emancipatory aspect of Epidemiology refers to Paim's questions:

On which epidemiology is on the horizon of the proposals? Epidemiology that is supportive of the implementation of the SUS, or that which constrains citizens, subjecting them to the "epidemiology authority"; the one that generates relevant information for those who suffer from the destructive processes of the organization of cities and, ultimately, of capitalist logic, or the epidemiology that masks the domestic reality and controls populations according to the interests of techno-bureaucrats and the political-ideological projects of the ruling classes? An epidemiology of those "from above" to reproduce their privileges and social exclusion or from those "from below" to produce information and power in search of equity and effectiveness?¹ (p. 560; our translation).

Final considerations

For Epidemiology applied to Workers' Health, overcoming the investigation based on isolated, fragmented, or decontextualized objects assumed as an explanation of the process of alteration of worker's life demands new categories of explanatory analysis for the health-disease-care process. The paths for this new method were shown based on the work environment^{3,19,27} and multidimensional methodologies^{5,23,27}

under an Epistemology of the South²⁶ in new territories full of contradictions²⁴ and uncertainties^{22,23}.

The methodological problems of Epidemiology, signaled as obstacles to the adoption of more comprehensive strategies, seem to have suffered a setback at the beginning of the 21st century since the operationalization of the (trans)interdisciplinary discussion, the multidimensional approaches, and the participation of workers as authors rather than as objects of investigations, which relegated them to the background. This occurred at a time of important advances in social networks and artificial intelligence, which have been used to compile and analyze large databases (big data) and further develop Genomic Epidemiology. The emergence of the COVID-19 syndrome showed the current limits and weaknesses of epidemiological data records, the distancing of health notifications by workers, and the still pressing epidemiological concealment of the work-health relationship.

In these times in which the expression of socioeconomic and environmental policy must be made explicit in the process of life, scientific production and practices of Worker's Health seem to have returned to the pre-1990 model. Vasconcellos¹⁷ finds such situation by considering the concept of Worker's Health "as a lost concept."

Although new priorities emerge on the agendas of technicians and activists, such as harassment, work-related cancer, pesticide poisoning, mental health, racial and gender vulnerability, etc., these still take place under an approach that fails to further develop their determinations, enabling analyses that are limited to prevention measures aimed at workers or that are quite vague and unspecific.

The intensification of computer resources, with sophisticated epidemiological methods such as big data analysis or fuzzy logic fails to overcome the cut-outs of isolated factors reorganized in a statistical model, which can result in distancing from the perception of health experienced by the population.

New monitoring strategies or categories/indicators due to the complexity of surveillance^{5,22,27,35} have been proposed, but health management is yet to value them.

This essay concludes by reiterating Laurell's concern⁶ with the epidemiological silence of the effects of political projects and the challenge of new popular-democratic scientific alternatives.

The epidemiological instruments that show the destructive processes of life in the current model of society and the tools for monitoring the potential for

life and health already exist, but it is adequate that Workers' Health appropriate them as an instrument of choice to "empower" the population and as a weapon for strategic and participatory planning.

References

1. Paim JS. Epidemiologia e planejamento: a recomposição das práticas epidemiológicas na gestão do SUS. *Ciênc Saúde Colet*. 2003;8(2):557-67.
2. Mendes R, Dias EC. Da medicina do trabalho à saúde do trabalhador. *Rev Saúde Pública*. 1991;25(5):341-9.
3. Laurell AC, Noriega M. Processo de produção e saúde-trabalho e desgaste operário. São Paulo: Hucitec; 1989.
4. Breilh J. Epidemiología crítica: ciencia emancipadora e interculturalidad. Buenos Aires: Lugar Editorial; 2003.
5. Breilh J. Critical epidemiology and the people's health. New York: Oxford University Press; 2021.
6. Laurell AC. Nuevas perspectivas temáticas para la epidemiología. In: Anais do 1o Congresso Brasileiro de Epidemiologia. Rio de Janeiro; 1990. p. 263-73.
7. Rothman KJ, Greenland S, Lash TL. Modern epidemiology. Philadelphia: Lippincott Williams & Wilkins; 2013.
8. Breilh J. Eficacia del poder, retroceso del derecho y degradación del trabajo: el escenario regresivo de la salud laboral en América Latina. In: Anais da Conferência de Abertura do Encontro Nacional de Saúde do Trabalhador. Brasília, Distrito Federal; 2001. p. 16-38.
9. Vasconcellos LCF, Pignati WA. Medicina do trabalho: subciência ou subserviência? Uma abordagem epistemológica. *Ciênc Saúde Colet*. 2006;11(4):1105-15.
10. Possas C. Epidemiologia e sociedade: heterogeneidade estrutural e saúde no Brasil. São Paulo: Hucitec; 1989.
11. Frias Junior CAS. A saúde do trabalhador no Maranhão: uma visão atual e proposta de atuação [dissertação de mestrado]. Rio de Janeiro: Fundação Oswaldo Cruz; 1999.
12. Checkoway H, Pearce N, Crawford-Brown D. Research in occupational epidemiology. New York: Oxford University Press; 1989.
13. Czeresnia D. Construção científica e inovação tecnológica: um desafio para a epidemiologia. *Physis*. 1993;3(1):77-90.
14. Brasil. Ministério do Trabalho e Previdência. Normas Regulamentadoras de Segurança e Saúde do Trabalhador. Brasília (DF): Ministério do Trabalho e Previdência; 1977.
15. Cordeiro R, Lima Filho EC. A inadequação dos valores dos limites de tolerância biológica para a prevenção da intoxicação profissional pelo chumbo no Brasil. *Cad Saúde Pública*. 1995;11(2):177-86.
16. Rose G. The strategy of preventive medicine. New York: Oxford University Press; 1992.
17. Vasconcellos LCF. Saúde, trabalho e desenvolvimento sustentável: apontamentos para uma política de Estado [tese de doutorado]. Rio de Janeiro: Escola Nacional de Saúde Pública Sergio Arouca; 2007.
18. Tambellini AT. Avanços na formulação de uma Política Nacional de Saúde no Brasil: as atividades subordinadas à área das relações produção e saúde. In: Anais da I Conferência Nacional de Saúde dos Trabalhadores (Brasília – 1986). Rio de Janeiro; 1988.
19. Basaglia F, Giovannini E, Pirella A. La salud de los trabajadores: aportes para una política de salud. Ciudad de México: Editorial Nueva Imagen; 1980.
20. Almeida Filho N. Epidemiologia sem números: uma introdução crítica à ciência epidemiológica. Rio de Janeiro: Campos; 1989.
21. Correa Filho HR. Vigilância das doenças crônicas ocupacionais: como passar das propostas às ações? *Saúde Soc*. 1995;4(1-2):99-105.
22. Ribeiro FSN. Metodologia progressiva e integrada de vigilância em saúde do trabalhador no SUS. In: Corrêa MJM, Pinheiro TMM, Merlo ARC. Vigilância em saúde do trabalhador no Sistema Único de Saúde: teorias e práticas. Belo Horizonte: Coopmed; 2013. p. 1445-77.
23. Lieber RR. O princípio da precaução e a saúde no trabalho. *Saúde Soc*. 2008;17(4):124-34.
24. Santos M. Por uma outra globalização: do pensamento único à consciência universal. Rio de Janeiro: Record; 2000.
25. Betancourt O. La salud y el trabajo: reflexiones teórico-metodológicas: monitoreo epidemiológico – Atención Básica en Salud. Quito: Ediciones CEAS-OPS; 1995.
26. Santos BS, Meneses MP, organizadores. Epistemologias do Sul. São Paulo: Cortez; 2010.
27. Ribeiro FSN. Vigilância em saúde do trabalhador: a tentação de engendrar respostas às perguntas caladas. *Rev Bras Saúde Ocup*. 2013;38(128):268-79.
28. Horton R. Health's intercultural turn. *Lancet*. 2023;401(10370):12.
29. Ribeiro FSN. A Epidemiologia aplicada à área de Saúde do Trabalhador: uma revisão integrativa. *Cad Saúde Pública*. No prelo 2023.
30. Santana VS. Saúde do trabalhador no Brasil: pesquisa na pós-graduação. *Rev Saúde Pública*. 2006;40:101-11.
31. Gehring Junior G, Corrêa Filho HR, Vieira Neto JD, Ferreira NA, Vieira SVR. Absenteísmo-doença entre profissionais de enfermagem da rede básica do SUS Campinas. *Rev Bras Epidemiol*. 2007;10(3):401-9.
32. Wunsch Filho V. Reestruturação produtiva e acidentes de trabalho no Brasil: estrutura e tendências. *Cad Saúde Pública*. 1999;15(1):41-52.

33. Pontes RJS. Sarampo em trabalhadores rurais: ensaio metodológico de Epidemiologia Social. Rev Saúde Pública. 1990;24(4):323-31.
34. Almeida IM. Acidentes de trabalho e a repolitização da agenda de saúde do trabalhador. In: Gomez CM, Machado JMH, Pena PGL. Saúde do trabalhador na sociedade brasileira contemporânea. Rio de Janeiro: Fiocruz; 2011. p. 203-25.
35. Pignati WA, Machado JMH. O agronegócio e seus impactos na saúde dos trabalhadores e da população do estado do Mato Grosso. In: Gomez CM, Machado JMH, Pena PGL. Saúde do trabalhador na sociedade brasileira contemporânea. Rio de Janeiro: Fiocruz; 2011. p. 245-72.
36. Almeida Filho N, Barreto ML. Epidemiologia e saúde: fundamentos, métodos, aplicações. Rio de Janeiro: Guanabara Koogan; 2012.
37. Chagas AMR, Salim CA, Servo LMS. Saúde e segurança no trabalho no Brasil: aspectos institucionais, sistemas de informação e indicadores. Brasília (DF): Instituto de Pesquisa Econômica Aplicada; 2011.
38. Rocha LE, Rigotto RM, Buschinelli JTP. Isto é trabalho de gente? Vida, doença e trabalho no Brasil. Rio de Janeiro: Vozes; 1994.
39. Costa DF, Carmo JC, Settimi MM, Santos UP. Programa de saúde dos trabalhadores: a experiência da zona norte: uma alternativa em saúde pública. São Paulo: Hucitec; 1989.
40. Brasil. Ministério da Saúde. Curso de saúde do trabalhador e ecologia humana, IV. Rio de Janeiro: EAD/ENSP; 2007.

Authors' contribution:

Ribeiro FSN and Pinheiro TMM contributed to the conception of the study, review and interpretation of the literature, writing of the article, review and approval of the text for publication, and assume full responsibility for the study and published content.

Data availability:

The entire dataset supporting the results of this study was published in this study.

Received: July 12, 2022
Revised: June 16, 2023
Approved: October 30, 2023

Editor-in-Chief:
Eduardo Algranti