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Genetics and prevention: work at risk or "workers at risk"?

by

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Abstract

In public health, two theoretical models underlie the epidemiological studies and public action in health. These models are founded on an implicit framework of the relationship between health and society. After a brief presentation of these models, this paper emphasises on the context in which the research about genetic susceptibility and genetic testing is taking place. Historically, in France, the tradition of the occupational medicine is under the influence of the rationalisation of the workforce management. Questioning the references of such a tradition, social movements put the necessary changes in working conditions as a priority of the labour policies during almost thirty years. But the "genetisation" of the society as a whole is giving a very strong framework to the pressure of the employers to get quickly genetic testing. The balance between the conception of selection practices and the strategies of prevention is now giving priority to the first one to the detriment of the other. Nevertheless, are the scientists able to answer to such a demand? And if it is the case, what about the worker's rights to occupational health? Such questions are discussed in this paper.

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Introduction

The last results of the national and European surveys about working are pointing out a very worrying situation highlighting the persistence of workers 'occupational exposure physical and chemical hazards (1, 2), a lot of them leading to long terms effects as it is the case for carcinogens. In a context influenced by a double evolution – contingent work and hazardous work subcontracting (3, 4) – some scientists as well as occupational health practitioners are promoting workers' genetic susceptibility as one of the tools necessary for prevention (5). Such a choice is questioning public health policies and what is founding their elaboration.

In public health, two theoretical models underlie the epidemiological studies and public action in health. These models are founded on an implicit framework of the relationship between health and society (6).

The first one regards the society as a sum of individuals whose particular characteristics – biological, genetic but also psychological, behavioural and social – account for the genesis and the distribution of diseases in a population. In that sense, the economic and social organization is to some extent the "natural" and intangible framework in which the life and the health of the individuals are organised. The causes of disease essentially lay in individual characteristics. The social conditions themselves are reduced to the dimensions of individual, genetic, biological, psychological but also social determinants. M. Foucault and G. Canguilhem have shown how such a model of health tends to do considering the individuals themselves as the responsible of their own biological, genetic but also social health problems, occulting at the same time any collective and political dimensions in the social production of these health problems (7, 8).

The second model understands the society as an historical construction and health as a process of interaction between the body in all its dimensions (biological, psychological, but also cultural and social ones), the material conditions – themselves socially determined by the cultural and technique evolution in reference to the political choices – and the social relations (9, 10). In that sense, the health is not only a sum of individual characteristics but a dynamic process which is articulating at any moment in life the individual and collective history of health, the material conditions of work and life, as well as the social relations and political choices.

These two theoretical models are underlying different ways of production of knowledge and action in public health. In the perspective of

the first one, any epidemiological results are used to point out what kind of individual therapeutic care and/or educational action are necessary in order to cure patients or to change the individual behaviour. In the second model, each dimension of the described process offers possible spaces of social transformation having for stake the improvement or the deterioration of the conditions of health, the reduction or the increase of the health inequalities. From this point of view, the public action is not related to a self-blaming and prescriptive strategy, but is founded by a criticism for an action on the level of the hazards themselves in order to change life and working conditions in their collective dimensions.

Obviously, genetics is at the centre of a conflict of values, according to what model scientists and practitioners are referring to understand social and health phenomena. The aim of this text is to question from a socio-anthropological point of view the development of predictive occupational medicine founded on the genetic testing of the susceptibility to chemicals and other toxic substances. That means to put the specific development of genetics in relation to the evolution of the organisation of work, of the science, of the social and civil rights, and to assess the role of such testing practices in a strategy for prevention at the workplace. The first part of the paper presents some points of the occupational health history. The second part discuss about who is interested by genetic screening and why.

Some reference points of the history of the labour force management

Before tackling the specific questions of genetic screening, some reference points about relations between science, medicine and the labour force management can illustrate how the two previously quoted models are constantly present in this history and in the social bases of its evolution.

At the end of the 19th century, “The scientific organisation of work” is under this design which sees in the society a sum of individuals. The assumption of it is that workers have to be selected in regard of their characteristics. P. Davezies studies the various moments of the scientific development in physiology, biology and occupational psychology, at the end of 19th and the beginning of the 20th century. Such a development of the science is oriented by a research of a rationalisation in the labour force recruitment and management (11). He points out three very important moments of this development which are briefly summarised below.

At first, in the midst 19^{e} century, L.R. Villermé is questioning the regeneration of the race. Then in 1916, during the first world war,

P. Mazel, a French occupational physician designs what can be a scientific use of workers in the arms factories. Finally, in 1940/1944, during the second world war, A. Carrel elaborates his theory for "rebuilding the man". So doing, A. Carrel defines the mission of the occupational medicine as a process of biological orientation of the labour force. In these three moments, the industrial rationalisation appears to be based on a biological rationalisation. In 1946, a decree officially institutionalises the French occupational medicine "of prevention", nevertheless maintaining in its heart a real contradiction in relation to the two previously quoted models. While having "to protect health from any kind of hazards at the workplace" (which means criticism and changes of the working conditions) the occupational physicians must also determine the workers' individual aptitude to work (which means to question the physical, psychological, behavioural characteristics of the individuals).

During the 19th and the 20th centuries, workers' struggles concerning the health and working conditions were conducted even though the memory of them is in a great part ignored of the official history of the industrialisation in France and in Europe. A. Cottereau highlights the individual and collective strategies of men and women – differently integrated in the social division of the labour – "not to let itself burst at work for a boss" (12). D. Rosner & G. Markowicz recall the chronology of the fights having led to the recognition of the silicosis as an occupational disease in the United States.

In the years 60-80, social movements deeply marked the evolution of the thought in occupational health: the refusal of infernal production rhythms, the first fights on asbestos... (13, 14). More basically a dispute emerged about the economic rationality which can be summarised in such an aspiration: "not to lose its life to gain it" (15). The improvement of working conditions was then at the centre of debates and led to the decision to do national surveys in the working population about their working conditions. It is also at this time that a first social movement against asbestos in France associated the scientific workers of the Jussieu University and the workers of a asbestos textile factory (AMISOL) in Clermont-Ferrand. This movement obtained the recognition of cancers as occupational disease related to asbestos exposure and the decision of a regulation about prevention (14). In the north of Europe, during the eighties and the very beginning of the nineties several countries adopted the laws prohibiting asbestos production and use (16).

In France in 1982, the "new rights of the workers" ("Auroux" laws) ratified such an evolution within the framework of the law: the right for hazardous work withdrawal, the right for a representative institution on

health and safety (CHS-CT) at the workplace, the workers' right to self expression about their working conditions (*Code du travail,* art. L231).

During the eighties, flexibility and subcontracting hazardous works were arising. At that time the management by the turn over of contingent workforce began to divide the exposure to toxic substances between a large number of workers without having to take into account the loss of employment and wages for temporary workers. This strategy gave to the companies the means to control the visibility of occupational hazards and their consequences without having to control the occupational hazards themselves. One of the more significant examples of this strategy is the ionising radiation exposure management in the maintenance of nuclear power plants (17).

During the nineties, an international social movement of the asbestos victims came to clarify the scandal of decades of use of a highly carcinogenic product, which strongly questions the effectiveness of the so-called prevention institutions (especially the occupational medicine). Twelve European countries had banned asbestos before that France itself decides by decree to ban asbestos in 1997. An European directive did the same in 1999 for a transposition in all the countries of the European Union at January 1, 2005. In France, lawsuits in a special civil court (the tribunal of social security affairs) condemned the employers for "inexcusable fault". On the 28th February 2002, these condemnations were confirmed by the supreme court of appeal (in French: "Cour de cassation") in 29 historical judgements (18).

Such is the context in which a strong pressure of the asbestos, nuclear and chemical industries as well as of the insurance companies is growing up in direction of the scientists and of the public authorities for the development of testing the genetic susceptibilities of workers exposed to hazardous workplace. Such a pressure is part of the ruling ideology in the scientific field and public health establishing the supremacy of the genetics in health and medical research as well as in the public health policies. The French institute of prevention in work environment (*Institut National de Recherche et de Sécurité*, INRS) which is financed by the national health insurance funds for prevention registers genetic research as one of its scientific priorities.

Genetic screening and work: which topical interests?

To understand these topical interests for the various protagonists of the occupational health field, it is necessary to question the state of the art about scientific research in genetics.

Scientific questions

At first, it should be stressed that the question of genetic screening in workers arises in a paradoxical way. In the United States the use of genetic testing kit seems to have been standardised in the ten last years. However according to E. Fox Keller (19), the molecular biologists are pointing out the limits of the knowledge and the innumerable questions that the last developments of research on the genome are putting out. The representation of a "genetic stability" is over. As of now, the new concept is a "regulating complex dynamics" which tends to reintroduce the concept of "environnement" (at least that of the cell and of the multiple interactions within it).

A first interrogation then relates to what measurement these screening tests are permitting and what are the conditions of reliability of such tools for biological investigation. To that question, the scientists do not answer anything else that their confidence in the future developments of genetic research. This is contributing to what seems to be more and more a "*genetisation of the society*" which means to conceive the destiny of the individuals according to genetic "*predictions*" or "*predispositions".* The development of genetic research is done in a narrow partnership between the scientists and the industries, sometimes pre-empting potential applications of not yet achieved results.

In France, in 2001, an INSERM collective expertise about *"genetic susceptibilities and occupational exposures"* has been carried out (20). The experts emphasise on the absence of conclusive results on the possible interactions between genetic factors, environmental factors and some specific diseases. If such interactions exist – the experts write – they raise in a probabilistic and nondeterministic way, because of multiple factors intervening in a biological process which cannot be considered as a simple interaction between, for example, a pollutant such as the asbestos and a genetic predisposition to cancer.

Who is interested by the genetic screening at the workplace?

Consequently, who may find some interest to the genetic susceptibility in the context of occupational health?

What's about the first concerned, namely the workers? For a long time, they have the experience of the selection by their "aptitude to the risks". One of the most significant examples is the management of the ionising radiation's exposure by the turn over of exposed workers within the framework of the organization of the maintenance of the nuclear

power plants. It is a very controversial design of health and employment management by an individual indicator of exposure to avoid exceeding the regulated allowed limits. This is done to the detriment of collective prevention strategies aiming to avoid the exposure itself.

As a person and a citizen, individually, the worker has the right to refuse any medical examination (or biological measurement) which he is not considering as favouring his health. But, as a collective actor, he is part of the social relations at the workplace and has to deal with what the organisation of work imposes.

The organisation of a worker's turn over according to the exposure measurement (or, may be in the future, according to genetic factors of predisposition) tends to reinforce the "normality" of the occupational hazards, depriving the workers of their right to act to protect themselves from the danger at the workplace. Taking place in an individualizing conception of the prevention, the genetic screening is contradictory with a strategy of prevention based on the control and/or the elimination of the risk. In the long term it could represent a threat for occupational disease compensation by the identification of the individual responsibility in the cause of such a disease.

Finally it is important to question what does it means for the worker to be obliged to support testing concerning his (her) body integrity and his (her) health. This question is related to the principles of basic rights, in particular that one which recognises health as a private field. The labour law is supposed to put some limits to the employer power on the employees within the framework of the relation of subordination. The person of the employee is holding an inalienable right to accept or refuse a medical examination which he(she) does not consider favourable to his(her) health. The prohibition of the genetic testing use in occupational environment by the French law[2] is fully a part of the protection of the worker's essential rights, even if the labour law is recognising the legitimacy for the physicians to decide of genetic testing in order to prevent diseases. As C.M. Poissonnet wrote, such an ambivalence is opening space for genetic selection practices (21).

The occupational physicians of the network of public health of the province of Quebec in Canada developed a reflexion about the impacts of the screening examinations on the protection of worker's health at

[2] The law about the patient's rights adopted the 4th of march, 2002, clearly prohibit any discrimination in relation to genetic tests in order to predict some future disease.

the workplace (22). Through some examples, they demonstrate that such screening examinations are not relevant in order to protect the worker's health. So they have published a demand of their network pleading for the abolition of all the medical examinations imposed by law. This discussion is in echo with the debate raised in France within the occupational medicine concerning a recent judgement of the *Conseil d'Etat*[3] about a new regulation on carcinogens (decree published on the 5th of February, 2001). In this decree, the government is maintaining the obligatory medical worker's examination to determine the "absence of counter-indication" to carcinogen exposure. In its arguments the ministry justify such a practice by the fact that it can exists some *"biological, behavioural or genetic knowledge"* which permits to determine an *"over-risk"* of cancer for some individual workers.

Amongst the French occupational physicians, a social movement has emerged questioning such an exclusionary practice. This movement is coherent with a report of the *Inspection Générale des Affaires Sanitaires et Sociales* (IGASS) (23) which notes that *"the aptitude which the physicians are assessing connects with an estimate of the predisposition for a worker to be compensated for occupational disease. It is more a vestige of the forensic medicine than a genuine tool of prevention... Had the workers of asbestos not all been declared able to work in such an occupational polluted environment? "*

Thus the IGASS poses clearly which is one of the principal stakes of the development of genetic research on individual susceptibility to the risk: it is a question of identifying *"workers at risk"*. Doing so, it becomes possible to exclude them before exposure in order to limit the costs of compensation which should be loaded by the employers and the insurers.

Anyway, there is also a secondary benefit for the employers as a whole. The development of the research on the genetics is accompanied by a quasi-disappearance of industrial toxicology. According to E. Drapper, research in occupational health passed from a paradigm centred on the knowledge of the collective hazards at the workplace to that one of the genetics which identifies the risk at the level of the worker himself in relation to his individual characteristics (genetic, biological, psychological, behavioural) (24). It can be seen in such a "new"

[3] The *Conseil d'Etat* is a council near the French administration which is judging of the legacy of the laws and decrees. Individuals or institutions (inclusive ONGs, trade unions, political parties) may do appeal against new laws or regulations.

paradigm the reference to the first theoretical system of interpretation of the pathological phenomena which sees the disease as the results of individual characteristics and not as a social construction. Priorities in research are the result of political choices, in particular assigning human and budgetary means to the research institutions. The choice of genetics research meets – in the name of competitiveness – the will of the industry managers (in particular of the chemical industry of the European Union) to avoid restrictive safety rules and public control about the use of toxic and carcinogen products.

Conclusion

To escape from the rules and costs of prevention at the workplace but also from the general duty on occupational health which was recalled in France by the supreme court of appeal in relation to asbestos, the European industry managers are ready "to invest" in the genetic testing development and practice. In the foreword of its famous text *"le normal et le pathologique"* G.Canguilhem warns against the eugenist drift that the genetics bear in germ: *"Why consequently not to dream of a hunting against the heterodox genes, a genetic inquisition? These dreams, we know, are not only dreams for some biologists of philosophical obedience (...) By dreaming these dreams, we are getting in another world, bordering on the best of the worlds of Aldous Huxley, from where the sick individuals, their singular diseases, and their doctors were eliminated. This is building the representation of the life of a natural population as a bag of lotto of which it belongs to civil servants delegated by the life science to check the regularity of the numbers that it contains, before it is allowed to the players to draw them from the bag to furnish the paperboards. At the origin of this dream, there is the generous ambition to save innocent and impotent living beings of the atrocious load to represent the errors of the life. On the arrival, what is found is the police force of genes, covered by the science of the geneticists."* (8) (G. Canguilhem, 3e edition 1991)

What C. Canguilhem has considered as the dream of some biologists is not transforming itself into a nightmare of the industrial societies? Whereas the improvement of the working conditions less than is ever regarded as a priority of the public health, the genetics became the dominant discipline of research concerning health. The opening of a true democratic debate is essential on the stakes of genetic research in France and Europe, not only about the use of genetic testing amongst workers but also in regard of this alarming evolution of the so-called advanced societies.

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