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The Cost of Trust: The World Health Organization and Vaccination's Contested Economization in France

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Abstract:

This article explores the role of the World Health Organization (WHO) within the tumultuous history of the hepatitis B vaccine in France, including a controversy that erupted in 1996 and lasted several years. When the first hepatitis B vaccine was commercialized in France in 1981, it inaugurated a new era in the industry characterized by high prices, an unprecedented number of patents and aggressive commercial competition. By inscribing the hepatitis B vaccine controversy into a broader, global history of the economization of immunization – in which the WHO played a central role – this article reframes the causes and implications of a controversy that both actors and scholars have approached through a primarily national lens. The challenge posed to the economic approach to immunization prepared the ground for subsequent critiques of vaccines as commodities. The article discusses a key transformation in the recent transatlantic history of public health by focusing on the perceived association of immunization with a contested economic order.

Keywords:

Economization, France, hepatitis B, immunization, public health, World Health Organization

A major hepatitis B vaccine controversy erupted in France in 1996, fueled by allegations that the vaccine caused a range of diseases including multiple sclerosis. This dispute lasted several years, leading to the shutdown of a national campaign to immunize schoolchildren, as well as extensive litigation. **The fact the uproar seemed limited to France, where no major vaccine controversy had been documented since the interwar period, perplexed public health officials and commentators at the time. The episode appeared to be an exception, lacking both recent national precedent and parallels in other countries where the same vaccine had been adopted.**¹ As the controversy started to recede in the early 2000s, experts and scholars attempted to explain it, delving into a set of national specificities, in particular **the notoriously weak field of public health in France.**² Sociologists emphasized the lack of epidemiological data and the absence of a centralized system for monitoring the side effects of immunization,³ journalists underscored multiple shortcomings and conflicts of interest,⁴ and

¹ While the controversy remained largely limited to France, arguments questioning the vaccine's innocuousness resonated more broadly. Following France's decision to halt the campaign to immunize schoolchildren against hepatitis B in 1998, the Canadian press began to doubt the safety of the vaccine, and the United States House of Representatives held hearings on the matter. See L. Monnais, *Vaccinations. Le mythe du refus* (Montreal 2019), 236; E. Conis, *Vaccine Nation: America's Changing Relationship with Immunization* (Chicago 2015), 196–201.

² A. Morelle, *La défaite de la santé publique* (Paris 1996) ; F. Grémy, *On a encore oublié la santé* (Paris 2004). For a critical evaluation of the ideas around public health 'culture' in France, see D. Fassin 'Au coeur de la cité salubre. La santé publique entre les mots et les choses', in D. Fassin and J-P. Dozon (eds), *Critique de la santé publique. Une approche anthropologique* (Paris 2001), 47-73.

³ O. Borraz and P. Quenel, 'Suspension de la campagne de vaccination scolaire contre l'hépatite B', in M. Setbon (ed.) *Risques, sécurité sanitaire et processus de décision* (Paris 2004), 38–54.

⁴ E. Giacometti, *La santé publique en otage* (Paris 2001).

public health experts highlighted the renewed visibility of anti-vaccine groups and blamed the public for buying into an irrational stance on immunization.

This well-worn narrative, however, leaves aside an important strand of criticism that crystallized **around the controversy. This scarcely noted criticism was not centered on the alleged side effects of the vaccine that had attracted the majority of public discourse. Instead, it targeted an alleged alliance between the pharmaceutical industry, the French state, and the World Health Organization (WHO).**⁵ Encountering the WHO in such a context might not be surprising because the international body had shaped the French position on immunization since the early 1980s. More unexpected, perhaps, was the public ridicule for the cost-benefit-based approach to immunization that the WHO championed, **a rationale increasingly associated with the rise of ‘Global Health’.**⁶ **Vaccine controversies often**

⁵ I. Löwy, ‘HPV Vaccination in Context: A View from France’, in K. Wailoo, J. Livingston, S. Epstein, and R. Aronowitz (eds) *Three Shots at Prevention: The HPV Vaccine and the Politics of Medicine’s Simple Solutions* (Baltimore, MD 2010), 270–92.

⁶ The economization of medical interventions has attracted considerable attention from scholars working on international health issues. The very expression ‘global health,’ used to describe the period starting in the 1990s, is defined by an ecosystem of international institutions, both private and public, that promoted economic assessment applied to health in order to rank interventions according to their measured value. See K. E. Kenny, ‘The Biopolitics of Global Health: Life and Death in Neoliberal Time’, *Journal of Sociology*, 51, 1 (2015), 9–27; V. Adams, ed., *Metrics: What Counts in Global Health* (Durham, NC 2016); M. Murphy, *The Economization of Life* (Durham, NC 2017); N. Jensen, ‘A Genealogy of Evidence at the WHO’, in D. Reubi and C. Herrick, eds., *Global Health and Geographical Imaginaries* (London 2017), 135–56; D. Reubi, ‘Epidemiological Accountability: Philanthropists, Global Health and the Audit of Saving Lives’, *Economy and Society*, 47, 1 (January 2018), 83–110; J.-P. Gaudillière and C. Gasnier, ‘From Washington DC to Washington State: The Global Burden of

reflect particular historical stakes and should not be reduced to a limited set of ‘anthropological’ constants, such as the distrust of public authorities or a particular relationship to ‘nature’, as several historians have demonstrated.⁷ In this regard, the French hepatitis B vaccine controversy wasn’t simply another instance of a crisis of confidence in the safety of a vaccine. When considered in its specific context, the crisis could be described as a breach of public consensus around recent global developments in the economization of vaccines.⁸ In inscribing this seemingly nation-bound dispute into a broader, global history of the economic justification of immunization **and its nascent critique**, this article shifts the focus of inquiry from the notion of immunization’s side effects to the question of cost. It points out the ambiguities in public health policy utilizing economic arguments and underscores the fact that vaccines have qualities beside efficacy and innocuity, such as their low cost and their simplicity, whose control has been instrumental to the normalization of this intervention.⁹

Diseases Data Basis and the Political Economy of Global Health’, in S. Leonelli and N. Tempini (eds) *Data Journeys in the Sciences* (Cham 2020), 351–70.

⁷ M. A. Largent, *Vaccine: The Debate in Modern America* (Baltimore, MD 2012) ; Conis, *Vaccine Nation*.

⁸ On tensions around the commodification of vaccines in the nineteenth century, see S. H. Gonzalez, ‘The Cowpox Controversy: Memory and the Politics of Public Health in Cuba’, *Bulletin of the History of Medicine*, 92, 1 (2018), 110–40.

⁹ For a discussion of simplicity as a primary concern for immunization, see G. Thomas, ‘Keeping Vaccination Simple: Building French Immunization Schedules, 1959–1999’, *Bulletin of the History of Medicine*, 94, 3 (2020), 423–58. **For a history of immunization’s social justification that goes beyond the mere efficiency and innocuity of vaccines, see J. Heller, *The Vaccine Narrative* (Nashville, TN 2008).**

The hepatitis B vaccine fosters an emphasis on economics. When it was introduced in several Western countries in the early 1980s – France and the United States in 1981, the United Kingdom in 1982 – its price was unusually high for a vaccine. The cost of a full course was approximately US\$100 in the United States (US dollars in 1982), 240fr in France (French francs in 1986).¹⁰ By way of comparison, the WHO estimated in the early 1980s that it took US\$10–15 to immunize a child against six targeted diseases, a figure that included vaccines, staff and infrastructure. Scholars and journalists have recounted how the unprecedentedly high prices shocked the research community, which worried that the hepatitis B vaccine would be out of reach for countries that most needed it.¹¹ A viral infection transmitted through bodily fluids, hepatitis B can cause cirrhosis and liver cancer when it becomes chronic. In the early 1980s, it was widespread in Asia and Africa,

¹⁰ A. Mulley, M. Siverstein and J. Dienstag, ‘Indications for Use of Hepatitis B Vaccine, Based in Cost-Effectiveness Analysis’, *New England Journal of Medicine*, 307, 11 (1982), 644-652 ; J.M. Hureau, ‘Rapport pour le CTV sur la vaccination contre l’hépatite B’, October 1986, Ministry of Health Records, 2005/006/3

¹¹ W. Muraskin, ‘The Silent Epidemic: The Social, Ethical, and Medical Problems Surrounding the Fight against Hepatitis B’, *Journal of Social History*, 22, 2 (1988), 277–98; W. Muraskin, ‘Hepatitis B as a Model (and Anti-Model) for AIDS’, in V. Berridge and P. Strong (eds) *AIDS and Contemporary History* (Cambridge 1993), 108–32; E. Giacometti, ‘Le produit le plus lucratif des années 1990’, *Le Parisien*, December 12, 2007 ; A.M. Moulin, F. Chabrol, and A. Ouvrier, ‘Histoire d’un vaccin pas comme les autres: les premiers pas du vaccin contre l’hépatite B au Sénégal’, in V. Delaunay, A. Desclaux, and C. Sokhna (eds) *Niakhar, mémoires et perspectives: recherches pluridisciplinaires sur le changement en Afrique*, (Dakar 2018), 489–510.

but only Western countries experiencing negligible case numbers could afford to recommend the vaccine to selected ‘risk groups’ – medical staff, homosexuals, drug users – a targeted strategy that, in itself, was influenced by considerations of cost. Even in countries with large budgets dedicated to prevention, the cost of the vaccine initially limited its widespread use.¹²

The hepatitis B vaccine inaugurated a new era in the pharmaceutical industry, characterized by higher prices, an unprecedented number of patent filings, and aggressive commercial competition. The trend of such transformations continued **in the following decade** as production grew progressively more privatized worldwide, transnational markets were **consolidated, and new expensive vaccines were introduced.**¹³ These were significant shifts in the history of public health since vaccines, up until then, had been synonymous with cheap, widely accessible pharmaceuticals, often produced by public institutions.

These developments did not go unnoticed by the public. National conversations about the hepatitis B vaccine cast immunization in a profit-driven light. Articles published in the French national press in the 1990s, as well as subsequent television coverage, referred to the vaccine

¹² J. Stanton, ‘What Shapes Policy? The Case of Hepatitis B Vaccine’, *Social History of Medicine*, 7, 3 (1994), 427–46.

¹³ F. Huzair and S. Sturdy, ‘Biotechnology and the Transformation of Vaccine Innovation: The Case of the Hepatitis B Vaccines 1968–2000’, *Studies in History and Philosophy of Science Part C*, 64 (2017), 11–21; S. Blume, *Immunization: How Vaccines Became Controversial* (London 2017); S. Blume, ‘The Erosion of Public Sector Vaccine Production: The Case of the Netherlands’, in C. Holmberg, S. Blume, and P. Greenough (eds) *The Politics of Vaccination: A Global History* (Manchester 2017), 148–73.

as a profit-maker.¹⁴ This was a new register of objections raised against immunization since French opponents had remained focused on legal obligation, coercion, and vaccine hazards until the mid-1980s. Arguments around profit and commodification consolidated around the controversy, undermining the vaccine's trustworthiness, and, by extension, immunization on the whole.¹⁵ Although this line of attack was indeed in direct response to the cost of the vaccine, more importantly, as this article argues, the broader economic approach to immunization that had been developing among experts since the late 1970s, first internationally and then in the French context, had catalyzed it. **When the Hepatitis B vaccine was introduced in the early 1980s, and its use extended in the following decade, immunization was being increasingly justified by cost studies, in particular cost-benefit calculations. The cost-benefit appraisal consists of a simple comparison between inputs and outputs. In balancing costs with potential future savings, it permits expensive products to be justified as financially worthwhile.**

The article follows the trajectory of the cost-benefit calculation applied to immunization, from its popularization by the WHO to the French Hepatitis B vaccine controversy.¹⁶ Through the

¹⁴ See, for instance, a well-reviewed documentary screened on national television: *90 Minutes*, 'Hépatite B, mensonges autour d'un vaccin', Canal + (January 23, 2001).

¹⁵ The timeline of the economic critique of immunizations in France is similar to what has been described in other Western countries. For the US, see J. Reich, *Calling the Shots: Why Parents Reject Vaccines* (New York 2016).

¹⁶ The expression 'cost-benefit' was most commonly used at the WHO and in the French contexts examined in this essay. Some experts spoke of 'cost-effective' studies. Cost-benefit and cost-efficiency calculations do not differ in nature as they both aim to establish a ratio between costs and outcomes. Vaccine experts often used them interchangeably.

Expanded Programme on Immunization launched in 1974 – the first initiative to implement immunization globally and systematically – the WHO was an early actor in the economization of immunization. In linking the operation of vaccination to the logic of maximizing cost-benefit, the WHO oriented associated actors to the notion of cost just at the crucial time that immunization started to be expensive. **This point remains overlooked in the literature: the WHO was deeply invested in cost-benefit studies before its competitors – UNICEF in the 1980s, The World Bank and new private foundations in the 1990s – promoted economic criteria to assess health interventions. Like most cost-benefit studies, the data produced within the WHO’s vaccination programme was hardly comparable.¹⁷ However, such studies gave the programme and immunization crucial political justification.**

In the first part of this paper, I **will** examine the reasons the WHO adopted and promoted cost-benefit calculations. I will then offer an analysis of the circulation and appropriation of the cost-benefit calculation that French actors applied to immunization. This underscores how the WHO, whose global influence in matters of immunization reached an apex at the turn of the 1990s, legitimized the French decision to recommend the hepatitis B to the entire population. In the final section, I stress how both the economization of immunization and the WHO as an institution were targeted during the mid-1990s French hepatitis B controversy.

[line break]

¹⁷ **On the contingency of cost-benefit studies applied to immunization, see O. J. M. Castañeda, ‘Making HPV Vaccines Efficient: Cost-Effectiveness Analysis and the Economic Assemblage of Healthcare in Colombia’, *Science and Technology Studies*, 31, 2 (2018), 2-18.**

In many ways, the WHO's adoption of cost-benefit calculations reflects how international organizations promoted methods and models from economics and management science during the second half of the twentieth century.¹⁸ At the WHO, it was the second director of the Expanded Programme on Immunization, Ralph Henderson, who shifted the emphasis to cost-benefit. After arriving at the WHO from the US Center for Disease Control (CDC) in 1977, he established his authority with a managerial flexibility and an interest in assessment that, according to his colleagues, stemmed from his training in medicine and public affairs at Harvard.¹⁹ In the literature on international organizations, one line of analysis links the spread of cost-benefit calculations to geopolitical allegiances and stakes during the Cold War. Although this retains some validity, I argue that the Expanded Programme on Immunization embraced an economic approach in reaction to the program's political weakness and immunization's lack of support within the WHO.²⁰ As demonstrated in the next section, following historian Theodore Porter's influential argument, cost-benefit calculations lent legitimacy to bureaucrats in weak political positions.²¹

¹⁸ Murphy, *The Economization of Life*; Vincent Gayon, 'De quoi est fait « l'ordre économique international »?', *Actes de la recherche en sciences sociales*, 234, 4 (2020), 4–13.

¹⁹ Ralph Henderson entered the CDC in 1965 and played an instrumental role in the West African campaign for smallpox-measles vaccination it launched in 1966. The CDC deployed him to the WHO and continued to pay his salary. On the CDC campaign in West Africa, see B. H. Reinhardt, *The End of a Global Pox: America and the Eradication of Smallpox in the Cold War Era* (Chapel Hill, NC 2015), 86–123.

²⁰ For the geopolitical argument about cost-benefit approaches, see N. Chorev, *The World Health Organization between North and South* (Ithaca, NY 2012).

²¹ T. M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, NJ 1996).

The origin of the Expanded Programme on Immunization lies in the smallpox eradication campaign the WHO launched in 1966. During a conference held in December 1970 at the Pan American Health Organization's (PAHO) headquarters in Washington DC, the head of the smallpox eradication campaign defended the idea of a broader international immunization program. Smallpox was still widespread in India and in the Middle East in 1970. All attempts to eradicate the disease had previously resulted in failures so that key public health officials, like Marcolino Candau, the WHO Director-General, doubted that eradication was within reach. The first years of the smallpox campaign, however, had brought good news from the epidemic fronts and gave immunization international momentum.²² Conference participants lamented the staggering ongoing prevalence of diseases in the southern hemisphere for which effective vaccines were available.²³ A working group from this conference ended up drafting plans for what became the Expanded Programme on Immunization.

Several years passed between the Washington conference and the official start of this program. In May 1974, the World Health Assembly, the WHO's parliament, finally voted on a resolution that established the program as a stable political entity. It also defined the scope of activity, specifying six diseases to be targeted in addition to smallpox: diphtheria, pertussis, tetanus,

²² Historians have provided a less idealized picture of the actual acceptance of the program, particularly in the Indian Subcontinent. See, e.g., P. Greenough, 'Intimidation, Coercion and Resistance in the Final Stages of the South Asian Smallpox Eradication Campaign, 1973–1975', *Social Science & Medicine*, 41, 5 (1995), 633–45; S. Bhattacharya, *Expunging Variola: The Control and Eradication of Smallpox in India, 1947–1977* (New Delhi 2006).

²³ PAHO, *International Conference on the Application of Vaccines Against Viral, Rickettsial, and Bacterial Diseases of Man* (Washington, DC 1971).

measles, poliomyelitis, and tuberculosis. According to the resolution, the program was expected to support the enactment of immunization policies, initially in the poorest countries, by providing material assistance, technical knowledge, and training to local staff. Moreover, the implementation of the campaigns was to be accompanied by vaccine research and licensing activities. Finally, WHO partner laboratories were to monitor vaccine batches. Yet despite many continuities, this program radically differed from the smallpox campaign in one way: the Expanded Programme on Immunization was never to expire as it did not aim to eradicate the targeted diseases.

The program struggled in its initial years. Between 1974 and a second vote in 1977, most of its activities were actually limited to prospective studies. It was only between 1977 and the early 1980s that national programs began to be implemented, the slow pace being due partly to the unprecedented nature of the project. No institution had ever undertaken a global immunization program. The campaigns to vaccinate against tuberculosis promoted by the WHO and UNICEF in the wake of the Second World War targeted Europe and North Africa, while smallpox eradication was limited to the southern hemisphere.²⁴ Leadership issues also plagued the early years of the program and help to explain the aborted term of its first director, Frank Schofield, who was replaced by Ralph Henderson in 1977.²⁵

The most significant reason for the Expanded Programme on Immunization's sluggish start was the WHO's support for a new doctrine, referred to as 'primary health care', along with its

²⁴ On the postwar campaigns to vaccinate against tuberculosis, see J. Farley, *Brock Chisholm, the World Health Organization, and the Cold War* (Vancouver 2008).

²⁵ R. Henderson and V. Harden (2006), *Ralph (Rafe) Henderson*. Available at: <http://www.globalhealthchronicles.org/items/show/3525> (accessed November 8, 2020).

reluctance to endorse a program that some accused of repeating the mistakes of postwar campaigns to eradicate infectious diseases.²⁶ These campaigns had been criticized for having ‘vertical’ structures and execution; that is, they were ordered and conducted from Geneva and generally focused on a single disease without sustainably improving national health systems. They also allegedly dismissed the needs that target populations had expressed, and ultimately failed to meet their goal of disease eradication. Within the WHO, many had opposed the smallpox program on these grounds and remained suspicious of the Expanded Programme on Immunization. The 1976 World Assembly marked a turning point towards ‘primary health care’. WHO Director General Halfdan T. Mahler endorsed an agenda that focused on improving populations’ access to care for their primary health needs through low-cost and socially transformative interventions. The organization’s Alma Ata conference, held in the capital of the Soviet Republic of Kazakhstan in September 1978 completed this process. Representatives from all over the world participated in staging a vision of public health that challenged two decades of postwar campaigns and reflected alternative models emerging in China and India.

Did vaccination have a place in this new doctrine? As a preventive measure, vaccination met the requirements of ‘primary health care’. The fact that the Expanded Programme on Immunization followed so soon upon the smallpox eradication program, however, made it difficult to associate it with this new vision; one could not fail to notice how disconnected it was from larger public health infrastructures. As an actor in primary care succinctly put it, ‘The

²⁶ M. Cueto, ‘The Origins of Primary Health Care and Selective Primary Health Care’, *American Journal of Public Health*, 94, 11 (2004), 1864–74; R. M. Packard, *A History of Global Health: Intervention into the Lives of Other Peoples* (Baltimore, 2016); M. Cueto, T. Brown, and E. Fee, *The World Health Organization: A History* (Cambridge, 2019).

most serious needs cannot be met by teams with sprays guns and vaccinating syringes.²⁷ At first, the team for the Expanded Programme on Immunization put great effort into highlighting its connection to the principles of Alma Ata and minimizing its unavoidable association with the smallpox eradication program.²⁸ But it found a more lasting solution by shifting the terms of the discussion to the question of immunization's low cost. The Alma Ata Declaration had criticized the development of expensive infrastructures that promoted a consumer culture and squandered resources; hence, the program made the case that inexpensive health interventions, like immunizations, were in the spirit of primary health care.

Countries and institutions more favorable to a program focused on immunization also coordinated a response to Alma Ata a year after that conference. The Rockefeller Foundation organized the conference 'Health and Population in Development' in its Italian villa in Bellagio. While Alma Ata's imperative of 'health for all' reflected a world order in which developing countries openly expressed their demand for political and economic equality, the Bellagio event, sponsored by the World Bank, the Ford and Rockefeller Foundations, the US development agency USAID, and its Canadian counterpart, represented more clearly the interests of donor countries. In line with the interests of the Global North, Bellagio produced a competing vision of public health that called for cost assessments and gave vaccination a prominent place.²⁹

²⁷ John Bryant, *Health and the Developing World* (Ithaca, NY 1969), quoted in Cueto, 'The Origins of Primary Health Care', 1864.

²⁸ EPI – *Update: Report of the Meeting*, Geneva, 24-26 May 1978, WHO Records, I8-87-3.

²⁹ Chorev, *The World Health Organization between North and South*, 80.

In 1978, one year after Ralph Henderson's arrival, and following the suggestion of WHO regional offices to hire an economist, the Expanded Programme on Immunization began to focus on the economic appraisal of the national programs it was starting to implement.³⁰ Henderson himself emphasized program assessment in his correspondence, emitting the ethos of 'a manager reviewing the overall costs and benefits.'³¹ Notably, he brought a sampling method of his own to measure immunization coverage.³² He also contacted a British economist of health and development at Wales University, Andrew Creese, highlighting the need and benefits of cost-benefit analyses for immunization, and specifically asking him to write a position paper for the Expanded Programme on Immunization. 'Further to our discussions during your recent visit to Geneva,' Henderson wrote to Creese,

I should like to propose the establishment of a contractual services agreement between yourself and the WHO to cover the writing of a position paper, the subject matter of which could be summarized by the title: The Expanded Programme on Immunization – What Costs and What Benefits? Although cost/benefits analysis, as applied to the health programmes in developing countries is subject to substantial

³⁰ Two EPI officials wrote to the WHO regional director for the Western Pacific in November 1977: 'We were very interested and intrigued by your remark, during the Regional Advisers Meeting in Kuala Lumpur, that WPRO is considering a two to four months consultancy for an economist to look at several budgetary and cost aspects of immunization programmes. We are in full agreement with you that considerably more information is required on the economic aspects of an EPI,' November 23, 1977, WHO Records, I8-445-2.

³¹ R. Henderson, letter to C. Fillastre, February 9, 1979, WHO Records, I8/372/2-ICC.

³² R. Henderson and T. Sundaresan, 'Cluster Sampling to Assess Immunization Coverage: A Review of Experience with a Simplified Sampling Method', *Bulletin of the World Health Organization*, 60, 2 (1982), 253–60.

difficulties, immunization services have a more identifiable output and a major input on individuals' life chances. Evidence for cost benefit appraisals of immunization programmes suggests high rates of return from these activities and thus the position of EPI as priority in the development of health services.³³

Henderson's letter launched Creese's long period of his association with the program, during which Creese published most of the academic articles relating to its cost-benefit, cost-effectiveness and raw costs. In his position paper, Creese underscored a crucial feature of cost-benefit analyses as applied to immunization – their results always favored this form of prophylactic intervention because of its low cost. From 1978 onwards, the Expanded Programme on Immunization linked its activity with cost-benefit studies whose results were systematically favorable to immunization. Creese also elaborated guidelines for implementing cost-benefit analysis in every national program, publishing the protocol in 1980 in the *Bulletin of the World Health Organization*.³⁴ He then tested it out himself in the Philippines, Thailand, and later Brazil (1984) and Columbia (1987). During the 1980s, seventeen national cost-benefit surveys were conducted that claimed to have followed these guidelines. Nevertheless, while the guidelines were supposed to provide a specific, unified definition of cost and make various implementations of the program in different contexts comparable, none of these studies actually included the same elements in the cost category, one report lamented.³⁵ Certainly not dissuaded by the difficulty of standardizing these elastic categories, the program management team never stopped supporting cost-benefit analyses and encouraged Creese to continue academic research and publishing on the subject. The team also created software in the late 1980s – EPICost – intended to generate standardized national data on the costs of the Expanded Programme on

³³ Ralph Henderson, letter to Andrew Creese, March 22, 1978, WHO Records, I8-445-2.

³⁴ EPI, 'Programme Costing Guidelines', *Weekly Epidemiological Record*, 55, 37 (1980), 281–83.

³⁵ 'The Cost of EPI', 1990, WHO Records, I8-445-2.

Immunization. Creese was subsequently hired by the WHO and contributed, as an in-house economist, to the World Bank's landmark 1993 *World Development Report*. Throughout its three-hundred-fifty pages, this report famously defended the use of cost-benefit analysis for determining the best public investments in health.³⁶

Before the Expanded Programme on Immunization started to promote the systematic implementation of these studies, the cost-benefit argument had formed the **discursive basis** of eradication policies; it had justified eradication campaigns since the mid-twentieth century, regardless of whether they used vaccines or not. WHO officials, for example, invoked the argument in defense of the malaria eradication campaign, claiming that eradicating malaria by means of DDT, a chemical compound considered one of the most promising pesticides of the postwar period, was more cost-beneficial than any other strategy for controlling the disease.³⁷ Likewise, one of the most vigorous proponents of smallpox eradication, Fred Soper, perpetually emphasized the economic advantages of eradication.³⁸ But the claim that eradication was cost efficient at this time did not rely on studies and it remained mostly rhetorical. Historian Randall M. Packard has pointed out that the economic benefit of the eradication of malaria, which ultimately failed, could not really be shown:

One of the great ironies of malaria eradication as well as one of its greatest weaknesses was that, despite all the arguments concerning the economic benefits

³⁶ World Bank, *World Development Report 1993: Investing in Health* (New York, NY 1993).

³⁷ A. L. Staples, *The Birth of Development: How the World Bank, Food and Agriculture Organization, and World Health Organization Changed the World, 1945–1965* (Kent, OH 2006), 166 and 277–78.

³⁸ N. Stepan, *Eradication: Ridding the World of Diseases Forever?* (Ithaca, NY 2011), 193; D. A. Henderson, *Smallpox: The Death of a Disease* (Amherst, NY 2009), 59.

of eradication, those who supported the idea could never demonstrate that the control or eradication of malaria had any economic or social impact outside of that which was achieved in closed labor systems, such as plantations, where careful cost and benefit analyses could be carried out.³⁹

Because of the absence of data, most health officials confined their arguments to a quick comparison of minimal expenditure and an unquantifiably advantageous long-term result to highlight the superiority of eradication over any other strategy. The Expanded Programme on Immunization, for its part, certainly saw the political gains of labeling immunization as economically beneficial, yet it went beyond mere rhetoric and planned to produce up-to-date and standardized cost data within the framework of every national vaccination campaign it implemented.

Without having to justify the program's relationship to the smallpox eradication campaign, its cost-benefit studies allowed it to adapt, in an oblique way, to the ideological framework of primary health care: vaccination was an intervention for all and proved to be cost-beneficial. Whether or not the cost-benefit studies were comparable, and even if they failed to follow Creese's guidelines, they regularly asserted that immunization was unrivaled from the point of view of the cost-benefit ratio. Early on, Ralph Henderson understood that this refrain would protect his program in different contexts: at the WHO, with national governments, and on the international scene.⁴⁰

³⁹ R. M. Packard, 'Malaria Dreams: Postwar Visions of Health and Development in the Third World', *Medical Anthropology*, 17, 3 (1997), 279–96, 285.

⁴⁰ Ralph Henderson, Letter to SEARO director, October 3, 1979, WHO Records, I8-445-2.

We have seen how the argument worked with the WHO and the close ties between it and the Expanded Programme. François Gasse, who joined the program management team in 1982, explained the importance of cost-benefit studies in terms of negotiating with national governments: ‘Cost-benefit studies allowed priority to the program, to demonstrate the program was a good investment that would generate cost-saving, and that the lack of vaccination would create diseases that would be expensive for the state’.⁴¹ Cost-benefit studies, then, also helped on the international scene because they allowed the program to speak the language of international donors. Another decisive conference was held in 1984 in the Rockefeller Foundation’s Italian villa at Bellagio. It aimed to accelerate the implementation of the program and was an important step for UNICEF’s participation in it. A new program called Universal Child Immunization emerged at this conference. Several international institutions led by UNICEF, and including the WHO and the World Bank, gathered to raise funds to strengthen the Expanded Programme on Immunization and reach the goal of immunizing eighty percent of the world’s children by 1990.⁴² In addition to the WHO directors and UNICEF, a small group of thirty international leaders attended Bellagio. Among them was Robert S. McNamara, former director of the World Bank and U.S. Secretary of Defense during the Vietnam War. He was known for being a fervent supporter of the use of cost-benefit studies for appraising public policies.⁴³ Ralph Henderson gave two lectures at Bellagio, emphasizing the cost-effectiveness of immunization. ‘Immunization is one of the most cost-effective measures to reduce childhood mortality,’ he told his audience.

⁴¹ Interview with François Gasse, October 15, 2014.

⁴² A. Hardon and S. Blume, ‘Shifts in Global Immunization Goals (1984-2004): Unfinished Agendas and Mixed Results’, *Social Science & Medicine*, 60, 2 (2005), 345–56.

⁴³ On Robert S. McNamara’s tenure at the World Bank, see J. P. Ruger, ‘The Changing Role of the World Bank in Global Health’, *American Journal of Public Health*, 95, 1 (2005), 60–70.

This in itself provides a powerful justification to provide the necessary financial resources. Furthermore, the resources required are not large. WHO estimates that it costs US\$5.00–15.00 to fully immunize a child, and as infants generally comprise 4% or less of the population, a national immunization programme could be fully implemented for an investment of approximately US\$0.20–0.60 per capita.⁴⁴

Following from local and national cost studies, the practice of providing estimates of the per-child price of the Expanded Programme on Immunization spread in the 1980s. In the 1970s, program officials had argued that only US\$3.00 were necessary for fully immunizing a child against the six targeted diseases. By March 1983, then, Ralph Henderson cited US\$5.00 before mentioning the range US\$5–15 at Bellagio in 1984. By 1993, the price had risen, with program officials noting that ‘an average of US\$13 per child [was] generally accepted as a global approximation of the cost of full immunization.’⁴⁵ These rough estimates were made by gathering data from national cost-benefit studies, and despite the dramatic increase in the quoted estimate, the numbers continued to make immunization attractive, not least because they allowed results to be compared.

⁴⁴ R. Henderson, ‘Vaccine Preventable Disease of Children : The Problem’, in Rockefeller Foundation, *Protecting the World’s Children: Vaccines and Immunization within Primary Health Care* (New York, NY 1984), 1–16, 10.

⁴⁵ T. Hill, R. Kim-Farley, and J. Rohde, ‘Expanded Programme on Immunization: A Goal Achieved Towards Health for All’, in J. Rohde, M. Chatterjee, and D. Morley, eds., *Reaching Health For All* (New York, NY - Delhi, 1993), 403–22, 410.

After Bellagio, international vaccine policies continued to be articulated through the lens of cost estimates as these caught and held donors' attention. All in all, significant amounts of money were gathered for global immunization in the 1980s, and significant amounts were necessary because of the broad scale of the programs. A 1990 WHO report concluded 'that national immunization programs are not inexpensive (in absolute terms) and that securing greater government resources for preventive programs will require some combination of reallocation of resources within the health sector, improved efficiency in service delivery, or the payment of immunization services by the population community.'⁴⁶ Yet monies flowed in because the cost-benefit analyses helped to prove the programs were well worth it. As French epidemiologist Daniel Lévy-Bruhl confirmed, the 'conception that expensive measures could be worthwhile, efficient and justified in economic terms won recognition first on the global scale because the WHO was begging for money.'⁴⁷

In contrast to the existing literature on the econometrics of global health, the early history of the Expanded Programme on Immunization shows that international public health actors promoted and circulated cost-benefit calculations well before the 1993 World Bank report mentioned above. What would later be identified as major tropes of the liberal 1990s, such as the idea of investing in health, helped the program to navigate the challenging institutional context of the late 1970s and to deflect criticism originating from the primary health care doctrine. In reassessing the chronology of the economization of immunization, I intend to highlight the reversibility of the cost argument: whereas internationally promoted cost studies lent credibility to a program that initially lacked political support, they transformed immunization's perception during national implementation campaigns in the 1980s and the

⁴⁶ 'The Cost of EPI', 1990, WHO Records, I8-445-2.

⁴⁷ Interview with Daniel Lévy-Bruhl, March 11, 2014, Saint-Maurice, France.

1990s. The **economic legitimization of immunization prompted new types of criticism against the intervention**. It is important to note that these changes were not only apparent in developing countries (where the focus of global health metrics usually lay) but also in countries with long-established vaccine policies, such as France.

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The WHO's influence over immunization in France in the 1980s and 1990s was significant, amplified by **French immunization experts' longstanding self-representation, which brought together national aspirations and a postcolonial internationalism**. In the previous decades, the International Children's Center, the main center for the epidemiological study of vaccination in France, had given immunization an international cachet.⁴⁸ Although it was a French institution by law, with headquarters located in a neoclassical mansion at the edge of the Bois de Boulogne in Paris, the International Children's Center mimicked the rhetoric, symbols, and organizational structure of UN agencies. Until its demise in 1999, it was both an influential institution on the international stage – active on issues related to children's health in Francophone Africa – and a national bureaucracy that helped to determine French vaccine policies. It was designated the national reference center for the immunization of children in 1984 and a permanent member of the newly founded national advisory committee for immunizations in 1986.

⁴⁸ J. L. Pearson, *The Colonial Politics of Global Health: France and the United Nations in Postwar Africa* (Cambridge, MA 2018); G. Thomas, 'La routine vaccinale. Enquête sur un programme français de rationalisation par les nombres, 1949–1999' (PhD thesis, École des hautes études en sciences sociales, 2018).

The rise of the Expanded Programme on Immunization was pivotal to the formation of an international field of immunization, which leading figures at the International Children's Center wished to be part of. From the late 1970s, the French institution was involved in various aspects of this program, both in Geneva and in the field. Its vaccine department took advantage of its experience in the former colonies in Africa to help implement the international program, especially in Ivory Coast and Algeria. Members of the International Children's Center trained people to administer the vaccine in several African countries in the late 1970s and throughout the 1980s. A senior member of the center attended the annual Expanded Programme on Immunization advisory board meeting as an observer from 1980.

At the turn of the 1990s, the French International Children's Center organized three conferences on 'the role of cost-analysis for improving the planning and management of the Expanded Programme on Immunization'. They reflected the center's wish to be involved in the most advanced work surrounding the program. Yet the center did not acknowledge the criticism expressed during these symposiums. In one instance, a Turkish doctor denounced the quantity of resources allocated to cost studies, which, in her view, seemed mostly to serve bureaucratic purposes.⁴⁹ Around the conferences, this institution, sensitive to international standards, also adopted the category of cost in its work in France, even though its team had no training in economics. In 1989, it hired an economist, Miloud Kaddar, whose work focused on cost studies. Kaddar then collaborated with WHO economists, including Andrew Creese, and organized a conference on the vaccine market in sub-Saharan Africa. In 1994, the International Children's Center finished its first cost-benefit study on the tuberculosis vaccine in France.

⁴⁹ 'Utilisation des études économiques et financières pour les programmes élargis de vaccination – Compte rendu de la troisième réunion internationale', June 1990, ICC Records, 1CIDEF523.

Although cost-benefit studies were not unknown in France before they came to be associated with international vaccine policies, they had not been largely adopted there. During a short episode from 1968 to the early 1970s, cost-benefit analysis became the emblematic tool of a unit of the French Ministry of Finance called ‘Rationalisation des choix budgétaires’, which opened a branch at the Ministry of Health and produced a number of studies on medical interventions.⁵⁰ Even so, the use of such analyses in dedicated bureaucratic structures was limited to this brief interlude. In the late 1970s, a team from the French national health institute (INSERM) also published a series of articles examining the cost-benefit ratio of the vaccine against tuberculosis.⁵¹ These publications, based on the same series of data collected in the department of Bas-Rhin, were part of a research program examining all the aspects of the vaccine: efficiency, injuries, cost, and the epidemiology of tuberculosis. Yet these publications did not inspire further research and were never quoted in expert circles. In the 1970s, the cost variable was rather uncommon in the work of French epidemiologists in France and was not part of health officials’ rhetoric. This may have been due to a strong consensus surrounding immunization during that decade, both at the state level and in the population.⁵² But in the latter half of the 1980s, French vaccine experts widely adopted cost-benefit analysis after the Expanded Programme on Immunization had popularized it; this new focus coincided with a rise in the price of vaccines.

⁵⁰ D. Benamouzig, *La santé au miroir de l'économie* (Paris 2005), 67–127.

⁵¹ See, for instance, F. Lert, A. Lotte, R. Petitjean, G. Burghard, and F. Pierau, ‘Coût-efficacité et coût-avantage de la vaccination BCG en France’, in INSERM, ICC, and WHO (eds) *Colloque vaccination des enfants* (Paris 1978), 397–400.

⁵² C. Marengo and S. Govedarica, *La vaccination des enfants en France, 1880–1980* (Paris 1980).

Once the French International Children's Center became involved in this international Expanded Programme on Immunization, the WHO's vaccination methods and recommendations grew more influential within French public health circles. In 1984, the French government agreed to the program's European objectives on immunization at the Conference of Karlovy Vary in the Czech Republic. **Ten years later, the head of the national advisory committee for immunizations (a body created in 1986) made a short presentation titled, 'The situation of France within WHO's recommendations'.⁵³ By the late 1980s, the goals** the WHO established for disease control and prevention had become a barometer within **this national** committee. It comes as no surprise that the WHO's evolving stance on the hepatitis B vaccine was instrumental in transforming France's approach to it from initially recommending vaccination for select risk groups to advocating a large public campaign aimed at covering the entire population.

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The first hepatitis B vaccine, Hevac B, was licensed in France in 1981. There was a strong consensus among French experts that the vaccine should target risk groups, owing to the low and circumscribed prevalence of the virus. **In the early 1980s, the French government and the body controlling hospitals in the Paris region recommended the vaccine to various segments of the medical profession that were characterized as highly exposed to 'serum hepatitis'. For most of the 1980s, the cost of the vaccine remained an obstacle to the extension of these recommendations, a situation similar to what transpired in other Western countries.⁵⁴**

⁵³ CTV Minutes, March 1994, Ministry of Health Records, 2005/006/4.

⁵⁴ Stanton, 'What Shapes Policy? '.

‘The fundamental problem is an economic one’, argued a virologist in October 1986, during the third session of national advisory committee for immunizations.⁵⁵ He presented a study published by the *New England Journal of Medicine*, according to which the hepatitis b vaccine was demonstrated to *not* be cost-beneficial for groups in which the prevalence of the virus remained below 2%. This was the case, according to scarce data at the time, in most medical professional groups.⁵⁶ While recognizing the importance of economics, the virologist contested various methodological choices made in the study – such as the alleged overestimation of side effects and the underestimation of costs associated with the treatment of liver cancer – thereby underscoring the malleability of cost-benefit studies. ‘Cost-benefit studies are highly sensitive to changes of variable’, he stated. He added that other cost-benefit studies would be required in order to factor in these variables, but he implied that such expensive and long-term studies would be pointless since another French committee had already made the recommendation to vaccinate every medical worker. His comments did not prevent a member of the meeting to request cost studies on the vaccination of newborns.

In the second half of the 1980s, the national advisory committee for immunizations consolidated the ‘risk groups’ approach, merely extending the existing recommendation to medical students and newborns whose mothers were hepatitis B positive. Parts of these recommendations were subsumed into a law enacted in 1991 that made the hepatitis B vaccine mandatory for every professional working in a medical establishment, including administrative staff.

⁵⁵ Huraux, ‘Rapport pour le CTV sur la vaccination contre l’hépatite B’.

⁵⁶ Mulley, Siverstein and Dienstag, ‘Indications for Use of Hepatitis B Vaccine’.

This ‘risk groups’ approach changed radically in the early 1990s, when the head of the national advisory committee for immunizations presented a frightening picture of the increased prevalence of the disease. ‘Hepatitis B is becoming more frequent among adolescents and young adults,’ he said. ‘Sexual transmission and drug addiction are key factors. [...] In France, a risk exists of evolution towards a medium endemicity similar to what has been observed around the Mediterranean.’⁵⁷ This picture was at odds not only with previous public positions but also with what little epidemiological data were available. **Furthermore, no study circulating within the national advisory committee for immunization had at this time demonstrated the hepatitis b vaccine to be cost-beneficial.**

So what caused this radical shift? It reflected the evolution of the WHO’s recommendations for Western countries. In 1987, the WHO had begun to question the efficiency of the ‘high-risk group’ strategy adopted in Europe and the United States because, for the previous two years, ‘the pattern of HB infection had not changed significantly.’⁵⁸ The WHO projected that countries with low endemicity would only be able to control the virus with a universal program that vaccinated infants, adolescents, or both, although it could only consider this strategy for

⁵⁷ Conseil supérieur d’hygiène publique de France, April 1992, Ministry of Health Records, 2005/006-7.

⁵⁸ Technical Advisory Group on Viral Hepatitis, ‘Progress in the Control of Viral Hepatitis: Memorandum from a WHO Meeting’, *Bulletin of the World Health Organization*, 66, 4 (1988), 443–55, 445.

developing countries once prices started to drop in the late 1980s.⁵⁹ It then adopted universal vaccination as its official position in 1992, with the goal of achieving it by 1997. The 1993 World Bank report also advocated that the hepatitis B vaccine be added to the Expanded Programme on Immunization framework, thus endorsing its universal use.⁶⁰

As the WHO's worldwide influence in immunization matters was growing in the 1980s and 1990s, it did not remain unchallenged. The Ligue nationale des vaccinations, the main French organization opposing vaccination, began to combat it **in early 1990s**.⁶¹ Founded in 1954, this organization attained great visibility in the media. Public health officials referred to it obsessively until its decline in the 1980s, following the death of its president, Ferdinand Delarue, who had continued to work as a full-time high school teacher during his tenure. The Ligue's media profile far outweighed its limited following – **its membership peaked at 7,600 in 1979, according to its own magazine**.⁶² For decades, the organization focused on issues such as the legal obligation to vaccinate, as well as vaccine hazards. Between 1964 and 2018, however, French lawmakers abandoned the idea of instituting new legal obligations to vaccinate and a national commission was created in 1978 to compensate victims of vaccine injuries. As

⁵⁹ J. E. Maynard, M. A. Kane, and S. C. Hadler, 'Global Control of Hepatitis B through Vaccination: Role of Hepatitis B Vaccine in the Expanded Programme on Immunization', *Reviews of Infectious Diseases*, 11 (1989), S574–78.

⁶⁰ World Bank, *World Development Report 1993*, 73.

⁶¹ J. Skomska-Godefroy, 'La résistance contemporaine à la vaccination: le cas français', in A. M. Moulin (ed.) *L'aventure de la vaccination* (Paris 1996), 423–37.

⁶² Simone Delarue, 'Où en sommes-nous en 1982 ?', *Santé Liberté et Vaccinations*, 73 (1982), 43-

a result, the Ligue gradually shifted its attention toward other issues and targets.⁶³ At the turn of the 1990s, the Ligue's magazine, *Santé, liberté et vaccination*, honed in on the Expanded Programme on Immunization. One article warned readers not to donate to the cause of childhood vaccinations: 'Donating to an organization supporting children's vaccinations is not an innocent gesture, even if its card is rather cute.'⁶⁴ The magazine criticized such campaigns for utilizing uncontroversial imagery to push UN initiatives, thus imposing Western technologies on medical traditions in the Global South.

Articles in the Ligue's magazine framed the Expanded Programme on Immunization as a neocolonial project that was somehow related to the French context. In 1990, for instance, an article wrongly described a French campaign to vaccinate children against measles, mumps, and rubella as being part of the program.⁶⁵ Most criticism related to France did not question public health sovereignty, however, and instead raised economic issues, such as accusing the program of creating a global market favoring the powerful French vaccine industry. Most significantly, the Ligue's magazine mocked the program's cost-benefit rationale. In March 1991, an article titled 'Cost-Efficient Ratio: The Catastrophe' featured the following remark: 'How could such a program [*an initiative related to the EPI*], which costs 250 million US dollars, be declared the most efficient and least expensive program ever carried out in human

⁶³ A. Bertrand and D. Torny, *Libertés individuelles et santé collective. Une étude socio-historique de l'obligation vaccinale* (Villejuif 2004).

⁶⁴ Simone Delarue, 'Éditorial', *Santé, liberté et vaccinations* 93 (March 1991), 3.

⁶⁵ 'Lancement d'une campagne des vaccinations rougeole oreillons rubéole', *Santé, liberté et vaccinations* 92 (July 1990), 20–26.

memory?’⁶⁶ In the same issue, another article ridiculed a quotation by the UNICEF director general, James Grant, who had suggested that the ‘total cost of immunization, which amounts to about one billion **US dollars**, is not enormous at all.’⁶⁷ In 1993, a new organization succeeded the Ligue. The publication of the Association Liberté Information Santé continued the established lines of attack. Its characterizations of the Expanded Programme on Immunization were not immune to errors, but they gave rise to a set of arguments on the cost of immunization that re-emerged a few years later in the context of the hepatitis B vaccine campaign.

As we saw above, the WHO began advocating universal vaccination for hepatitis B in 1992, and in 1994, France launched a national campaign to vaccinate adolescents in public schools. One year later, in 1995, questions concerning the safety of the hepatitis B vaccine began to appear in the French media. Between 1994 and 1998, 66 million doses of the vaccine were sold, and an estimated 16–22 million people were vaccinated, including 6–7 million children below the age of sixteen.⁶⁸ The whole effort was considered unparalleled and highly successful.⁶⁹ A series of events, however, thrust the campaign into a national controversy. Children vaccinated in secondary schools complained of mild headaches, and reports of serious side effects among adults were made to the national agency that licensed drugs, the Agence du médicament. In February 1997, vaccinated adults alleging serious neurological side effects created an

⁶⁶ D. Banerji, ‘Le point de vue du Pr Debabar Banerji’, *Santé, liberté et vaccinations*, 93 (March 1991), 13–19, 16.

⁶⁷ S. Valmage, ‘Programme élargi de vaccinations de l’Organisation mondiale de la santé’, *Santé, liberté et vaccinations*, 93 (March 1991), 8–11, 11.

⁶⁸ O. Borraz, *Les Politiques Du Risque* (Paris 2008), 211.

⁶⁹ D. Lévy-Bruhl, ‘Succès et échecs de la vaccination anti-VHB en France: historique et questions de recherche’, *Revue d’épidémiologie et de santé publique*, 54 (2006), 89–94.

organization, REVHAB. Its data was closely examined by the Agence du médicament and its claims amplified by major national media outlets throughout 1997. As concerns about the side effects grew dramatically, Geneva reacted publicly in May with an unsigned article published in its *Weekly Epidemiological Record*. The WHO dismissed the French media coverage of the vaccine and warned against the potential consequences for vaccine campaigns worldwide:

During the past year, articles in the French popular press and television programmes have raised concerns among the French public that hepatitis B (HB) immunization may be linked to new cases or flare-ups of multiple sclerosis (MS) or other demyelinating diseases. These concerns have led to significant reductions in the uptake of HB vaccine in France, and misinformation on this subject may spread to other countries. Since the scientific data do not support the idea that HB vaccine causes or exacerbates MS, and since universal childhood and/or adolescent immunization with HB vaccine is now a policy in 85 countries, this has the potential to cause significant damage to important public health programmes.⁷⁰

The WHO's intervention in the French controversy immediately backfired. The most active publication in the controversy, the independent health magazine *Alternative Santé – L'impatient* published a short article entitled 'The World Health Organization Is at the Service of the Vaccine Merchants.' In it, the author suggested that 'Like the French authorities, the WHO is only playing into the hands of vaccine merchants.'⁷¹ Unlike the publications of French

⁷⁰ 'Expanded Programme on Immunization: Lack of Evidence that Hepatitis B Vaccine Causes Multiple Sclerosis', *Weekly Epidemiological Record*, 72, 21 (1997), 149–52, 149.

⁷¹ R. Pluchet, 'L'Organisation mondiale de la santé au service des marchands de vaccins', *Alternative Santé – L'impatient*, 238 (1997), 10.

organizations dedicated to anti-vaccination campaigns, *Alternative Santé* was a widely read monthly magazine covering a broad range of health-related issues. As the controversy unfolded in subsequent years, the magazine was joined by others who accused the WHO (an organization some came to call ‘World Immunization Organization’) for advocating global immunization campaigns in order to enrich vaccine producers.⁷² The French hepatitis B controversy, in other words, was one of the first major crises of the economization of immunization.

Why was a line of attack linking the WHO to pharmaceutical greed so effective in the second half of the 1990s? During this period, the WHO actively tightened its relationships with the pharmaceutical industry by promoting public-private partnerships.⁷³ Even though such collaboration was emblematic of the rise of neoliberal global health initiatives, however, vaccination opponents did not focus on it. Instead, opponents responded to the particular way in which the WHO had proposed to economize vaccination through cost-benefit schemes. As explained in the first section of this article, the Expanded Programme on Immunization had placed a major emphasis on cost from the turn of the 1980s. It had been part of a strategic move to legitimate the vaccination program inside the WHO and to justify it to external donors. The WHO had recommended in its guidelines that national governments produce cost-benefit assessments. It calculated the estimates of the raw cost to fully immunize a child. During the 1980s, its initiative led to a veritable avalanche of numbers on the cost of immunization, numbers that had initially favored its cause.

While this was going on, however, the pharmaceutical industry went through an important round of mergers. The Mérieux Institute, the main French vaccine producer, for example, in the

⁷² Giacometti, *La santé publique en otage*, 64.

⁷³ Cueto, Brown, and Fee, *The World Health Organization*.

1980s and 1990s absorbed Pasteur Production and the Canadian Connaught Laboratory, which created a new global leader in vaccine production. This ran parallel to the privatization of vaccine production worldwide, which completed the transformation of vaccines into **expensive commodities**, a development noted in the French public. The fact that the pharmaceutical industry aggressively advertised the hepatitis B vaccine in the mid-1990s triggered further suspicion. In this rapidly changing landscape, the WHO's emphasis on cost, which was picked up in France, proved fatal for the public trust in vaccination. **The metrics of global health could have provided a precarious solution, in demonstrating that the hepatitis B vaccine was on the right side of cost-benefit calculations despite its price. But in many cases, the hepatitis B vaccine was not even demonstrated to be cost-beneficial.** While it was the first vaccine to be narrowly examined through the lens of cost-benefit calculations in France, public health officials struggled to decide whether its benefits actually outweighed its costs. The crisis of evidence was not limited to causal factors, such as whether the vaccine caused serious side effects; it also involved **a fragile economic rationale that came to be contested when publicly discussed.**

In conclusion, the history of the reception of the hepatitis B vaccine in France shows how important sources of vaccine legitimacy – its economic rationale and the mandate of an international organization, the WHO – **came to be challenged and became a political liability.** By inscribing the hepatitis B vaccine controversy into a history of the economization of immunization, this article explored the causes and implications of what has hitherto been described as **the symptom of a supposedly weak public health 'culture' in France. Against this form of essentialization, this article described the controversy as one of the first crises of the global economization of immunization and thereby demonstrated that this event should not be understood as contained within a national frame.**

The 1990s constitute a turning point in the history of the economization of immunization. In the previous decade, the WHO promoted cost-benefit calculations in order to strengthen immunization's political legitimacy on the world stage. But as the price of new vaccines kept rising after the introduction of the hepatitis b vaccine, the audience for cost-benefit analyses started to shift towards state bureaucrats who had to decide whether or not they would introduce these expensive innovations into the regular immunization schedule.⁷⁴ In the meantime, while cost-benefit calculations were becoming the gospel of the increasingly global field of immunization, pharmaceutical companies came to use it as a way of fixing the price of vaccines. It transformed into an equation with a single unknown: a vaccine can be cost-beneficial or efficient if it had an appropriate price. French epidemiologist François Gasse, a former official in the Expanded Programme on Immunization, provided a case in point when he looked back at the introduction of Gardasil, a vaccine for the human papillomavirus (HPV) produced by Merck, approved by European regulators in 2006, and recommended by French authorities the following year:

The two vaccine producers looked at how expensive cervical cancer was for the government and health insurance companies. They realized it costs millions. They made their calculation and said: even if we sell it for 300 US dollars, they [*states and insurance companies*] will save crazy amounts of money. So we will sell the vaccine for 300 US dollars, a crazy amount of money. American health companies paid, because they looked at the cost-efficiency ratio.

⁷⁴ For instance, see Stuart Blume analysis of the introduction of chickenpox vaccination in the United States, Blume, *Immunization*, 118.

In France and in other countries, cost-benefit analyses have been used throughout the 2000s and the 2010s in the negotiation between the state and pharmaceutical companies, to set the final price of recommended vaccines.⁷⁵

The economization of immunization also continued to shape public discussions. The controversy described here set the stage for subsequent vaccination campaigns, such as failed H1N1 vaccination efforts in 2009, which were plagued by the public perception that both WHO experts and the pharmaceutical industry were motivated by economic interest rather than public health and the public good.⁷⁶ European governments were accused of wasting tax money by buying an excessive number of vaccine doses.⁷⁷ The association of immunization with a contested **economic** order is rarely discussed in the abundant literature on the rise of ‘vaccine hesitancy’, which mostly focuses on individuals’ **behaviors, perceptions and** purported lack of rationality.⁷⁸ But as the world’s attention turns to the newly developed covid-19 vaccines, it seems more urgent than ever to consider together **immunization’s** structural transformations and public perception.

⁷⁵ O. J. M. Castañeda, ‘Price-effectiveness: pharmacoeconomics, value and the right price for HPV vaccines’, *Journal of Cultural Economy*, 10, 2 (2017) 163–177.

⁷⁶ D. Cohen and P. Carter, ‘WHO and the Pandemic Flu “Conspiracies”’, *British Medical Journal*, 340, 77 (2010), 1274–79.

⁷⁷ J. Sturcke, ‘Drug Companies Face European Inquiry over Swine Flu Vaccine Stockpiles’, *The Guardian*, January 11, 2010.

⁷⁸ See for instance, H. Larson, *Stuck: How Vaccine Rumors Start – and Why They Don’t Go Away* (New York, NY 2020).