



Assessing Environmental Health and Hygiene: A Study of Public Restroom conditions at the 2020 Tokyo and 2024 Paris Olympics

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Abstract

Background: We explored the perceptions, value, and social visibility of public toilets by comparing the implementation of public restrooms at the 2020 and 2024 Olympics. We specifically examined how sociocultural factors influenced restroom policies and development.

Methods: We conducted a survey of the history of public toilets as a form of public hygiene management in Japan and France during the Olympics. The analyses compare Paris's eco-friendly and Tokyo's culture-oriented approaches.

Results: The 2020 Tokyo Olympics demonstrated how public restrooms can promote cleanliness and hygiene. However, the 2024 Paris Olympics adopted a practical, eco-friendly approach in response to the climate crisis. Thus, the public restrooms in both cities provided novel examples of public health policies, integrating scientific and cultural perspectives.

Conclusion: Although Tokyo successfully implemented its sanitation culture in its public restrooms, challenges related to sustainability remained. In Paris, the perceptions of public restrooms have not yet been fully addressed. Nevertheless, the innovative approaches of both cities are expected to yield constructive outcomes for the 2028 Games, demonstrating the future value of such policies.

Keywords: Environmental health; Urban public hygiene; Toilet sanitation; Olympics; France; Japan

Introduction

Hygienic and safe defecation, which affects an individual's health, has only been possible since the Industrial Revolution with the toilets being connected to water and sewer systems (1). Accessing basic sanitation is considered a critical environmental determinant of health, and governments normally consider public toilets as a basic and essential public service (2-4). However,

4.2 billion people around the world currently live without "safe sanitation," and an estimated 673 million people defecate in the open. In response, the United Nations has designated November 19, 2021, as World Toilet Day, an official International Day of Observance that calls for actions addressing sanitation (5).



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Public restrooms are also linked to tourism from a hygiene perspective (6), and international sporting events can increase the spread of infectious diseases, potentially negatively impacting a host city's healthcare system (7). The negative environmental impacts of mega sporting events mostly occur in the infrastructure, waste management domains, and construction (8). Moreover, infectious diseases accounted for less than 1% of healthcare visits during the 1996 Atlanta and 2000 Sydney Olympics, while respiratory infections (6.7%) and gastroenteritis (3.7%) were the most reported illnesses at the 2004 Athens Olympics. At the 2008 Beijing Olympics, reports of infectious diseases, including gastroenteritis, decreased by 40% compared to 2007 (9). The Tokyo 2020 Olympics set a new standard for the health management of international sporting events in the context of a pandemic by demonstrating the continued effectiveness of WHO advice on implementing public health measures like "social distancing, mask wearing and hand hygiene" (10). A review study on 20 years of Sport and infectious risk reported skin infection with methicillin-resistant community acquired *Staphylococcus aureus* as the most marked risk which was followed by *Tinea corporis* and *capitis* (13.7%), and leptospirosis (11). Hence, it is essential to develop a thorough plan for sanitation and hygiene based on the experiences of previous host cities (12).

Public restrooms in countries preparing for mega international sporting events are often improved by adopting international sanitation and technology standards and introducing new features. For example, South Korea implemented public restroom modernization projects during the 1986 Asian Games and the 1988 Seoul Olympics (13), and Japan made similar efforts during the 1964 and 2020 Tokyo Olympics (14). The Paris 2024 Olympics established a public health policy of a "low-carbon, green Olympics," and the Paris Organizing Committee (COJOP 2024) increased the number of *sanisettes* (self-cleaning, portable public toilets) and street urinals along the Seine River and around the Olympic venues.

We analyzed the public restroom policies of the Tokyo 2020 and Paris 2024 Olympic Games in terms of public sanitation according to the cultural differences between the East and West. By comparing the status and improvements of public restrooms at the Tokyo 2020 Games (which introduced Western-style, accessible, and gender-neutral restrooms) and the Paris 2024 Games (which introduced temporary eco-friendly restrooms), it explores how the traditional meanings of "hygiene" and "safety" in public restrooms are changing in sociocultural and historical terms. As a result, this will influence the need for sustainable public toilet hygiene (15).

Historical trends in public restrooms in Japan and France

Public restrooms in Japan

Japan's public restroom policy was established as part of national sanitation measures in response to three cholera outbreaks between 1822 and 1886. Japanese society continued to use human waste as fertilizer until 1989 but began the large-scale construction of sewers in the 1950s, with substantial investments in sewer infrastructure in preparation for the 1964 Tokyo Olympics. As a result, the "nostrils of colonization" were fully internalized (16).

While most public toilets in Japan are free, paid toilets were first installed in Shinjuku Station in the 1960s and in many commercial facilities in the 1980s. However, when Japan Railways (JR) was privatized in 1987, it focused on improving user service to overcome the "4Ks" (*kurai*, dark; *kitanai*, dirty; *kowai*, scary; *kusai*, smelly). As a result, the distinction between free and paid toilets diminished, and by 2013, 24 out of 37 (64.9%) paid service JR toilets were either closed or converted to free service. With the recent increase in tourist visits to Japan, 24-hour facilities like convenience stores have also begun opening their restrooms to the public. However, the recent influx of visitors has raised concerns about the increased cleaning and water bills in such restrooms at popular tourist destinations, necessitating further revisions to the city's sanitation policies (17).

Public restrooms in France

The 2016 Olympic Games in Rio de Janeiro and the 2023 British swimming championships in London confirmed that human waste, if not fully treated in wastewater treatment facilities, can pollute rivers and become a source of waterborne diseases (18). Recognizing this problem, the city of Paris invested €1.4 billion to improve the water quality in the Seine, but a Canadian athlete still vomited 10 times during a triathlon event at the 2024 Paris Olympics (19).

The pollution in the river was closely linked to the use of public toilets, making it an important issue in the history of modern public health policy in Paris. The Count de Lanvuto (1781–1869)

installed 478 Vespasian toilets on major avenues to reduce the pollution of the Seine (20), and Georges-Eugène Haussmann (1809–1891) entrusted the engineer Eugène Belgrand with the design and construction of Paris's water supply system, and later oversaw the overhaul of the sewage system. As a result, by 1900, Paris had become the most hygienic city in Europe (21). As a result, the expansion of the water and sewage system was considered to have had a positive impact on cholera prevention. Cholera-related deaths in Paris (blue) had already fallen sharply before the increase in buildings connected to the sewer system (orange) (22) (Fig. 1).

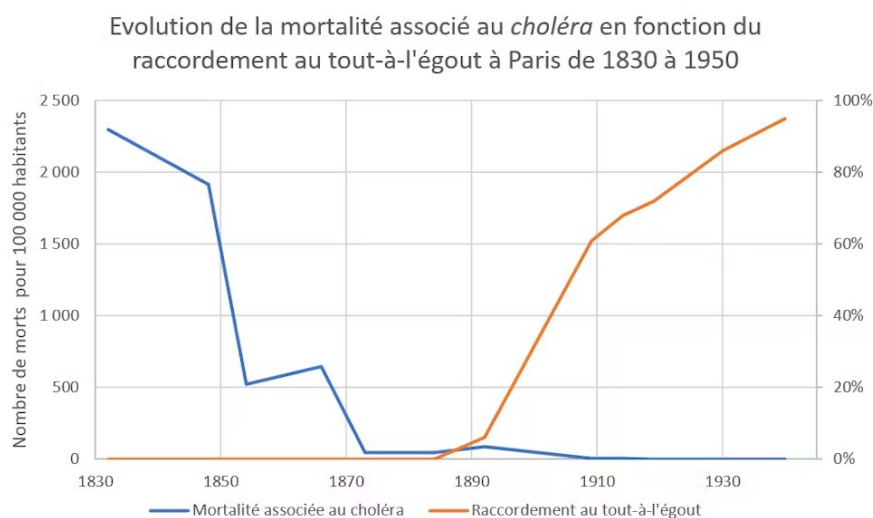


Fig. 1: Cholera-related mortality in Paris and the proportion of buildings connected to sewer systems (22)

In Paris, La Madeleine, a large public restroom that was open from 7 a.m. to midnight and charged 1 franc, was installed in 1905. In 1930, 1,230 toilets were installed, and modern public toilets (*sanisettes*) were installed in 1981. Fig. 2 compares the location of public restrooms in each *arrondissement* with the number of reports of street urination, in which 2A displays the “street urination” incidents per *arrondissement*. Fig. 2B shows the number of public toilets in each *arrondissement* of Paris, showing that neighborhoods

with more open urination have more public toilets. Notably, the 1st, 2nd, and 3rd *arrondissements* have less than 2% of all public toilets, while the 18th *arrondissement* had 12% concentrated within its boundaries (23). As a result, Paris has focused on installing public toilets to improve sanitation in the northern part of the city, where many low-income residents live. However, in preparation for the 2024 Olympics, the city also built a system of urinals, sinks, and urine-discharge dry toilets (UDTTs) in the 14th *arrondissement*.

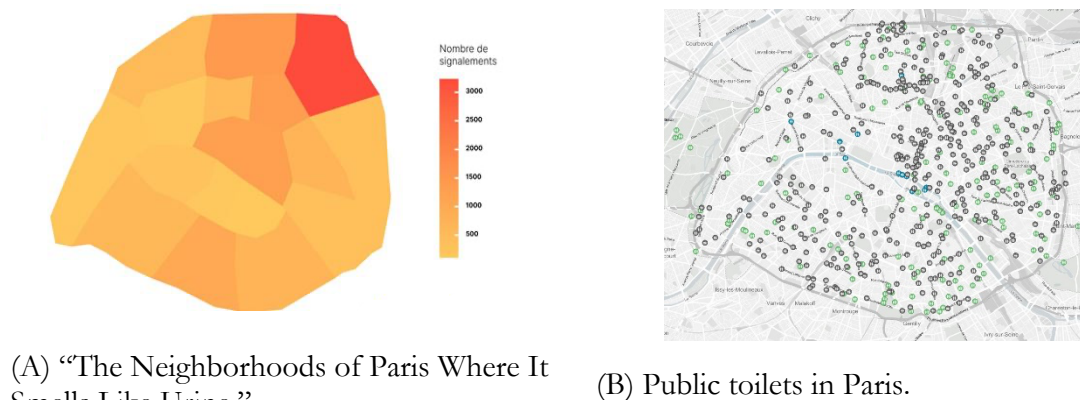


Fig. 2: Frequency of street urination and installation of public restrooms by *arrondissement* (23)

Methods

This study analyzes the status and future value of public toilets from a scientific, social, and cultural perspective in the context of the sanitation policies established by the Tokyo 2020 and Paris 2024 Olympic Games. A literature review was conducted to examine the history and current infrastructure of public restrooms in Tokyo and Paris. The authors focused on a sociocultural and historical exploration that compares the differences in public restroom user perceptions, design, and future value based on the public health policies of the two cities.

Results

Tokyo: Public restrooms as culture

In hosting two Olympic Games, Japan has changed local perceptions of public restrooms, which were once associated with anxiety, dirt, and unpleasant odors, to one that focuses on cleanliness and safety. For the Tokyo 2020 Olympics, Japan promoted a new image of Japanese public restrooms as a form of “hospitality” (*omotenashi*) (24-25). The Cabinet Office’s Quality of Life Research Committee even recommended that the Japanese government set an example of

clean, convenient, state-of-the-art restrooms for the world (26). As a result, public restrooms in Japan have become more “*omotenashi*” (hospitality-oriented) than “high-tech”. Fig. 3 represents the perception of citizens and the reasons for not using public restrooms.

As a result, international travelers who have visited Japan in the past 10 years have provided positive feedback about the country’s public restrooms as free, clean, and easily accessible. International travelers cited hygiene (60.6%), friendliness (55.9%), safety (51.0%), delicious food (35.2%), and *omotenashi* (34.1%) as Tokyo’s most attractive features (27). They related hygiene and *omotenashi* to the availability of clean, Western style restrooms. In 2018, the Japan National Tourism Organization therefore decided to remodel approximately 40% of the 4,000 Japanese-style public restrooms in major tourist destinations with Western-style restrooms. Taking it a step further, the Japan Foundation partnered with local companies and world-class architects to launch the Tokyo Toilet Project. The project involved the construction. We replaced it with a higher resolution image from their site of 17 public restrooms by renowned architects in Shibuya, a popular tourist destination and a key area for the Tokyo 2020 Olympic Games (Fig. 4).

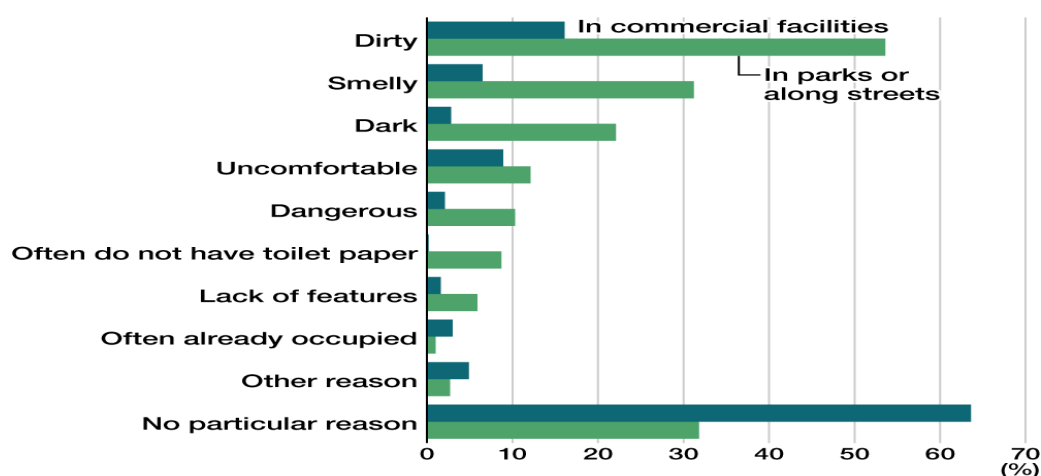


Fig. 3: Japanese perceptions of public restrooms
Source: nippon.com

In 2023, the movie *Perfect Days* was released, documenting the daily lives of the cleaners involved in the project. The “story” of the public toilets has become cultural *omotenashi* content, representing Japan’s emphasis on hygiene and cleanliness, and the Tokyo Toilet Project has become a

source of “toilet tourism” due to its outstanding designs. Launched in March 2024, the “toilet tour” provides two options—the two-hour “Express” and the four-hour “Standard”—and costs around \$24 (27).

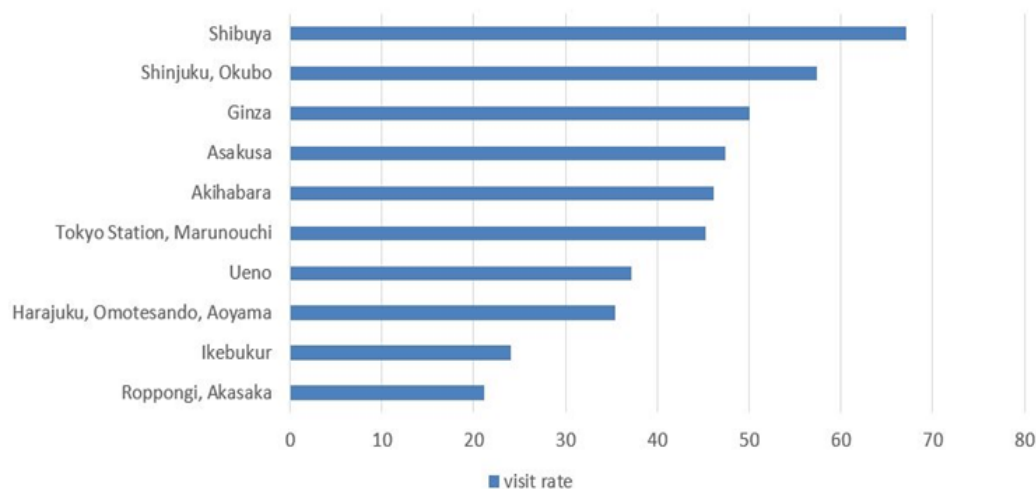


Fig. 4: Tokyo wards ranked as most popular among foreigners (2022) (25)

Paris: Public restrooms for science

The opening ceremony of the Paris 2024 Olympic Games took place on July 26, 2024, and lasted three hours and 15 minutes, with more than 160 boats parading along a six-kilometer course from Pont d’Estaing Ritz to the Trocadero. COJOP

2024 provided 700 paid toilets for opening ceremony attendees, while the city of Paris provided 900 free private toilets and 500 urinals (organized in 125 blocks of four), for a combined total of 2,100 toilets (28).

The 2024 Paris Olympics collected urine from

open toilets to recycle it into fertilizer as part of its commitment to a “low-carbon, green Olympics” in response to the climate crisis (29) (Fig.5). Urine recycling began in eco-villages in Sweden in the 1990s, and the Gotland Project has collected more than 70,000 liters of urine from waterless urinals and special toilets to make fertilizer pellets (30). To promote urine collection and recycling in France, the École des Pays de Paris Tech has an OCAPI research program, and

VINCI Autoroutes has developed a new model in collaboration with Topi Organics to process 400,000 liters of urine annually (31). As a result, France has plans to utilize approximately 30 billion liters of urine annually to fully replace chemical fertilizers. The success of these initiatives is driving the demand for dry toilets and toilets equipped with urine separators, underscoring the necessity to minimize the overall risks to both human health and the environment (32).



(A) *Sanisettes* and urinals along the Seine



(B) Sou Fujimoto. Nishisando: 3-27-1 Yoyogi
The Tokyo toilet list (2020)

Fig. 5: Public restrooms at the Paris Olympics (A) and the Tokyo Toilet Project (B) (31)

Discussion

While public toilets at the Olympics are focused on maintaining public hygiene and preventing infectious disease, Tokyo’s 2020 Games emphasized soft power as making these facilities a cultural space of *omotenashi* to reflect their cultural mindset, and the 2024 Paris Games emphasized urine recycling as a response to the climate crisis. Japan’s public restrooms demonstrated their commitment to maintaining and managing “smart” public restrooms with the Tokyo Toilet Project. Since the initiation of the project, the use of public restrooms has increased sevenfold in Hatagaya and fivefold in Nishisando. Satisfaction with public restrooms has risen from 44% to nearly 90%, while resistance to using public restrooms has decreased from approximately 30%

to 3% (33). With their design and hygiene standards, Tokyo’s public toilets have become a unique tourist space in the city, considering inclusivity and maintaining their value as a public facility. Such a presentation of public toilets is compliant with ‘The Sanitation Triangle model’ which is a theoretical and practical model for global sanitation and involves ‘health, materials, and socio-culture’ (34). Accordingly, the Tokyo 2020 Games developed public toilets as part of the city’s architecture and art through the Tokyo Toilet Project.

Public toilets in France brought scientific efficiency to the forefront by turning urine into an eco-friendly fertilizer for the 2024 Olympics, in line with a “Low Carbon Green Olympics” mission. A typical toilet consumes an average of nine liters of water per use, and if an adult uses it four

times a day, it pollutes about 13,000 liters of water per person per year. At key venues and tourist attractions for the 2024 Olympic Games, 185 (42%) of the existing *sanisettes* were replaced with new models, with the remaining 29 upgraded by 2025 (35). The new sensors reduce water use by two-thirds and are powered by 100% renewable energy, reducing electricity use by one-third. UDTTs, which collect urine separately for recycling, significantly reduce water use in areas without existing drainage systems and are thus essential for sanitation. In Paris, where new indoor public toilets are difficult to introduce due to the historic architecture, the city has adopted a scientific policy of recycling urine as fertilizer to reduce carbon emissions rather than reducing the “visual filth” and odor of curbside toilets (36).

Conclusion

A country's public restroom policy can evolve beyond the traditional categories of mindsets about health and hygiene. The architectural design in Shibuya, Tokyo, reflects Japan's culture of consideration, respect, and hospitality for an inclusive society, while the urine recycling system in Paris symbolizes a scientific and ecological identity aimed at overcoming the climate crisis.

Journalism Ethical considerations

Potential ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been carefully avoided by the authors.

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Conflicts of Interest

The authors have no relevant conflicts of interest to disclose.

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