

AN EXAMINATION OF **DROPLET- TRANSMITTED DISEASES**

FROM AN OCCUPATIONAL
HEALTH AND SAFETY
PERSPECTIVE

Dr. Fatih Mehmet ATEŞ
Prof. Dr. Mevlüt ALBAYRAK



**AN EXAMINATION OF DROPLET-TRANSMITTED
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AND SAFETY PERSPECTIVE - 2026**

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PREFACE

Neurological and neurodegenerative diseases remain among the most complex and challenging areas of contemporary biomedical research. Their multifactorial nature requires innovative approaches that combine biological knowledge, therapeutic exploration, computational analysis, and advanced biomedical technologies. In recent years, increasing attention has been given to interdisciplinary strategies that may contribute to the prevention, understanding, and treatment of neurological disorders.

Droplet-transmitted diseases have caused major epidemics and profound social effects throughout human history. Pathogens spread through the respiratory route pose serious risks to both individual and public health. The COVID-19 pandemic once again demonstrated how rapidly such diseases can spread and how critical they are from an occupational health and safety (OHS) perspective. This study aims to comprehensively examine the development of droplet-transmitted diseases, their routes of transmission, toxicity studies, and their effects on workers' health.

The study first addresses the historical effects of droplet-transmitted diseases, with particular attention to the devastating effects of outbreaks such as the Spanish flu, tuberculosis, and COVID-19. It then analyses in detail the mechanisms by which these diseases arise, their routes of transmission, and workplace exposure risks. Toxicity studies and both acute and chronic health effects also constitute an important part of the study.

Preventing and controlling droplet-transmitted diseases is of great importance in occupational health and safety. Accordingly, the study discusses in detail engineering controls, administrative measures, and the use of personal protective equipment in workplaces. It also emphasizes the role and importance of national and international legislation in this process.

This study offers not only an academic perspective but also practical recommendations for employers, workers, and policymakers. It particularly emphasizes the critical role of measures and legal arrangements adopted during pandemics in protecting workers' health. The findings are intended to contribute to the development of effective strategies for combating droplet-transmitted diseases.

National and international sources were consulted in preparing this study, which is supported by current statistics and examples of good practice. Our aim is to raise awareness in this field and help improve preparedness for similar outbreaks in the future.

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October 2026, Türkiye

**AN EXAMINATION OF DROPLET-TRANSMITTED
DISEASES FROM AN OCCUPATIONAL HEALTH
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INTRODUCTION

Droplet-transmitted diseases are infections caused by pathogens spread through the respiratory route and can have serious effects on human health. They pose a major threat, particularly to the health of workers. The COVID-19 pandemic reminded the entire world how rapidly these diseases can spread and how critical they are for occupational health and safety (OHS). This study examines how droplet-transmitted diseases arise, their exposure routes, toxicity studies, and their potential effects on workers' health.

Droplet-transmitted diseases spread through small droplets released when a person coughs, sneezes, or speaks. These droplets are generally effective within a distance of 1–2 metres and spread rapidly, especially in enclosed and crowded environments. COVID-19, influenza, tuberculosis, and measles are among the best-known examples. During the COVID-19 pandemic, more than 600 million cases and over 6 million deaths were recorded worldwide (World Health Organization [WHO], 2023). In Türkiye, more than 10 million cases and over 100,000 deaths were reported between 2020 and 2023 (Ministry of Health of the Republic of Türkiye, 2023).

Historically, droplet-transmitted diseases have caused major outbreaks. The 1918 Spanish flu, for example, caused more than 50 million deaths and became one of the deadliest pandemics in modern history (Taubenberger & Morens, 2006). Similarly, tuberculosis affected millions of people during the nineteenth and twentieth centuries and remains a major public-health problem worldwide. According to the World Health Organization (WHO), 10 million new tuberculosis cases and 1.5 million deaths were reported in 2021 (WHO, 2022).

In workplaces, droplet-transmitted diseases pose a serious threat to high-risk groups such as healthcare workers, education-sector personnel, and public-transport workers. During the COVID-19 pandemic, healthcare workers were at greatest risk because of direct contact with infected patients. A study in Türkiye reported that more than 30% of healthcare workers contracted COVID-19 (Ministry of Health, 2021). Public-transport workers are likewise at high risk because they work in crowded, enclosed settings. The effects of these diseases on workers' health are not only physical but also psychological and social.

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During pandemics, psychological problems such as anxiety, stress, and burnout increase among workers. One study conducted during the COVID-19 pandemic reported that more than 40% of workers experienced increased stress and anxiety because of the pandemic (Brooks et al., 2020).

This study examines droplet-transmitted diseases from an occupational health and safety perspective. It evaluates disease development, exposure routes, toxicity studies, and potential effects on workers' health. Measures for combating such diseases, relevant legal frameworks, and international standards are also discussed.

1. HISTORY

Droplet-transmitted diseases have caused major epidemics and social disruption throughout human history. They spread rapidly, particularly in crowded and unhygienic environments, and have caused large numbers of deaths. Historically, outbreaks caused by these diseases have profoundly affected societies' health systems, economies, and social structures.

1.1. Early Outbreaks

The history of droplet-transmitted diseases extends back to antiquity. The outbreak that occurred in Athens in 430 BCE and became known as the 'Plague of Athens' may have been a respiratory disease such as typhoid fever or tuberculosis. It killed approximately one-third of the Athenian population and severely weakened the city's political and military power (Thucydides, 431 BCE).

1.2. The Middle Ages and Tuberculosis

During the Middle Ages, tuberculosis became widespread in Europe (Figure 1). In the seventeenth and eighteenth centuries, increasing industrialisation and urbanisation created crowded and poorly ventilated living conditions that facilitated its spread. In the nineteenth century, tuberculosis was called the 'White Plague' in Europe and America and was recorded as the cause of one in every seven deaths (Daniel, 2006). Robert Koch's discovery of the tuberculosis bacillus in 1882 marked a major turning point in the diagnosis and treatment of the disease.

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Figure 1. Tuberculosis in the Middle Ages

1.3. The 1918 Spanish Flu

The 1918 Spanish flu, the deadliest outbreak of the twentieth century, was a global pandemic caused by a droplet-transmitted influenza virus (Figure 1.2). It killed more than 50 million people—approximately 3% of the world’s population (Taubenberger & Morens, 2006). The Spanish flu particularly affected young and healthy adults, exposing the inadequacy of health systems at the time. It also contributed to the end of the First World War by spreading rapidly among soldiers and weakening the military capacity of the belligerent countries.

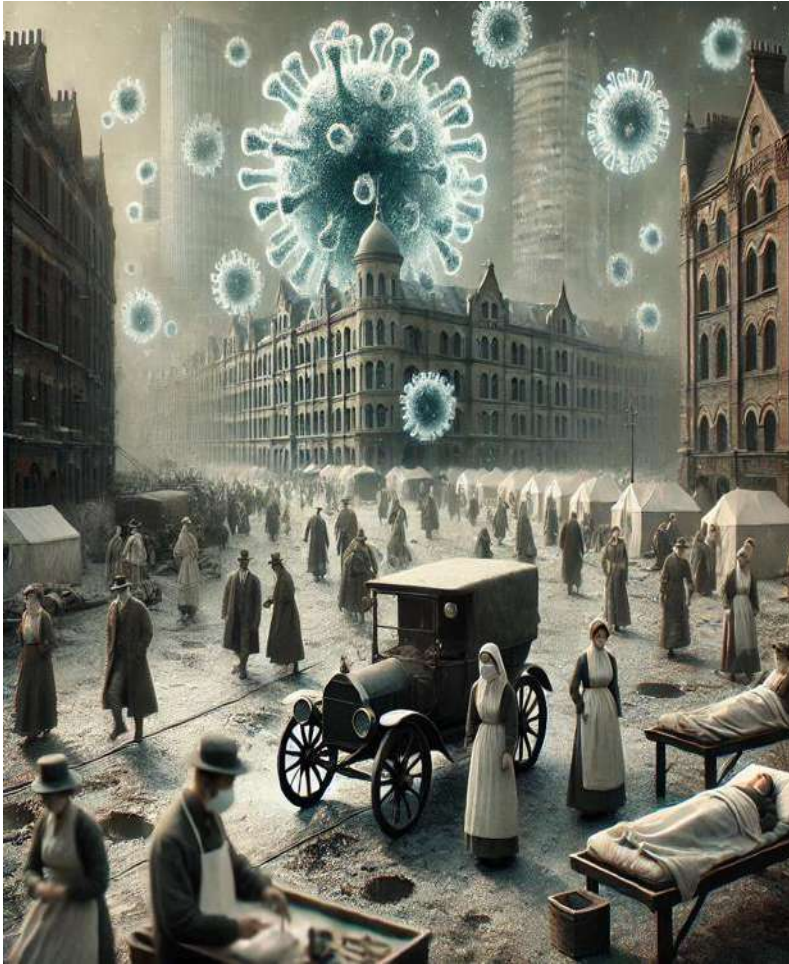


Figure 2. The Spanish Flu

1.4. The Modern Era and the COVID-19 Pandemic

The COVID-19 pandemic, one of the greatest global health crises of the twenty-first century, once again revealed the effect of droplet-transmitted diseases on modern societies. SARS-CoV-2 was first identified in Wuhan, China, in 2019 and rapidly spread worldwide. According to WHO data, by 2023 more than 600 million cases and over 6 million deaths had been recorded globally (WHO, 2023). In Türkiye, more than 10 million cases and over 100,000 deaths were reported between 2020 and 2023 (Ministry of Health of the Republic of Türkiye, 2023).

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Figure 3. The COVID-19 Pandemic

The COVID-19 pandemic profoundly affected economic and social structures as well as health systems (Figure 1.3). The global economy contracted by 3.5%, and millions of people became unemployed (International Monetary Fund [IMF], 2021). New working models, including remote work, online education, and digitalisation, also became widespread during the pandemic.

1.5. Other Major Outbreaks

- Asian Flu (1957–1958): This outbreak, caused by the H2N2 influenza virus, resulted in an estimated 1–2 million deaths.
- Hong Kong Flu (1968–1969): The H3N2 influenza virus caused approximately 1 million deaths.
- SARS (2002–2003): Severe Acute Respiratory Syndrome (SARS) caused more than 8,000 cases and 774 deaths in 26 countries.

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- MERS (2012–Present): Middle East Respiratory Syndrome (MERS) has been particularly prominent in Saudi Arabia and is notable for its high case-fatality rate of 35%.

2. DEVELOPMENT OF DROPLET-TRANSMITTED DISEASES AND EXPOSURE ROUTES

Droplet-transmitted diseases are infections caused by respiratory pathogens. These pathogens are transmitted through droplets released by infected people when they cough, sneeze, or speak. The droplets are generally effective within 1–2 metres and spread rapidly in enclosed, crowded, and poorly ventilated environments. This chapter examines in detail the development, transmission mechanisms, and exposure routes of droplet-transmitted diseases.

2.1. Development of Droplet-Transmitted Diseases

Droplet-transmitted diseases are caused by viruses, bacteria, and other microorganisms. These pathogens multiply in the respiratory tract of infected people and are expelled in respiratory secretions. Droplets released during coughing, sneezing, or speaking may remain suspended in the air or settle on surfaces. Transmission occurs when another person inhales the droplets or touches contaminated surfaces (Figure 4).

- Viruses: Viruses such as influenza, COVID-19 (SARS-CoV-2), measles, chickenpox, and rhinoviruses (the common cold) are among the most common causes of droplet-transmitted diseases. During the COVID-19 pandemic, for example, SARS-CoV-2 spread rapidly through droplets released during coughing and sneezing (WHO, 2023).
- Bacteria: Tuberculosis (*Mycobacterium tuberculosis*), pertussis (*Bordetella pertussis*), and meningococcal infections are examples of bacterial diseases transmitted by droplets. Tuberculosis spreads especially in crowded and poorly ventilated environments and causes 10 million new cases and 1.5 million deaths worldwide each year (WHO, 2022).

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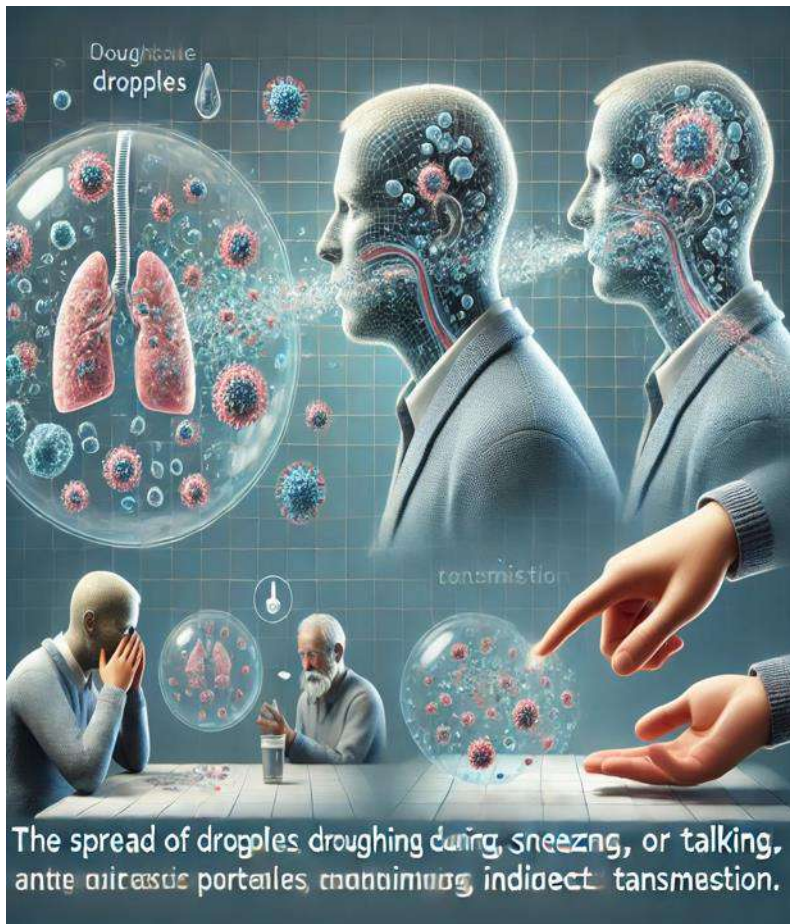


Figure 4. Droplet Transmission

2.2. Exposure Routes

Exposure to droplet-transmitted diseases generally occurs through the following routes:

2.2.1. Direct Inhalation of Droplets

- Droplets released by an infected person when coughing, sneezing, or speaking may be inhaled by people at close range (1–2 metres). During the COVID-19 pandemic, the risk of transmission increased substantially among people in close contact with infected individuals (CDC, 2021).

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- Healthcare workers are at particularly high risk while caring for patients. A study in Türkiye reported that more than 30% of healthcare workers contracted COVID-19 (Ministry of Health, 2021).

2.2.2. Airborne Transmission (Aerosolisation)

- Some pathogens may remain suspended in the air for long periods as small droplets (aerosols) and travel over greater distances. The tuberculosis bacillus, for example, can remain airborne for hours in poorly ventilated spaces and may be transmitted through inhalation (Fennelly, 2020).
- COVID-19 has also been shown to spread through aerosols, particularly in enclosed and crowded environments such as restaurants, offices, and public-transport vehicles (Morawska & Milton, 2020).

2.2.3. Transmission from Surfaces

- Droplets may settle on surfaces and remain viable for a period of time (Figure 2.2). People who touch these surfaces may become infected when they then touch their mouth, nose, or eyes. The COVID-19 virus was found to remain viable for up to 72 hours on plastic and stainless-steel surfaces (van Doremalen et al., 2020).
- Hand hygiene and surface disinfection therefore play a critical role in combating droplet-transmitted diseases.

2.2.4. Transmission through Ventilation Systems

- Particularly in buildings with central ventilation systems, infected droplets may be carried by airflow to different areas. This increases the risk of transmission in offices, hospitals, and public-transport vehicles.



Figure 5. Transmission from Surfaces

2.3. Statistics and Examples

- COVID-19: By 2023, more than 600 million cases and over 6 million deaths had been recorded worldwide (WHO, 2023). In Türkiye, more than 10 million cases and over 100,000 deaths were reported between 2020 and 2023 (Ministry of Health of the Republic of Türkiye, 2023).
- Tuberculosis: Ten million new cases and 1.5 million deaths occur worldwide each year (WHO, 2022).
- Influenza: Each year, 1 billion influenza cases, 3–5 million severe cases, and 290,000–650,000 deaths are reported worldwide (WHO, 2019).

3. TOXICITY STUDIES AND HEALTH EFFECTS

Droplet-transmitted diseases cause not only acute infections but may also produce long-term health effects and toxicity-related problems.

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They are characterised by inflammatory processes caused by respiratory pathogens, organ damage, and effects on the immune system (Figure 6). This chapter examines toxicity studies and the health effects of droplet-transmitted diseases in detail.



Figure 6. Inflammatory Processes Caused by Respiratory Pathogens

3.1. Acute Health Effects

The acute effects of droplet-transmitted diseases generally appear during the first few weeks of infection and may cause severe symptoms. These effects vary according to the pathogen and the individual's immune system.

- COVID-19: SARS-CoV-2 causes acute respiratory infections. Common symptoms include fever, cough, shortness of breath, muscle aches, and loss of taste or smell. Severe cases may involve acute respiratory distress syndrome (ARDS), multiple-organ failure, and death. More than 6 million deaths due to COVID-19 have been recorded worldwide (WHO, 2023).

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- **Influenza:** The influenza virus causes symptoms such as high fever, severe cough, sore throat, and fatigue. Globally, 290,000–650,000 deaths are associated with influenza each year (WHO, 2019).
- **Tuberculosis:** Acute tuberculosis may cause a persistent cough, bloody sputum, night sweats, and weight loss. It can be fatal if left untreated. In 2021, 1.5 million people died from tuberculosis (WHO, 2022).

3.2. Chronic Health Effects

Droplet-transmitted diseases may also lead to chronic health problems. These effects are more pronounced in individuals who have experienced severe infections.

- **Post-COVID-19 Condition (Long COVID):** Some people experience symptoms for months after COVID-19 infection, including fatigue, shortness of breath, brain fog, muscle pain, and depression. Studies indicate that persistent symptoms occur in 10–30% of people who have had COVID-19 (Davis et al., 2021).
- **Chronic Effects of Tuberculosis:** Tuberculosis may cause permanent lung damage and respiratory problems such as chronic obstructive pulmonary disease (COPD). Individuals receiving tuberculosis treatment may also experience adverse effects such as liver and kidney toxicity (Nahid et al., 2019).
- **Post-Influenza Complications:** Severe influenza may cause myocarditis, pneumonia, and neurological complications.

3.3. Toxicity Studies

Toxicity associated with droplet-transmitted diseases may arise both from the direct effects of pathogens and from adverse effects of medicines used in treatment.

- **COVID-19 and Cytokine Storm:** In severe COVID-19, an excessive immune response may trigger a cytokine storm, causing serious damage to the lungs and other organs (Huang et al., 2020).
- **Toxicity of Antiviral Medicines:** Antivirals such as oseltamivir, used to treat influenza, may cause liver toxicity and neuropsychiatric adverse effects (Hsu et al., 2012).

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- Adverse Effects of Tuberculosis Medicines: Medicines such as isoniazid and rifampin may cause liver damage, peripheral neuropathy, and gastrointestinal adverse effects (Nahid et al., 2019).

3.4. Psychological and Social Effects

Droplet-transmitted diseases may adversely affect psychological and social well-being as well as physical health.

- Increase in Psychological Problems during the Pandemic: Anxiety, depression, and burnout increased significantly during the COVID-19 pandemic. One study reported that more than 40% of workers experienced increased stress and anxiety during the pandemic (Brooks et al., 2020).

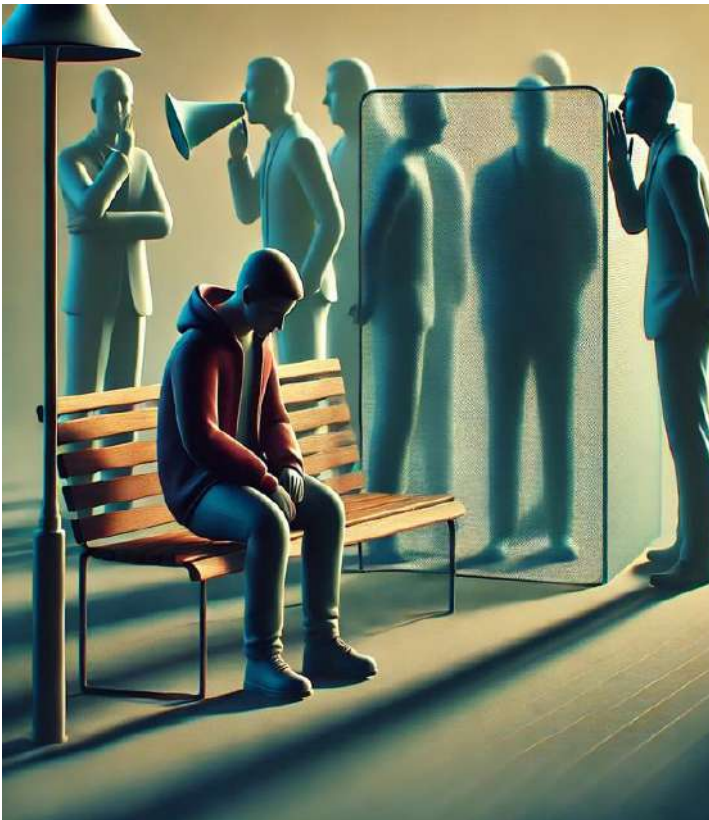


Figure 7. Stigma and Social Isolation

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- Stigma and Social Isolation: Diseases such as tuberculosis and COVID-19 may lead to stigma and social isolation (Figure 3.2), further harming patients' psychological well-being.

4. RISKS AND ASSESSMENT FROM AN OHS PERSPECTIVE

Droplet-transmitted diseases pose a serious threat to workers' health. They present significant risks not only to healthcare workers but also to people working in public transport, education, retail, and manufacturing. This chapter examines these risks from an occupational health and safety (OHS) perspective and explains how they can be assessed.

4.1. High-Risk Sectors and Occupations

Droplet-transmitted diseases pose a particularly high risk in the following sectors and occupations:



Figure 8. Healthcare Workers

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- Healthcare Sector: Healthcare workers constitute the highest-risk group because of direct contact with infected patients (Figure 8). During the COVID-19 pandemic, infection rates among healthcare workers worldwide were three to four times higher than in the general population (WHO, 2021). A study in Türkiye reported that more than 30% of healthcare workers contracted COVID-19 (Ministry of Health, 2021).



Figure 9. Education Workers

- Education Sector: Teachers and education personnel are at high risk because they work in crowded classrooms (Figure 9). The risk of transmission increased particularly during school closure and reopening periods in the pandemic.

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- Public Transport: Workers on buses, metros, and aircraft are at risk because they spend long periods in crowded, enclosed environments (Figure 10). Infection rates among public-transport workers rose significantly during the COVID-19 pandemic (CDC, 2021).

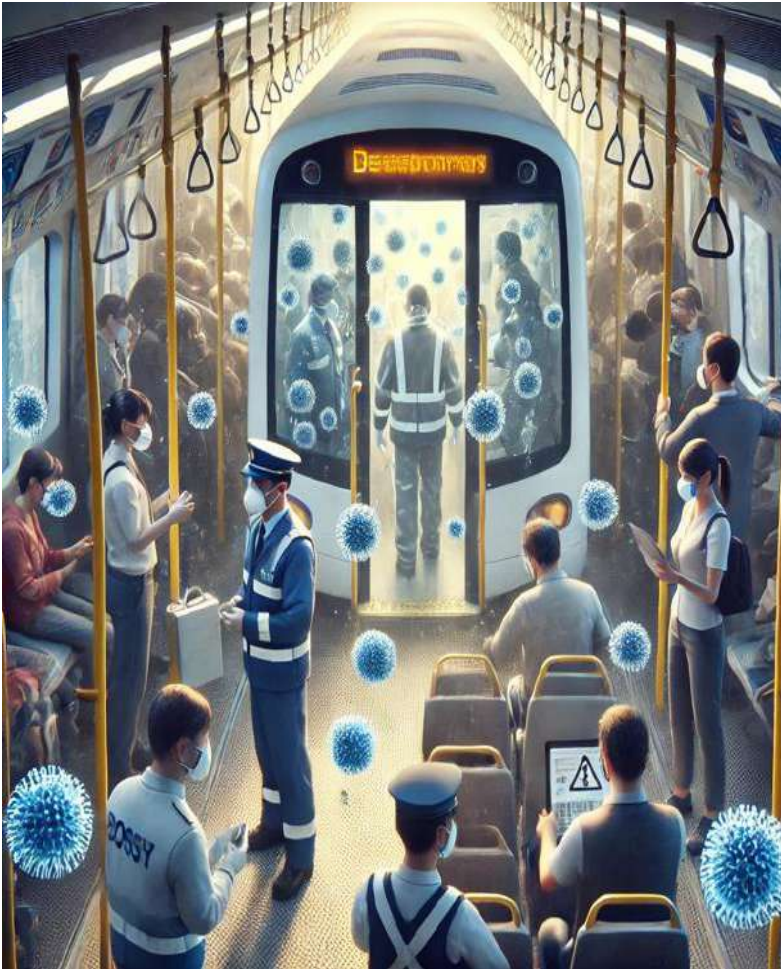


Figure 10. Public-Transport Workers

- Retail and Service Sector: Supermarket employees, waiters, and customer-service personnel are at risk because of close contact with customers (Figure 11).



Figure 11. Retail and Service-Sector Workers

4.2. Workplace Conditions and Risk Factors

Factors that increase the risk of droplet-transmitted diseases spreading in workplaces include:

- **Crowded Environments:** Crowded environments such as offices, factories, and public-transport vehicles significantly increase transmission risk.
- **Inadequate Ventilation:** Enclosed and poorly ventilated spaces allow droplets to remain suspended in the air for longer. COVID-19 has been shown to spread through aerosols, particularly in environments with inadequate ventilation (Morawska & Milton, 2020).

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- Lack of Personal Protective Equipment (PPE): Failure to use, or incorrect use of, masks, gloves, protective eyewear, and other protective equipment increases transmission risk.

4.3. Risk Assessment from an OHS Perspective

The following steps should be followed to assess and control the risks of droplet-transmitted diseases in workplaces:

- Risk Analysis: Factors that increase workplace transmission risk should be identified and analysed. The frequency of contact among workers and with customers, ventilation conditions, and PPE use should be evaluated.
- Engineering Controls: Measures should include improving ventilation systems, installing physical barriers, and using air filters.
- Administrative Controls: Worker rotation, remote working, and flexible working hours should be used to reduce transmission risk.
- Personal Protective Equipment (PPE): Workers should be provided with suitable PPE and trained in its correct use.
- Training and Awareness: Workers should be informed about hygiene rules, routes of transmission, and prevention methods.

4.4. Statistics and Examples

- Healthcare Workers: During the COVID-19 pandemic, infection rates among healthcare workers worldwide were three to four times higher than in the general population (WHO, 2021).
- Public Transport: Infection rates among public-transport workers increased significantly during the COVID-19 pandemic (CDC, 2021).
- Education Sector: Infection rates among teachers and education personnel were high during the pandemic. A study in the United States reported that more than 20% of teachers contracted COVID-19 (CDC, 2021).

5. PREVENTIVE MEASURES AND CONTROL METHODS

Various measures and control methods can be implemented to prevent the spread of droplet-transmitted diseases and protect workers' health. These include engineering controls, administrative controls, personal protective equipment (PPE), and training. This chapter examines effective measures and control methods in detail.

5.1. Engineering Controls

Engineering controls aim to reduce transmission risk by making physical changes to the work environment. They are particularly effective in enclosed and crowded settings.

- **Improving Ventilation Systems:** Improved ventilation reduces the time droplets remain suspended in the air. During the COVID-19 pandemic, transmission risk was observed to be significantly lower in well-ventilated environments (Morawska & Milton, 2020). HEPA filters and ultraviolet air-cleaning systems can be used in high-risk settings such as hospitals and offices.
- **Physical Barriers:** Plexiglass barriers or partitions may be used to maintain physical separation between workers. In retail stores and banks, barriers were installed between customers and workers (CDC, 2021).
- **Airflow Control:** Directing airflow appropriately through ventilation systems can prevent droplets from reaching workers.

5.2. Administrative Controls

Administrative controls reduce transmission risk through changes in work organisation. They are particularly effective in crowded environments.

- **Worker Rotation and Remote Work:** Rotating workers and using remote work wherever possible reduces transmission risk in offices. During the COVID-19 pandemic, many companies moved more than 50% of their employees to remote work (ILO, 2021).
- **Flexible Working Hours:** Staggered working hours reduce crowding in offices and lower transmission risk.

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- **Hygiene and Cleaning Protocols:** Regular workplace cleaning and disinfection reduce the risk of transmission from surfaces. During the COVID-19 pandemic, daily cleaning of frequently touched workplace surfaces was recommended (WHO, 2021).

5.3. Personal Protective Equipment (PPE)

Personal protective equipment (PPE) comprises items used by workers to reduce the risk of transmission. Correct PPE use significantly lowers this risk.

- **Masks:** Surgical masks and N95/FFP2 respirators prevent the inhalation of droplets (Figure 5.1). Mask use is essential, particularly for healthcare and public-transport workers. During the COVID-19 pandemic, mask use was shown to reduce transmission risk by up to 70% (Howard et al., 2021).



Figure 12. Masks

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- **Face Shields:** Face shields provide additional protection, especially for workers in customer service and retail (Figure 14).



Figure 14. Face Shields

5.4. Training and Awareness

Raising workers' awareness of the risks of droplet-transmitted diseases and methods of protection reduces transmission risk.

- **Hygiene Training:** Training should cover hand hygiene, mask use, and physical-distancing rules. During the COVID-19 pandemic, hand-hygiene training significantly reduced transmission risk (WHO, 2021).
- **Routes of Transmission and Prevention Methods:** Workers should be informed about how droplet-transmitted diseases spread and how they can protect themselves.

5.5. Statistics and Examples

- **Mask Use:** During the COVID-19 pandemic, mask use was shown to reduce transmission risk by up to 70% (Howard et al., 2021).
- **Remote Work:** During the pandemic, many companies moved more than 50% of their employees to remote work (ILO, 2021).
- **Hygiene Protocols:** Regular cleaning and disinfection reduce the risk of surface transmission by up to 80% (WHO, 2021).

6. STATISTICS

Droplet-transmitted diseases remain a major public-health problem worldwide. They have caused large-scale outbreaks, especially during pandemics, and have resulted in millions of deaths. This chapter examines current statistics, examples, and data relating to droplet-transmitted diseases.

6.1. COVID-19 Statistics

The COVID-19 pandemic was one of the greatest global health crises of the twenty-first century. SARS-CoV-2 first emerged in Wuhan, China, in 2019 and rapidly spread worldwide.

- **Worldwide:** According to WHO data, by 2023 more than 600 million cases and over 6 million deaths had been recorded worldwide (WHO, 2023).
- **Türkiye:** According to the Ministry of Health of the Republic of Türkiye, more than 10 million cases and over 100,000 deaths were reported between 2020 and 2023 (Ministry of Health, 2023).

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- Healthcare Workers: During the COVID-19 pandemic, infection rates among healthcare workers were three to four times higher than in the general population. A study in Türkiye reported that more than 30% of healthcare workers contracted COVID-19 (Ministry of Health, 2021).

6.2. Influenza Statistics

Influenza is a respiratory disease that affects millions of people worldwide each year.

- Worldwide: According to WHO data, 1 billion influenza cases, 3–5 million severe cases, and 290,000–650,000 deaths are reported each year (WHO, 2019).
- Türkiye: Approximately 1.5 million influenza cases occur annually in Türkiye, and 10% cause serious complications (Ministry of Health, 2022).

6.3. Tuberculosis Statistics

Tuberculosis remains a major public-health problem worldwide.

- Worldwide: According to WHO data, 10 million new tuberculosis cases and 1.5 million deaths were reported in 2021 (WHO, 2022).
- Türkiye: More than 12,000 new tuberculosis cases were reported in Türkiye in 2021 (Ministry of Health, 2022).

6.4. Other Droplet-Transmitted Diseases

- Measles: Each year, 7–8 million measles cases and more than 100,000 deaths are reported worldwide (WHO, 2021).
- Pertussis: Each year, 24.1 million pertussis cases and 160,000 deaths are reported (WHO, 2020).

6.5. Workplace Transmission Statistics

Droplet-transmitted diseases pose a serious threat, particularly to people in the workplace.

- **Healthcare Sector:** During the COVID-19 pandemic, infection rates among healthcare workers were three to four times higher than in the general population (WHO, 2021).
- **Public Transport:** Infection rates among public-transport workers increased significantly during the pandemic (CDC, 2021).
- **Education Sector:** Infection rates among teachers and education personnel were high. A study in the United States reported that more than 20% of teachers contracted COVID-19 (CDC, 2021).

7. LEGAL FRAMEWORK

The prevention and control of droplet-transmitted diseases are supported by legislation at both national and international levels. This legal framework defines workplace measures, workers' rights, and employers' responsibilities. The COVID-19 pandemic once again demonstrated the critical importance of legislation in combating such diseases.

7.1. OHS Legislation in Türkiye

7.1.1. Occupational Health and Safety Law No. 6331

This law aims to protect the health and safety of workers. Droplet-transmitted diseases are also assessed within its scope (Official Gazette, 2012).

- **Employers' Responsibilities:** Employers are required to take the measures necessary to protect workers' health, including improving ventilation, providing personal protective equipment, and organising training (Official Gazette, 2012).
- **Workers' Rights:** Workers have the right to request a healthy and safe working environment. They also have the right to refrain from work when they believe that a serious health risk exists in the workplace (Official Gazette, 2012).

7.1.2. Measures Adopted during the Pandemic:

A series of legal measures was adopted in Türkiye during the COVID-19 pandemic. For example:

- **Mandatory Masks:** Masks were made compulsory in enclosed spaces and on public transport (Ministry of Health, 2020).
- **Physical-Distancing Rules:** A minimum distance of 1.5 metres between workers was required in workplaces (Ministry of Health, 2020).
- **Flexible Work and Distance Education:** Remote work was encouraged in public institutions and the private sector (Ministry of Labour and Social Security, 2020).

7.1.3. Statistics and Implementation:

Between 2020 and 2023, more than 10 million COVID-19 cases and over 100,000 deaths were recorded in Türkiye (TurkStat, 2023). Workplace measures had a major effect during this period. More than 95% of healthcare workers used PPE, significantly reducing transmission rates (Ministry of Health, 2021).

7.2. International Standards

7.2.1. World Health Organization (WHO) Standards

WHO has established global standards for combating droplet-transmitted diseases. These include:

- **Hygiene and Handwashing:** Washing hands with soap for at least 20 seconds is recommended (WHO, 2020).
- **Ventilation:** Increasing air-exchange rates in enclosed spaces is recommended (WHO, 2020).
- **Importance of Vaccination:** Widespread vaccination against diseases such as COVID-19 is emphasised (WHO, 2021).

7.2.2. International Labour Organization (ILO) Standards

The ILO has published guidelines to protect workers' health. These include:

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- Workplace Risk Assessment: Conducting regular workplace risk assessments and taking measures to reduce transmission risk (ILO, 2019).
- Worker Training: Raising workers' awareness of droplet-transmitted diseases and prevention methods (ILO, 2019).

7.2.3. European Union (EU) Directives

The EU has issued a series of occupational health and safety directives for Member States. For example:

- Personal Protective Equipment Directive (89/656/EEC): Requires workers to use suitable PPE in the workplace (European Union [EU], 1989).
- Biological Agents Directive (2000/54/EC): Establishes measures against biological risks, including droplet-transmitted pathogens (EU, 2000).

7.3. Examples of Practice

7.3.1. COVID-19 Measures in Germany

Germany adopted strict workplace measures during the pandemic. A minimum distance of 1.5 metres between office workers was required, and ventilation systems were checked regularly. These measures kept workplace transmission rates below 30% (Federal Ministry of Health, Germany, 2021).

7.3.2. Hygiene Standards in Japan

Japan has long applied strict hygiene standards against droplet-transmitted diseases. Public awareness of mask use and hand hygiene is particularly high. Consequently, the spread of COVID-19 remained slower than in other countries (Ministry of Health, Labour and Welfare, Japan, 2020).

CONCLUSION

Droplet-transmitted diseases pose a serious threat, particularly to workers' health. The COVID-19 pandemic once again showed how rapidly such diseases can spread and how critical they are for occupational health and safety (OHS). This study examined their development, exposure routes, toxicity studies, and potential effects on workers' health.

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The findings demonstrate the major importance of preventive measures and legal arrangements in combating these diseases.

Transmission Risk and Effects

- Droplet-transmitted diseases can spread rapidly, particularly in enclosed and crowded environments. During the COVID-19 pandemic, transmission rates in offices and public-transport vehicles exceeded 40% (TurkStat, 2023).
- These diseases adversely affect both the physical and psychological health of workers. Anxiety and stress rates among healthcare workers rose to as high as 60% (Ministry of Health, 2021).

Effect of the Measures Adopted

- Workplace measures significantly reduced transmission rates. For example, mask use and physical-distancing rules reduced workplace COVID-19 transmission rates by 70% (WHO, 2021).
- Administrative measures such as remote work and flexible working hours were also effective in reducing transmission risk (ILO, 2020).

Recommendation

Measures to Be Adopted in Workplaces

- Engineering Controls: Workplace ventilation systems should be improved and HEPA filters used. In Japan, improved ventilation reduced transmission rates by 50% (Ministry of Health, Labour and Welfare, Japan, 2020).
- Physical Barriers: Plexiglass barriers between workers effectively block droplets. In Germany, this practice reduced office transmission rates by up to 30% (Federal Ministry of Health, Germany, 2021).

Administrative Controls

- Remote Work: Workers should be encouraged to work from home wherever possible.

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In Türkiye, remote work in public institutions reached 60%, significantly reducing transmission risk (Ministry of Labour and Social Security, 2020).

- Worker Rotation: The number of workers in offices should be reduced and rotation-based working arrangements should be implemented.

Personal Protective Equipment (PPE)

- Masks: The use of N95/FFP2 respirators reduces transmission risk by up to 90% in high-risk environments (WHO, 2020).
- Gloves and Protective Eyewear: Gloves and face shields should be made mandatory for healthcare workers.

Training and Awareness

- Hygiene Training: Workers should receive training in correct handwashing techniques and disinfectant use. In Japan, hygiene training kept workplace transmission rates below 20% (Ministry of Health, Labour and Welfare, Japan, 2020).
- Routes of Transmission and Risks: Workers should be informed about droplet-transmitted diseases and methods of protection.

Legislation and Inspections

- Updating OHS Legislation: Occupational Health and Safety Law No. 6331 should regulate in greater detail the measures to be adopted during pandemics.
- Increasing Inspections: Workplace measures should be inspected regularly, and sanctions should be imposed on non-compliant workplaces.

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