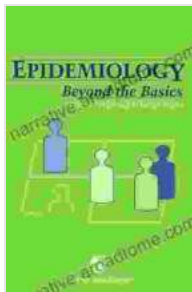


Epidemiology Beyond The Basics: Unveiling the Science of Disease Prevention and Control

: Embracing a Comprehensive Approach to Public Health

In a world grappling with a multitude of health challenges, understanding the science of disease prevention and control is paramount. Epidemiology, the study of the distribution and determinants of health-related states or events in a defined population, plays a pivotal role in safeguarding public health. 'Epidemiology Beyond The Basics' is a comprehensive guidebook that transcends the boundaries of foundational knowledge, delving into the intricacies of epidemiology and empowering you to become an active participant in preserving the well-being of our communities.



Epidemiology: Beyond the Basics

★★★★☆ 4.5 out of 5

Language	: English
File size	: 117126 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Word Wise	: Enabled
Print length	: 590 pages
X-Ray for textbooks	: Enabled



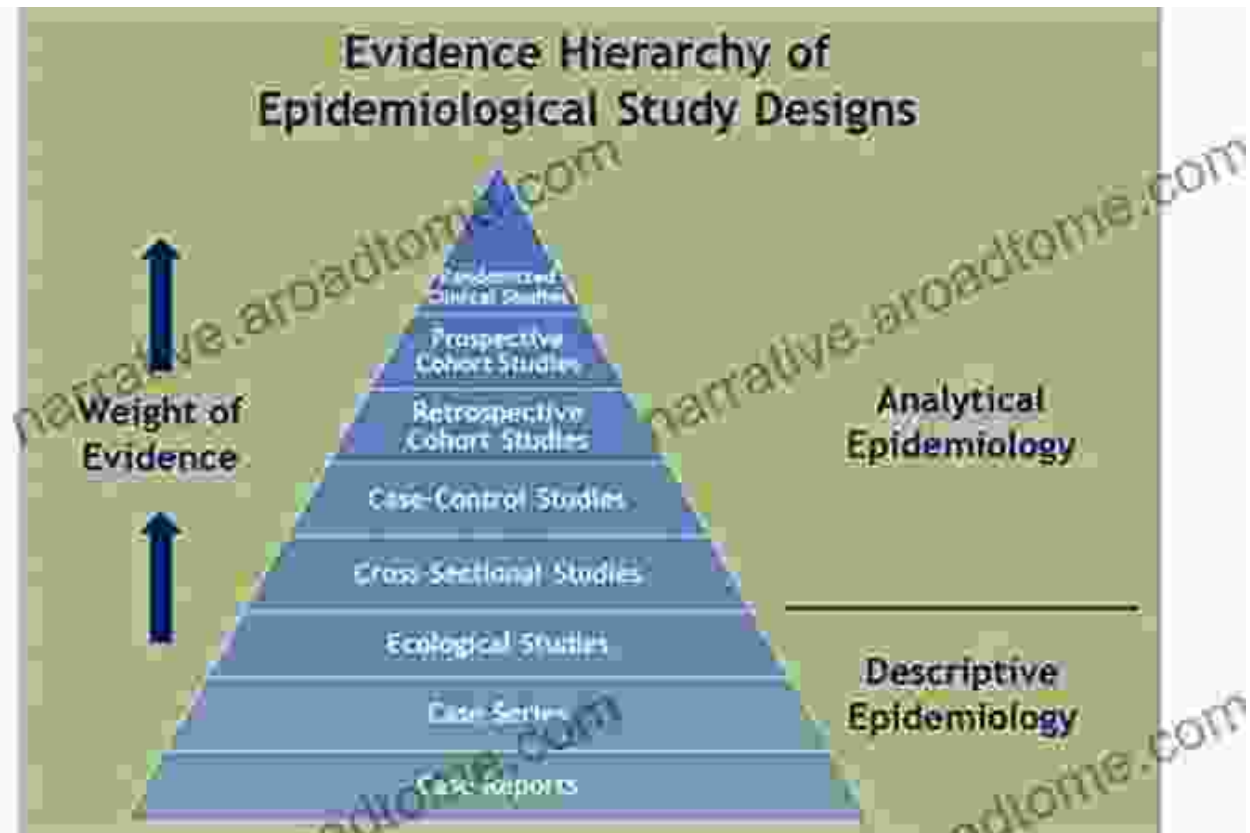
Chapter 1: Unraveling the Foundations of Epidemiology

Chapter 1 establishes a solid foundation for your epidemiological journey, meticulously explaining key concepts and principles. You will gain insights into the history, scope, and methods of epidemiology, equipping you with the essential tools to comprehend the dynamics of disease occurrence and transmission.



Measures of Disease Frequency

- Rates, Ratios, and Proportions
- Incidence versus Prevalence
- Risk
- Rate
- Risk versus Rate
- Mortality
- Risk/Rate Adjustment



Chapter 2: Exploring the Spectrum of Infectious Diseases

Chapter 2 takes you on an expedition into the realm of infectious diseases, unveiling their causes, transmission patterns, and the strategies employed to prevent and control their spread. You will delve into the principles of immunization, surveillance systems, and outbreak investigations, empowering you to contribute to the fight against infectious disease outbreaks.

Modes of Infectious Disease Transmission

A. General Transmission

Abiotically environmental factors

- Wind
- Water
- Inhalation of spores
- Entry into skin



Animal vectors

- Mosquitoes (malaria, dengue)
- Fleas (bubonic plague)



B. Human to Human Transmission

Direct Contact



- Pathogen survives best inside the body
- Eg: HIV, Herpesviruses, Ebola

Indirect Contact



- Pathogen survives harsh environment
- Pick up pathogen from surface or air
- Eg: influenza, norovirus

Droplets



- Pathogens are in droplets, but do not survive long this way
- Eg: Ebola, *Bordetella pertussis*

Airborne



- Pathogens aerosolized and stay infective
- Eg: influenza, tuberculosis

Fecal-Oral



- Through contaminated water or food
- Eg: Cholera, Norovirus, Shigella

A glance at vaccine development over the centuries



Source: National Foundation of Infectious Diseases, World Health Organization, The Centers for Disease Control and Prevention

Control measures for an outbreak

- General measures
 - Till source and route of transmission identified
- Specific measures, based upon the results of the investigation
 - Agent
 - Removing the source
 - Environment
 - Interrupting transmission
 - Host
 - Protection (e.g., immunization)
 - Case management

Chapter 3: Unmasking Non-Communicable Diseases and Their Risk Factors

Chapter 3 shifts the focus to non-communicable diseases (NCDs), which pose a significant health burden globally. You will explore the major NCDs, their risk factors, and the preventative measures that can be implemented to reduce their incidence and impact. This chapter emphasizes the importance of lifestyle choices, environmental factors, and access to healthcare in shaping NCD outcomes.

Deaths from non-communicable diseases since 2000

Each year, an average of 36.2 million people die of non-communicable diseases (NCDs), equivalent to 61 percent of global deaths.

■ NCDs-related deaths ■ Other deaths



Source: WHO Global Health Estimates

CGTN

Noncommunicable Diseases

4 Diseases, 4 Modifiable Shared Risk Factors

	Tobacco Use	Unhealthy diets	Physical Inactivity	Harmful Use of Alcohol
Cardio-vascular				
Diabetes				
Cancer				
Chronic Respiratory				

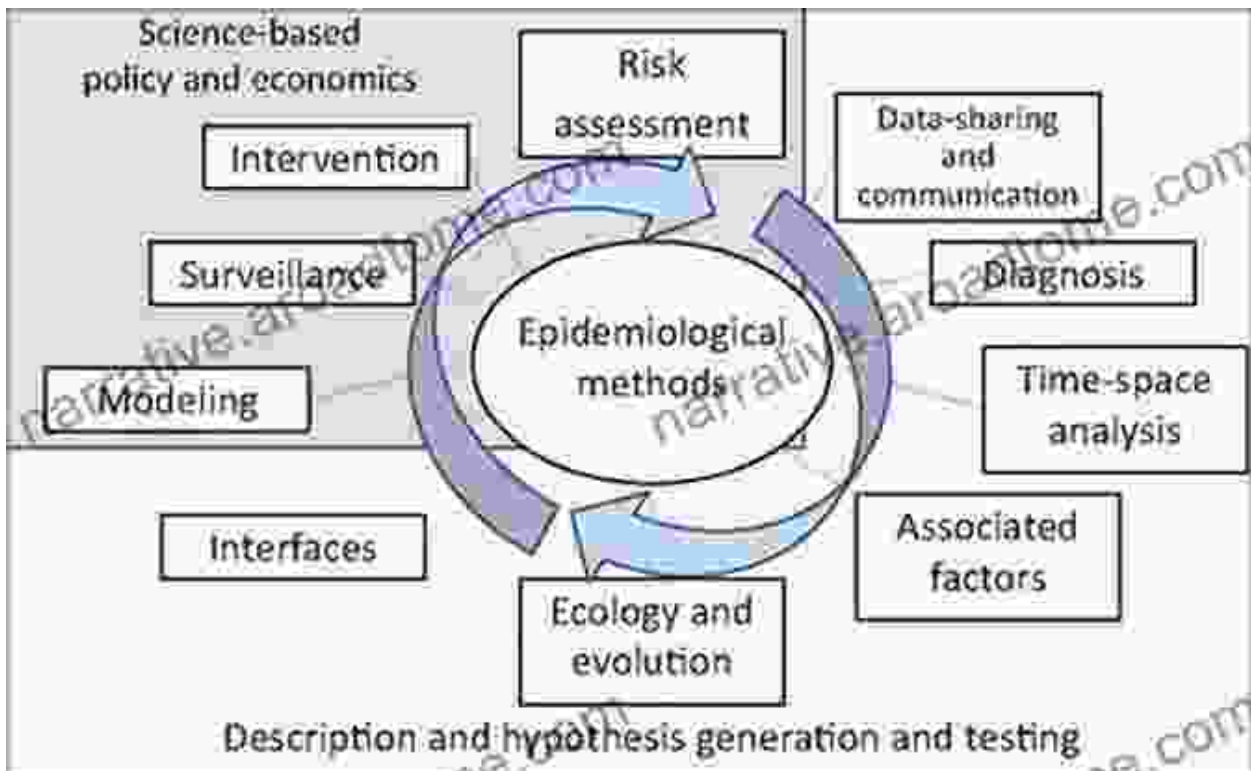


Risk factors of noncommunicable diseases (NCDs)



Chapter 4: Mastering Data Analysis and Statistical Methods

Chapter 4 equips you with the essential skills of data analysis and statistical methods, which form the backbone of epidemiological research. You will learn how to collect, analyze, and interpret epidemiological data, enabling you to draw meaningful conclusions and make informed decisions regarding disease prevention and control measures.



Measures of Association

- **Measures of association**—a single summarizing number that reflects the strength of the relationship. This statistic shows the **magnitude** and/or **direction** of a relationship between variables.
- **Magnitude**—the closer to the absolute value of 1, the stronger the association. If the measure equals 0, there is no relationship between the two variables.
- **Direction**—the sign on the measure indicates if the relationship is positive or negative. In a **positive relationship**, when one variable is high, so is the other. In a **negative relationship**, when one variable is high, the other is low.

interventions, empowering you to design and implement effective health promotion programs.



Healthy Behavior Change

The College for Behavioral Health Leadership

the E-Guide Road Map



health literacy is the first step



get engaged and activated



explore motivation and readiness



recovery & resilience is shared

It Begins with You



look at the social determinants of health



acknowledge the role of peers, family & community



think about workplace

It Takes a Village

Supportive Technologies



E-health and Health Metrics have a growing role in support



We all need systems that are trauma-informed



put it all together and combine insights to explore the base of healthy behavior change



Check it Out!
change4health.org

Sample Intervention Assessment Framework				
Intervention	Purpose	Context	Impact Mechanisms	Intervention Outcomes
Smart Shelves	The ability to detect the removal of product from specific shelves or displays based on defined criteria.	<p>Members of sales staff or security guards alerted in real time when items are removed from shelving/display.</p> <p>Voice recording triggered if the person removing items from a shelving/display.</p> <p>Members of sales staff or security guards alerted in real time when an unusual number of items are removed from shelving/display.</p> <p>Voice recording triggered if the person removing an unusual number of items from shelving/display.</p> <p>Alert triggered when there are no items remaining on the shelving/display.</p>	<p>Staff able to address potential threats and increase perceived sense of risk of apprehension.</p> <p>Help to provide evidentiary data on identification of shoplifters.</p> <p>Staff made aware of when the shelving/display is empty to better control out of stocks.</p>	<p>Losses reduced because offenders less likely to steal protected items due to presence of staff member.</p> <p>Less likely to steal because more shelves are protected and buried from entering stores and so detected.</p> <p>Losses from other unprotected products increase as offending is displaced by the intervention.</p> <p>Lost profits from out of stock reduced as fewer items are leaving the store without being restocked, improving stock file accuracy.</p> <p>Lost profits from out of stock reduced as staff are made aware more quickly of empty shelves/displays.</p>

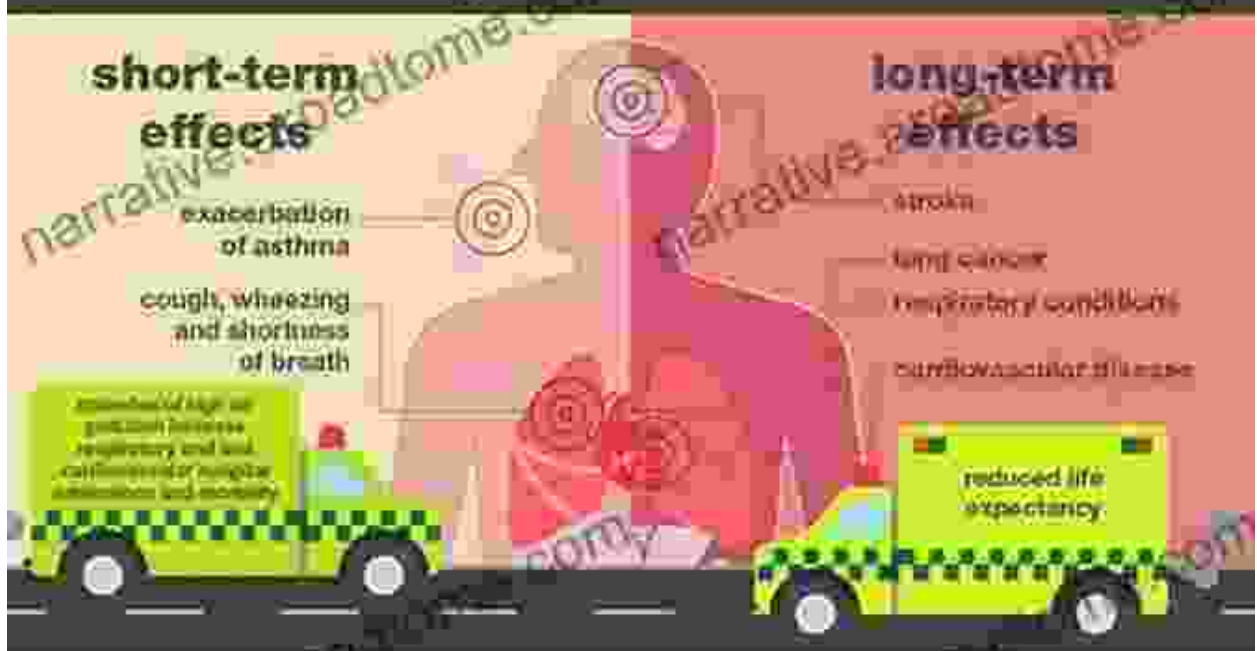
Chapter 6: Environmental Health and Disease Control

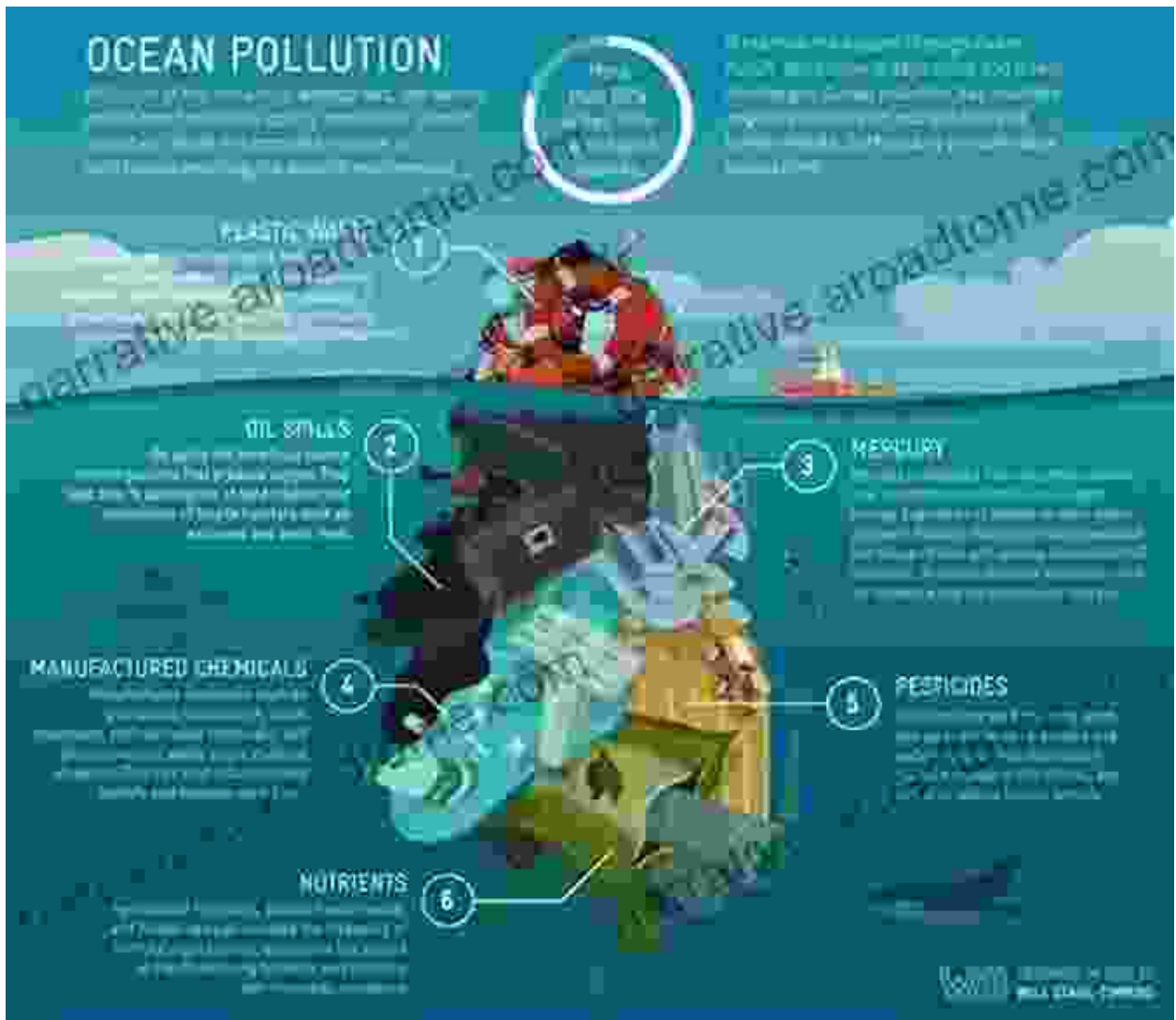
Chapter 6 delves into the intricate relationship between environmental factors and human health, examining how environmental hazards can contribute to disease occurrence and the strategies employed to mitigate their impact. You will explore the principles of environmental epidemiology, learn about air and water pollution, and gain insights into the role of environmental health policies in protecting public health.

Environmental health hazards

- ◆ Land and climate related hazards
- ◆ Atmospheric hazards –
- ◆ Water related hazards-
- ◆ Food Borne hazards
- ◆ Vector Borne Hazards
- ◆ Domestic Hazards
- ◆ Occupational Hazards
- ◆ Infrastructural hazards
- ◆ Others

Health effects of air pollution





Chapter 7: Epidemiology in Action: Case Studies and Applications

Chapter 7 brings the concepts of epidemiology to life through real-world case studies and applications. You will explore how epidemiological principles and methods have been successfully utilized to address pressing public health challenges, including disease outbreaks, vaccine development, and chronic disease management. These case studies provide practical insights into the impact of epidemiology on improving health outcomes.


Steps in an OUTBREAK INVESTIGATION


DETECT A possible outbreak 

FIND Cases in an outbreak 

GENERATE Hypotheses through interviews 

TEST Hypotheses through analytic studies and laboratory testing 

SOLVE Point of contamination and original source of outbreak vehicle 

CONTROL Outbreak through recalls, facility improvements, and industry collaboration 

DECIDE An outbreak is over 

If cases continue →

Not finding associations ←

If cases stop →

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ARTICLE SUMMARY

Efficacy and Safety of mRNA-1273 SARS-CoV-2 Vaccine

by Paul H.arden, et al. DOI: 10.1093/nyas/nzab029

Context

The COVID-19 pandemic continues and expands. Additional data regarding vaccines to prevent symptoms or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection are needed. The mRNA-1273 vaccine is a lipid-stabilized mRNA vaccine encoding the prefusion-stabilized spike protein of SARS-CoV-2.

Objective

A randomized, double-blind trial to evaluate the efficacy and safety of mRNA-1273.

18,420 participants 18 years old were assigned to receive either the vaccine or placebo in two intramuscular injections 28 days apart. Participants were followed for safety and the development of laboratory-confirmed symptomatic COVID-19 over a median of 3 months after the second dose.

Results

Safety: Vaccine recipients had higher rates of local reactions (pain, erythema, swelling) and systemic reactions (e.g., headache, fatigue, myalgia) than placebo recipients. Most reactions were mild to moderate and resolved over 2–3 days.

Efficacy:

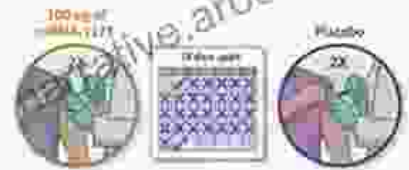
The incidence of COVID-19 was lower among vaccine recipients than among placebo recipients as early as 14 days after the first dose. Protection in the vaccine group persisted for the period of follow-up.

Conclusions and Remaining Questions

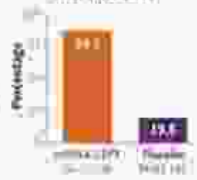
Further study is required to understand the following:

- Safety and efficacy over a longer period of time, in a larger population, and in younger children and children.
- Whether the vaccine prevents asymptomatic infection and transmission to unvaccinated persons.
- How to best use those who miss the second dose.

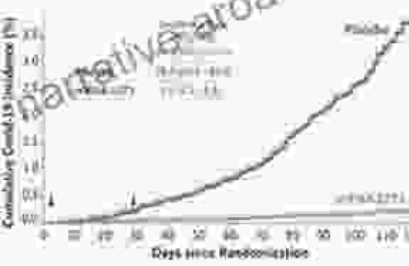
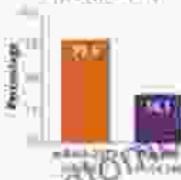
Links: Full article | NLM Quick Take | Epubs



Injection-Site Adverse Events after First Dose



Systemic Adverse Events after Second Dose



Applying Cooperative Research to Recent Outbreaks

INFECTIOUS DISEASE SURVEILLANCE

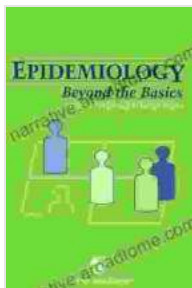


: Empowering Public Health Professionals

As you embark on this epidemiological journey, 'Epidemiology Beyond The Basics' will guide you every step of the way, equipping you with the knowledge, skills, and perspectives necessary to excel as a public health professional. By mastering the principles of epidemiology, you will become

an advocate for disease prevention and control, actively contributing to the health and well-being of your community and beyond.

Embrace the challenge, delve into the fascinating world of epidemiology, and witness the transformative power of this science in shaping a healthier future for all.



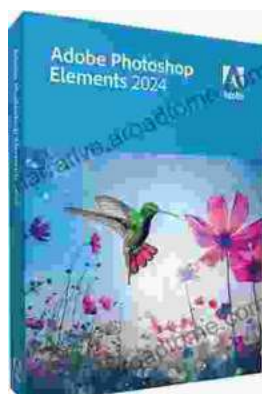
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