

A review study of the current trend of COVID-19 in India.

By:

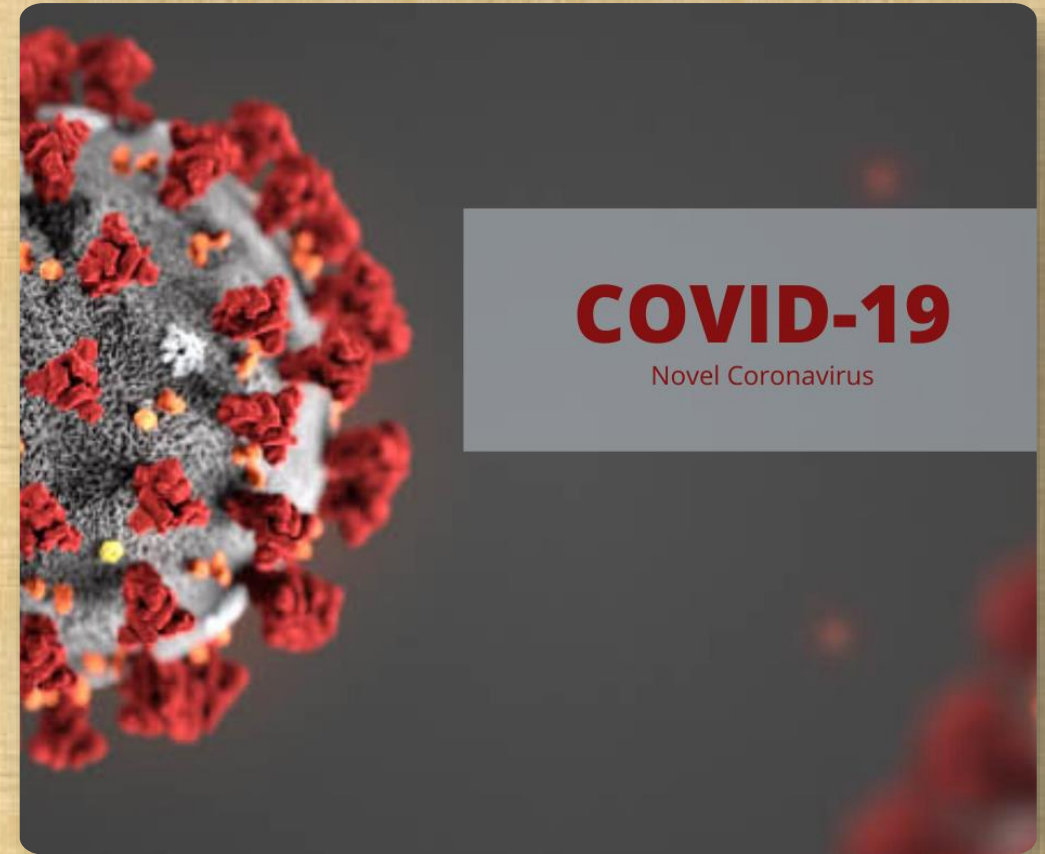
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Under the Guidance Of

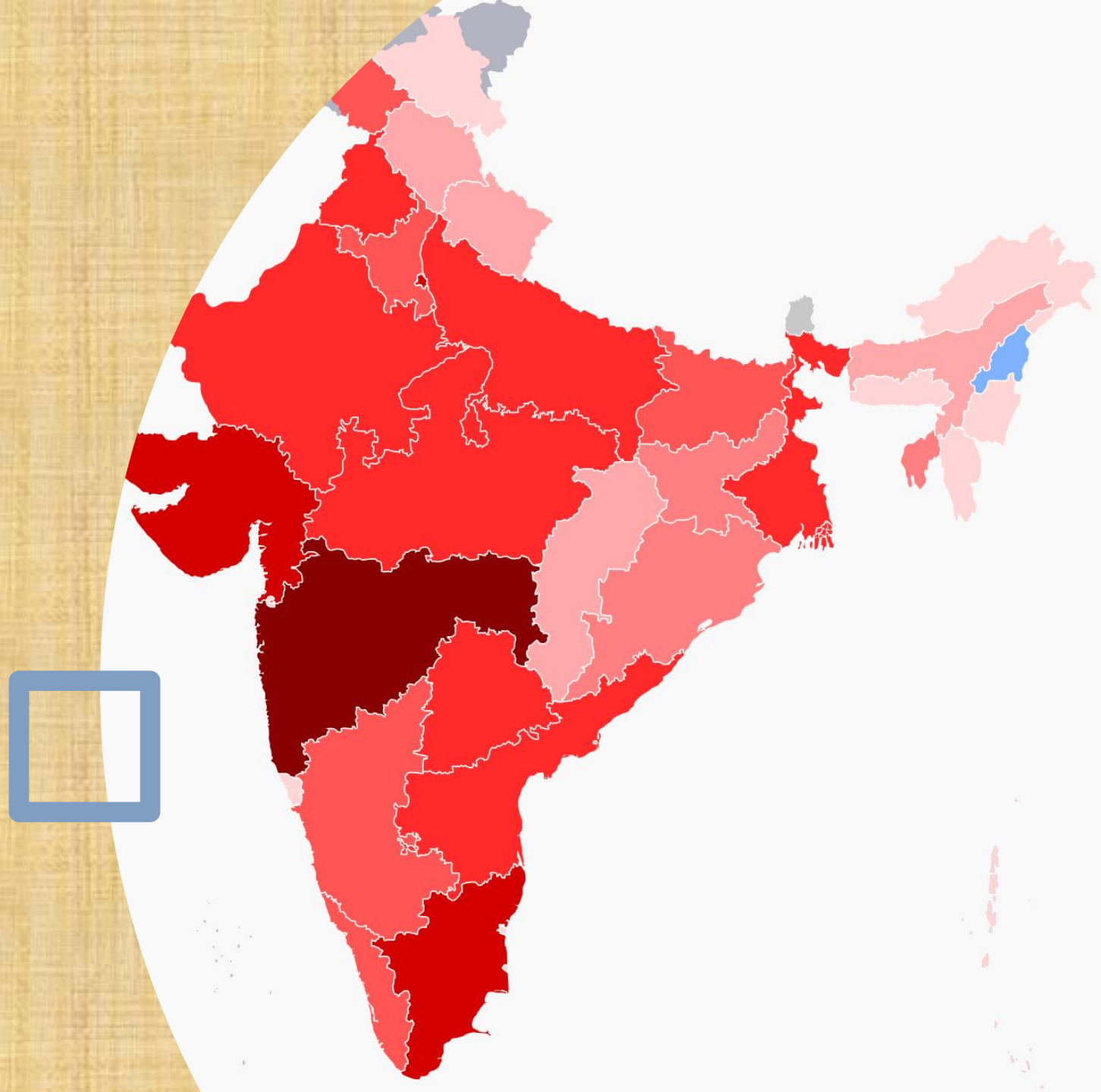
Dr. Deepti Sharma

(ASSOCIATE PROFESSOR)



Objective:

To understand the status of India
in terms of COVID-19 spread till
8th April 2020



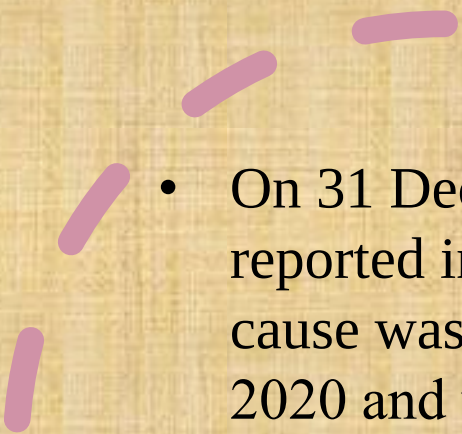
Abstract:

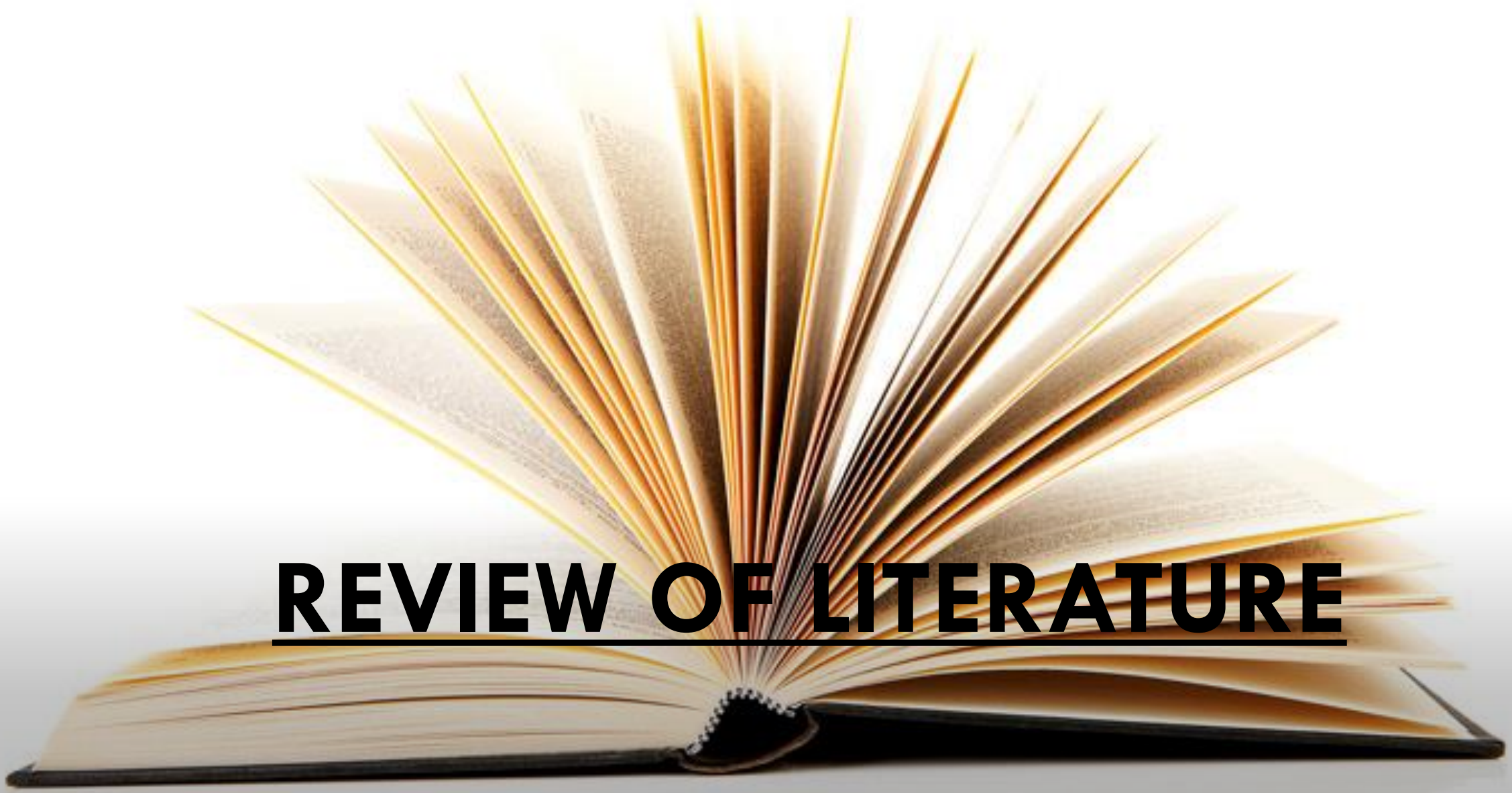
- The outbreak of the pandemic around the globe is alarming with the spread of novel coronavirus (COVID-19) or severe acute respiratory syndrome 2 (SARS-2). The virus seems to have been originated in bats through unknown mediator animals in Wuhan, Hubei province, China in December 2019.
- Here this study is conducted to analyze different states and key districts in which India is facing a major challenge.
- COVID-19 care hospitals should be equipped with Ventilators, ICUs, and beds with assured oxygen support. Though this antimalarial drug is not yet approved by WHO but in some patients this drug was a game-changer drug and helped them cure this disease.





Introduction to Coronavirus

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- On 31 December 2019, several cases of pneumonia with unknown causes were reported in Wuhan city, China. The virus which caused the Pneumonia of unknown cause was then known as the novel coronavirus by Chinese authority on 7 January 2020 and was named “2019-nCoV”.
 - These viruses show mild to moderate illness i.e common cold, cough, fever, and show severe symptoms.
 - Special care and attention are needed by elderly patients, patients with diabetes, cardiovascular disease.
 - As well, suspending travels, and attempt to decrease crowds, various measures are being taken by the government of India.
 - In the past two events occurred wherein crossover resulted in severe disease in humans.

An open book is shown from a top-down perspective, lying flat. The pages are fanned out symmetrically from the center, creating a wide, sunburst-like shape. The paper has a warm, yellowish-tan hue. The text "REVIEW OF LITERATURE" is superimposed over the lower half of the book, underlined.

REVIEW OF LITERATURE

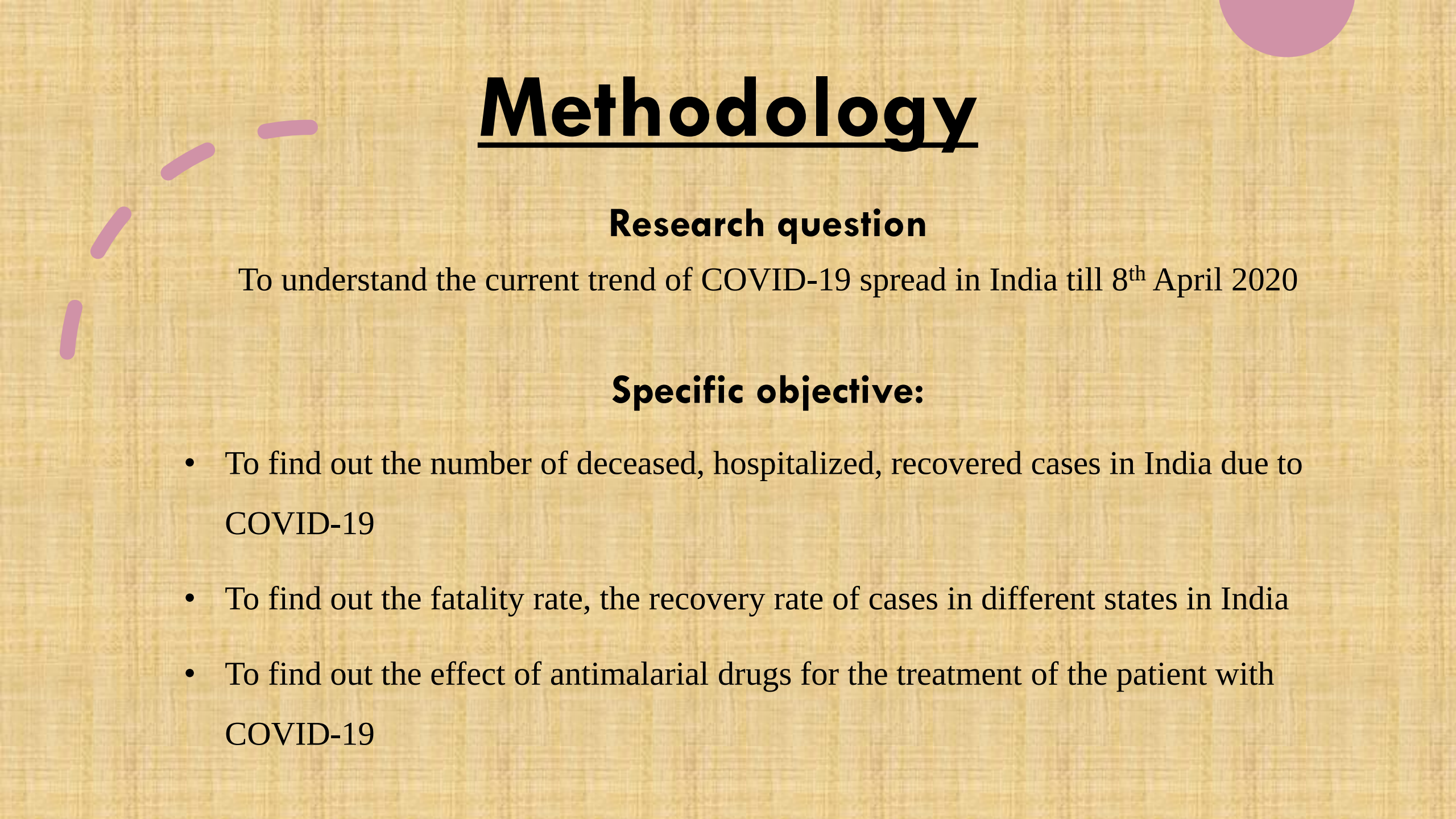
JOURNAL	TITLE	AUTHOR/LINK	MAIN QUESTION/OBJECTIVE	KEY FACTS
www.elsevier.com/locate/antiviral (05 March 2020)	Antiviral Research Of chloroquine and COVID-19	Franck Touret, Xavier de Lamballerie	What is the benefit of chloroquine, in the treatment of patients infected by the novel coronavirus (SARS-CoV-2)?	More than 100 patients demonstrated that it is superior in inhibiting the aggravation of pneumonia, shortening the disease course, and improving lung imaging findings.
International Journal Of Antimicrobial Agents (31 March 2020)	Antiviral effects of chloroquine against coronavirus: What to expect for COVID-19?	Christian A. Devaux, Jean-Marc Rolain, Philippe Colson, Didier Raoult	Antiviral effects of chloroquine against coronavirus. What to accept for COVID-19?	In vitro, chloroquine and remdesivir inhibited SARS-CoV-2. A rapid decline in fever, improvement of lung & shorter recovery time, experienced by the patient.

JOURNAL	TITLE	AUTHOR/LINK	MAIN QUESTION/OBJECTIVE	KEY FACTS
International Journal of Antimicrobial Agents (31 March 2020)	Aminoquinolines Against coronavirus disease 2019 (COVID-19): Chloroquine or hydroxychloroquine	Zahra Sahraei, Minoosh Shabani, Shervin Shokouhi, Ali Saffae	To find out the effect of Aminoquinolines against coronavirus disease 2019 COVID-19.	It alters the glycosylation of the cellular receptors of Coronavirus. It confers broad-spectrum antiviral effects by reducing pH.
Diabetes & Metabolic Syndrome: Clinical Research & Reviews (May-June 2020)	Doctors and healthcare workers at the frontline of COVID-19 epidemic	Anoop Misra	What preventive measures should be taken by frontline workers dealing with COVID-19?	For treating COVID-19 patients requires training, wear PPE, ICU with ventilators. Public sector ICUs are needed up-gradation.

JOURNAL	TITLE	AUTHOR/LINK	MAIN QUESTION/OBJECTIVE	KEY FACTS
Diabetes & Metabolic Syndrome: Clinical Research & Reviews (22 March 2020)	Chloroquine or Hydroxychloroquine is the treatment of COVID-19 with or without diabetes	Awadesh Kumar Singh, Akriti Singh	What is the effect of chloroquine or hydroxychloroquine in treating patients of COVID-19 with or without diabetes?	Human research has shown a combination of HCQ plus azithromycin is highly efficient in just 3-6 days cleared nasopharyngeal carriage. It can be given in type 2 diabetes adult patients for controlling glycemia (approved in India).
Forensic Science International : Mind and Law (2020)	Caring for persons in detention suffering from mental illness during the Covid-19 outbreak	Michael Liebreinz, Dinesh	How to provide care for the mental illness during the COVID-19 outbreak?	Psychological care is a major challenge for many health care systems. Quarantine service and all the essential amenities isolating the suspected and their close contacts.

JOURNAL	TITLE	AUTHOR/LINK	MAIN QUESTION/OBJECTIVE	KEY FACTS
The Indian Journal of Pediatrics (13 March 2020)	A Review of Coronavirus Disease-2019 (COVID-19)	Tanu Singhal	A review of the global impact of this new epidemic.	In the hospitalized adult patient's death rate ranges from 4 to 11%. The case death rate varies from 2 to 3%. The virus enters the respiratory mucosa by angiotensin receptor 2 (ACE2).
Treatment and Research Centre for Infectious Diseases (17 February 2020)	Pathological findings of COVID-19 associated with acute respiratory distress syndrome	Z Xu MD, L Shi MD, J Zhang Ph.D., L Huang MD, C Zhang Ph.D., P Zhao MSc, H Liu BSc, J Song Ph.D., P Xia MSc	What are the pathological findings related to ARDS?	Sever condition cause massive alveolar damage and progressive respiratory failure. over activation of T cells, Th17, and high cytotoxicity of CD8 T cells, the severe immune injury in this patient.

JOURNAL	TITLE	AUTHOR/LINK	MAIN QUESTION/OBJECTIVE	KEY FACTS
BMJ 2020;368: m1066 doi: 10.1136 (17 March 2020)	Covid-19 and community mitigation strategies in a pandemic	Shahul H Ebrahim adjunct professor, 1, Qanta A Ahmed associate professor	What should be the community migration strategies during a pandemic?	Restrict- Mass gatherings, political events, cultural celebrations, religious gatherings, and music festivals. Home quarantine decreases stress on the healthcare system.
BioScience Trends Advance Public(2020)	Chloroquine phosphate has shown apparent efficacy in the treatment of COVID-19 associated pneumonia in clinical studies	Jianjun Gao1, Zhenxue Tian2, Xu Yang2	Chloroquine phosphate, shown to have apparent efficacy and acceptable safety against COVID-19	In the testing ground, chloroquine was capable of blocking COVID-19 with a half-maximal effective concentration of 1.13 μ M Chloroquine phosphate has potent action against COVID-19.



Methodology

Research question

To understand the current trend of COVID-19 spread in India till 8th April 2020

Specific objective:

- To find out the number of deceased, hospitalized, recovered cases in India due to COVID-19
- To find out the fatality rate, the recovery rate of cases in different states in India
- To find out the effect of antimalarial drugs for the treatment of the patient with COVID-19



Type of research method: A review study

Type of research design: Quantitative/Qualitative, mixed-method approach

Data Collection:

Data is collected from secondary sources like journals, articles, websites, and papers.



CURRENT STATUS OF CORONAVIRUS SPREAD IN INDIA:

- The government of India planned a joint meeting with empowered groups (04 April) created for the planning and implementation of COVID-19 response actions throughout the country.
- ICMR to collaborate with the WHO solidarity trial- an international randomization trial for treating COVID-19 in hospitalized patients

Based on data provided to date 08th April 2020, data analysis is performed. India has reported 5399 total cases, out of which 5215 are hospitalized, 27 deaths, and 116 patients recovered according to the data from the Health Ministry and State Governments.

Row Labels	Count of patient number	
Deceased	27	
Hospitalized	5215	
Migrated	1	
Recovered	116	
(blank)	40	
Grand Total	5399	

Table1: Representing Patient numbers in India on 8 April.

Data till 8th April 2020

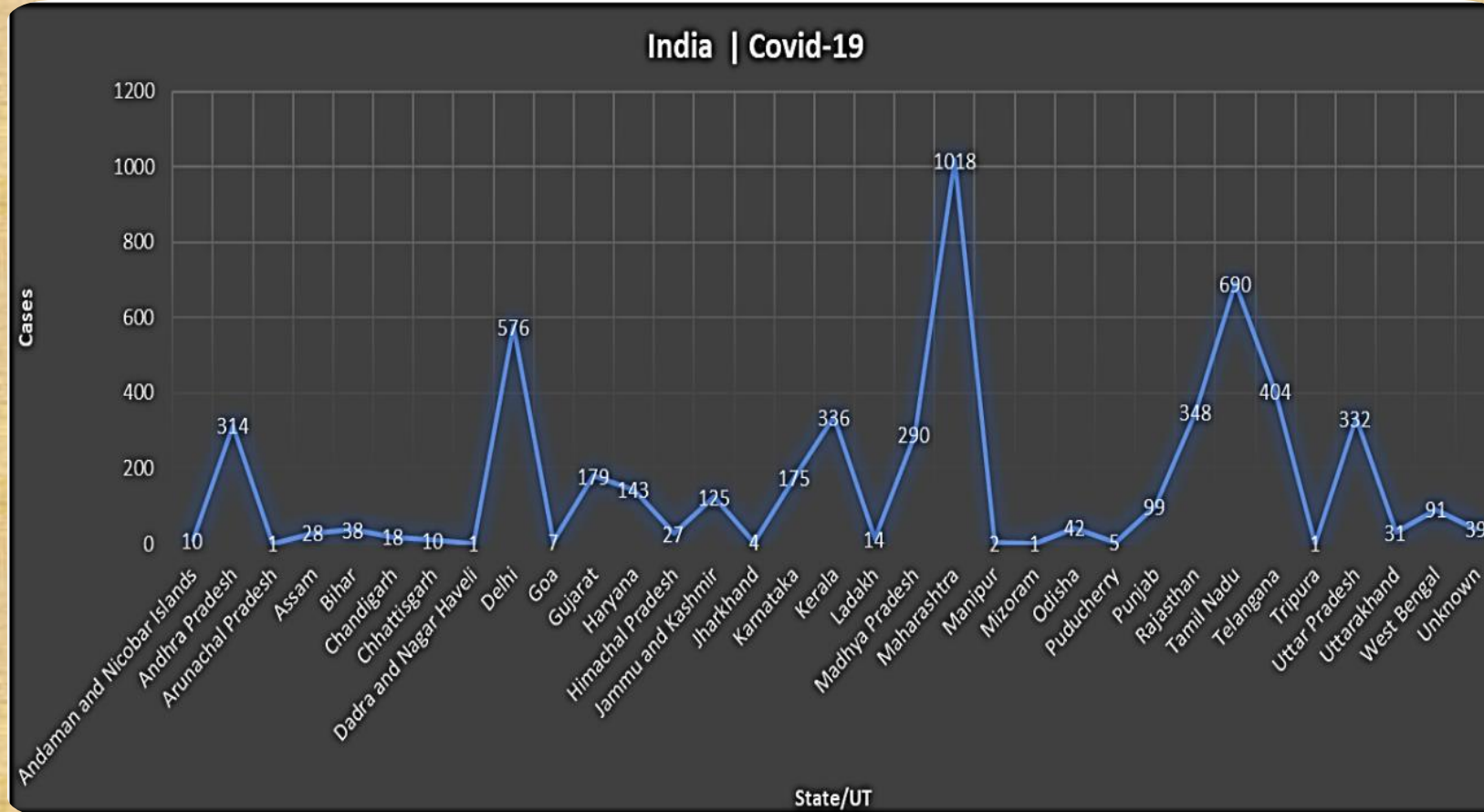


S. No.-	State/UT	Cases
1	Andaman& Nicobar	10
2	Andhra Pradesh	314
3	Arunachal Pradesh	1
4	Assam	28
5	Bihar	38
6	Chandigarh	18
7	Chhattisgarh	10
8	Dadra & Nagar Haveli	1
9	Delhi	576
10	Goa	7
11	Gujarat	179
12	Haryana	143
13	Himachal Pradesh	27
14	Jammu and Kashmir	125
15	Jharkhand	4
16	Karnataka	175
17	Kerala	336
18	Ladakh	14
19	Madhya Pradesh	290
20	Maharashtra	1018
21	Manipur	2
22	Mizoram	1
23	Odisha	42
24	Puducherry	5
25	Punjab	99
26	Rajasthan	348
27	Tamil Nadu	690
28	Telangana	404
29	Tripura	1
30	Uttar Pradesh	332
31	Uttarakhand	31
32	West Bengal	91
33	Unknown	39

CURRENT STATUS OF STATES IN TERMS OF COVID-19 SPREAD:

Table 2: Representing Coronavirus cases in India on 8th April 2020.

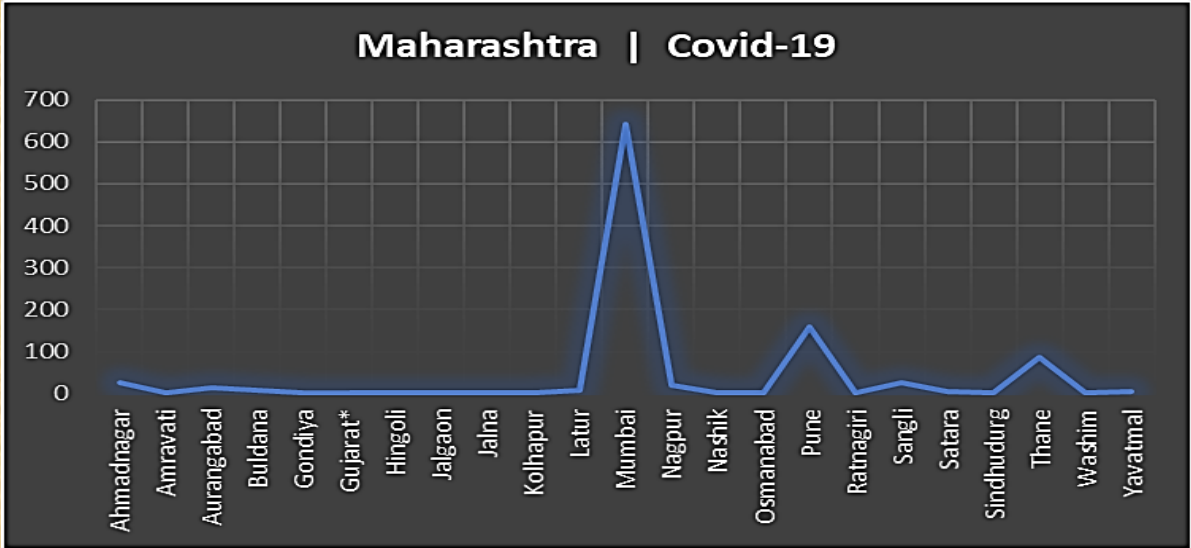
CORONAVIRUS TREND



The country is seeing a spurt in the number of cases with 1,018 cases in Maharashtra was the worst-hit state, followed by Tamil Nadu at 690 and Delhi at 576, Telangana at 364 and Kerala at 336. Followed by Rajasthan, Andhra-Pradesh, Uttar Pradesh.

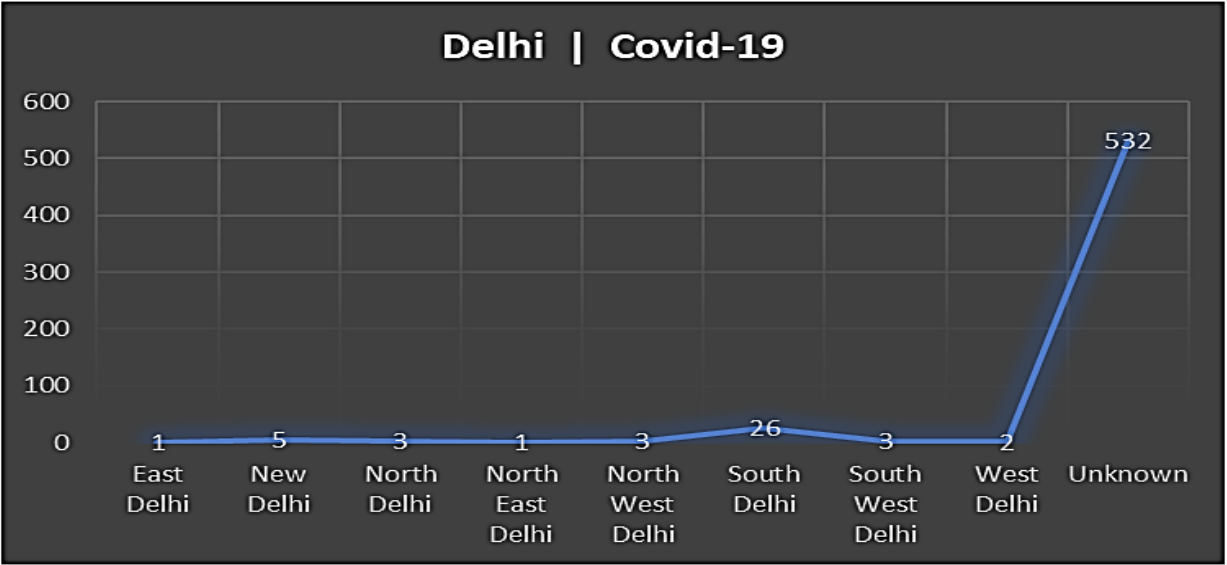
Graph 1: Graphical representation of COVID-19 cases in India on 8th April 2020

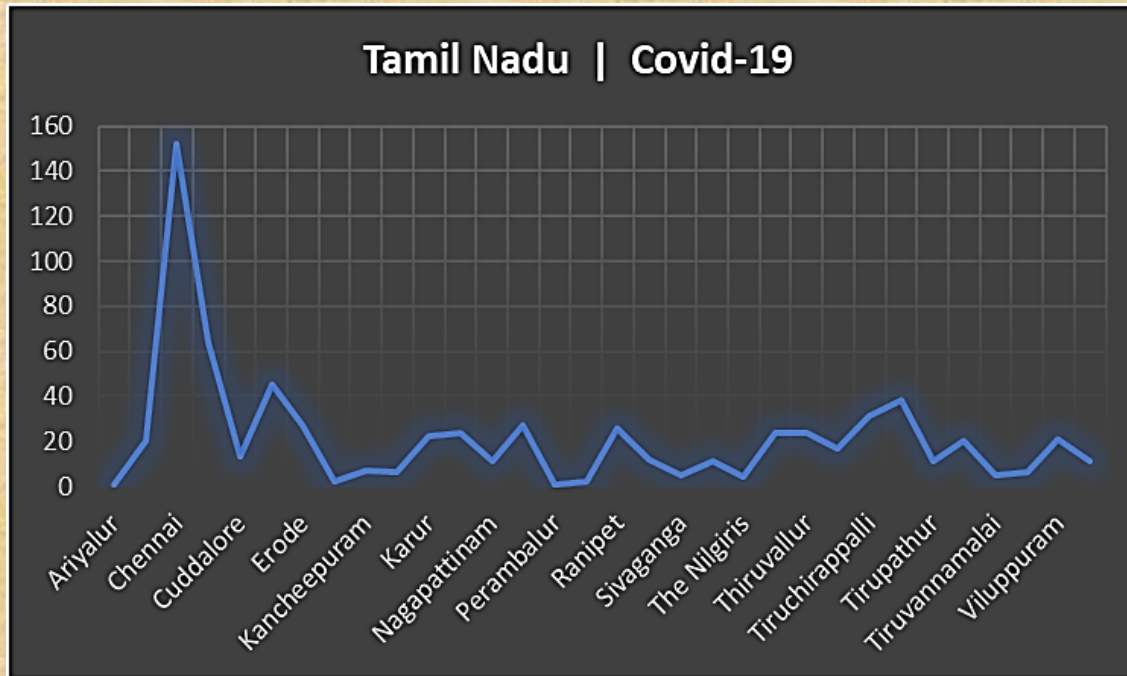
Key states and districts in India facing a major challenge:



Graph 3: Representing COVID-19 cases in Maharashtra

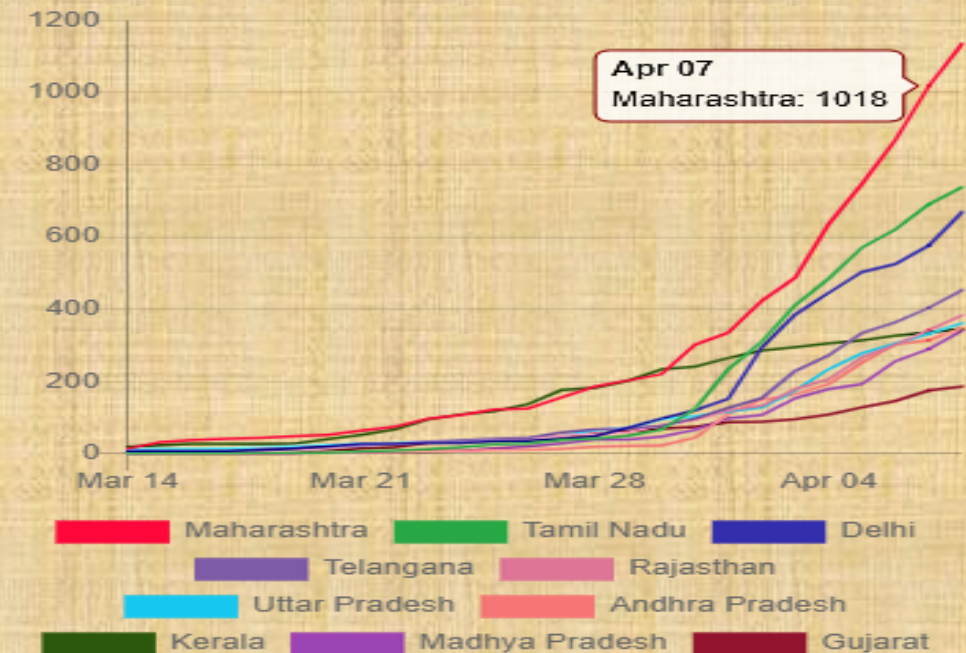
Graph 4: Representing COVID-19 cases in Delhi





Graph 4: Representing COVID-19 cases in Tamil Nadu

Maharashtra reported the highest number of cases, with Mumbai alone having 643 cases, followed by Pune 159. Tamil Nadu reported 690 cases, where Chennai reported with 152 cases. The number of cases in the capital has risen to 576.



Graph 5: Trend analysis of the COVID-19 pandemic in India

DISCUSSION

The strategy recommended for hospitals treating cases with COVID-19:

- There should be ambulances identified specifically for transporting COVID-19 suspected patients or those who have developed complications.
- COVID care hospitals should be equipped with ICUs, Ventilators, and beds with Oxygen support.
- Patients having mild symptoms should be admitted to **COVID CARE CENTRE** (hotels/lodges/hostels), moderate symptoms admitted to **DEDICATED COVID HEALTH CENTRE**, and severe in **DEDICATED COVID HEALTH CENTRE** with ICU facility.



Lockdown strategies for severely affected states:

- India, begin its 21-day lockdown which started midnight on March 24 involved shutting down offices, public gathering, and asking everyone to stay home.
- Launch a massive education campaign for educating people in the affected places, so that they inform if they feel any symptoms, instead of hiding it.
- Mass screening camps at bus stands, railway stations, college, and school campuses and in other public spaces should be performed.



Exceptions. (During lockdown)

- Ration shops (groceries, fruits and vegetables, dairy, meat, and fish) home delivery may be preferred to minimize the movement of individuals.
- Bank, Insurance offices, ATMs
- Pharmaceuticals, medical equipment will be delivered through E-commerce.
- Warehousing services and Cold storage

Role of Anti-Malarial Drugs in Treating COVID-19 Patients:

Research conducted on chloroquine and hydroxychloroquine in vitro

- In an experimental research study, chloroquine inhibits the replication of intracellular microorganisms in vitro.
- Chloroquine changes the pH of lysosomes and inhibits cathepsins, which leads to the formation of the autophagosome which splits COVID-19 spike protein.
- Chloroquine prevents its attachment to the target cells, by interfering with glycosylation of the ACE2 receptor.
- The **second human study** conducted in an open-label, non-randomized trial (n=36) conducted in Marseille, France, Gautret et al. discovered that HCQ and combination of HCQ and azithromycin are highly efficient in just 3-6 days in cleaning nasopharyngeal carriage which is measured by PCR.
- HCQ functioning was considerably higher in patients with symptoms as compared to asymptomatic patients.

CONCLUSION

- A significant number of cases are reporting daily in India with 5399 cases reported on April 8th, 2020. The country is seeing several cases with 1,018 cases in Maharashtra was the worst-hit state, followed by Tamil Nadu at 690 and Delhi at 576, Telangana at 364, and Kerala at 336.
- The Government will extend the lockdown by arguing that it is necessary to “flatten the curve” of infections.
- The Proof of chloroquine and HCQ is limited but seeing the agreeable risk-benefit balance of chloroquine and HCQ, we can use this for treatment of the current pandemic COVID-19 outbreak.
- The line of treatment must depend upon the severity and health condition of the patient.

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Epidemiology: The Basic Science of Public Health

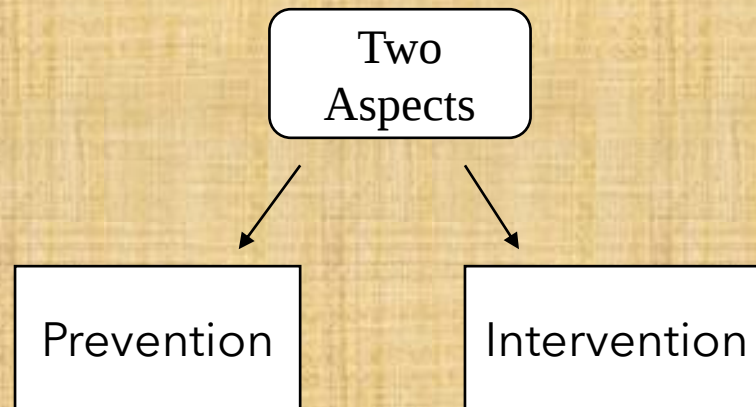
Report on an online course offered by
THE UNIVERSITY of NORTH CAROLINA at
CHAPEL HILL



coursera

KEY LEARNINGS

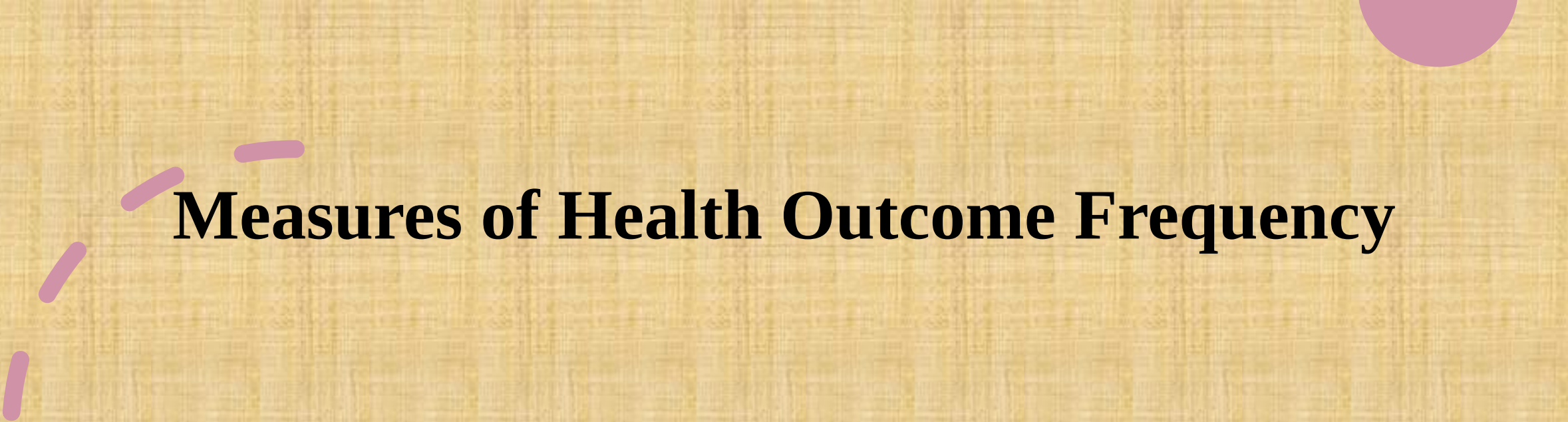
Epidemiology – “The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems”. John M. Last (1988)





Three Levels of Public Health Prevention –

Primary prevention	It may decrease the risk of health outcomes. Ex. Vaccination
Secondary Prevention	It aims to treat the disease early, which may cure disease. Ex. Early-stage of Cancer
Tertiary prevention	The main aim is to prevent damage from the disease. Ex. Diabetes and heart disease.



Measures of Health Outcome Frequency

Health Outcome – It includes diseases, illness, conditions, disorders, symptoms, behavior, risk factors and injuries, and as well as healthy behavior. Ex. Eating fruits and vegetables, No smoking habit.

Prevalence – Proportion of defined population that has the health outcome. Cases were diagnosed before the beginning of the study. Quantifies the burden on the population.

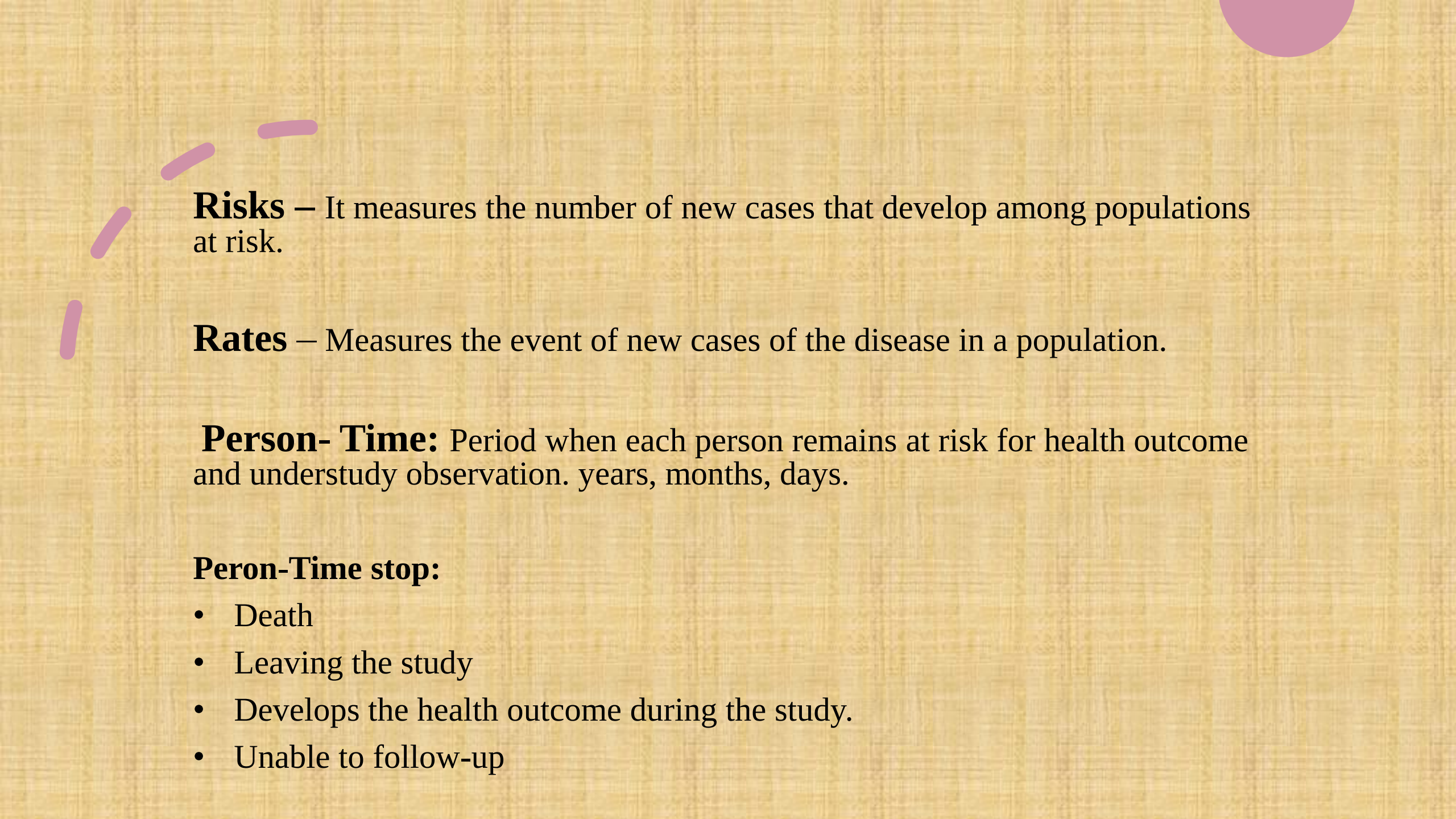


Two types of Prevalence Measurements

Point Prevalence – Prevalence at one point in time. Ex. Do you currently have ulcers?

Period Prevalence – No. of people with the health outcome over a specific time, divided by the number of populations during that time.

Ex. Have you had asthma during the past few years.



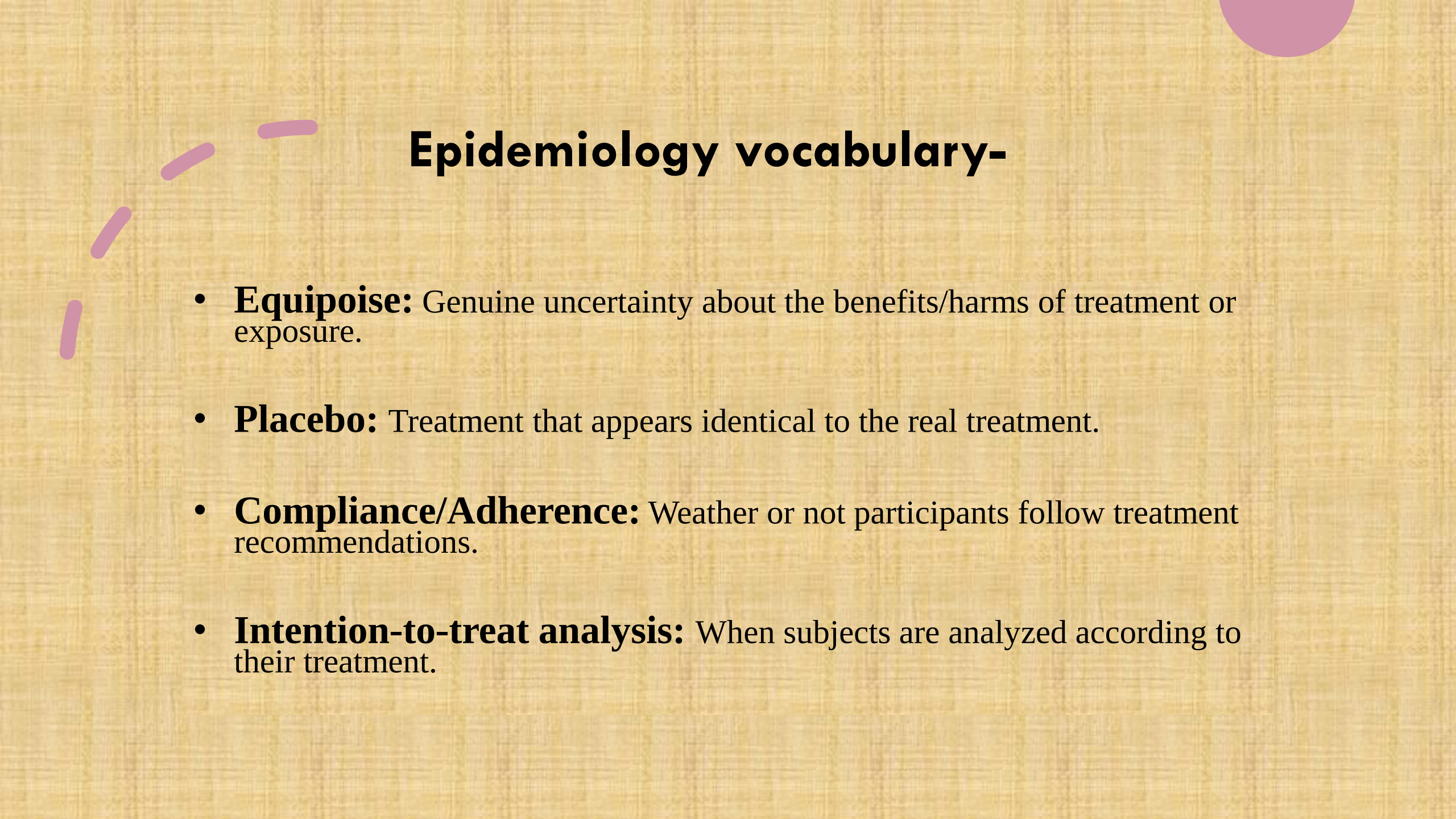
Risks – It measures the number of new cases that develop among populations at risk.

Rates – Measures the event of new cases of the disease in a population.

Person- Time: Period when each person remains at risk for health outcome and under study observation. years, months, days.

Person-Time stop:

- Death
- Leaving the study
- Develops the health outcome during the study.
- Unable to follow-up



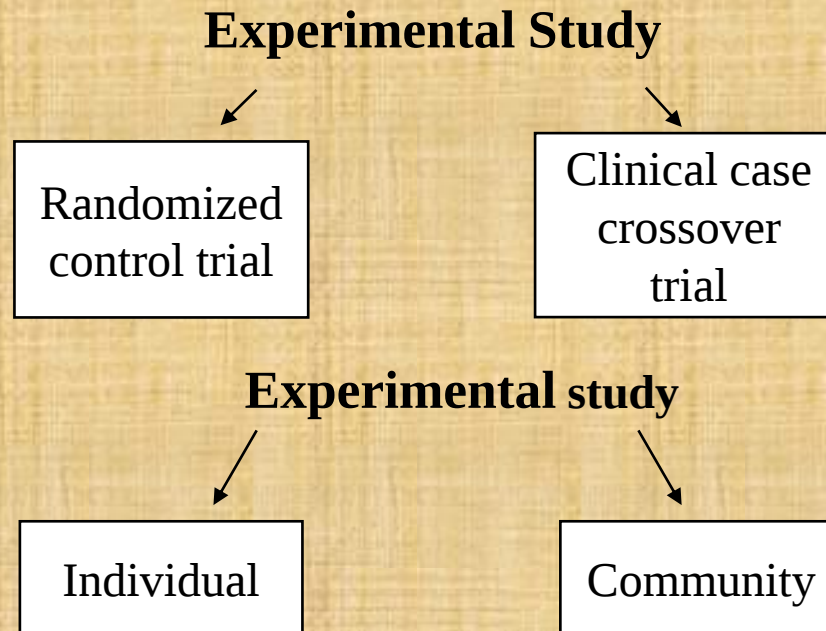
Epidemiology vocabulary-

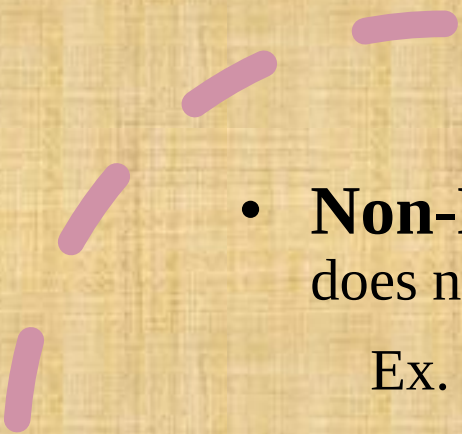
- **Equipoise:** Genuine uncertainty about the benefits/harms of treatment or exposure.
- **Placebo:** Treatment that appears identical to the real treatment.
- **Compliance/Adherence:** Whether or not participants follow treatment recommendations.
- **Intention-to-treat analysis:** When subjects are analyzed according to their treatment.

Types of Study Designs –

Experimental study design: In experimental study design the investigator usually determines who will get exposed and who will not. This exposure or intervention is randomly allocated.

Ex. Developing a new drug.



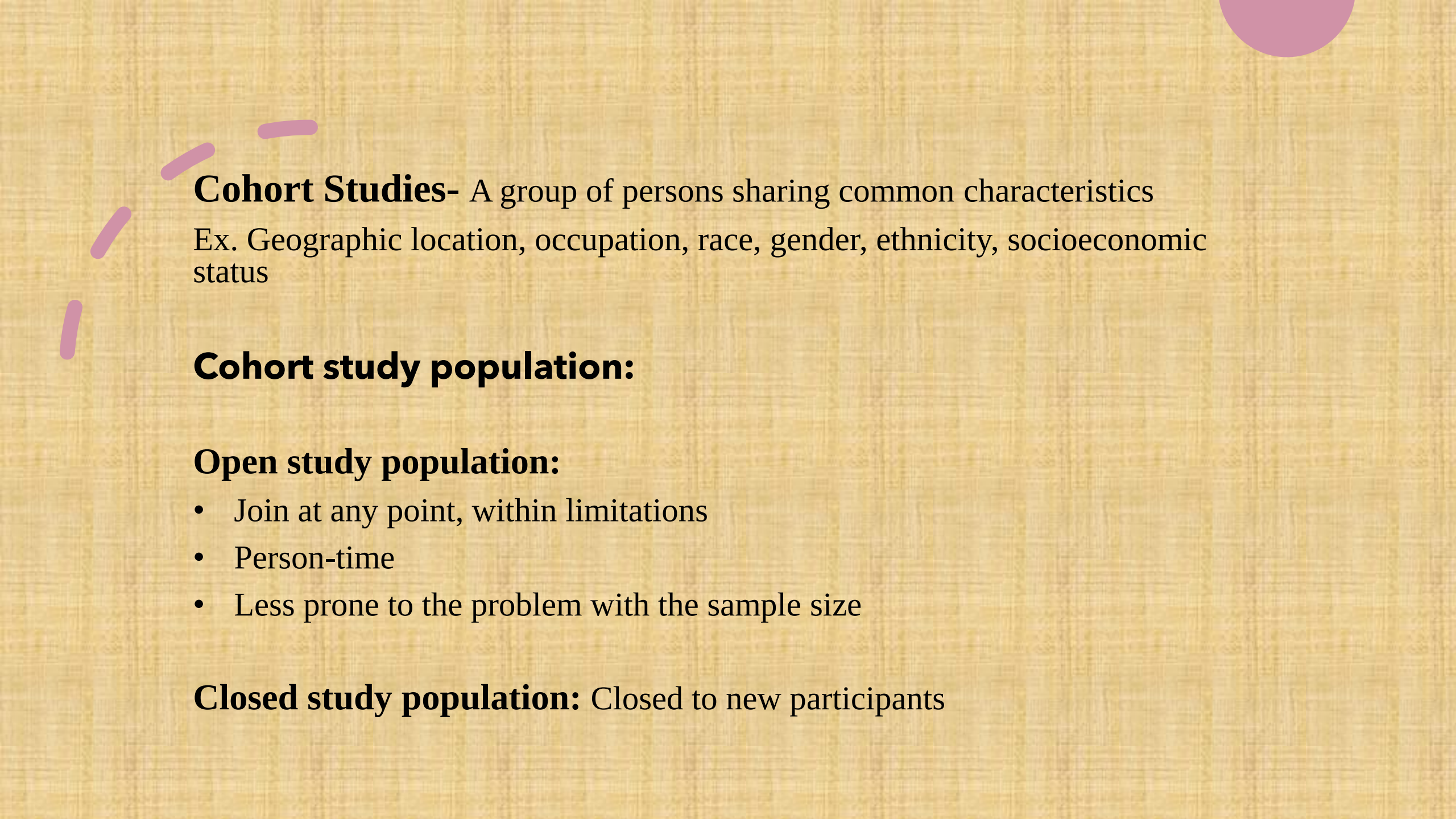
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- **Non-Experimental or Observational study:** Investigator usually does not determine the exposure.

Ex. Health status of the people working in coal mines.

- **Randomized Control Trial-** Intervention groups and Control groups should be comparable in all aspects. Ex. The proportion of males and the age distribution should be similar in both groups.

- **Crossover Clinical Trial-** In this trial subjects switch from one treatment to another after a certain period.

Wash-out period (no treatment is given during this period).



Cohort Studies- A group of persons sharing common characteristics

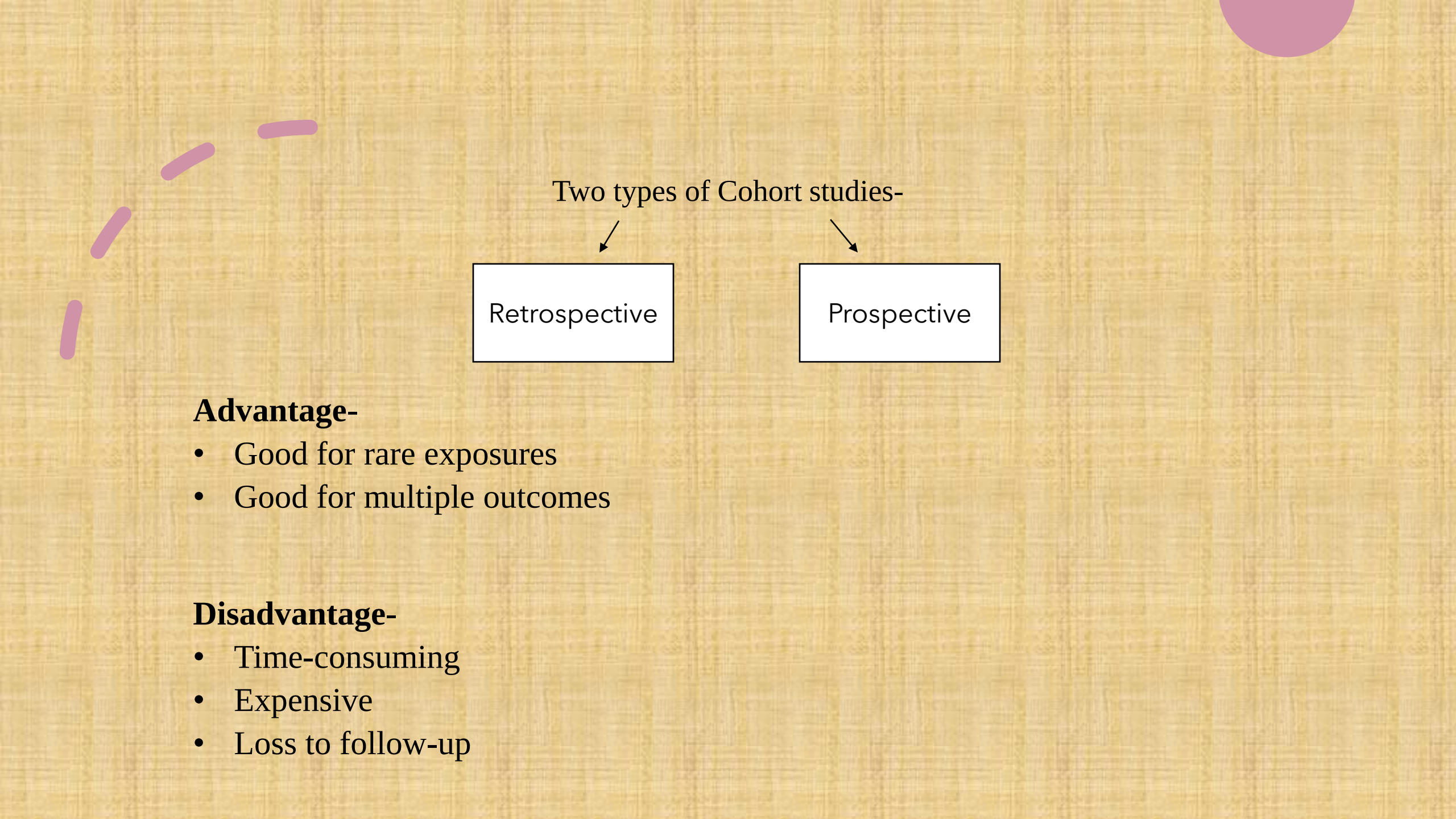
Ex. Geographic location, occupation, race, gender, ethnicity, socioeconomic status

Cohort study population:

Open study population:

- Join at any point, within limitations
- Person-time
- Less prone to the problem with the sample size

Closed study population: Closed to new participants



Two types of Cohort studies-

Retrospective

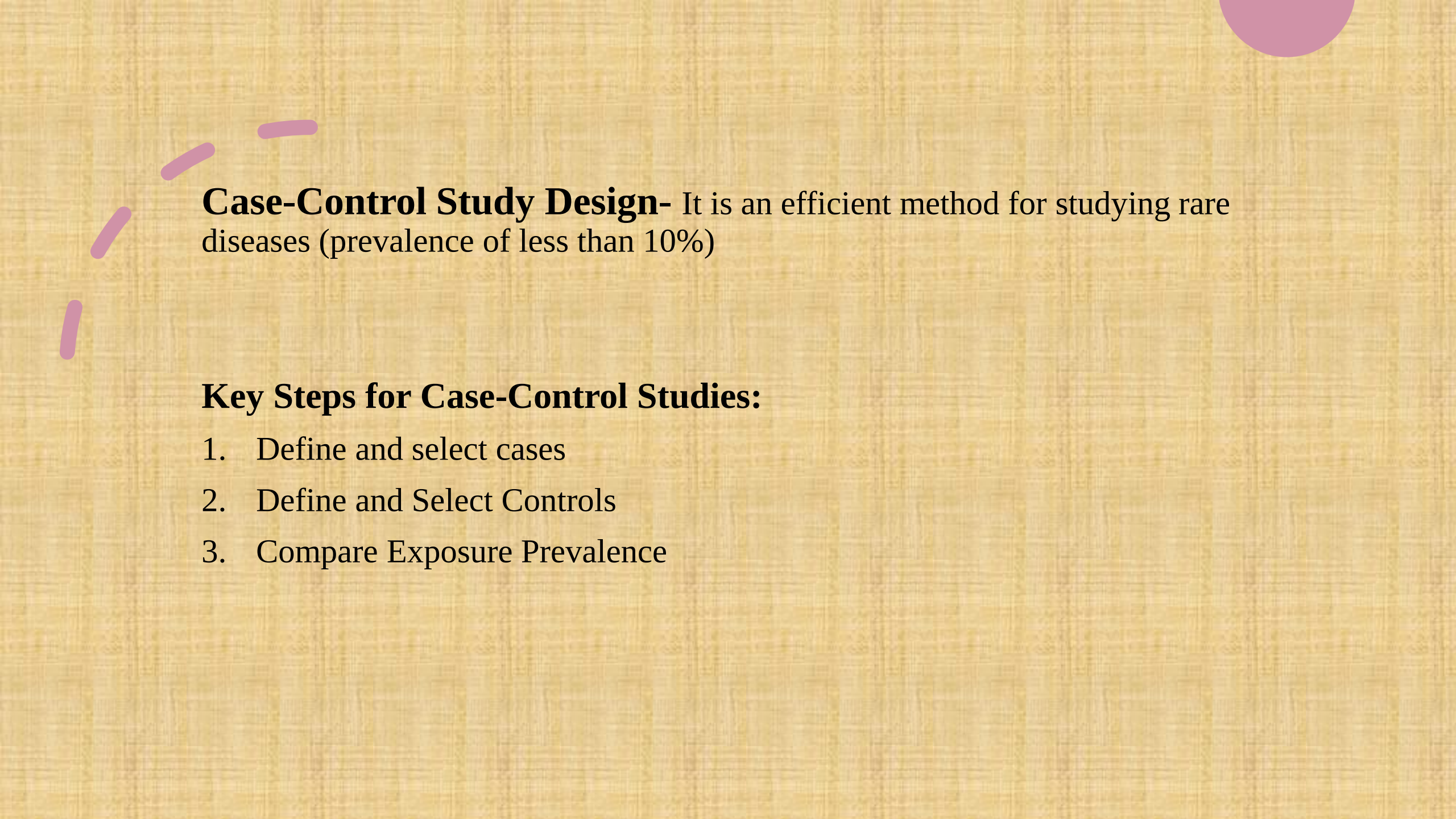
Prospective

Advantage-

- Good for rare exposures
- Good for multiple outcomes

Disadvantage-

- Time-consuming
- Expensive
- Loss to follow-up



Case-Control Study Design- It is an efficient method for studying rare diseases (prevalence of less than 10%)

Key Steps for Case-Control Studies:

1. Define and select cases
2. Define and Select Controls
3. Compare Exposure Prevalence



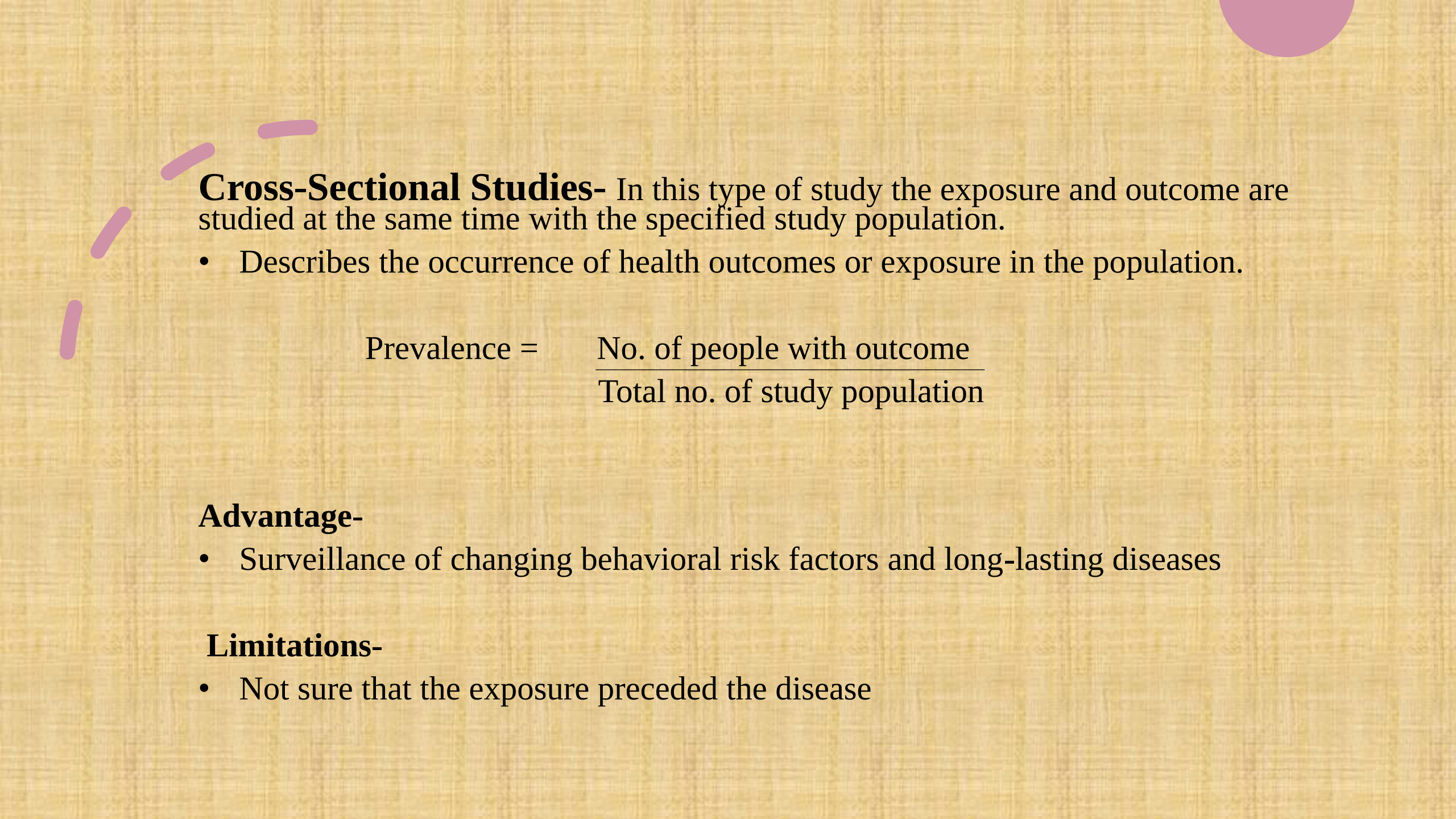
Case-Control Study Design

Advantage-

- Take less time
- Use fewer resources and money
- Can examine multiple exposures

Disadvantage-

- Some possible biases in the selection of subjects, measurement of exposures, and analysis



Cross-Sectional Studies- In this type of study the exposure and outcome are studied at the same time with the specified study population.

- Describes the occurrence of health outcomes or exposure in the population.

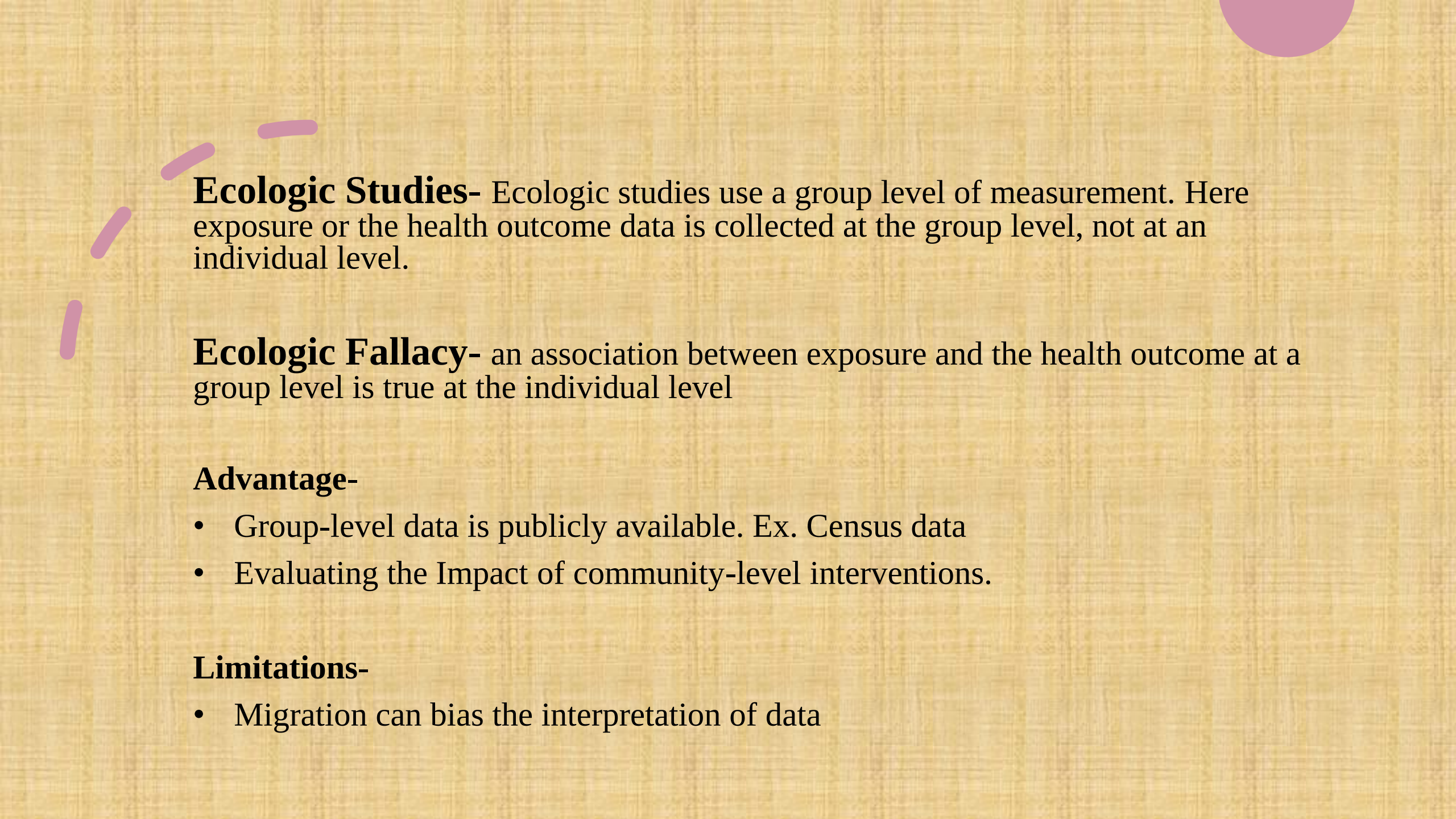
$$\text{Prevalence} = \frac{\text{No. of people with outcome}}{\text{Total no. of study population}}$$

Advantage-

- Surveillance of changing behavioral risk factors and long-lasting diseases

Limitations-

- Not sure that the exposure preceded the disease



Ecologic Studies- Ecologic studies use a group level of measurement. Here exposure or the health outcome data is collected at the group level, not at an individual level.

Ecologic Fallacy- an association between exposure and the health outcome at a group level is true at the individual level

Advantage-

- Group-level data is publicly available. Ex. Census data
- Evaluating the Impact of community-level interventions.

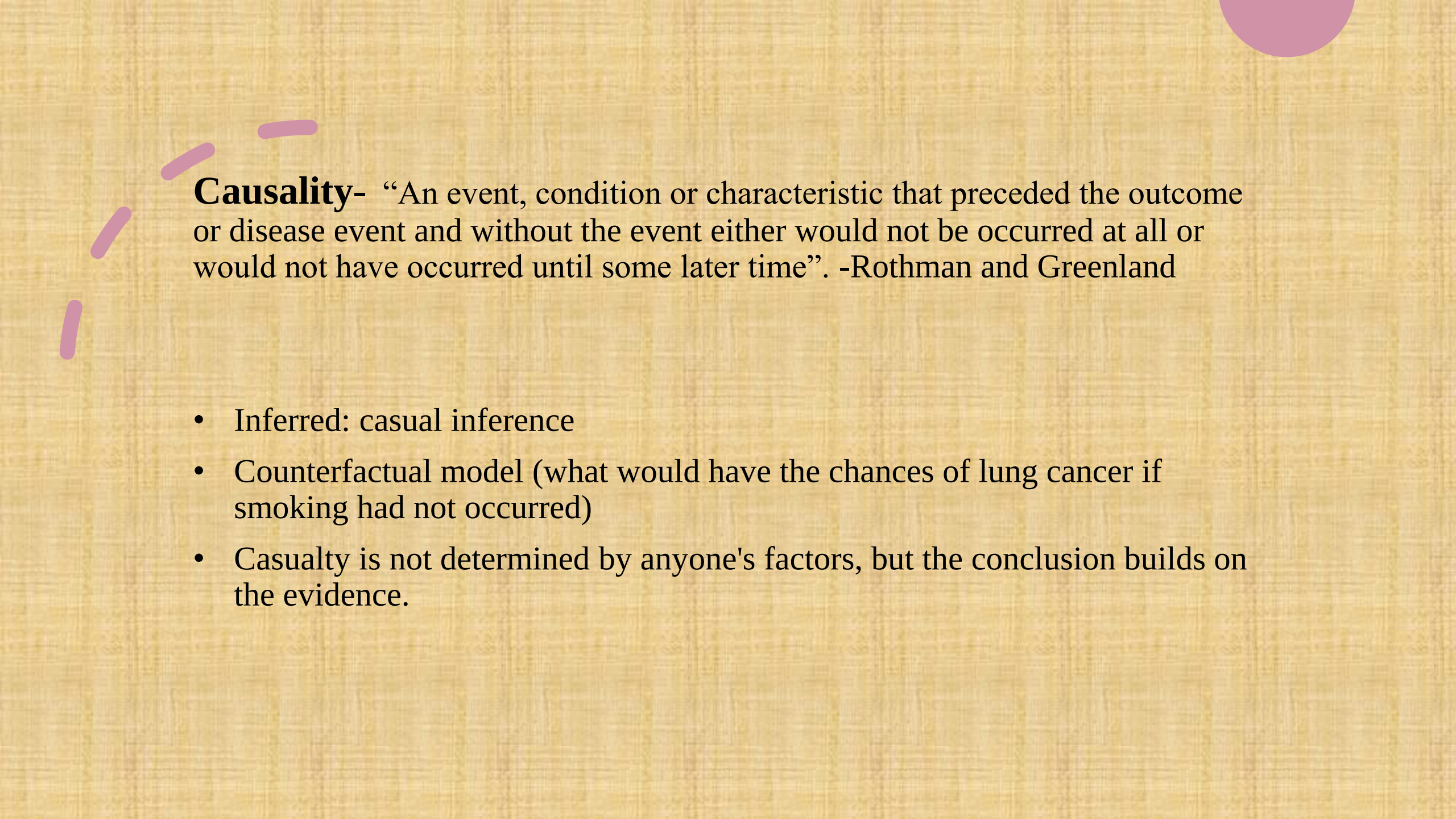
Limitations-

- Migration can bias the interpretation of data

Measures of association and study design

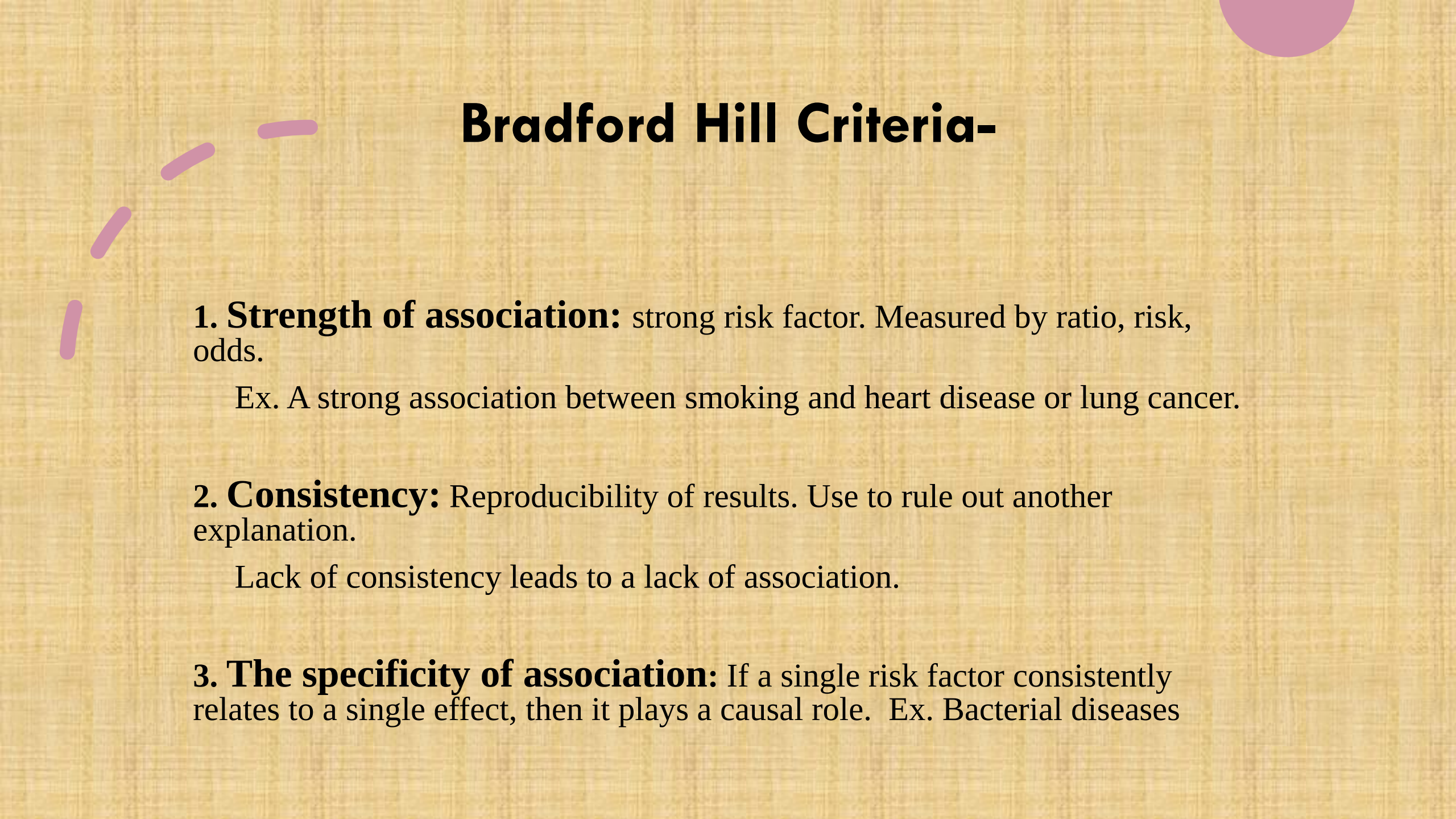


	Prevalence ratio, difference	Odds ratio, difference	Risk ratio, difference	Rate ratio, difference
Study design	Cohort (at baseline or for non-outcome variable)	Cohort	Cohort	Cohort
	Cross-sectional	Cross-sectional		
		Case-control		
		Experimental	Experimental	Experimental
	Ecologic	Ecologic	Ecologic	Ecologic



Causality- “An event, condition or characteristic that preceded the outcome or disease event and without the event either would not be occurred at all or would not have occurred until some later time”. -Rothman and Greenland

- Inferred: casual inference
- Counterfactual model (what would have the chances of lung cancer if smoking had not occurred)
- Casualty is not determined by anyone's factors, but the conclusion builds on the evidence.



Bradford Hill Criteria-

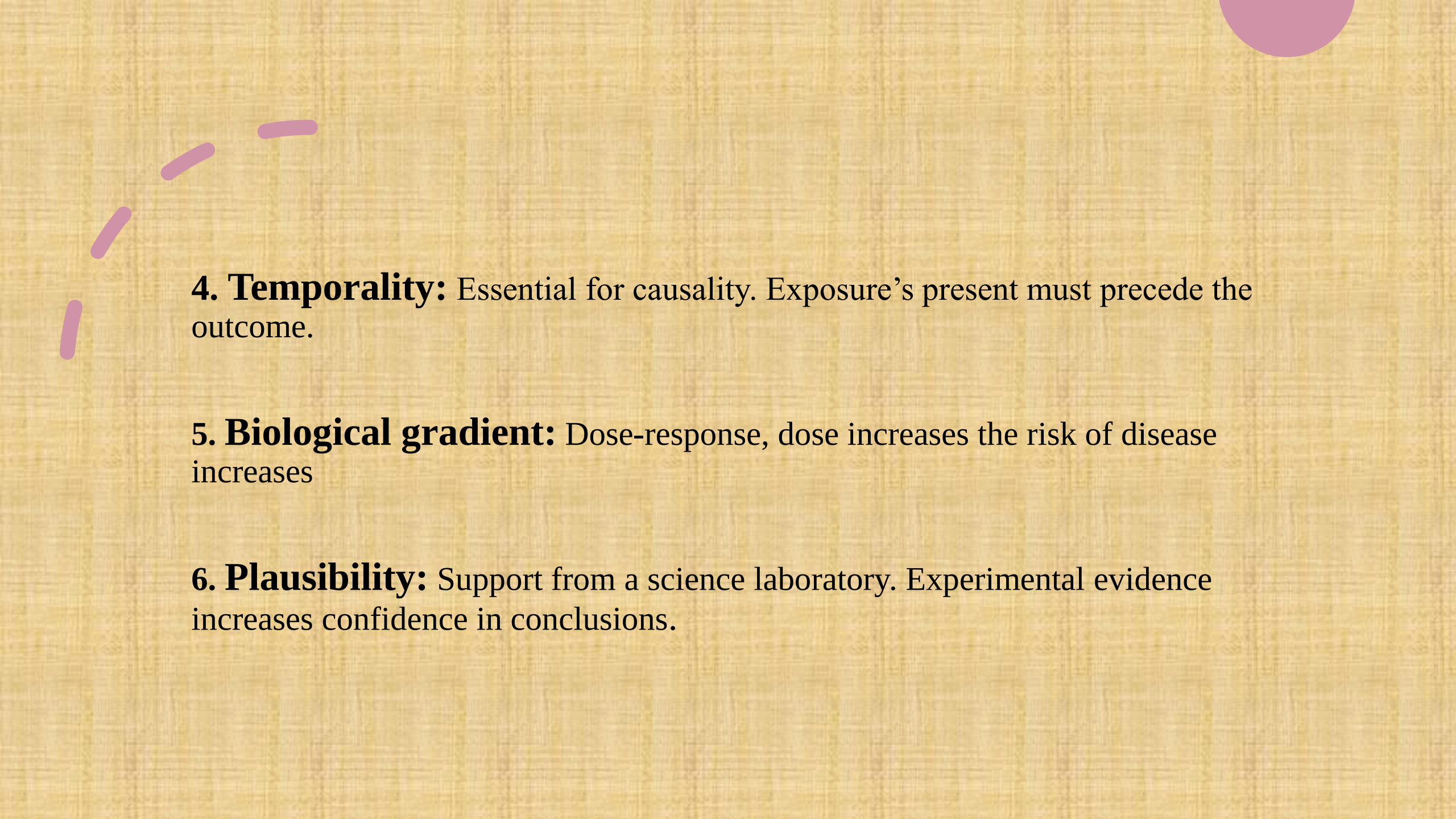
1. Strength of association: strong risk factor. Measured by ratio, risk, odds.

Ex. A strong association between smoking and heart disease or lung cancer.

2. Consistency: Reproducibility of results. Use to rule out another explanation.

Lack of consistency leads to a lack of association.

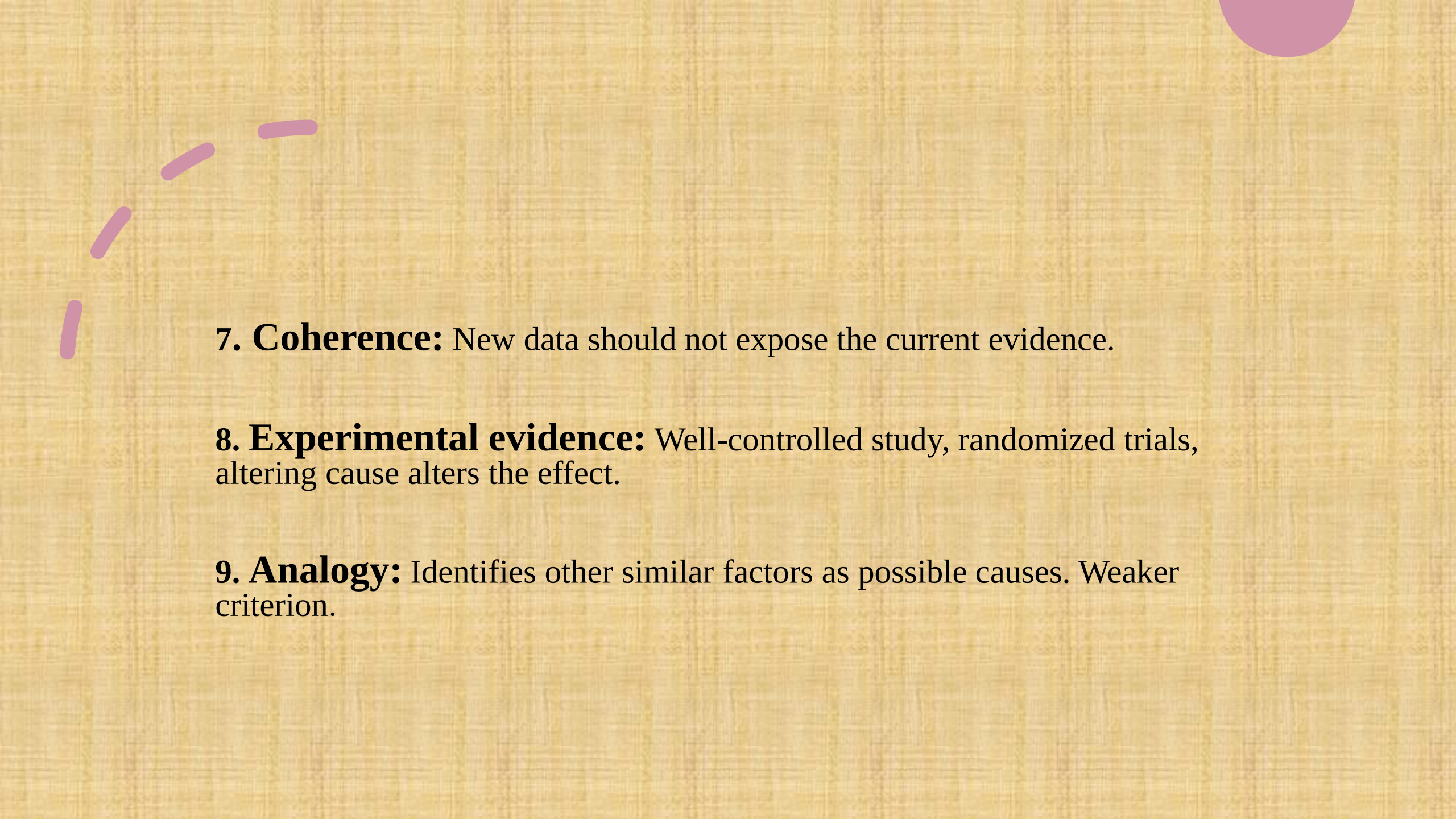
3. The specificity of association: If a single risk factor consistently relates to a single effect, then it plays a causal role. Ex. Bacterial diseases



4. Temporality: Essential for causality. Exposure's present must precede the outcome.

5. Biological gradient: Dose-response, dose increases the risk of disease increases

6. Plausibility: Support from a science laboratory. Experimental evidence increases confidence in conclusions.



7. Coherence: New data should not expose the current evidence.

8. Experimental evidence: Well-controlled study, randomized trials, altering cause alters the effect.

9. Analogy: Identifies other similar factors as possible causes. Weaker criterion.

The image features a large white circle centered on a solid orange background. A dashed orange line, composed of several short segments, curves along the top-left edge of the white circle. A solid orange dot is positioned on the right side of the white circle, near its edge.

Thankyou