



SUMMER TRAINING REPORT

2019-20

By Harleen Kaur





REPORT 1

TEACHINGS FROM PAST LESSONS LEARNT FROM THE PAST PANDEMICS

RATIONALE

*"Those who cannot remember the past are
condemned to repeat it."*

— George Santayana

- The term “Clioepidemiology” (after Clio, the muse of history), describes the practice of studying information from past epidemics for advice about the present.
- Historical data can clearly offer valuable insights that are highly relevant to today's concerns—insights that in some cases can be obtained in no other way.
- Pandemics tend to highlight underlying weaknesses in the health system that might not have been in evidence prior to the outbreak.

SARS 2002-04

- The first epidemic of 21st century
- Caused by *Severe Acute Respiratory Syndrome Coronavirus* (SARS-CoV or SARS-CoV-1)
- On 16th November 2002, in the Foshan city of Guangdong province of China, this outbreak was identified,
- About 8422 cases and 916 fatalities were reported from 1st November 2002 to 7th August 2003.
- India reported three “probable cases” and 10 “suspect cases”.
- By the end of epidemic, SARS cases were reported by 32 countries.

Areas	Total	Number of deaths	CFR (%)
Canada	251	41	17%
China	5327	349	7%
Hong Kong	1755	300	17%
Taiwan	665	180	27%
India	3	0	0%
Viet Nam	63	5	8%

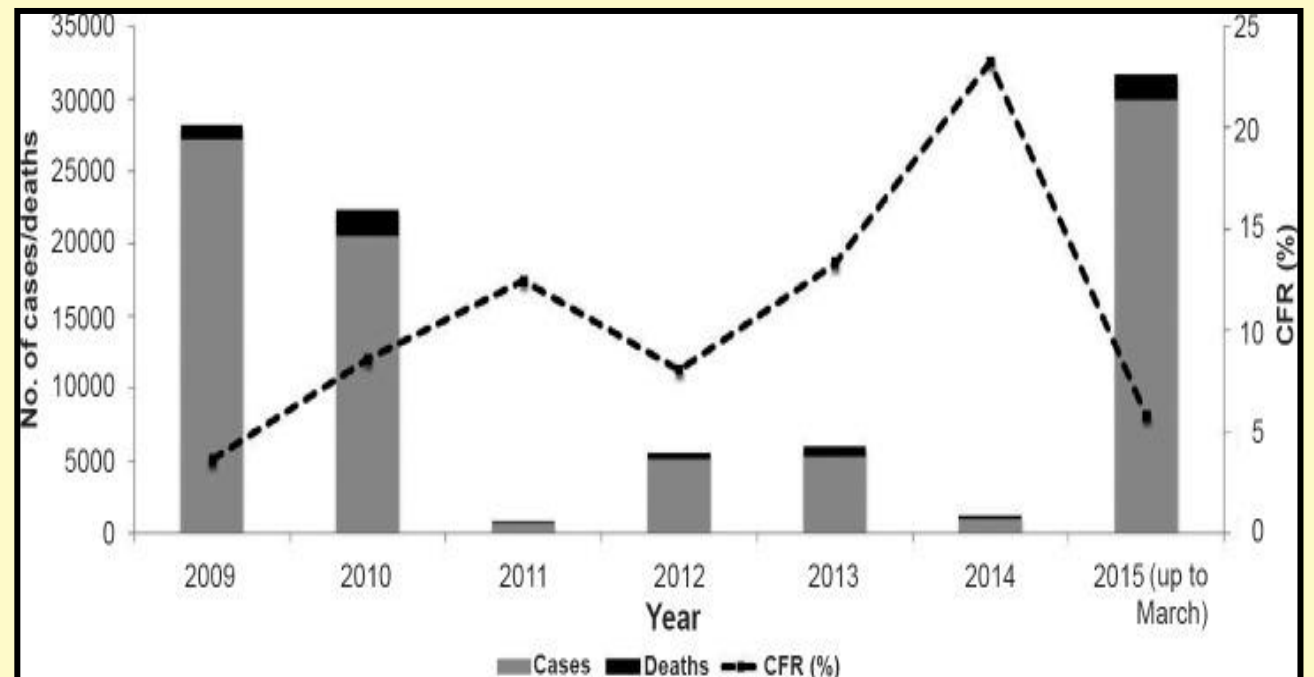
DENGUE 2006

- The Dengue outbreak of 2006 was caused due to dengue viruses transmitted by *Aedes* mosquitoes.
- Can vary from asymptomatic infection or mild fever to severe Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).
- In August 2006, dengue fever struck India again along with chikungunya fever
- By end of November 2006, about 10,344 cases and 162 deaths due to dengue (DHF/ DSS) had been reported.

YEAR	CASES	DEATHS
2012	50,222	242
2013	75,808	193
2014	33,320	86
2015	99913	220
2016	129166	245
2017	188401	325
2018	101192	172
2019(till Nov.)	136422	132

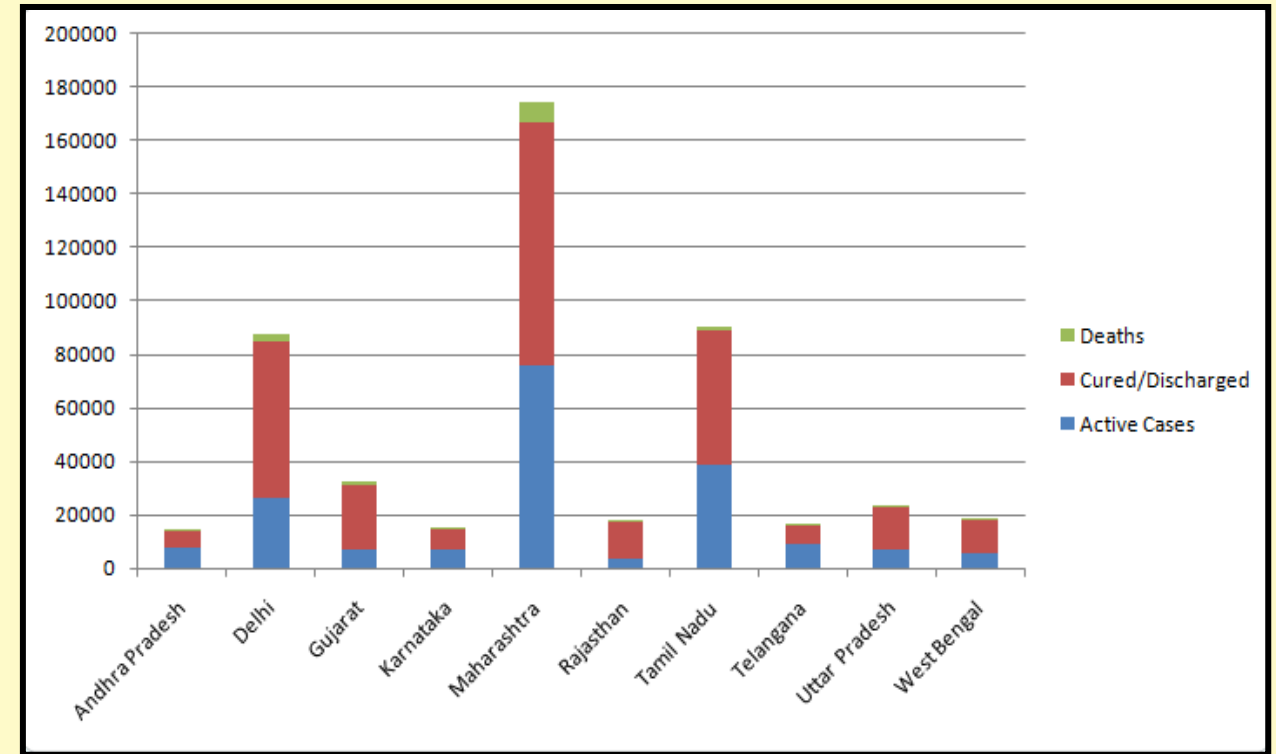
H1N1 2009

- The “Swine flu” H1N1 began in May 2009 in Mexico and spread globally by 11th July, 2009
- Between 2009-10, around 18,300 deaths had taken place across 74 countries worldwide
- During the 2009 pandemic, India reported 27,236 cases and 981 deaths.
- The International Health Regulations (IHR) of WHO declared Influenza-H1N1, a seasonal strain on 10th August 2010
- Resurgence of H1N1 was observed in India between December 2014 to March 2015 that caused 30,000 cases and 2000 deaths countrywide.



COVID-19

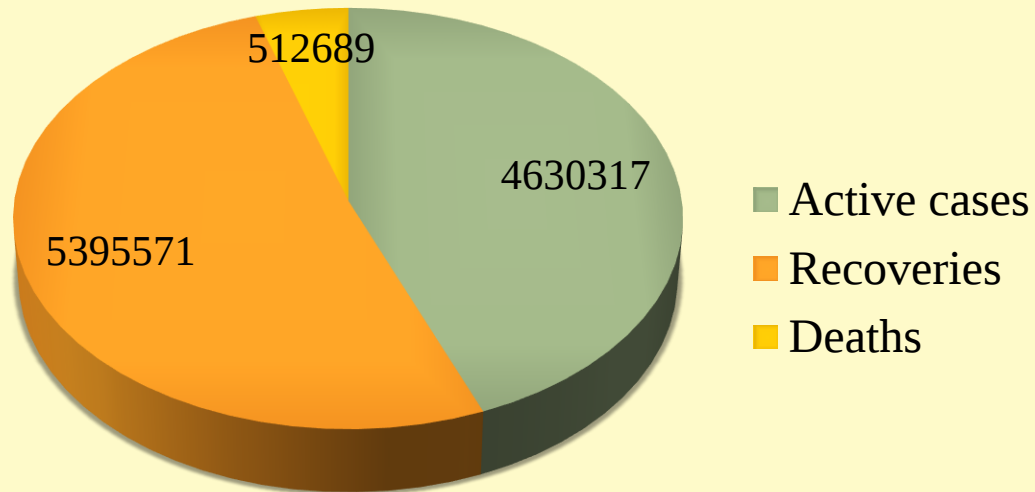
- Identified in Wuhan city of Hubei province in China in December 2019
- On 30th January, WHO declared COVID-19 to be a “public health emergency of international concern”,
- And on 11th March 2020, WHO characterized COVID-19 as a “pandemic”
- In India, the first case of COVID-19, was reported, in Thrissur, Kerala of a student who came home from Wuhan University, China on 30th January 2020.
- India currently has the fourth highest confirmed cases after United States, Brazil and Russia.



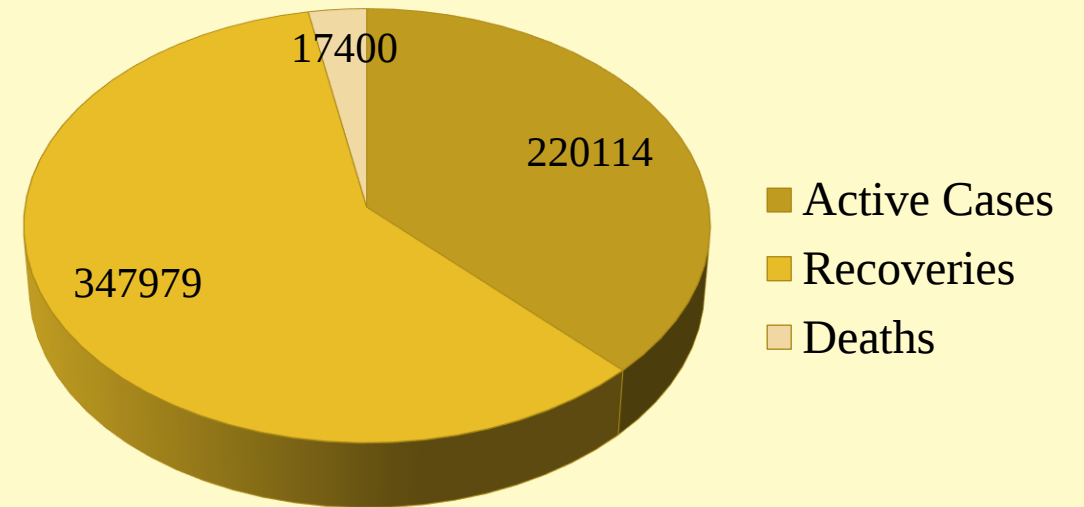
Cases, Deaths and Recoveries due to COVID-19

as of 1st July

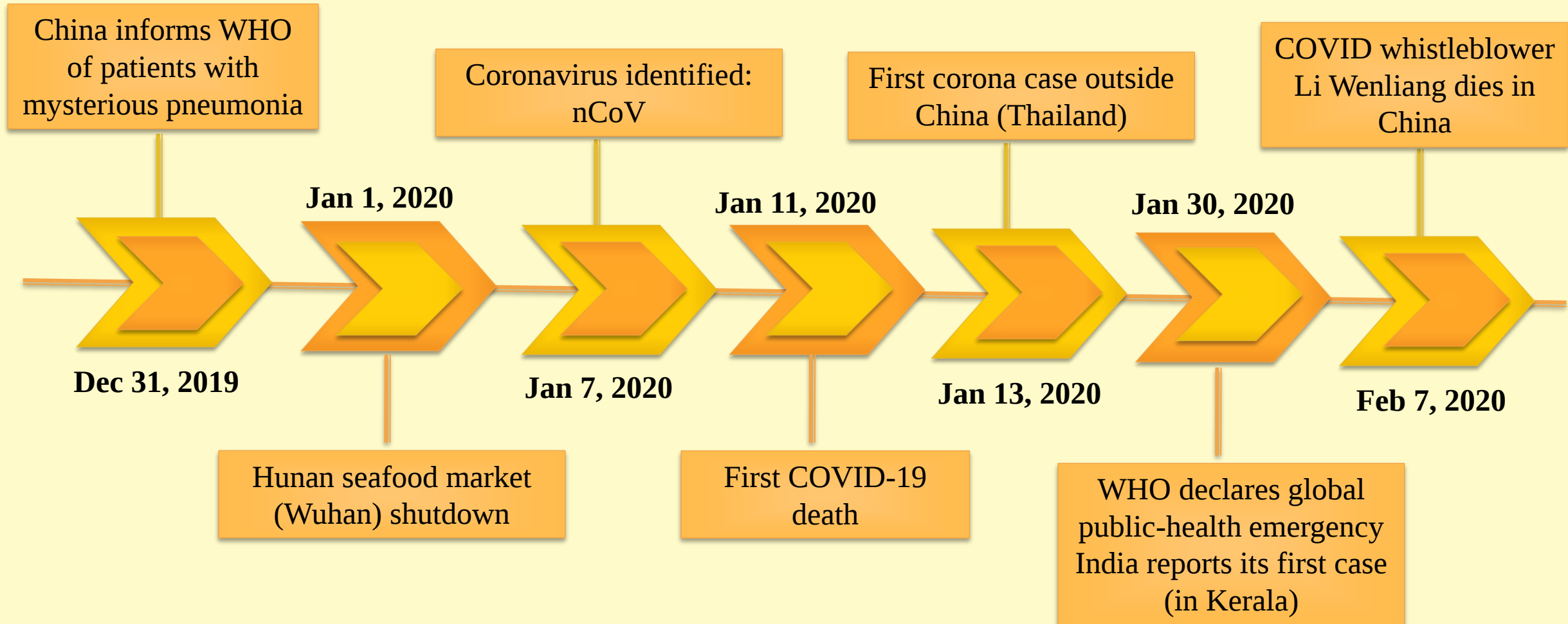
Global

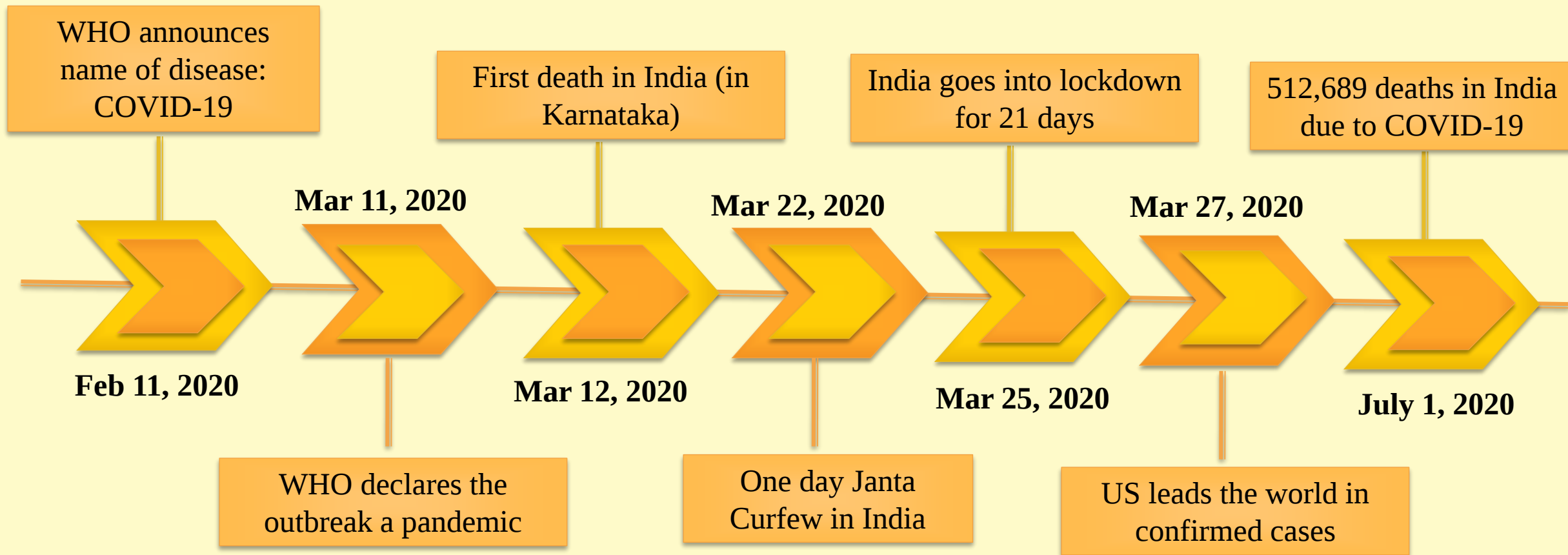


India



Timeline Of COVID-19





S.No	Name	Virus	Transmission	Symptoms	Incubation Period	Infection Period	Rate Of Infection
1	COVID-19	SARS-CoV-2 Coronaviruses of family <i>Coronaviridae</i>	close contact with an infected person, infected mothers to the newborns or conjunctiva.	fever, cough, shortness of breath, severe pneumonia	The incubation period is about 4-8 days post-infection.	1-3 days before symptoms appear and first 7 days after symptoms.	2.68
2	SARS 2002-04	SARS-CoV Coronaviruses (CoVs)	spread through droplets and close contact; also through contaminated skin, secretions and excrete of patients	fever, headache, malaise, chills, anorexia and fatigue, with rarely occurring diarrhea	from 2-10 days but may last as long as 16 days	ILI (Influenza-like-illness) that lasts around 3-7 days	3
3	DENGUE 2006	DENV(1,2,3,4) genus <i>Flavivirus</i>	mosquito-borne and <i>Aedes aegypti</i> is the principal vector	high fever (39-40°C) with headache, nausea, vomiting, myalgia and retro-oribital pain	The person develops illness, 4-7 days after the bite.	4-5 days after first symptoms appear	2.0
4	SWINE FLU 2009/2015	H1N1 Influenza A that of the <i>Orthomyxoviridae</i> family	person-to-person, by inhalation of the virus or by coming in contact with contaminated surfaces exposure to fomites that may be infected , zoonotic infection.	fever, chills, headache, fatigue, vomiting, myalgia, abdominal pain and diarrhea. cough, sore throat, irritated eyes and shortness of breath.	The incubation period in humans ranges from 1 to 7 days; more likely 1-4 days	a day before the onset of symptoms till 5-7 days after the onset of symptoms or until symptoms resolve.	1.4-1.6



PREVENTION AND CONTROL STRATEGIES

SARS

Global Response

- WHO formed a SARS working group that comprised of 11 research laboratories worldwide for identification of the causative agent and development of diagnostic tests.
- CDC also issued guidelines that were periodically updated
- SARS outbreak was the first time when the GOARN (Global Outbreak Alert and Response Network) set in 1997 by WHO, identified and responded to an outbreak.
- Timely surveillance helped WHO from guidelines and recommend measures to prevent further spread.

India's Response

- Surveillance of international passengers.
- Those with illness were hospitalized and healthy passengers were recommended to self-quarantine for 10 days and report, if symptoms appear
- Standard precautions such as hand washing and minimal contact were made necessary.
- For all healthcare workers, use of gloves, gowns and masks were also recommended.
- IDSP (Integrated Disease Surveillance Programme) was established in India in November, 2004 with the assistance of World Bank for the detection and surveillance of diseases quickly.
- The National surveillance programme for communicable diseases (NSPCD) was expanded from 5 to 100 districts.

Dengue

Global Response

- WHO deployed a team from its headquarters in February-March 2006 to the South-West Indian ocean, to analyze the control measures used and form a plan for surveillance and control of the virus along with national authorities

India's Response

- India deployed a multidisciplinary team from 13th to 17th February to help local healthcare authorities.
- Individuals were recommended to protect themselves by using insect repellents and wearing clothes that minimize skin exposure
- Significant need in improvement of health infrastructure in slums, which may help in prevention of vector breeding

H1N1 Swine Flu

Global Response

- WHO recommended periodic monitoring and surveillance of swine flu cases to prevent another outbreak.
- Many countries adopted the strategy of mass vaccination for Swine flu pandemic.
- CDC had also released a “Flu vaccination pledge for 2014-2015”.
- Advisory Committee on Immunization Practices (ACIP) recommended an annual influenza vaccination.
- WHO recommended vaccination for high-risk groups, and also for healthcare personnel operating in close contact to influenza patients.

India's Response

- GOI issued guidelines suggesting social distancing.
- Thermal screening
- MoHFW launched various public awareness campaigns through visual and print media
- Diagnostic kits of H1N1 were ordered and so were additional stocks of oseltamivir and N95 masks.
- Vaccination was recommended for health-care personnel and staff who came in contact with influenza patients, laboratory personnel and people involved in investigating the outbreak.
- MoHFW set some guidelines for categorization of the symptomatic patients

COVID-19

Global Response

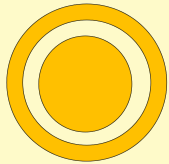
- Quarantining along with measures to maintain personal hygiene, ban on mass gatherings and events, closure of school and workplace, and travel restrictions.
- WHO recommended some precautionary actions such as regular hand washing, maintaining cough etiquette, and avoiding unprotected contact with farm or wild animals etc.
- Chloroquine and hydroxychloroquine are being used for mass sanitization
- China has temporarily banned wildlife trade of animals
- Thermal screening at airports
- Real-time statistics about the pandemic are available online by a virus tracker developed by researchers at Johns Hopkins University.

India's Response

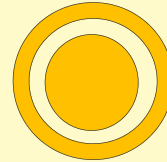
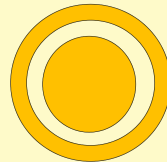
- MoHFW initially advised to refrain travelling to China and quarantine of people coming from there.
- Thermal entry screening.
- On 24th March, PM Modi ordered complete lockdown for 21 days, which extended till 31st May.
- Unlock-1 started on 1st June and the country is divided in 3 containment zones.
- Aarogya Setu, a smart-phone application to curb the spread of COVID-19 pandemic was launched.

LESSONS LEARNT

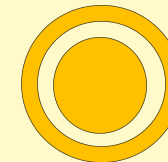
Surveillance And
Reporting



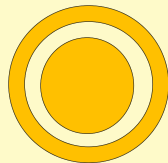
Strengthening Of
Public Health
Systems



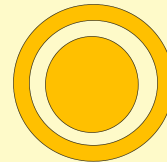
Co-ordination
among systems



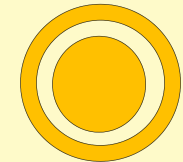
Vaccine
development and
research



Adequate
Monitoring System

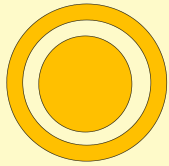


Non-pharmaceutical
interventions

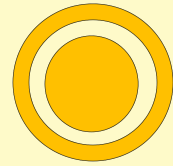


Research and
Development

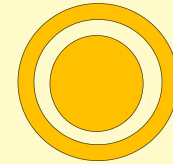
Training Of Health
Personnel



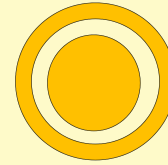
Wildlife Trade



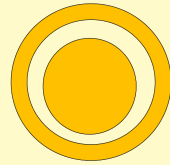
Digital
Technology
And Health



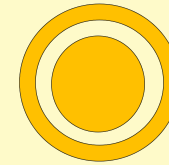
Communication
with the masses



Emerging and Re-
Emerging
Diseases



Air travel



REPORT 2



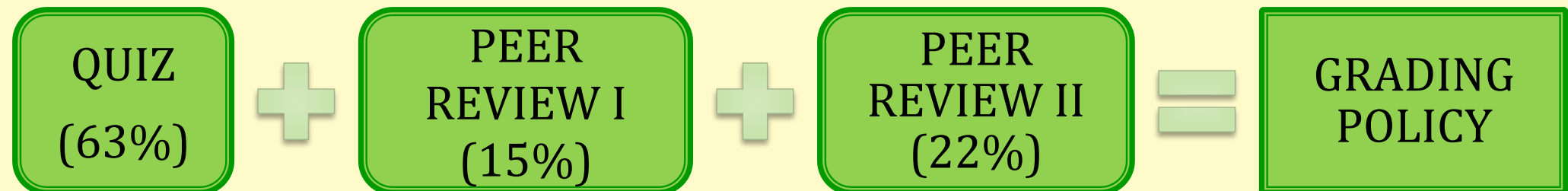
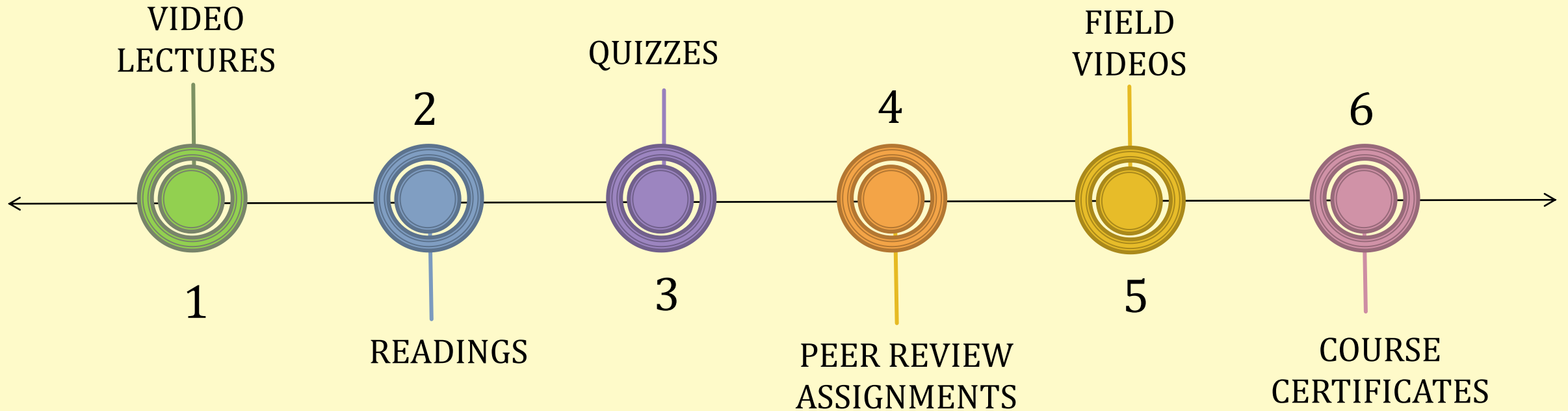
INTRODUCTION TO SYSTEMATIC REVIEW AND META-ANALYSIS

Online Course by
John Hopkins University
at Coursera

COURSE DESCRIPTION

Week 1:	Overview of basics and use of systematic review and meta-analysis.
Week 2:	Elements required for framing, refining, scope of the research question.
Week 3:	About the pursuit of evidence, search strategy and assessment of the bias.
Week 4:	Minimizing different types of biases, transparent reporting, and interpretation of results.
Week 5:	Meta-analysis and the statistical approaches for meta-analysis.
Week 6:	Summarizes the key concepts with the submission to Peer Review Assignments

COURSE CONTENTS



COURSE OBJECTIVES



Describe the steps in conducting a systematic review



Develop an answerable question using the “Participants Interventions Comparisons Outcomes” (PICO) framework



Describe the process used to collect and extract data from reports of clinical trials



Describe methods to critically assess the risk of bias of clinical trials



Describe and interpret the results of meta-analyses

Steps of a systematic review

1. Frame research question (PICO/PECO)



2. Develop search strategy



3. Develop protocol



4. Run search strategy in at least two decades



5. Retrieve and de-duplicate citations

6. Develop system for screening titles/abstracts and full textx



7. Screen titles/abstracts



8. Retrieve and screen full-texts



9. Develop forms for assessing 'risk of bias' and extracting data



10. Assess 'risk of bias' and extract data

11. Clean and manage data



12. Conduct qualitative synthesis



13. Conduct meta-analysis(if appropriate)



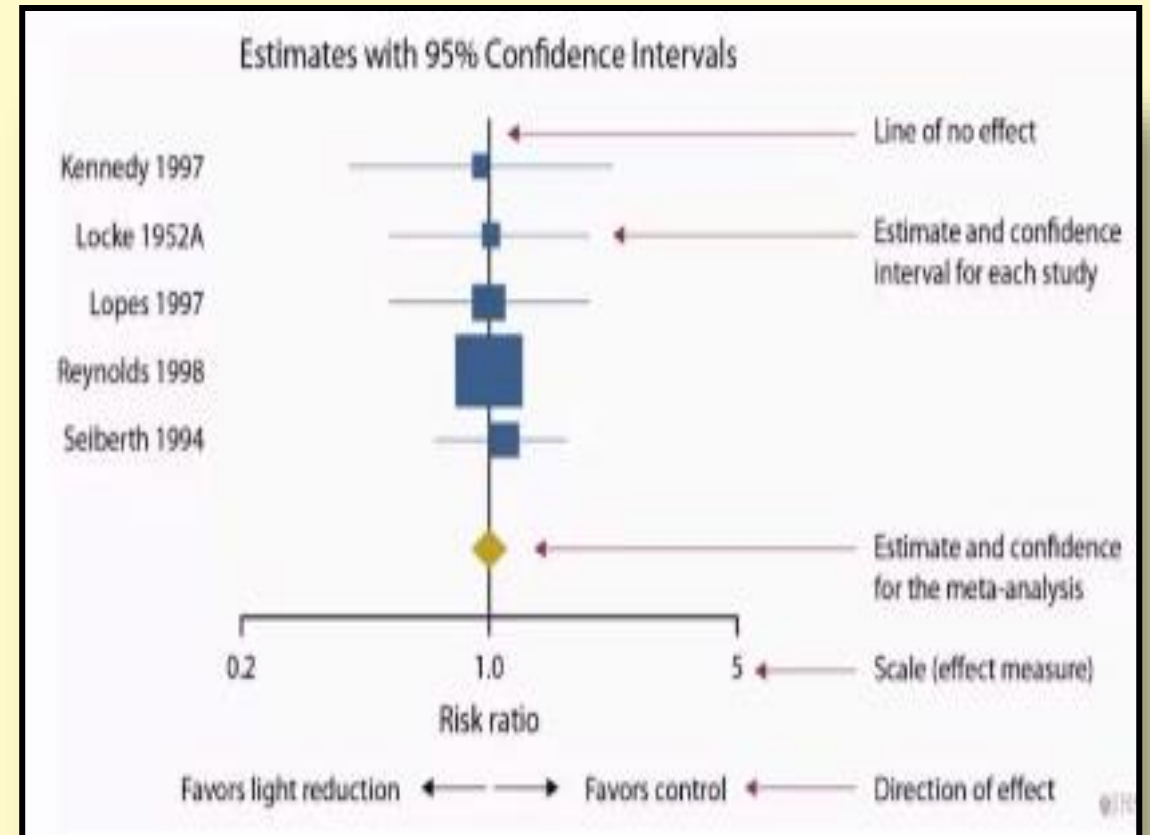
14. Write report of systematic review



15. Update systematic review.

WEEK 1

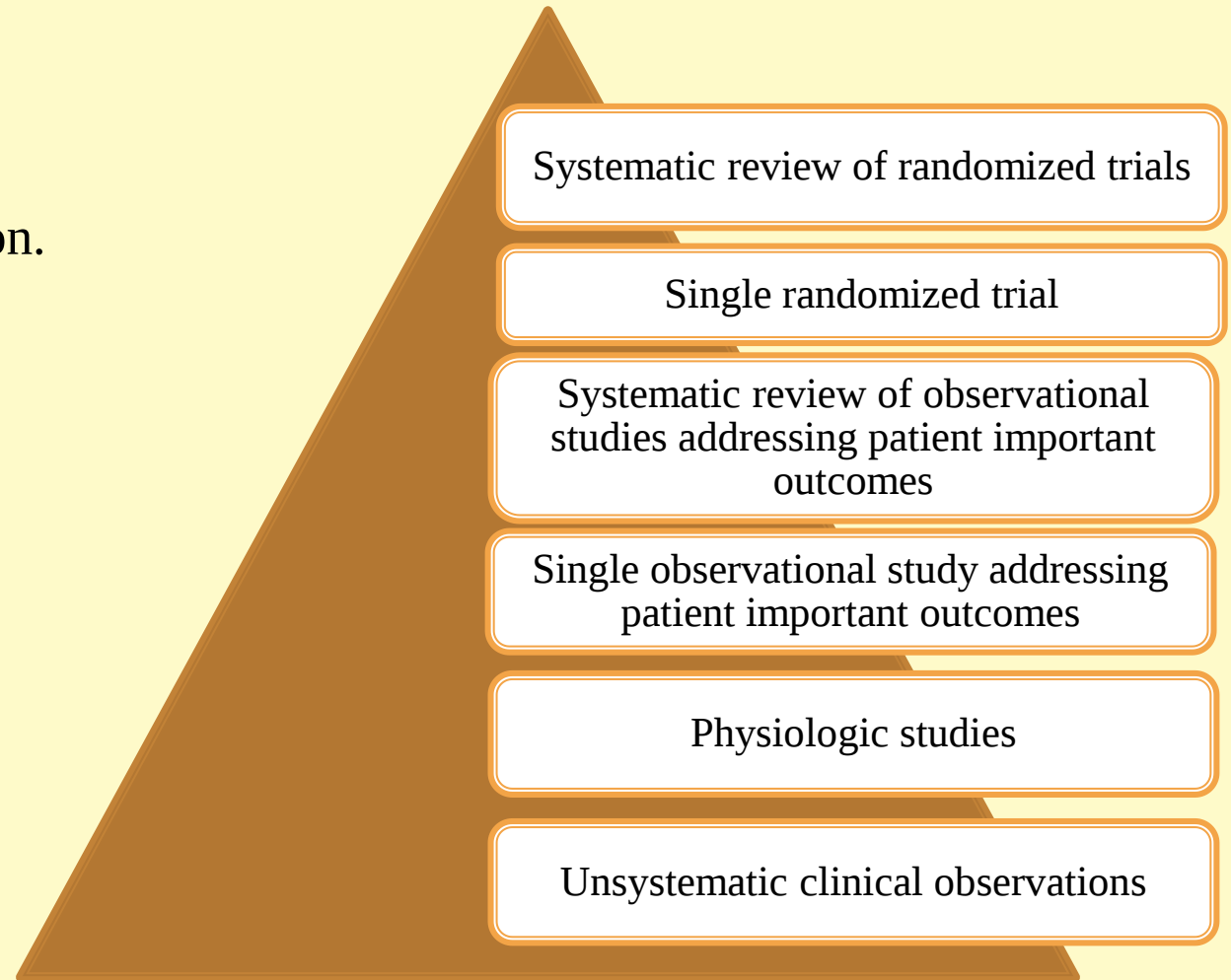
- A systematic review focuses on specific questions and uses explicit, pre-planned scientific methods to identify, select, appraise, and summarize similar but separate studies.
- Not all systematic reviews would have a meta-analysis. Most meta-analysis are presented in forest plot.
- Meta-Analysis can be useful in accessing strength of evidence. It helps to combine the results quantitatively and obtain a single summary result also to investigate heterogeneity, to examine reasons for different results among studies.



WEEK 2

- Formulating the topic requires:
 - Confirming the need a new review.
 - Development of an analytic framework
 - Use of PICO format to articulate question.
 - Stating rationale for each question, and
 - Refining it

- TYPE OF QUESTION
 - ✓ Incidence
 - ✓ Prevalence
 - ✓ Therapy
 - ✓ Screening
 - ✓ Diagnostic Accuracy
 - ✓ Prognosis
 - ✓ Harm
 - ✓ Etiology



Hierarchical evidence for interventional studies

PICO Framework

P

- **Patients or populations.**
 - Define condition or disease
 - Population and setting of interest

I/E

- **Interventions or exposures**
 - Timing of exposure
 - Route of administration
 - Dose intensity
 - Duration of exposure

C

- **Comparison groups**
 - For trials, placebo, standard therapy, no treatment

O

- **Outcome**
 - Criteria for defining
 - Unpublished data?

WEEK 3

How do you do the search?

- Identify and document the sources to use.
- Document the details of searches, the dates and the exact strategies.
- Determine how you make decisions, the inclusion and exclusion criteria. Duplicate screening can be used.

Identifying Key Sources and Techniques for Searching

- Electronic databases- PubMed, MEDLINE, EMBASE etc
- Use of “controlled vocabulary, MeSH, and keywords.
- Trial registers, Gray literature, personal contacts.
- Techniques like hand-searching and “snowballing.”

To develop a search strategy:

- Formulate a research question using PICO format .
- Identify synonyms and controlled vocabulary
- Use Boolean characters like “AND”, “OR” , “NOT”
- Revise the search strategy until optimal.
- Use tested study design filters.

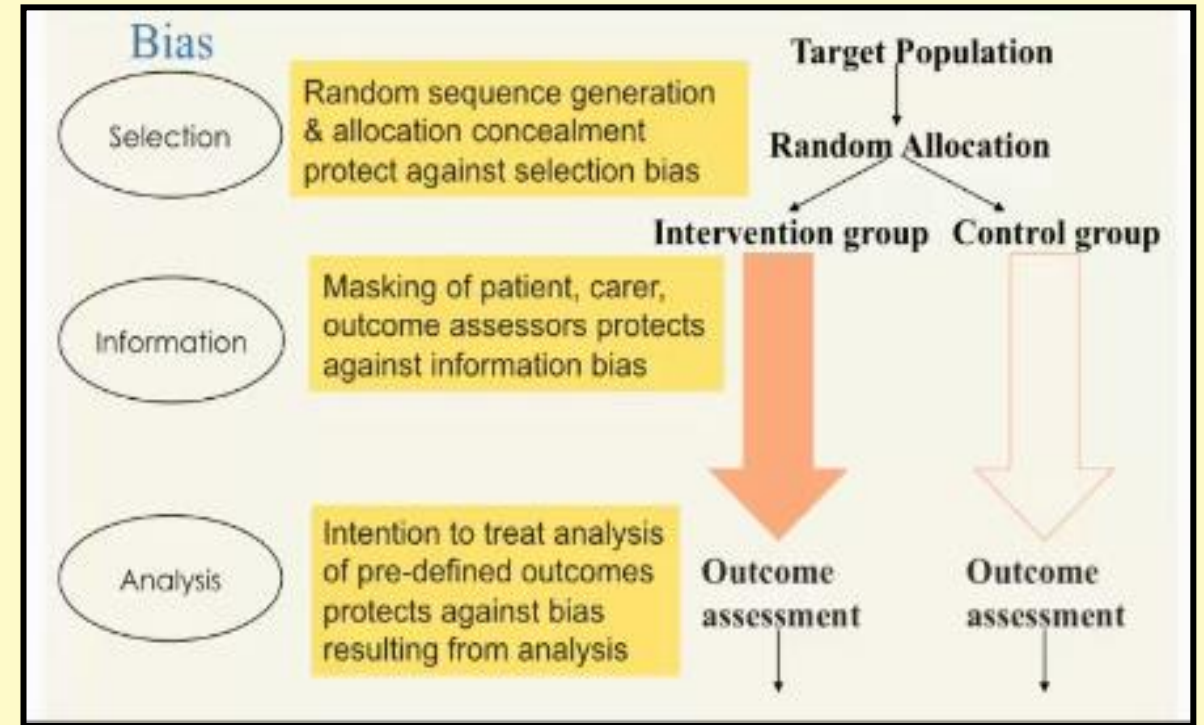
Documenting Your Search and Conclusions

- Use Endnote, or RefWorks, QUOSA
- Record when we did the search, which sources were used, the exact strategy used and what we found specifically.
- PRISMA

WEEK 3

There are mainly 3 types of bias:

- Selection bias, usually refers to a bias in how the treatment was assigned.
- Information bias: In a randomized trial, we mask or blind the participants in the study, the doctors or other healthcare providers, and the people who are assessing the outcome in the study, to prevent information bias
- Bias in the analysis: Losses to follow-up, noncompliance, withdrawals and changes in the outcome measure can increase bias. Missing data can also pose problems. Post hoc definition of outcomes is very important.



WEEK 4

- Bias in conducting a systematic review is called **metabias**.
- There are 3 forms of metabias; Selection biases, Information bias and Bias in the analysis
- Types of reporting Bias:
 - Publication bias
 - Selective outcome reporting,
 - Ascertainment bias
 - Selection bias.
- Information Bias
 - Accuracy of our quality assessment
 - The accuracy of the data abstraction
 - Completeness of data abstraction.
- There are two types of statistical models used for the meta analysis called **random effects** and **fix effects models**.
- The random effects model is used when statistical heterogeneity is present.
- **Qualitative synthesis** is an assessment of the body of evidence that goes beyond factual descriptions or tables. It helps in describing the nature of the evidence, interpreting it, evaluating strengths and weaknesses of the review and concluding.

WEEK 5

- Systematic reviews contain analysis of the primary study. There are two components of any analysis.
 1. Qualitative synthesis.
 2. Quantitative synthesis.
- Meta-analysis is statistical analysis of a large collection of analysis resulting from individual studies with the aim to integrate the findings.
- What does a meta-analysis involve?
 - Comparisons to be formed.
 - Use of study results in each comparison.
 - Best summary of effect for each comparison.
 - Similarity of results of studies
 - Reliability of those summaries.
- Effect measures are used to describe the outcomes of participants treated with different interventions or exposed to different levels of risk factors.
 1. Dichotomous data
 2. Continuous data
 3. Ordinal data
 4. Counts for the infrequent event.
 5. Time-to-event data.

Fixed Effect Model	Random Effects Model
We assume all studies share a common true effect size	We assume there's a distribution of true effects.
There's only one identical common effect size	Distribution of effect size
One source of variance	Two sources of variance. The within study variance, as well as the between-study variance.
$Y_i = \theta + \varepsilon_i$	$Y_i = \mu + \zeta_i + \varepsilon_i$

Thank you!

