DIEP/Lazio
Department of Epidemiology
Lazio Regional Health Service - Italy

SISTEMA SANITARIO REGIONALE
ASL ROMA E
REGIONE LAZIO

Recommendations: Facing the challenges of risk communication: do's, don'ts, traps

Carla Ancona

Department of Epidemiology, Lazio Regional Health Service, Rome Italy

ICTP The Abdus Salam International Centre for Theoretical Physics

DIEP Lazio
Department of Epidemiology
Lazio Regional Health Service - Italy

SISTEMA SANITARIO REGIONALE
ASL ROMA E
REGIONE LAZIO

Systematic Reviews

Carla Ancona

Department of Epidemiology, Lazio Regional Health Service, Rome Italy

The Abdus Salam International Centre for Theoretical Physics

Problem

- Multiple studies have typically been performed
- This creates at least two problems
  - Overview of ”overall result” may be difficult to have when many studies conducted
  - Results frequently (apparently) inconsistent

Why are Reviews necessary?

The volume of published material makes it impractical for clinicians to stay up to date on a variety of common conditions.

- 1 million published articles on 30.000 scientific journals
- 17.000 textbook in medical field
- annual growth of scientific publications is approximately 7%

Sacket et al. Evidence Based Medicine: how to practice and teach. Churchil Livingstone, London 2000.

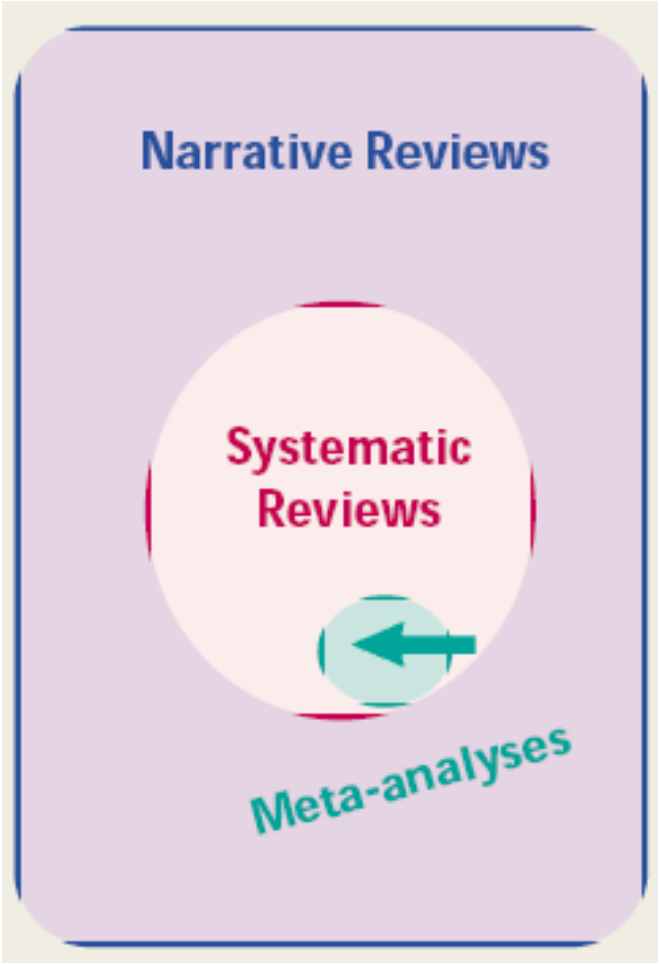
Methods

- Selection of “best study”
- Narrative, traditional review
- Systematic review
- Meta-analysis

Narrative Reviews vs Systematic Reviews

Narrative reviews describes and appraises previous work but generally does not describe specific methods by which the reviewed studies were identified, selected and evaluated.

A systematic review is a research project conducted following an explicit, reproducible and transparent approach finalized at minimizing biases and errors and producing the best synthesis of information available on a specific topic.



Problem of narrative review

- Selection of studies may be biased or at least not transparent
- Typically no quantitative assessment

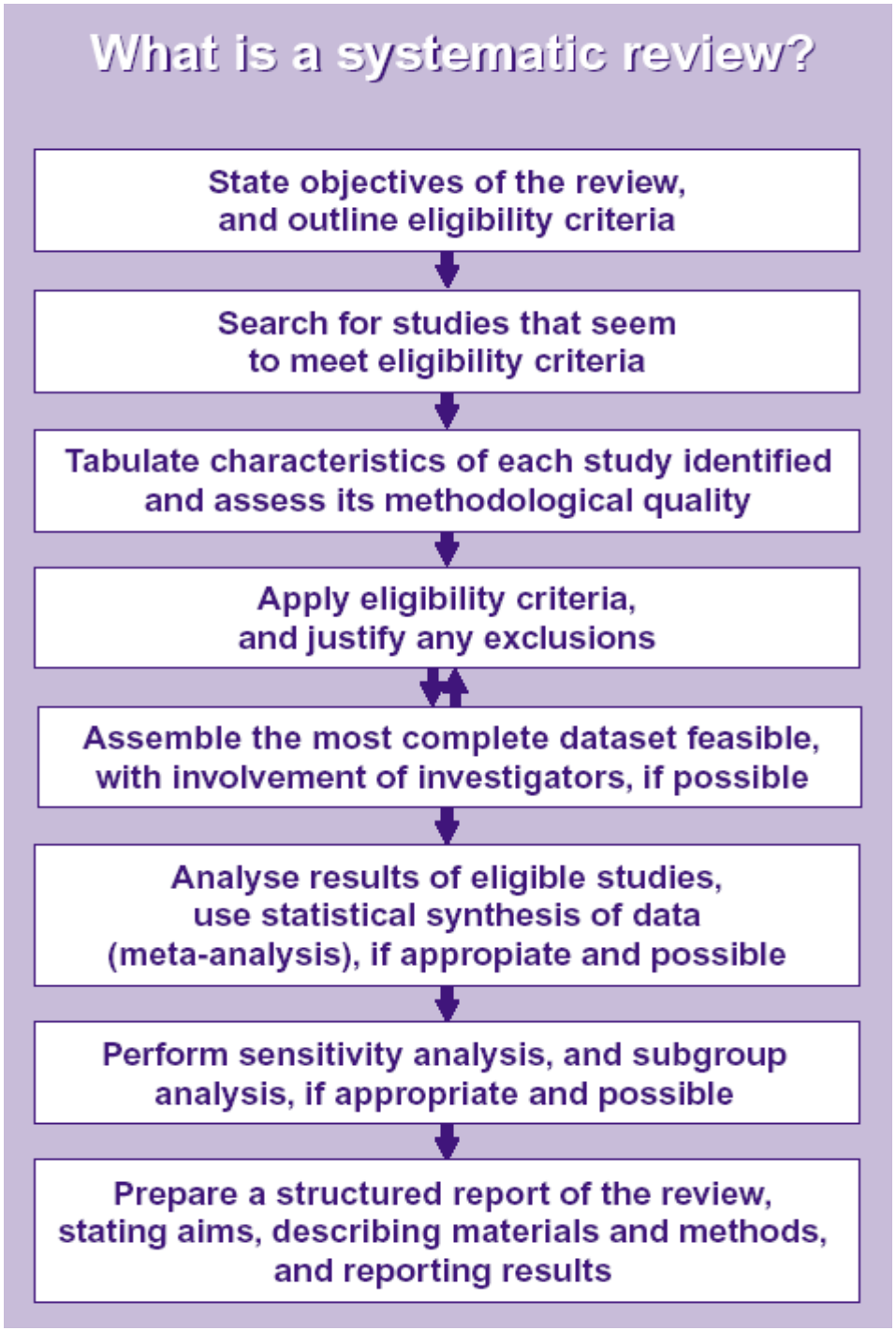
Why are Systematic Review useful?

- To have the whole picture of the evidence available on a specific topic
- To highlight gap in knowledge
- To plan future research
- To inform decision making process

Systematic review

- Should be considered as an observational study of results of studies
- Therefore requires a study protocol

They are retrospective studies and their validity depends on the studies included!!!!

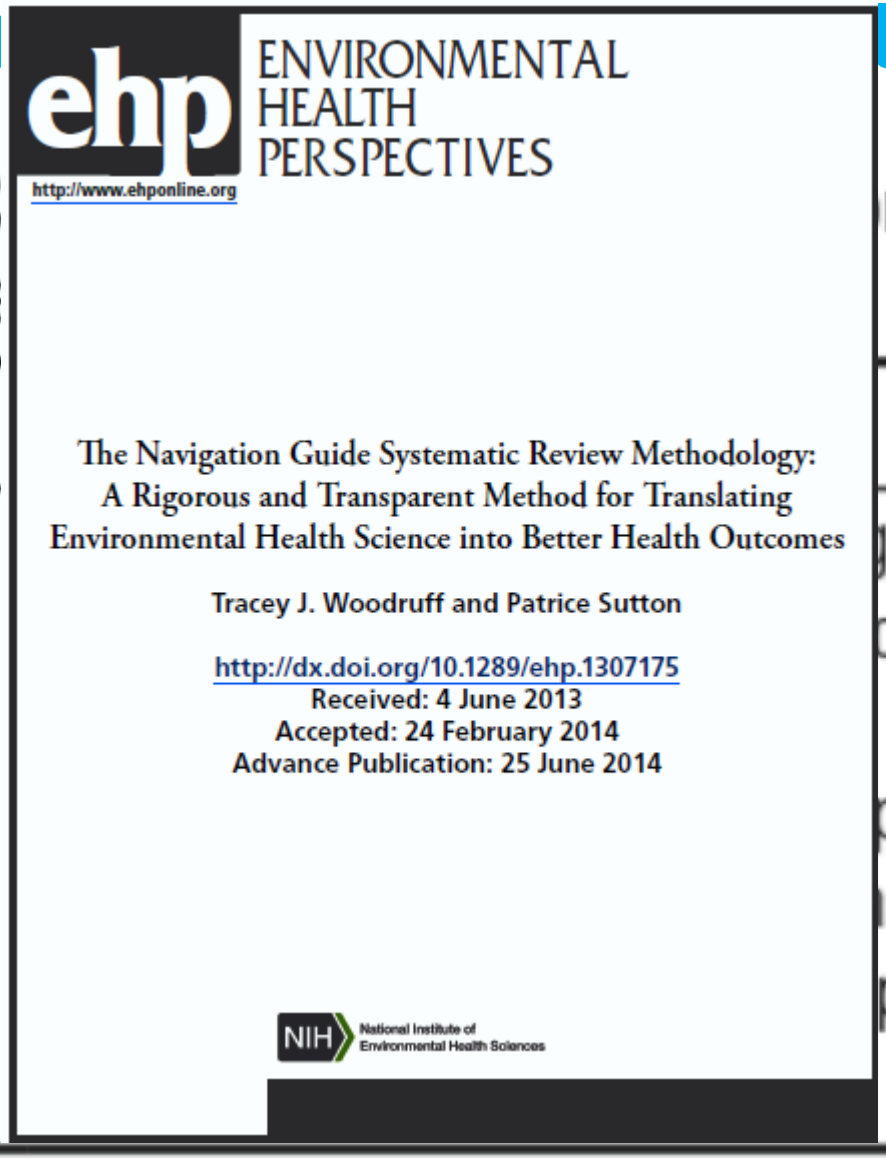


Main steps for conducting a Systematic Review

For tion

Table 1. PEC mparator, outcome) sta

PECO	
Population	g prenatal)
Exposure	centration
Comparator	to lower posure pared to pant.
Outcome	



The search strategy

- Essential step
- Performed by an information specialist
- Search more than one database
- Search for unpublished studies
- No language restrictions
- Beware of publication bias!

Databases

Most disciplines have specialized databases

Biomedicine:

- PubMed
- Cochrane Library
- EMBASE
- Toxnet
- Toxcenter

Multi-disciplinary databases:

- SCOPUS
- Web of Science

Other:

- Google Scholar
- WHO

Selecting “grey literature”

Depending on the topic, the searcher may have to search:

- Conference websites
- Trial registries
- Governmental research, e.g., National Technical Reports Library
- Google or Google Scholar

Search Strategy: an example

1. "myocardial infarct*" [title abstract]
2. " Heart attack*" title abstract]
3. Acute Coronary Syndrome [mesh]
4. Myocardial Infarction/ mesh]
5. "heart infarction" [title abstract]
6. #1 or #2 or #3 or #4 or #5
7. air pollution/ [mesh]
8. Particulate Matter/ [mesh]

type of outcome

type of exposure

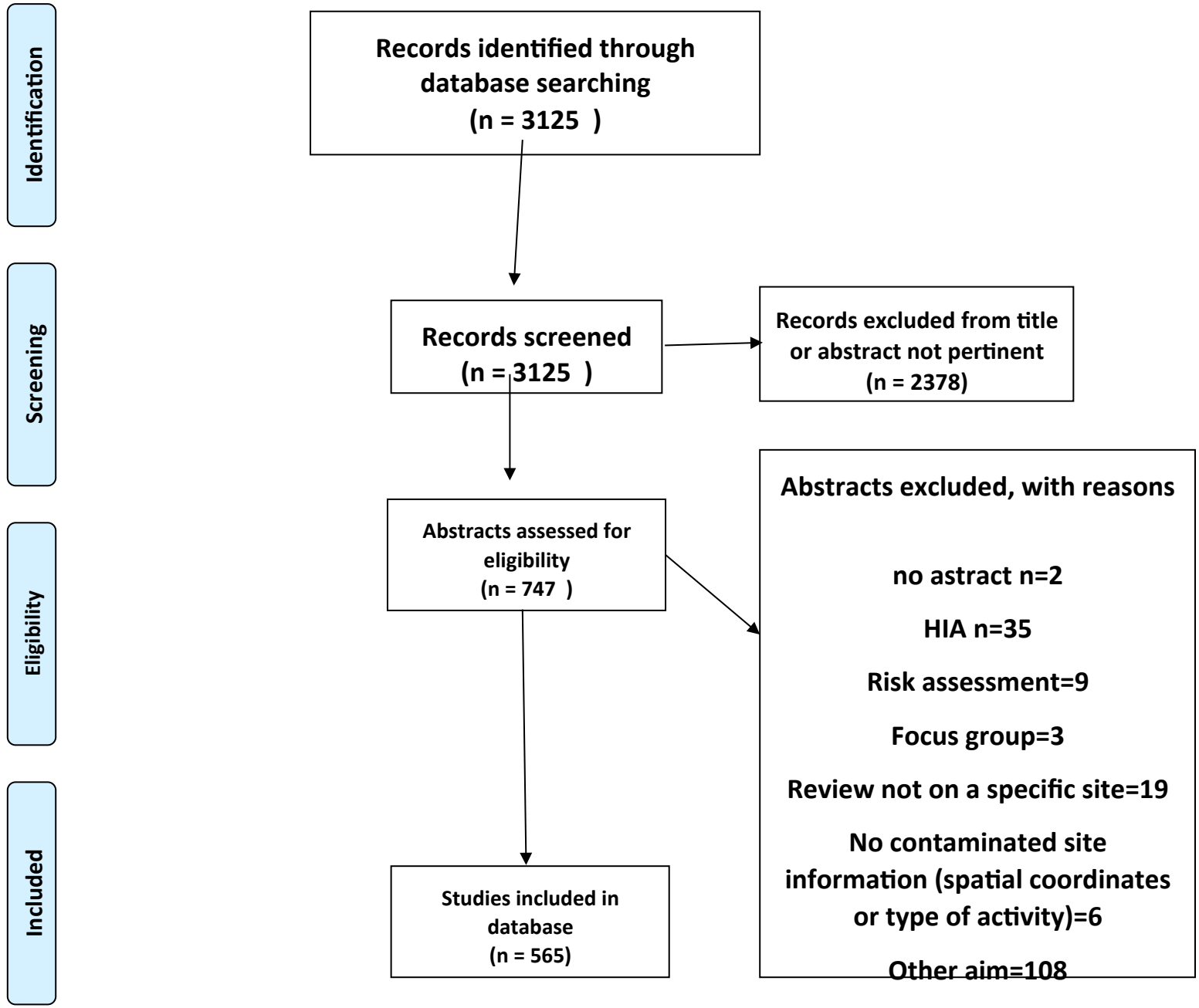
9. ((air or atmosphere or atmospheric) AND (pollution* or polluted or pollutant* or contamination or contaminated)) [title abstract]
10. "particulate matter" or "PM2.5" or "PM10 " or ozone or "Carbon Monoxide" or "nitrogen dioxide " "sulfur Dioxide " or " NO2 " or "dinitrogen tetraoxide" or "nitrogen peroxide" or "nitrogen tetroxide" or nitrogenoxide or "nitrous dioxide" or "sulphur dioxide" or "sulphur dioxyde" or "sulfurous anhydride" or "SO2" [title abstract]
11. #7 or #8 or #9 or #10
12. #6 AND #11

Inclusion and exclusion criteria

- The validity of a Systematic Review is strongly influenced by the studies that are included in it;
- Synthesising both qualitative an quantitative studies that have important bias or limitation can lead to misleading results
- Which type of studies?
- Is quality an inclusion criteria?

Data collection

- The list of data to be extracted should be agreed upon a priori consensus during the design stage of the study
- It is necessary to design a review-specific data extraction form, so that the same data are extracted from each study and missing data are clearly apparent
- To ensure that data extraction is accurate and reproducible, it should be performed by at least two independent reviewers
- Collected data includes: study characteristics, sample demographics, outcome data, etc…


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 3125)
Records screened (n = 3125)
Records excluded from title or abstract not pertinent (n = 2378)
Abstracts assessed for eligibility (n = 747)
Abstracts excluded, with reasons
no astract n=2
HIA n=35
Risk assessment=9
Focus group=3
Review not on a specific site=19
No contaminated site information (spatial coordinates or type of activity)=6
Other aim=108
Studies included in database (n = 565)

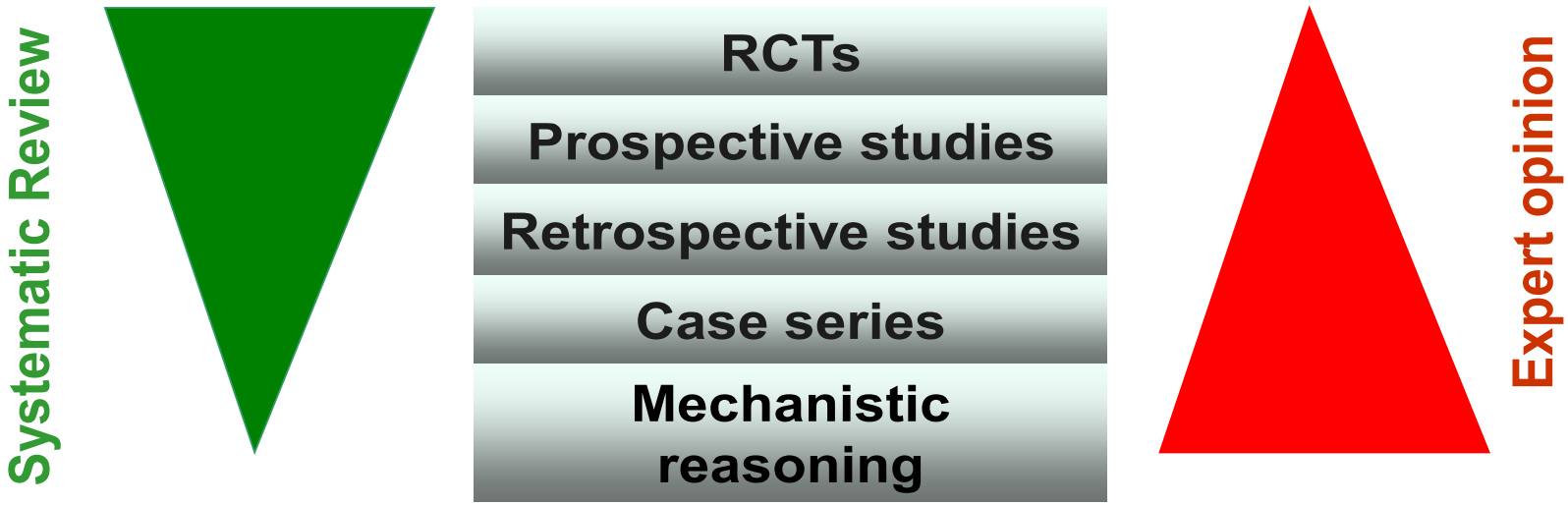
Assessment of Risk of Bias

- A **Bias** is systematic error, or deviation from the truth, in results or inferences;
- Characteristic of a study that can introduce systematic errors in the magnitude or direction of results;
- Internal validity, generalizability, quality of reporting.

In clinical studies…

- Randomized Controlled Trials (RCT):
  - RCT are considered to be more rigorous than observational studies
  - A review based on well-designed RCT will likely be more valid and accurate than a review based on observational studies or case reports

LEVELS OF EVIDENCE AS FUNCTION OF THE ROLES OF EXPERT OPINION AND EVIDENCE SYNTHESIS (SYSTEMATIC REVIEWS)



Alessandro Liberati 2011

Imprecision

- Small sample size
  - small number of events
- Wide confidence intervals
  - uncertainty about magnitude of effect

Publication Bias

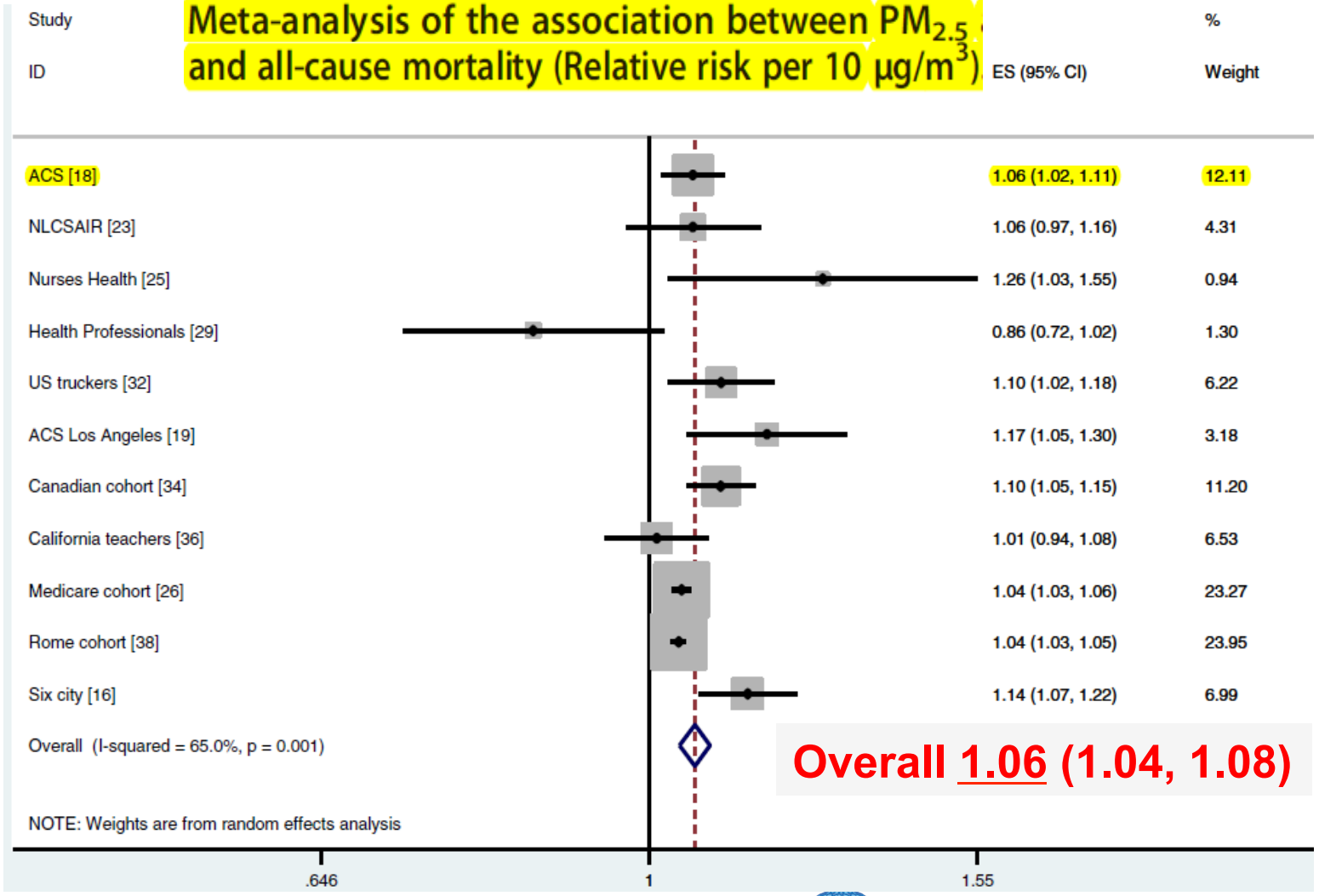
- Should always be suspected
  - Only small “positive” studies
  - For profit interest
  - Various methods to evaluate

Analysis of results

- Tabulation of individual results and characteristics
- Graphical display of the results (Forrest plot)
- Evaluation of heterogeneity
- Calculation of summary estimates
- Sensitivity analysis

Long-term air pollution exposure and cardio- respiratory mortality: a review

Gerard Hoek[1*], Ranjini M Krishnan[2], Rob Beelen[1], Annette Peters[3], Bart Ostro[4], Bert Brunekreef[1,5] and Joel D Kaufman[2]



Summary

- With the increasing number of studies, systematic reviews become more important
- Simple calculation methods exist to derive summary estimates
- Problems occur in selection of studies, dealing with quality of studies, treating heterogeneity and publication bias
- Meta-analysis should be performed as rigorously as any empirical study

DIEP Lazio
Department of Epidemiology
Lazio Regional Health Service - Italy

SISTEMA SANITARIO REGIONALE
ASL ROMA E
REGIONE LAZIO

Reporting

Carla Ancona

Department of Epidemiology, Lazio Regional Health Service, Rome Italy

The Abdus Salam International Centre for Theoretical Physics

The Public….

Doctors and Patients….

Policy makers….

What information do patients and the public need

We need to ensure that all information is developed with the people who will use it, what do patients and the public **want**

This must be tailored for different audiences:

- Older people living with a lung or cv condition
- Carers of people living with a lung or cv condition
- Children living with a lung condition
- All children
- Parents/Guardians of children living with a lung condition and without a lung condition
- Wider public

Some questions from patients

- "should I move house?"
  - mother of child with severe asthma living on a main road
- "what should my child do on high pollution days?"
  - mother of child with cystic fibrosis
- "should I consider pollution levels when choosing a school"
  - parents of child with asthma

David Spiegelhalter

Figure 1. Generic interpretation of your 'effective age'

> *a **microlife** is 30 minutes of your life expectancy*

Life expectancy for a man aged 22 in the UK is currently about 79 years, which is an extra 57 years, or 20,800 days, or 500,000 hours, or 1 million half hours. So, a young man of 22 typically has 1,000,000 half-hours (57 years) ahead of him, the same as a 26 year-old woman. We define a microlife as the result of a chronic risk that reduces life, on average, by just one of the million half hours that they have left.

What to comunicate

- About the risk
  - quantification
  - long term vs. short term exposure
- Practical advices
  - short and easy messages
  - main aim to reduces exposure

Good Risk Communication..

– seeks to

- translate the scientific findings and probabilistic risk assessment into understandable terms
- explain the uncertainty ranges, knowledge gaps and ongoing research programs
- address the issue of building credibility and trust
- understand the public's framing of the risk issues
- acknowledge the specific questions that arise in this domain (public's perception)
- analyze the conditions needed for allowing the public to acquire needed information, skills and participatory opportunities

Useful strategies to adopt include:

- Ensure reporting methods are defined, and agreed with stakeholders, early in the assessment
- Use range of different communication methods and media(diagrams, maps, animations)
- Produce structured set of materials, ranging from simple headline messages through to more detailed scientific reports, each designed to target a specific audience
- Make available all the relevant supporting information needed to explain how the results were derived and justify any decisions made in the process - and offering direct access to this information as part of the reporting process;
- Evaluate effectiveness of all communication materials, via a panel of stakeholders, before they are released
- Involving professional communicators in the process of designing, preparing and disseminating the materials

Consistency in the messages!

Important map design issues

Choice of metric

- absolute measures *versus* relative measures or rates

Choice of denominator

- choice of denominator must reflect the purpose of the map

Zone design

- irregular polygons *versus* regular grid

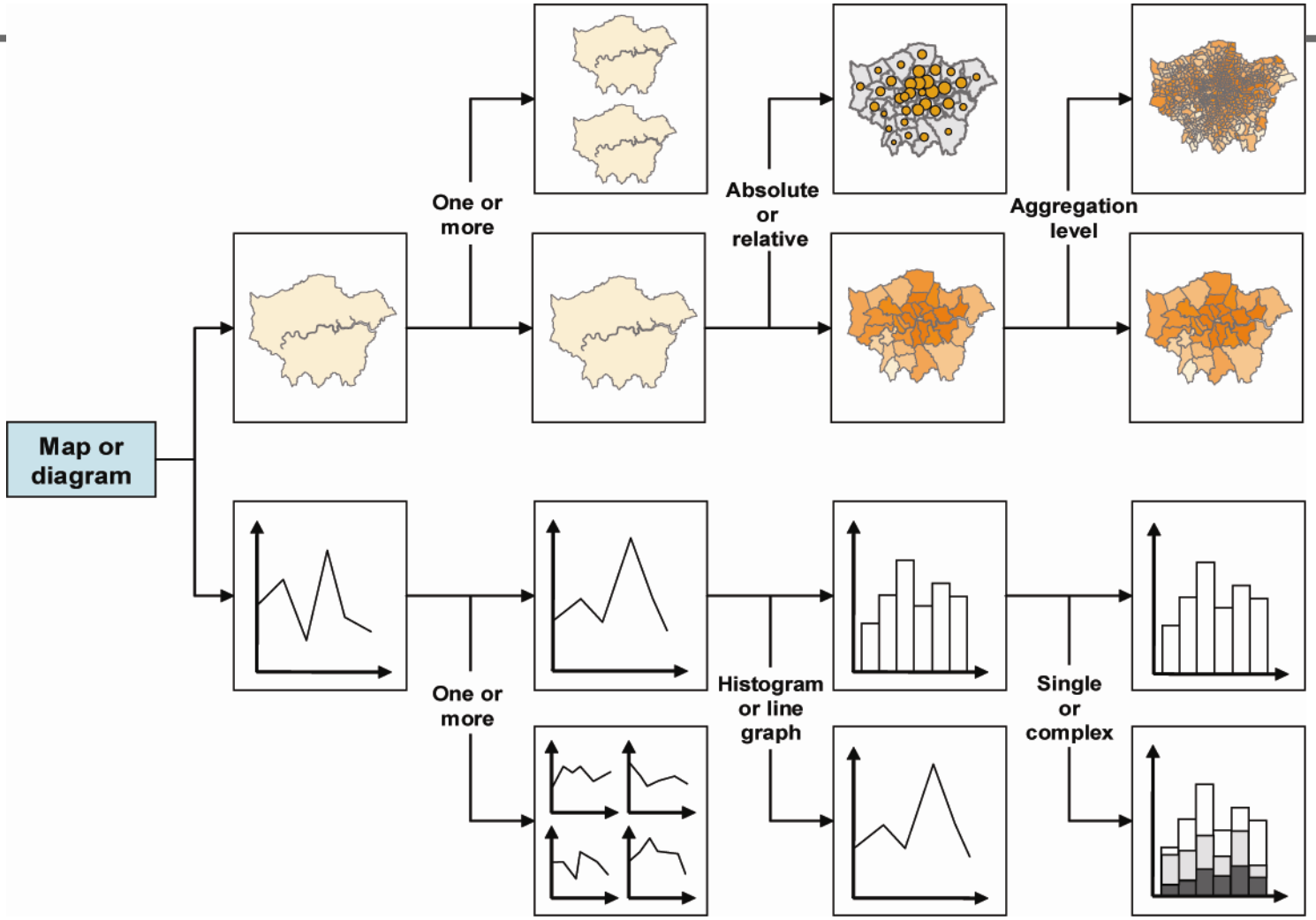
Map scale and resolution

- broad scale low resolution *versus* fine scale high resolution

Symbolisation and colour

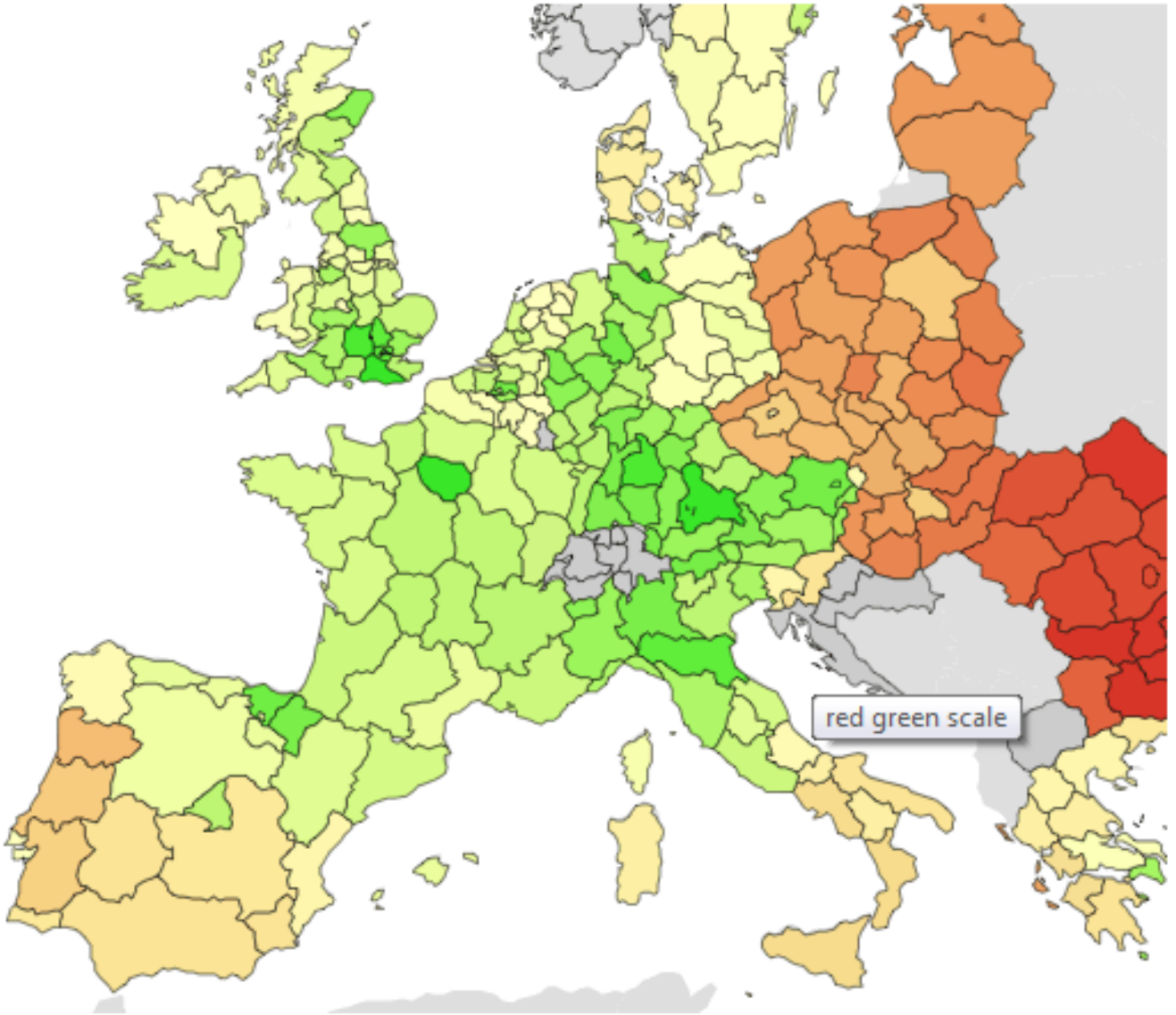
- ensure that they convey information both clearly and without bias

Choices of data for display

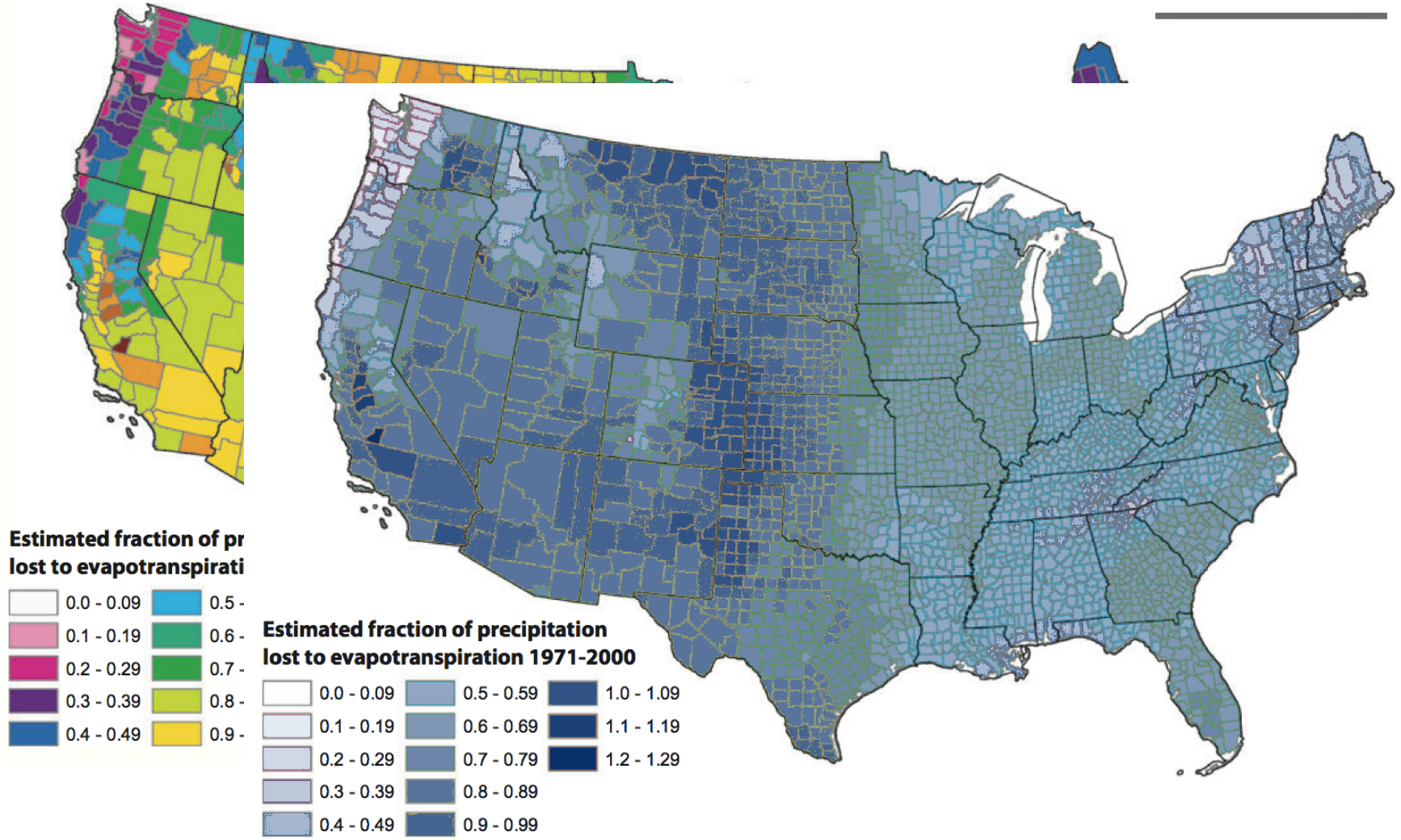


Adapted from Kraak M.J., Ormeling F, 1996, Cartography: Visualisation of Geospatial Data

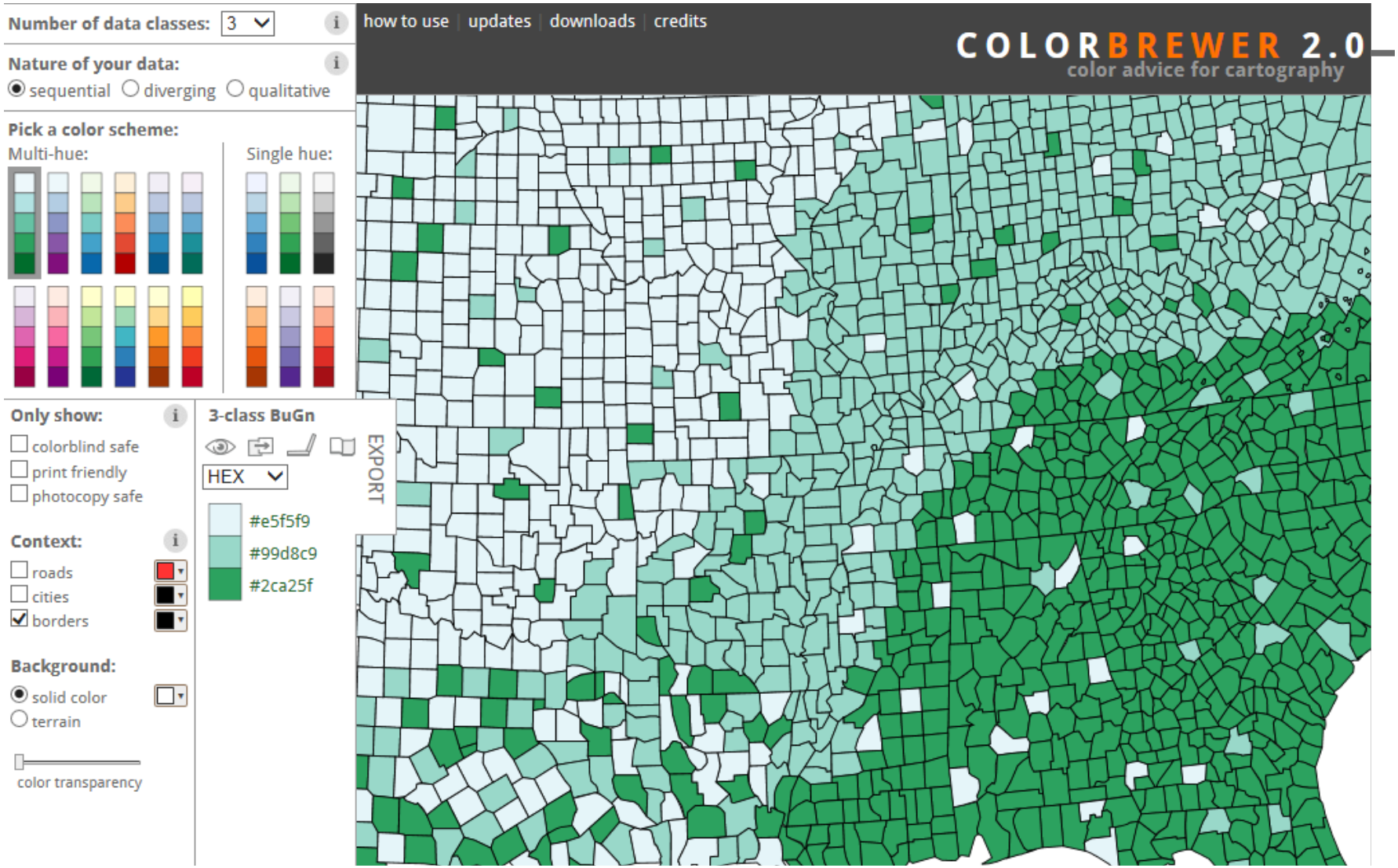
Bad use of colours (1)



Bad use of colours (2)

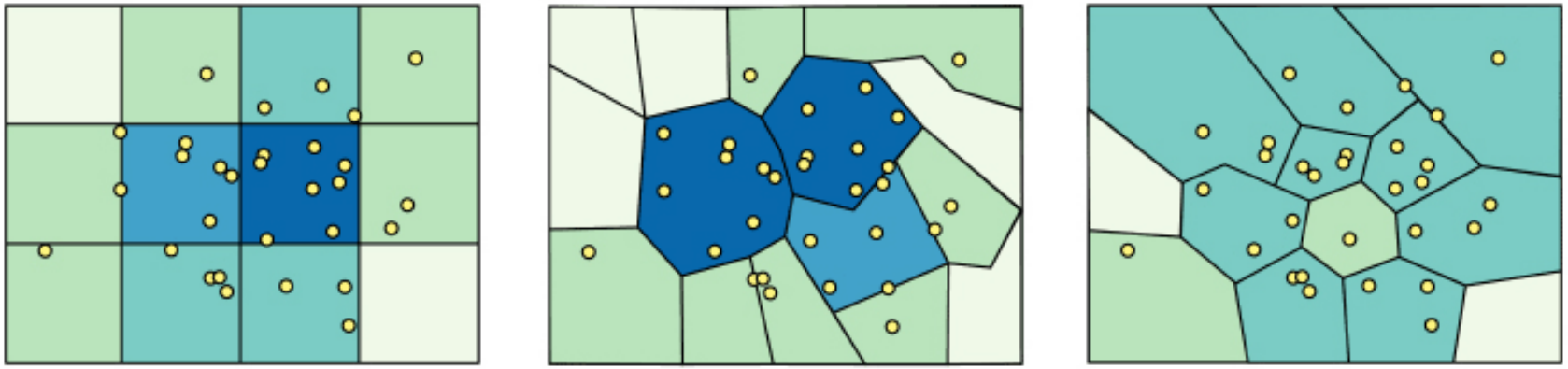


Effective map design



Modifiable Area Unit Problem (MAUP)

Different aggregations of individual counts produce different spatial patterns



Reporting

1. Context
- The question and the need

2. Scope and content of the assessment
- The issue
- Scenario and type of assessment
- Geographical and temporal scope
- Environmental exposures
- Health outcomes

3. Assessment methodology
- Exposure assessment
- Health effect assessment
- Impact assessment
- Uncertainty analysis

4. Results
- Main findings

5. Interpretation
- Implications
- Caveats
- Lessons learned

6. Additional materials
- Executive summary
- Assessment protocol
- Stakeholder engagement
- References/ bibliography

EPA Risk Communication Guidelines

- Accept and involve public as a legitimate partner
- Plan carefully and evaluate performance
- listen to your audience
- be honest, frank and open
- coordinate and collaborate with other credible sources
- meet the needs of the media
- speak clearly and with compassion

DIEP Lazio
Department of Epidemiology
Lazio Regional Health Service - Italy

SISTEMA SANITARIO REGIONALE
ASL ROMA E
REGIONE LAZIO

Recommendations: Facing the challenges of risk communication: do's, don'ts, traps

Carla Ancona

Department of Epidemiology, Lazio Regional Health Service, Rome Italy

The Abdus Salam International Centre for Theoretical Physics