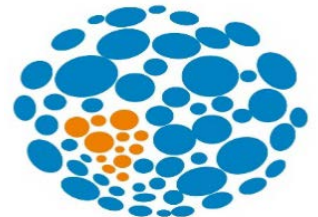# Methodological considerations for performing multimorbidity research in LMIC settings

Vilma Irazola

London, June2018
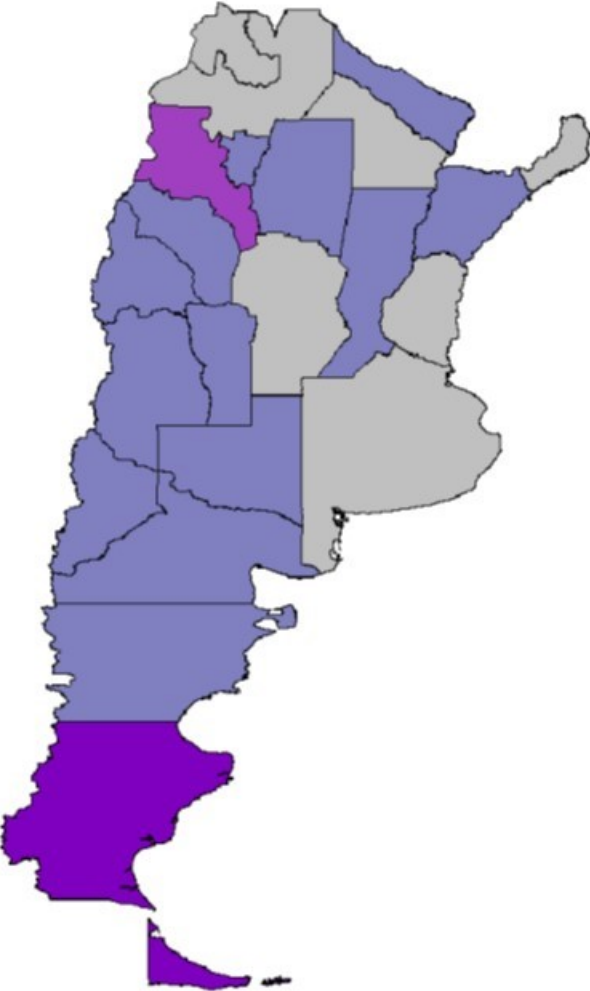
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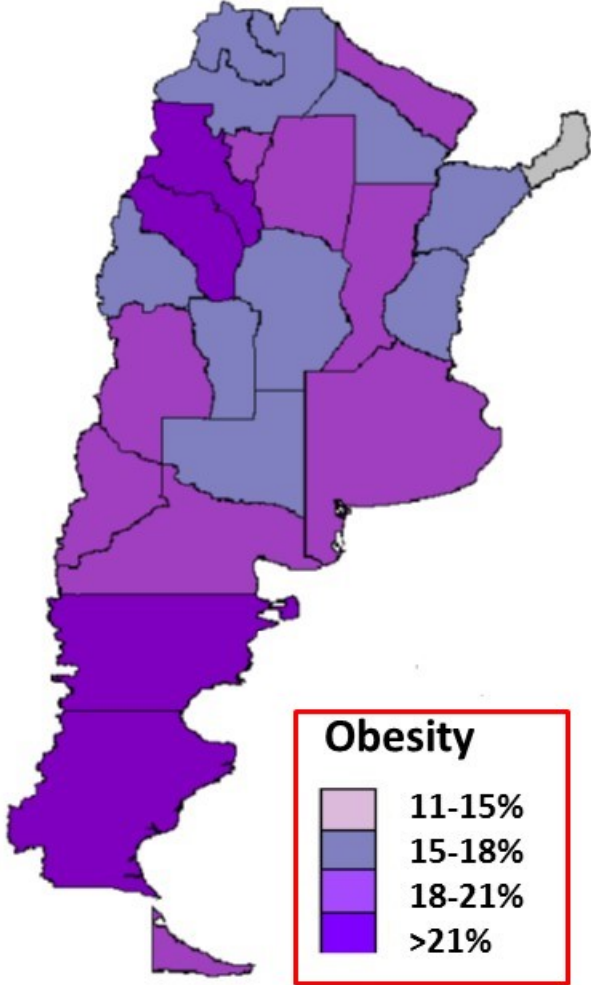# Selected data

Prevalence of Obesity in Argentina Age ≥ 18 Yrs Old
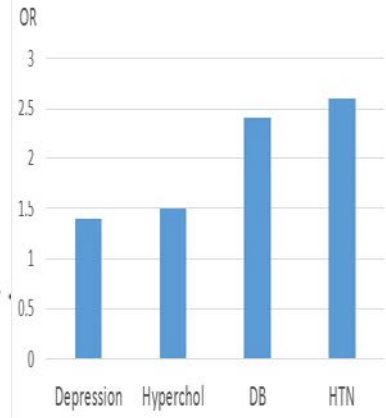

2005   2009   2013

Obesity
- 11-15%
- 15-18%
- 18-21%
- >21%
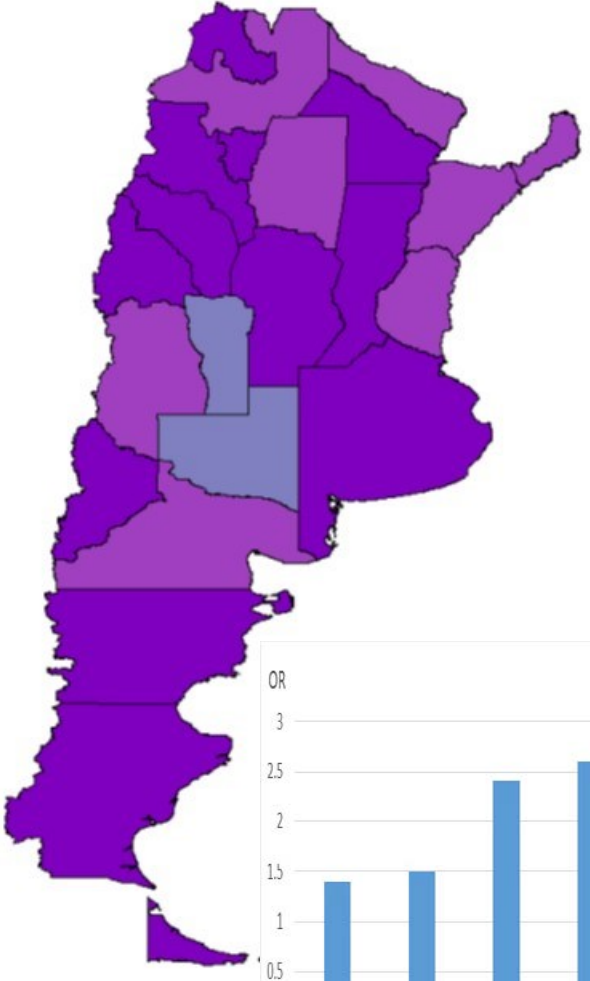
Data from the National Risk Factors Survey

Comorbidities in obese adults in the Southern Cone of LA: Chile, Argentina and Uruguay
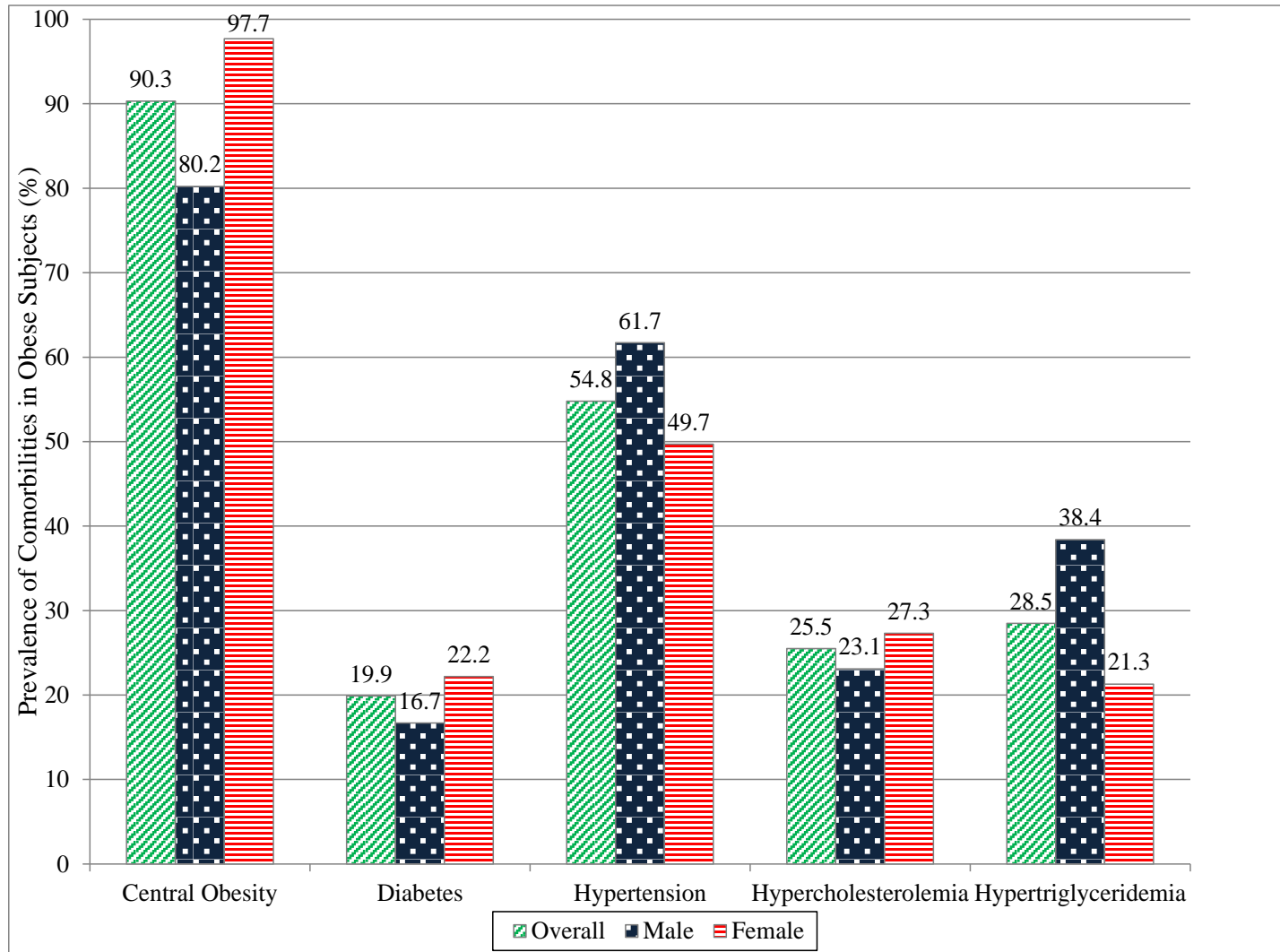
Data from the CESCAS Cohort Study

Comorbidities in hipertensive subjects in the Southern Cone of LA: Argentina, Chile and Uruguay

Prevalence of HTN: 42.2 % [CI95%40.7;43,8]

Category	Value
HTN	34.7%
HTN + Obesity	28.8%
HTN + Obesity + Hyperchol	7.6%
HTN + Obesity + Hyperchol + DM	2.6%

CESCAS

Data from the CESCAS Cohort Study
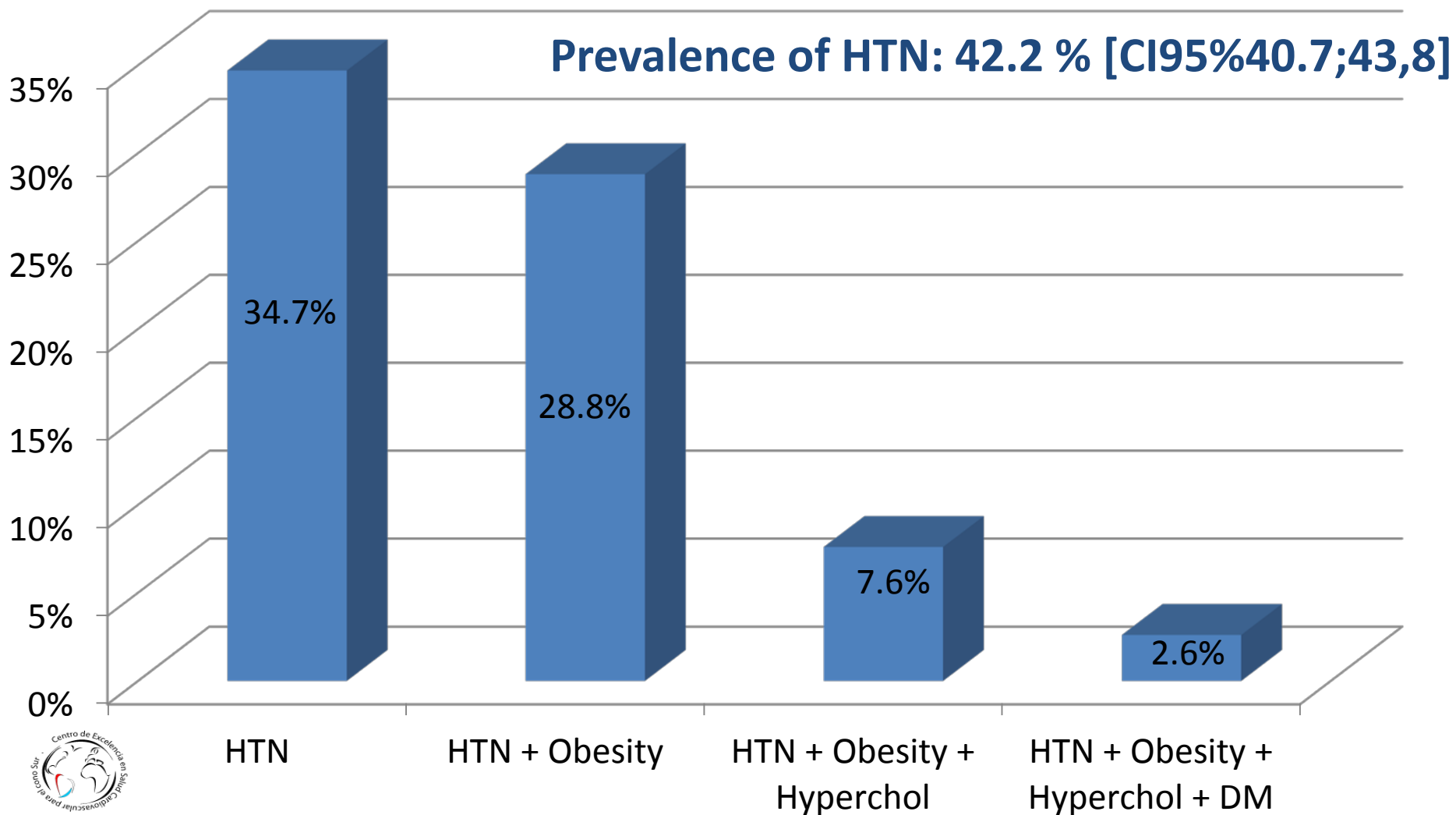
Comorbidities in diabetic adults in the Southern Cone of LA: Chile, Argentina and Uruguay

Prevalence of DM: 11,7% [10,8;12,7]

	HTN	Obesity	Hyperchol	Metab Synd
	66%	56%	21%	81%

Data from the CESCAS Cohort Study

CESCAS

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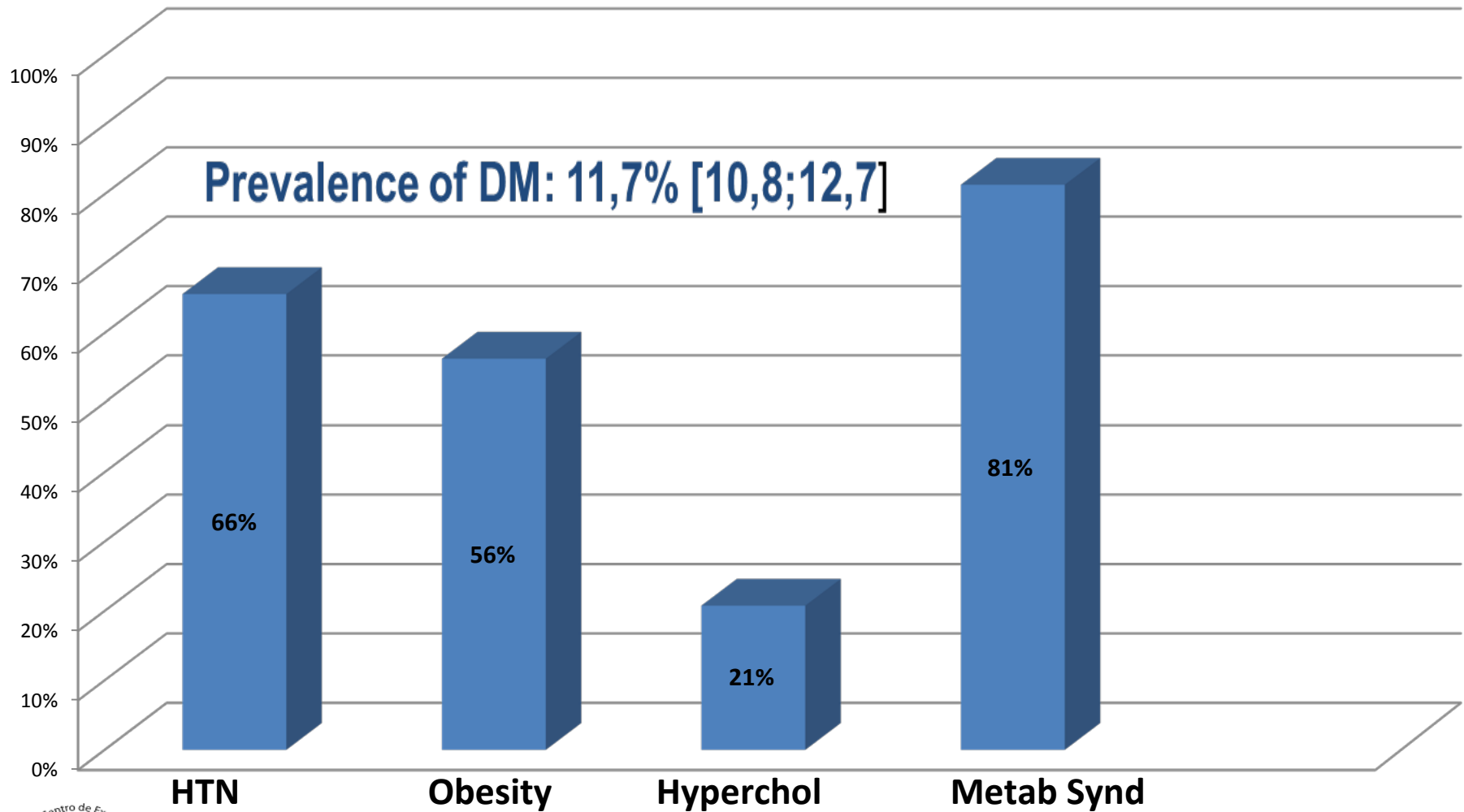
Comorbidities in CKD in the Southern Cone of LA: Chile, Argentina and Uruguay

Comorbidities in CKD
CESCAS I study
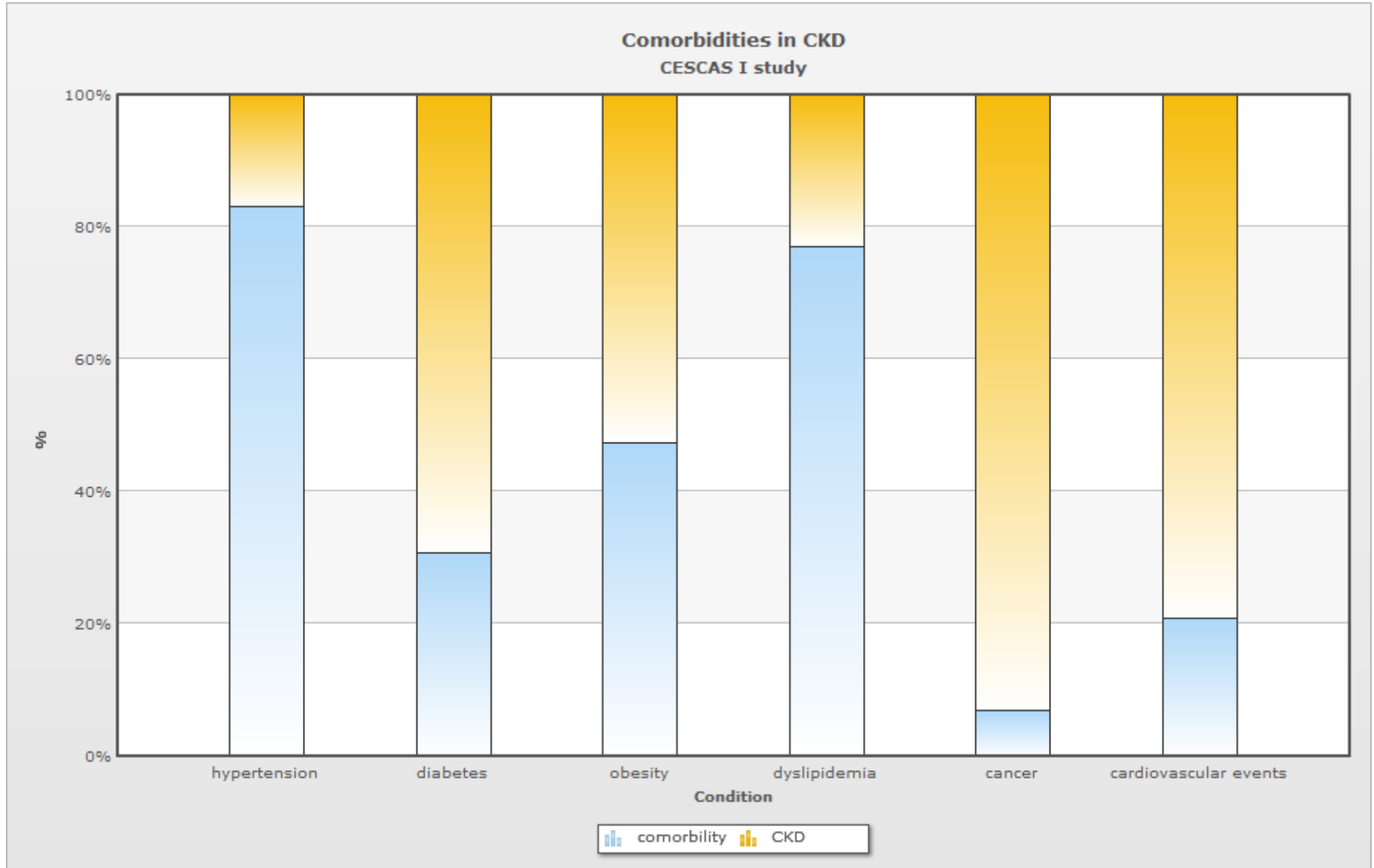
Comorbidities in adults in the Southern Cone of LA: HTN, DM, Chronic Kidney Disease, Obesity, Hyperchol

Data from the CESCAS Cohort Study
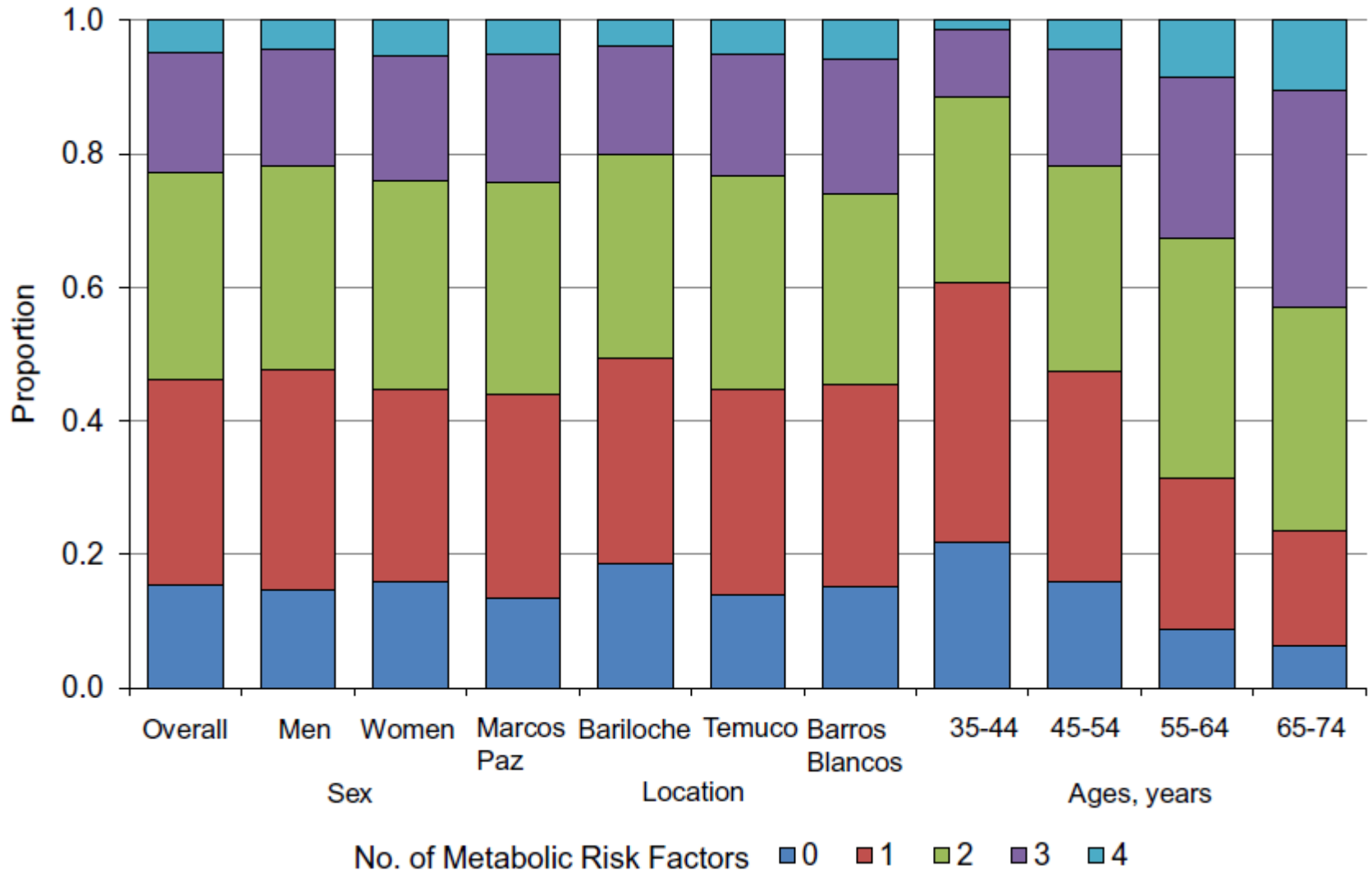
Comorbidities in adults in the Southern Cone of LA: socioeconomic gradient
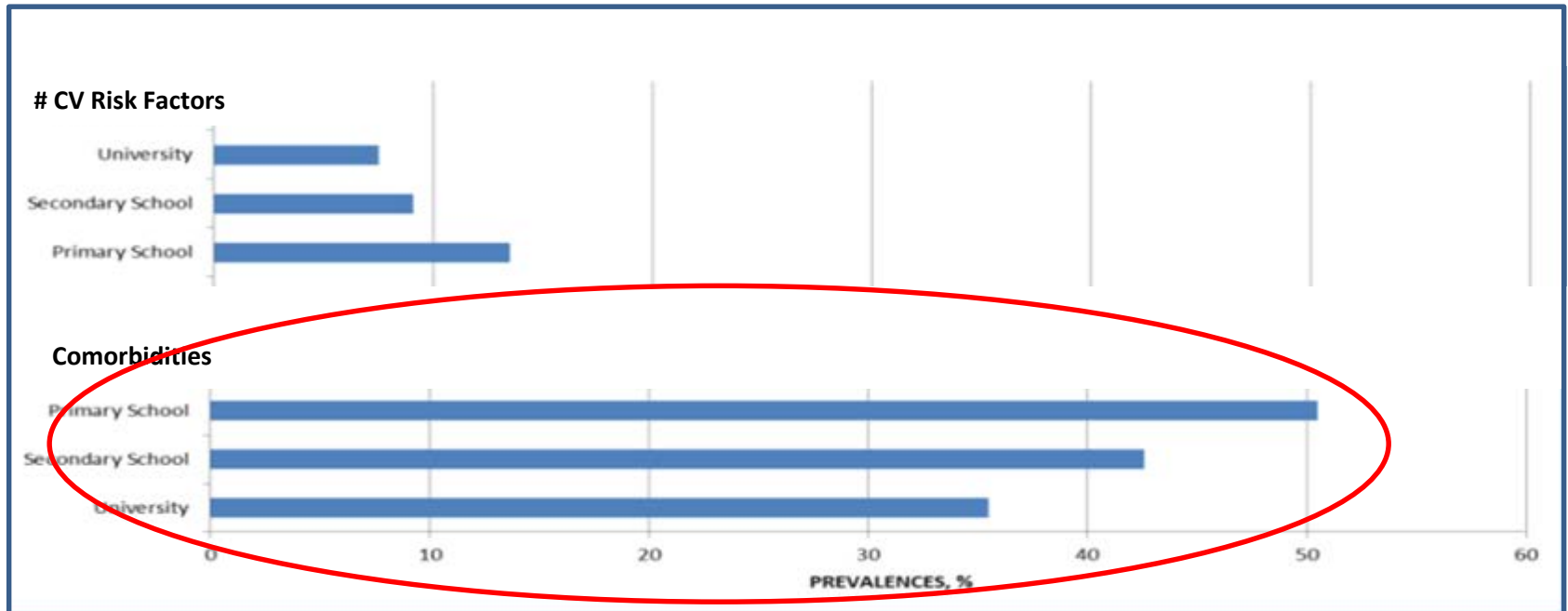
Data from the CESCAS Cohort Study

Comorbidities in the adult population in Peru

	Alcohol disorder n = 401	Asthma n=62	COPD n=173	Diabetes n=194	Depression n=477	Hypertension n=548
Alcohol disorder		6.5% (4)	16.2% (28)	8.3% (16)	10.7% (51)	11.9% (65)
Asthma	1.0% (4)		6.9% (12)	2.1% (4)	4.2% (20)	2.4% (13)
COPD	7.0% (28)	19.4% (12)		2.6% (5)	8.0% (38)	7.9% (43)
Diabetes	4.0% (16)	6.5% (4)	2.9% (5)		6.3% (30)	13.7% (75)
Depression	12.7% (51)	32.3% (20)	22.0% (38)	15.5% (30)		13.9% (76)
Hypertension	16.2% (65)	21.0% (13)	24.9% (43)	38.7% (75)	15.9% (76)	

Data from the CRONICAS Cohort Study

Comorbidities in the adult population in Brazil

Percentage of people with each condition who have comorbidities

This condition only | This condition +1 other
This condition +2 | This condition +3 or more
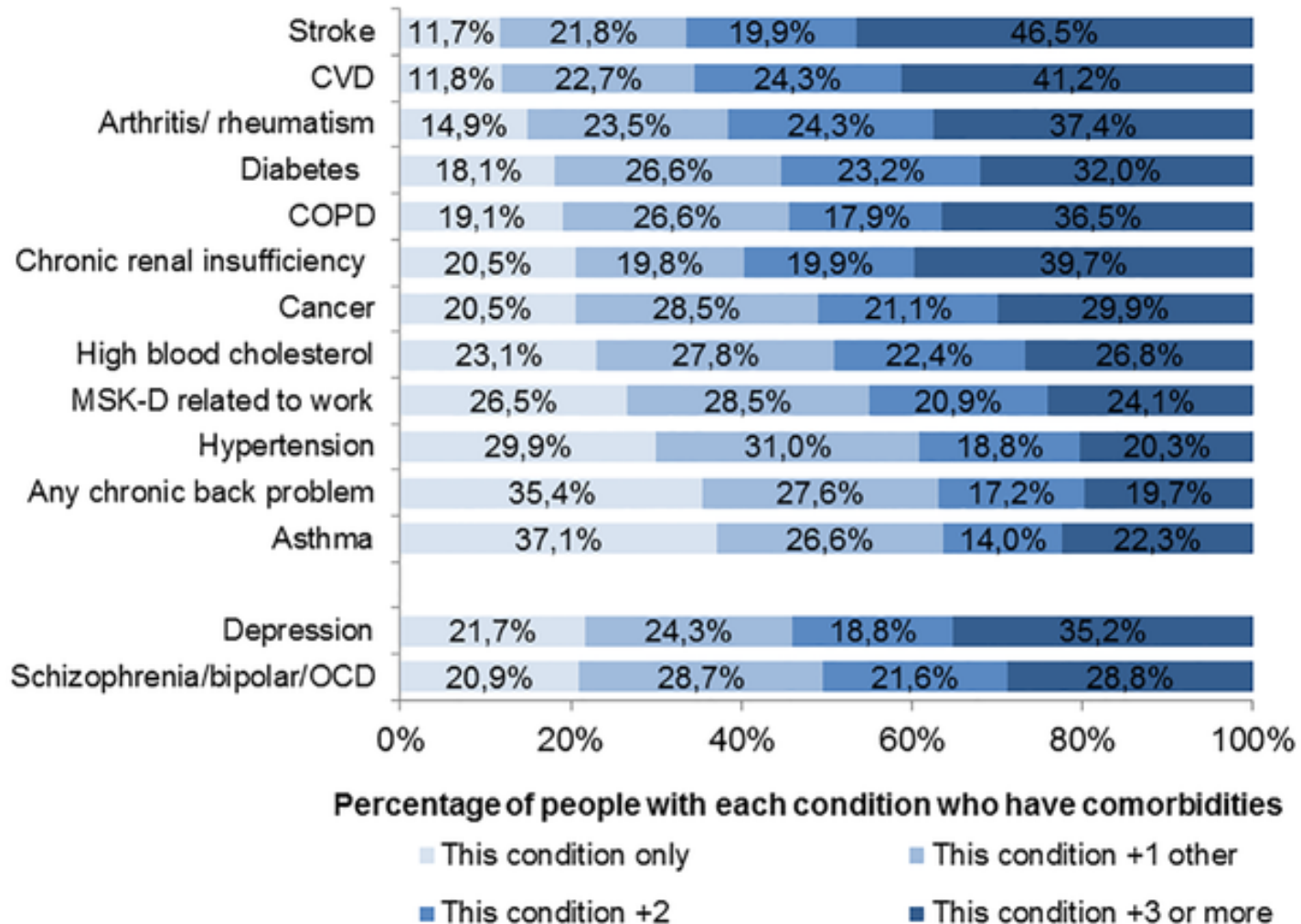
Rzewuska M, de Azevedo-Marques JM, Coxon D, Zanetti ML, Zanetti ACG, et al. (2017) Epidemiology of multimorbidity within the Brazilian adult general population: Evidence from the 2013 National Health Survey (PNS 2013). PLOS ONE 12(2): e0171813.

Selected topics on comorbidities

- Cardiovascular and cardiometabolic risk
- Mental Health
- Comorbidities in the elderly
- Adherence
- Gender perspective
- Social determinants
- Health care access

Selected topics on methodological approaches to comorbidities

Selected topics on methodological approaches to comorbidities

Observational studies:

- Collaborative projects:
    Cohort studies in LA

Selected topics on methodological approaches to comorbidities

Observational studies:

- Collaborative projects:
  cohort studies in LA
- Big data: existing databases

Selected topics on methodological approaches to comorbidities

Observational studies:

- Collaborative projects:
  cohort studies in LA
- Big data: existing databases
- Causal inference

Risk Factor 1   Risk Factor 2

Disease 1   Disease 2

No etiological association: there is no etiological association between the diseases.

Risk Factor 1   Risk Factor 2

Disease 1   Disease 2

Direct causation
One of the diseases may cause the other, eg, Disease 1 (D1) = diabetes mellitus, Disease 2 (D2) = cataracts.

Risk Factor 1   Risk Factor 2

Disease 1   Disease 2

Associated risk factors
The risk factors for each disease are correlated, eg, Risk Factor 1 (RF1) = smoking; Risk Factor 2 (RF2) = alcohol; D1 = chronic pulmonary obstructive disease; D2 = liver cirrhosis.

Risk Factor 1   Risk Factor 2

Disease 1   Disease 2

Heterogeneity
The risk factors for each diseases are not correlated, but each one of them can cause either disease, eg, RF1 = smoking; RF2 = age; D1 = ischemic heart disease; D2 = lung cancer.

Risk Factor 1   Risk Factor 2   Risk Factor 3

Disease 1   Disease 2   **Disease 3**

Independence
The presence of the diagnostic features of each disease is actually due to a third distinct disease, eg, D1 = hypertension; D2 = tension headache; D3 = pheochromocytoma.
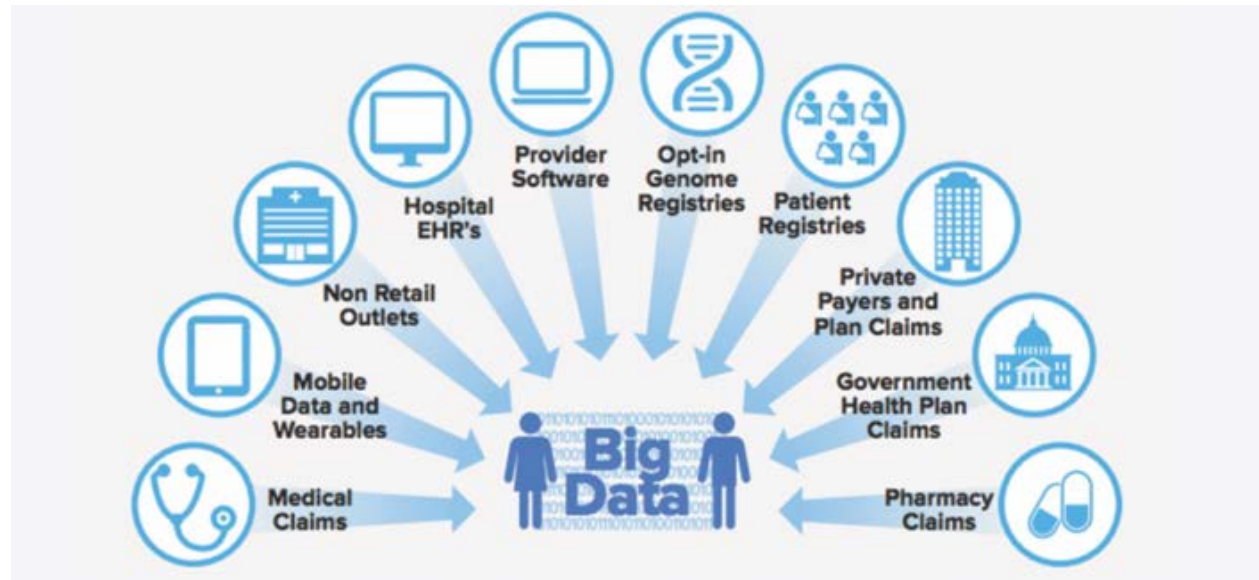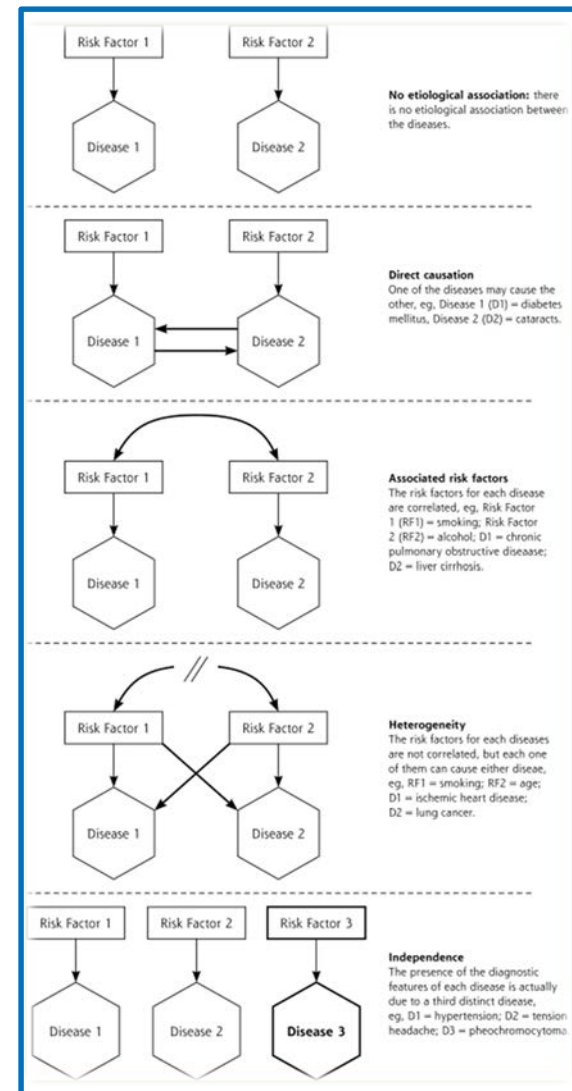
Selected topics on methodological approaches to comorbidities
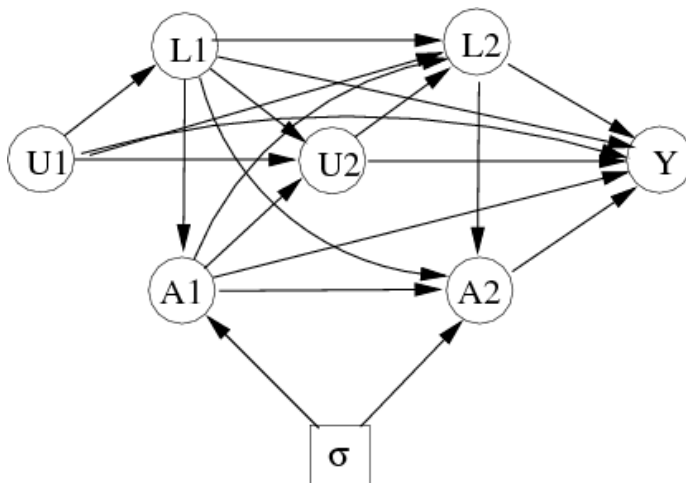
Observational studies:

- Collaborative projects:
    cohort studies in LA
- Big data: existing databases
- Causal inference

Diabetes is a marker of distal risk factors

Diabetes as an intermediate in the causal pathway to cancer

Diabetes treatment as a risk factor for cancer
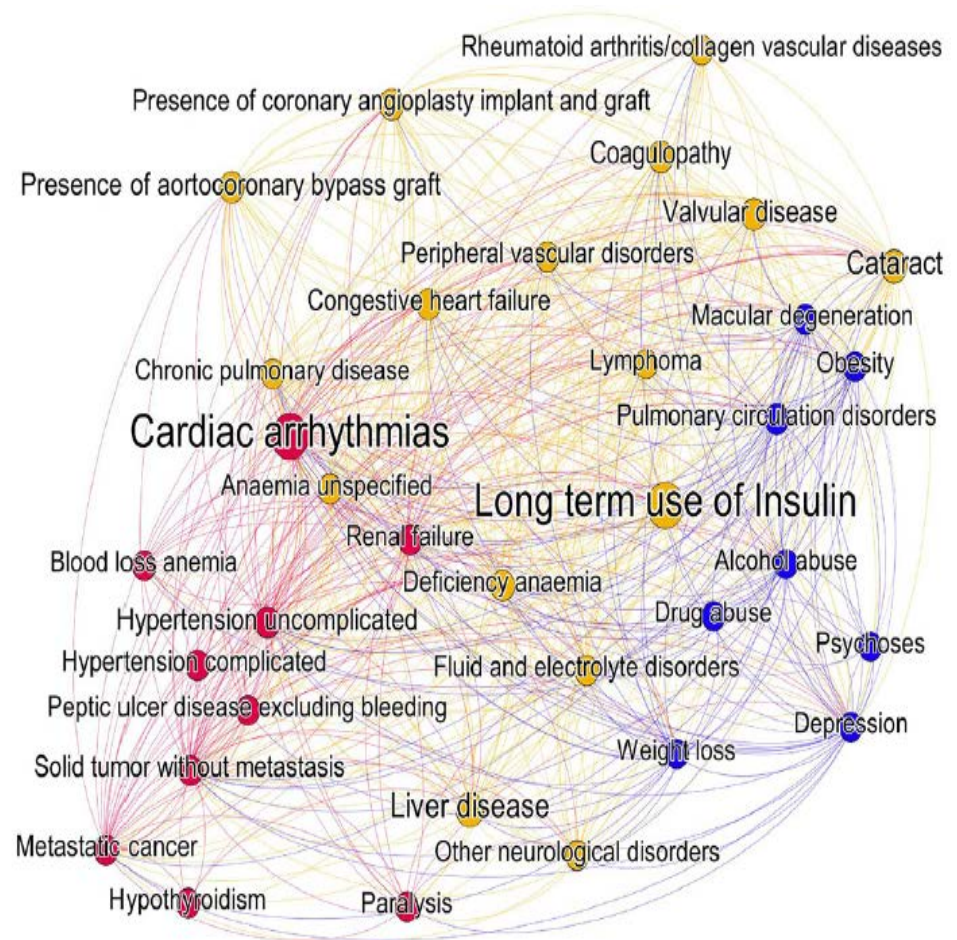
Diabetes → Metformin → Cancer

Selected topics on methodological approaches to comorbidities

Observational studies:

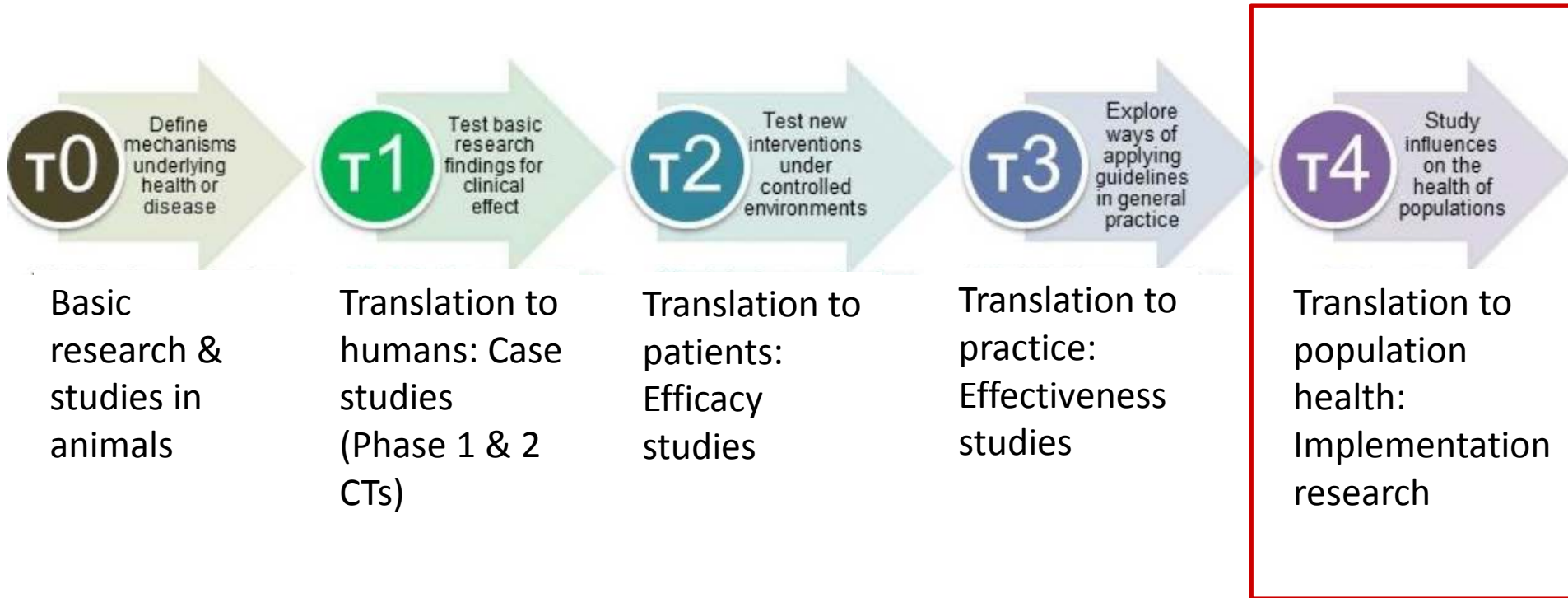- Collaborative projects: cohort studies in LA
- Big data
- Causal inference
- Comorbidity networks:

Khan et al. 2018

Selected topics on methodological approaches to comorbidities

Interventional studies:

Translational Research

T0 Define mechanisms underlying health or disease	T1 Test basic research findings for clinical effect	T2 Test new interventions under controlled environments	T3 Explore ways of applying guidelines in general practice	T4 Study influences on the health of populations
Basic research & studies in animals	Translation to humans: Case studies (Phase 1 & 2 CTs)	Translation to patients: Efficacy studies	Translation to practice: Effectiveness studies	Translation to population health: Implementation research

Implementation Science
Implementation Research
Implementation and Dissemination

Implementation Research to improve health care

KNOW

Proven interventions that are effective and cost-effective
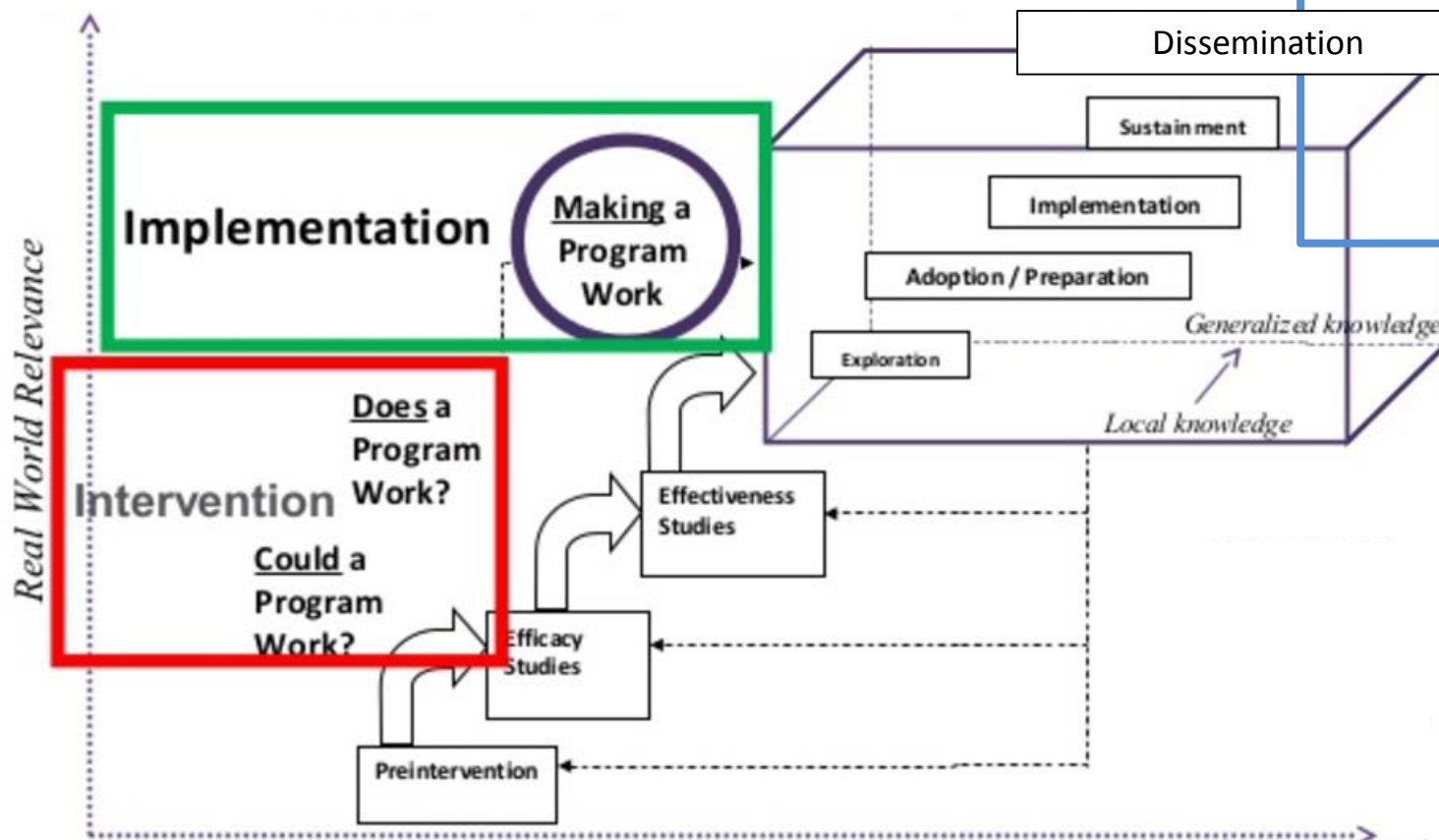

DO

Proven interventions are not fully implemented in the real world

22

Implementing and Scaling-up

Adapted from Landsverk 2012 and Aarons 2011

Traditional Translation Pipeline
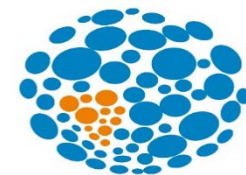
Implementation research

- Implementation research is the scientific study of methods and strategies to promote the systematic uptake of research findings and other evidence-based paractices into routine practice.

(Eccles/Mittman, 2006)

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Implementation research goals

1. Develop reliable strategies for increasing _use_ of evidence-based/ effective services to improve outcomes, and facilitate widespread <u>adoption</u> of these strategies

2. Produce <u>generalizable knowledge</u> and increased understanding of implementation _processes_, _barriers_, _facilitators_, _strategies_

(Mittman 2010)

Implementation research frameworks

Elements of the RE-AIM Framework

Scaling-up

- Scaling up is the process by which health interventions shown to be effectively implemented on a small scale and/under still more controlled conditions are expanded under real world conditions into broader policy or practice, at a large scale.

- While the terms "spread/dissemination" and "scale-up" have been used interchangeably, "spread" refers to the adoption and replication of an intervention within a health system (more passively), whereas "scale-up" addresses the system/infrastructure issues that arise during full-scale implementation.

WHO Guide – Framework Model

Relationship between implementation and the implementation research cycle
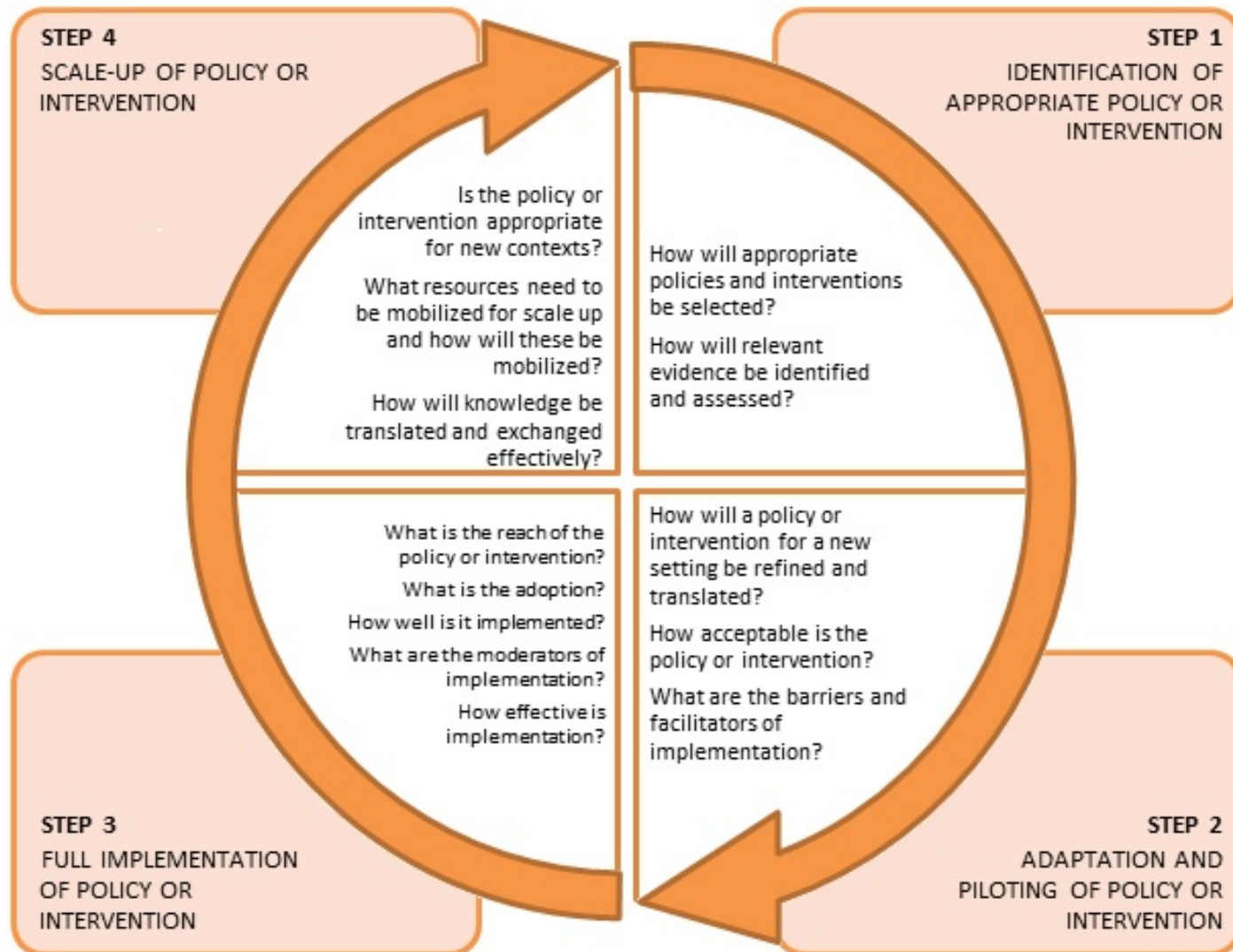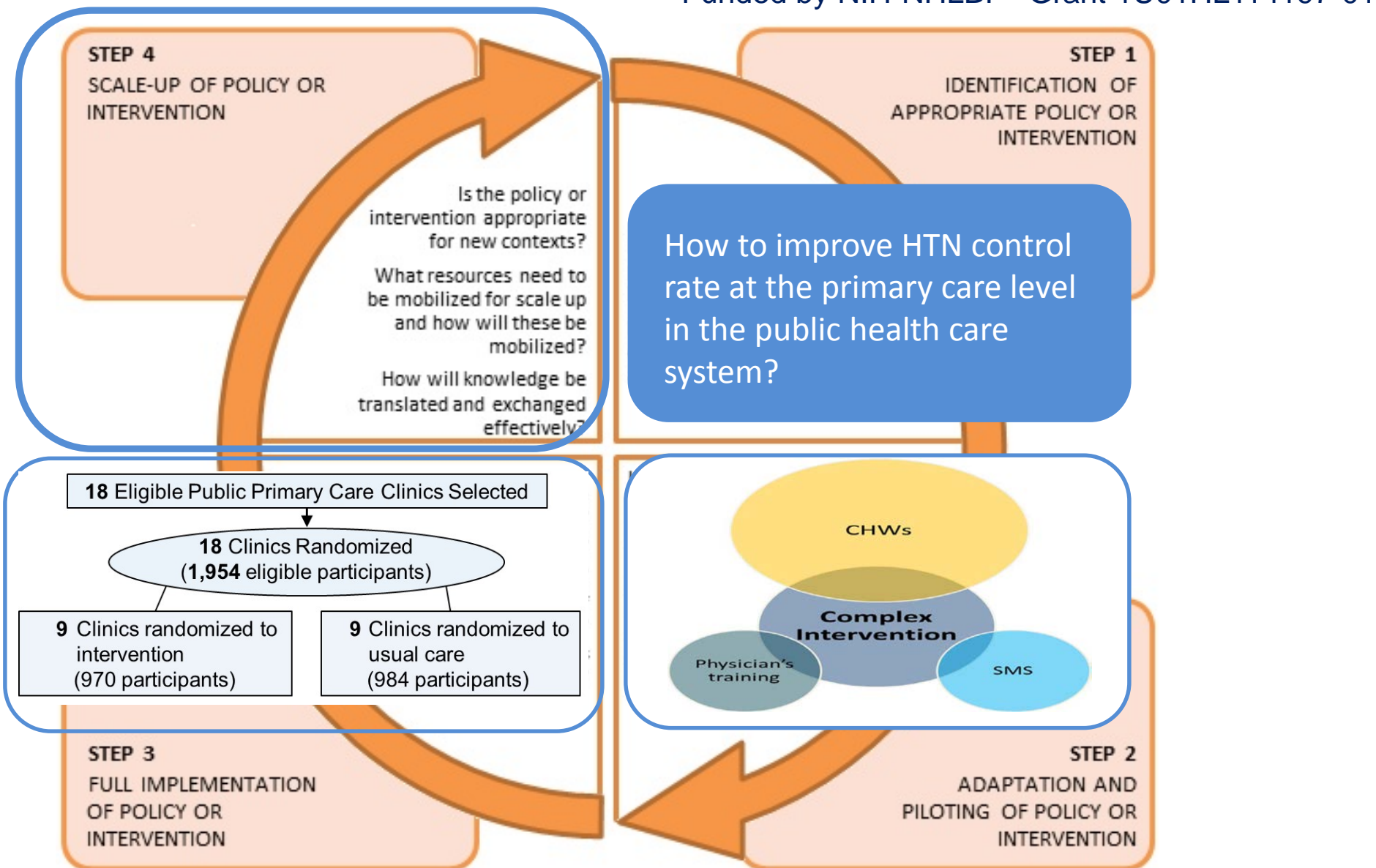
Example 1: Comprehensive intervention for HTN control in the public health care system in Argentina

STEP 4
SCALE-UP OF POLICY OR INTERVENTION

Is the policy or intervention appropriate for new contexts?

What resources need to be mobilized for scale up and how will these be mobilized?

How will knowledge be translated and exchanged effectively?

STEP 1
IDENTIFICATION OF APPROPRIATE POLICY OR INTERVENTION

How to improve HTN control rate at the primary care level in the public health care system?

18 Eligible Public Primary Care Clinics Selected

18 Clinics Randomized
(**1,954** eligible participants)

9 Clinics randomized to intervention
(970 participants)

9 Clinics randomized to usual care
(984 participants)

CHWs

Complex Intervention

Physician's training

SMS

STEP 3
FULL IMPLEMENTATION OF POLICY OR INTERVENTION

STEP 2
ADAPTATION AND PILOTING OF POLICY OR INTERVENTION

Example 2: Approaching comorbidities: a multicomponent intervention to manage HTN and DM in low resource settings

STEP 4

STEP 1
IDENTIFICATION OF APPROPRIATE POLICY OR INTERVENTION

translated and exchanged effectively?

How to improve HTN and DM control at the primary care level in the public health care system?

Training
Physicians
CHW
Nurses
Educators

Registry

Decision Aids

M-Health
SMS for patients

STEP 3
FULL IMPLEMENTATION OF POLICY OR INTERVENTION

STEP 2
ADAPTATION AND PILOTING OF POLICY OR INTERVENTION
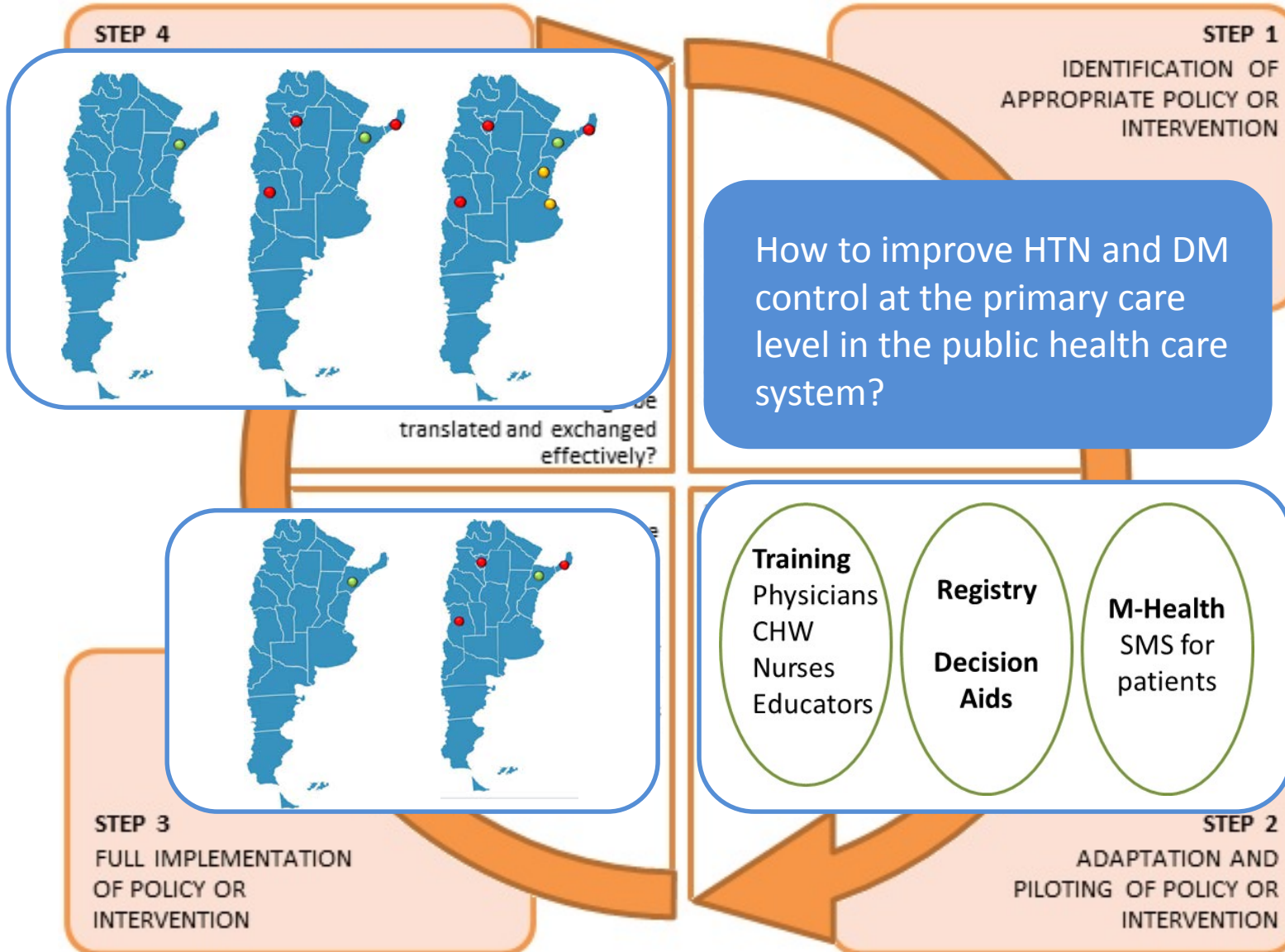
THANK YOU!

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