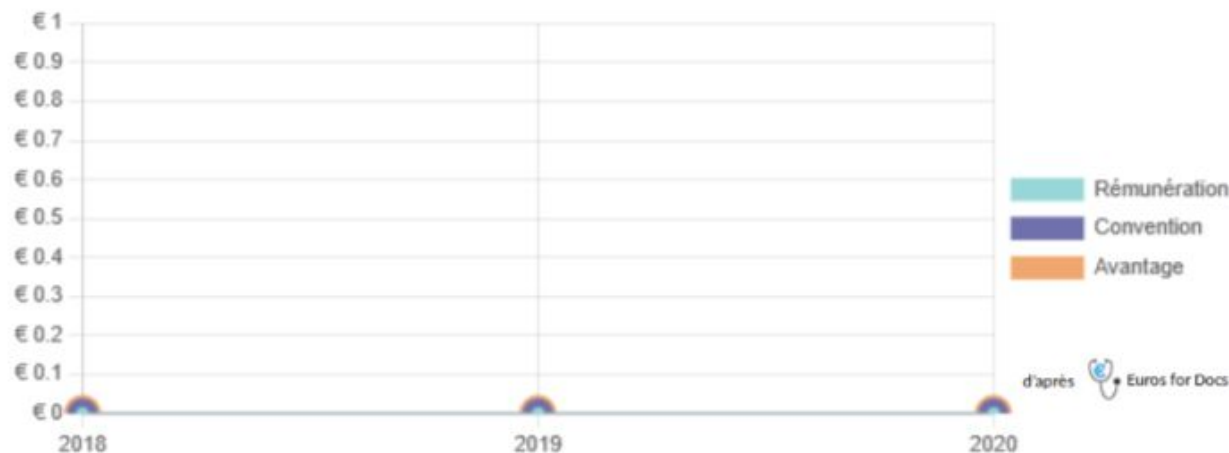# *Identification and prioritization of personomic markers for the personalization of smoking cessation interventions*

A. Malmartel, P. Ravaud, V.-T. Tran

Déclaration publique d'intérêts de MALMARTEL ALEXANDRE

Financements reçus de l'industrie

Liens spécifiques à l'intervention

« Identification and prioritization of personomic markers for the personalization of Smoking Cessation Interventions »

- Aucun

Autres liens d'intérêts

Activité professionnelle

- Médecin géneraliste (2016-en cours)
- Maitre de conférences des universités (2021-en cours)
- Rédacteur responsable de rubrique dans la revue

Engagements

- Membre du conseil scientifique du CNGE (2021-en cours)

Principaux financeurs

- Aucun

Déclaration complète

- disponible sur Archimede.fr

Introduction to personalization

Definition

Limits

Hypotheses

- Adapting treatment to the individual characteristics of the patient (1)

- to improve the therapeutic strategy (timing, dose, nature, etc.) and timing of health care using these characteristics (2)

(1) National Research Council ; 2011.

(2) Jameson, J. L, Longo, D. L; NEJM ; 2015.

Introduction to personalization

Definition

Limits

Hypotheses

- Personalized versus non-personalized interventions: non-consensual results (1)

- Only 50% of personalized interventions outperform non-personalized interventions (2)

- Low to moderate effect size for implementing personalization in the intervention (3)

(1)   Taylor, G. et al. *Cochrane Database of Systematic ; 2017.*
(2)   Ryan, P., & Lauver, D. R. *Journal of Nursing Scholarship ; 2002.*
(3)   Baker R et al.. *The Cochrane Database of Systematic Reviews ; 2015*

Introduction to personalization
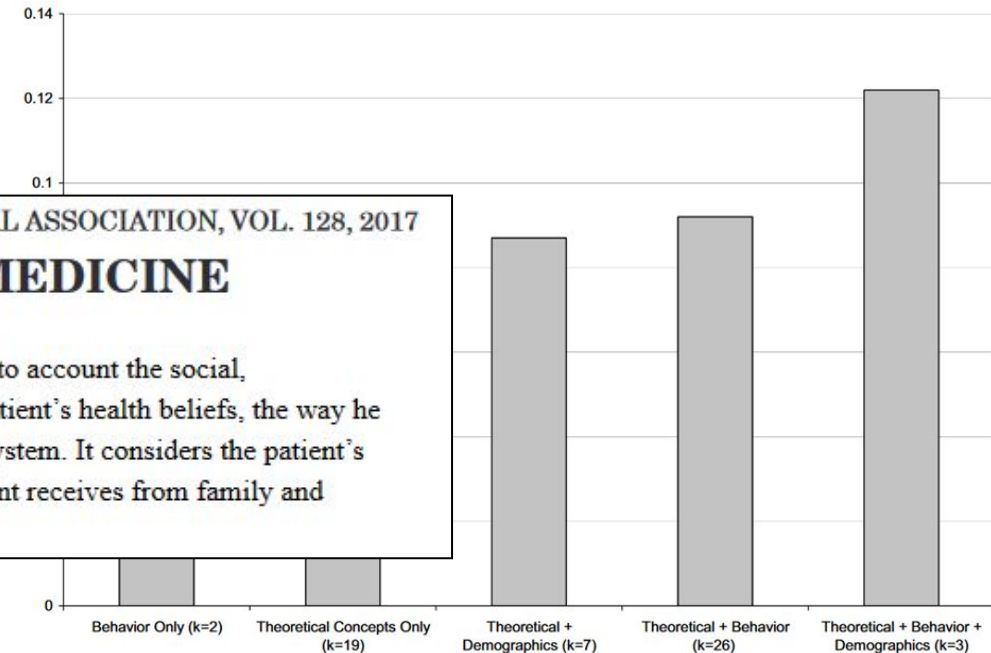
Definition

Limits

Hypotheses

Is personalization adapted to patients' needs?

TRANSACTIONS OF THE AMERICAN CLINICAL AND CLIMATOLOGICAL ASSOCIATION, VOL. 128, 2017

PERSONOMICS AND PRECISION MEDICINE

ROY C. ZIEGELSTEIN, MD, MACP

Personomics takes into account the social, psychological, cultural, behavioral, and economic factors that affect the patient's health beliefs, the way he or she approaches illness, and the patient's interactions with the medical system. It considers the patient's personal preferences, his or her values and goals, and the support the patient receives from family and friends.

| | 0.14 |
| 0.12 |
| 0.1 |
| 0 |

Behavior Only (k=2) — Theoretical Concepts Only (k=19) — Theoretical + Demographics (k=7) — Theoretical + Behavior (k=26) — Theoretical + Behavior + Demographics (k=3)

(1) Noar, S et al. Psychological Bulletin ; 2007.
(2) Beck, C et al. Nursing outlook ; 2010.

1/ **Develop a methodological framework** to identify variable of personalization to take into account in the development of smoking cessation interventions.

2/ **Assess the relevance of personomic markers** for personalizing non-pharmacological smoking cessation interventions according to patients and physicians

3/ **Compare personomic markers prioritized** by patients and physicians

1/ Identification of the potential personomic markers

- Condition: smoking cessation
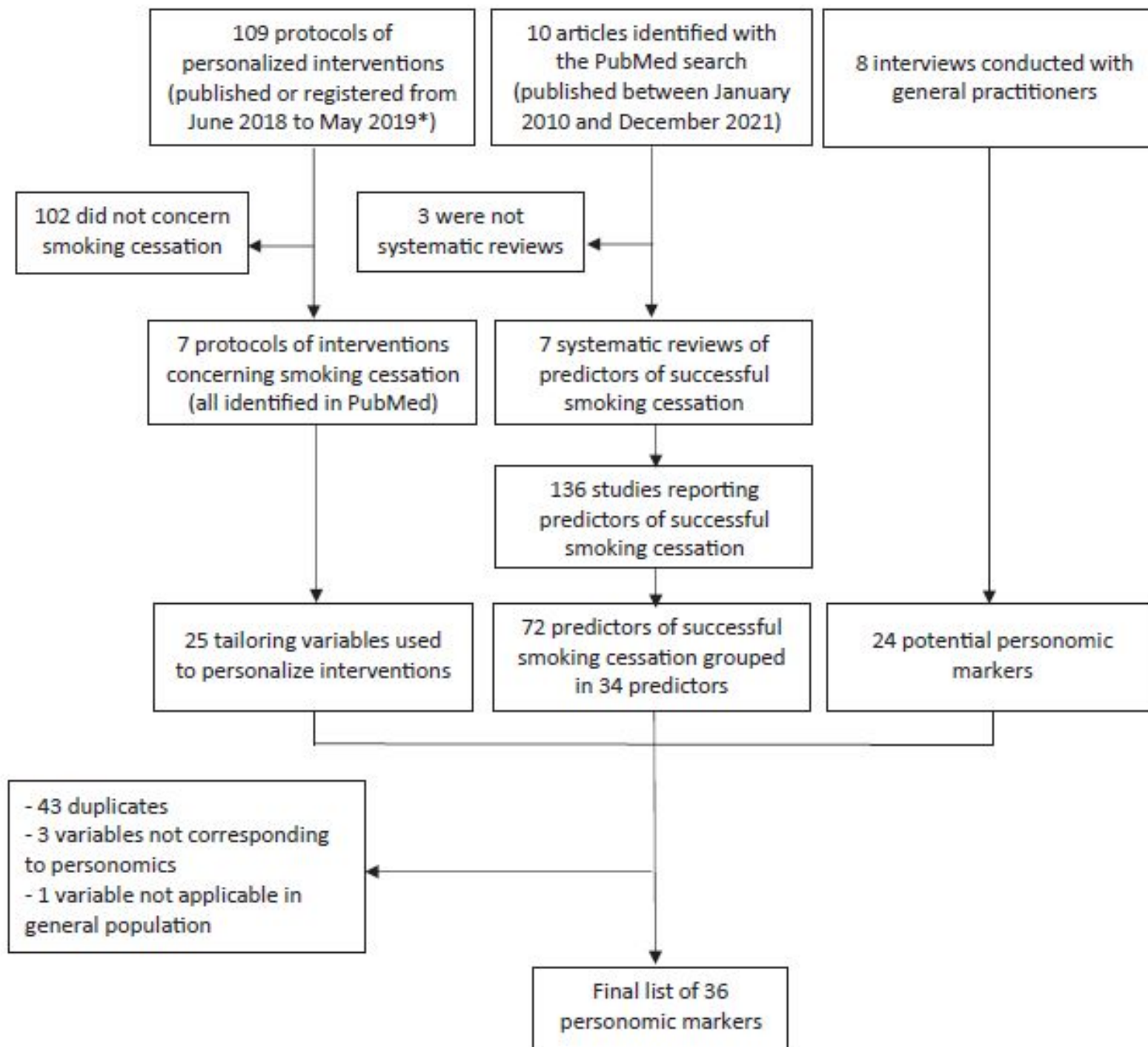
- Clinical trial protocols: Pubmed, ClinicalTrials.gov, NEJM et JAMA

- Systematic reviews of predictors of smoking cessation success : Pubmed

- Interviews : 8 academic general practitioners from University Paris Cité

- Analyses :

  - Extraction of potential personomic markers
  - Exclusion of markers not corresponding to personomics (e.g., genomics)
  - Grouping similar concepts

2/ Classification of personomic variables

- Participants :
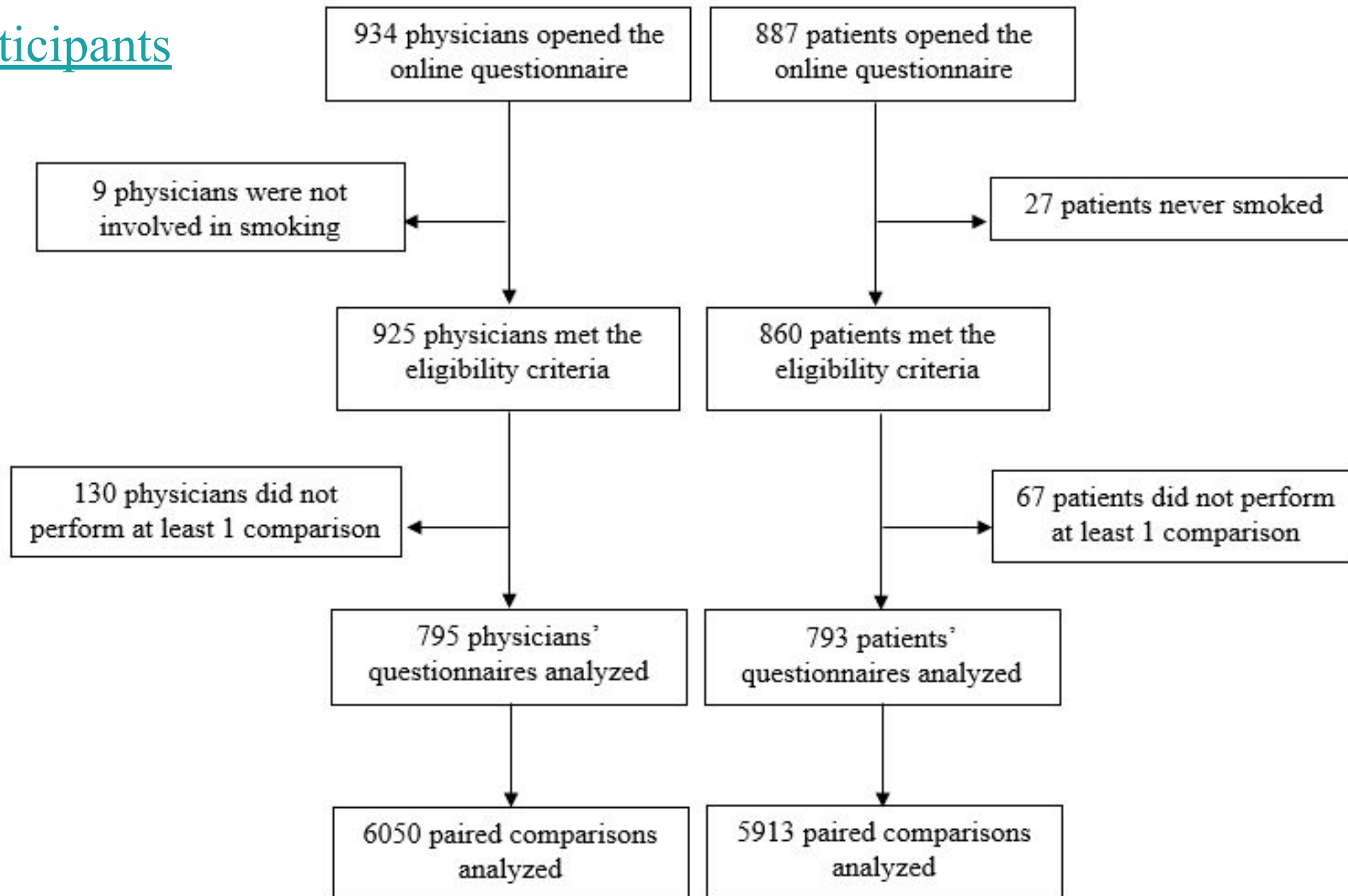 - Physicians involved in smoking cessation via social and professional networks
  - Current and former smokers via the ComPaRe e-cohort

- Procedure :
  - 10 random pairs of personomic markers per participant
  - Paired comparison experiments

- Analyses :
  - Bradley Terry Luce models:
    - where the "ability" is the probability that a marker is superior to others
  - Physicians' ranking / patients' ranking

Identification of the persononomic markers

109 protocols of personalized interventions (published or registered from June 2018 to May 2019*)	10 articles identified with the PubMed search (published between January 2010 and December 2021)	8 interviews conducted with general practitioners

102 did not concern smoking cessation

3 were not systematic reviews

7 protocols of interventions concerning smoking cessation (all identified in PubMed)

7 systematic reviews of predictors of successful smoking cessation

136 studies reporting predictors of successful smoking cessation

25 tailoring variables used to personalize interventions

72 predictors of successful smoking cessation grouped in 34 predictors

24 potential persononomic markers

- 43 duplicates
- 3 variables not corresponding to personomics
- 1 variable not applicable in general population

Final list of 36 persononomic markers

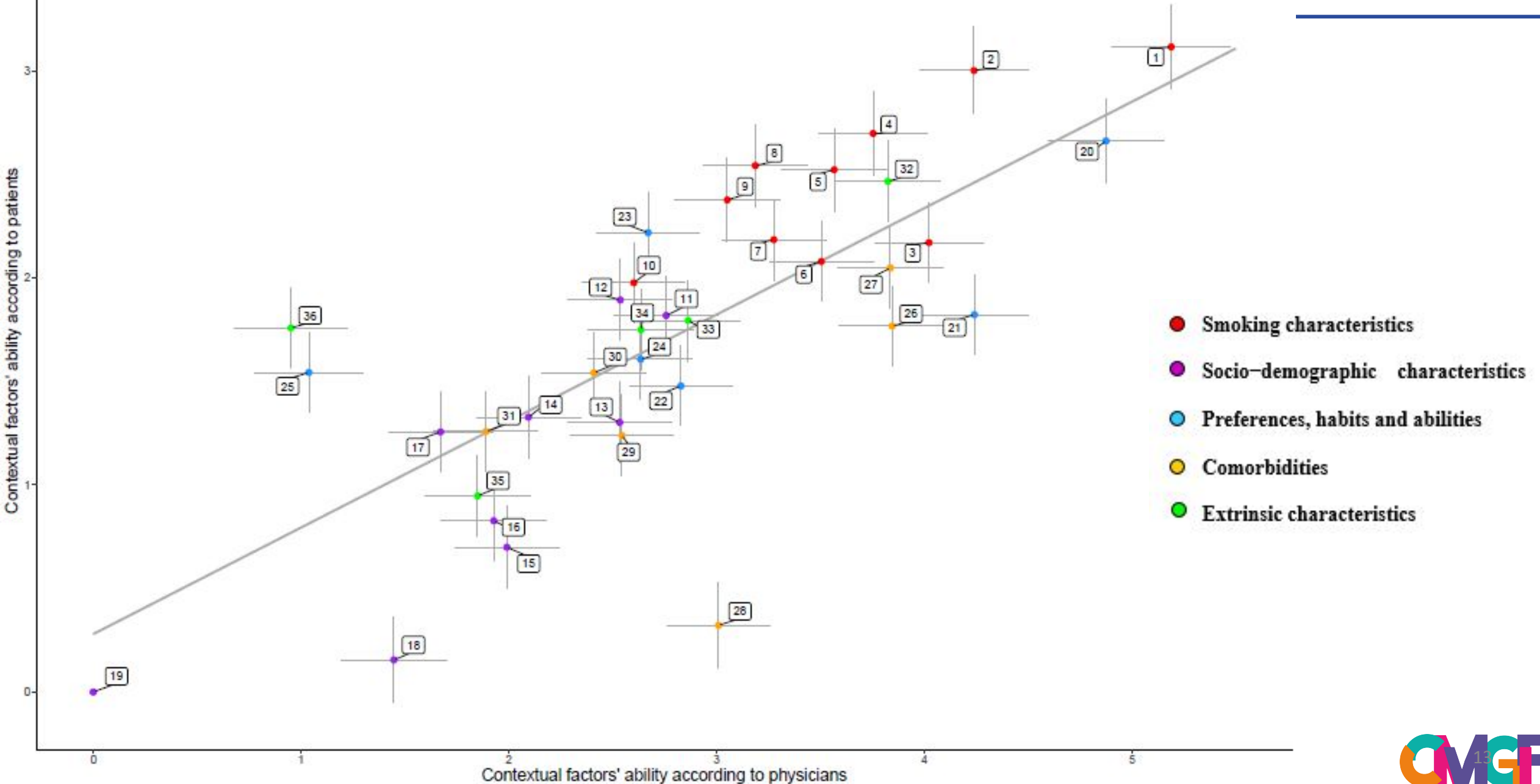|	PERSONOMIC MARKERS	DEFINITIONS	EXEMPLES
SMOKING CHARACTERISTICS	Motivation to quit	Willingness and readiness to quit smoking	Prochaska's stage of change
	Smoking behavior	Actions taken that are associated with smoking	Personalization according to habits such as location (work/home), schedule (morning/evening), context (alone/between friends)...
	Dependence on tobacco	Physical and psychological factors that make it difficult to quit	Fagerström test
PREFERENCES, ABILITIES	Preferences/expectations	Patient's preferences and expectations regarding the treatment	*P*reference for oral instead of patch nicotine replacement therapy
	Fears and beliefs about smoking	Patient's fears concerning continuing or quitting smoking and beliefs about smoking	Adapted information targeting weight gain, anxiety or withdrawal symptoms depending on patient's fears

934 physicians opened the online questionnaire

887 patients opened the online questionnaire

9 physicians were not involved in smoking

27 patients never smoked

925 physicians met the eligibility criteria

860 patients met the eligibility criteria

130 physicians did not perform at least 1 comparison

67 patients did not perform at least 1 comparison

795 physicians' questionnaires analyzed

793 patients' questionnaires analyzed

6050 paired comparisons analyzed

5913 paired comparisons analyzed

Rankings

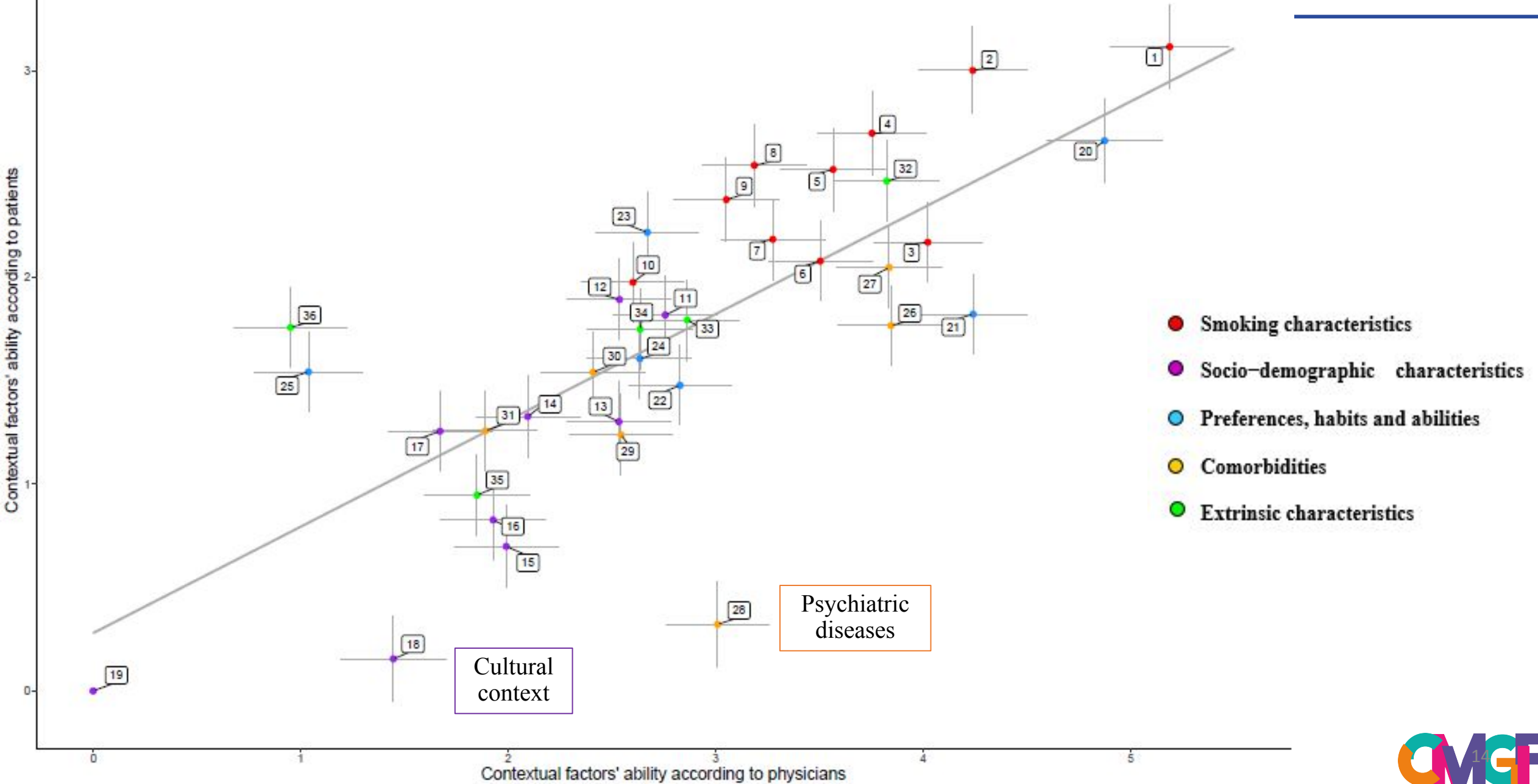| ability (SE)	PHYSICIANS	PATIENTS	ability (SE)
5.19 (0.28)	**Motivation to quit smoking**	**Motivation to quit smoking**	3.12 (0.21)
4.88 (0.28)	**Preferences/expectations**	**Smoking behavior**	3.00 (0.21)
4.25 (0.26)	Fears/beliefs about smoking	Dependence on tobacco	2.70 (0.20)
4.24 (0.26)	**Smoking behavior**	**Preferences/expectations**	2.66 (0.20)
4.02 (0.26)	Previous attempts to quit	Expected side effects	2.54 (0.20)
3.85 (0.26)	Current pregnancy	Impact on quality of life	2.52 (0.20)
3.84 (0.25)	Co-addictions	Smokers in the environment	2.47 (0.20)
3.83 (0.26)	Smokers in the environment	Symptoms related to smoking	2.38 (0.20)
3.75 (0.26)	Dependence on tobacco	Physical activity and abilities	2.22 (0.20)
3.57 (0.25)	Impact on quality of life	Past tobacco use	2.18 (0.20)

Discrepancies

Contextual factors' ability according to patients

Contextual factors' ability according to physicians

Legend:
- Smoking characteristics (red)
- Socio−demographic characteristics (purple)
- Preferences, habits and abilities (blue)
- Comorbidities (orange)
- Extrinsic characteristics (green)

Discrepancies

Contextual factors' ability according to patients

Contextual factors' ability according to physicians

Legend:
- Smoking characteristics
- Socio−demographic characteristics
- Preferences, habits and abilities
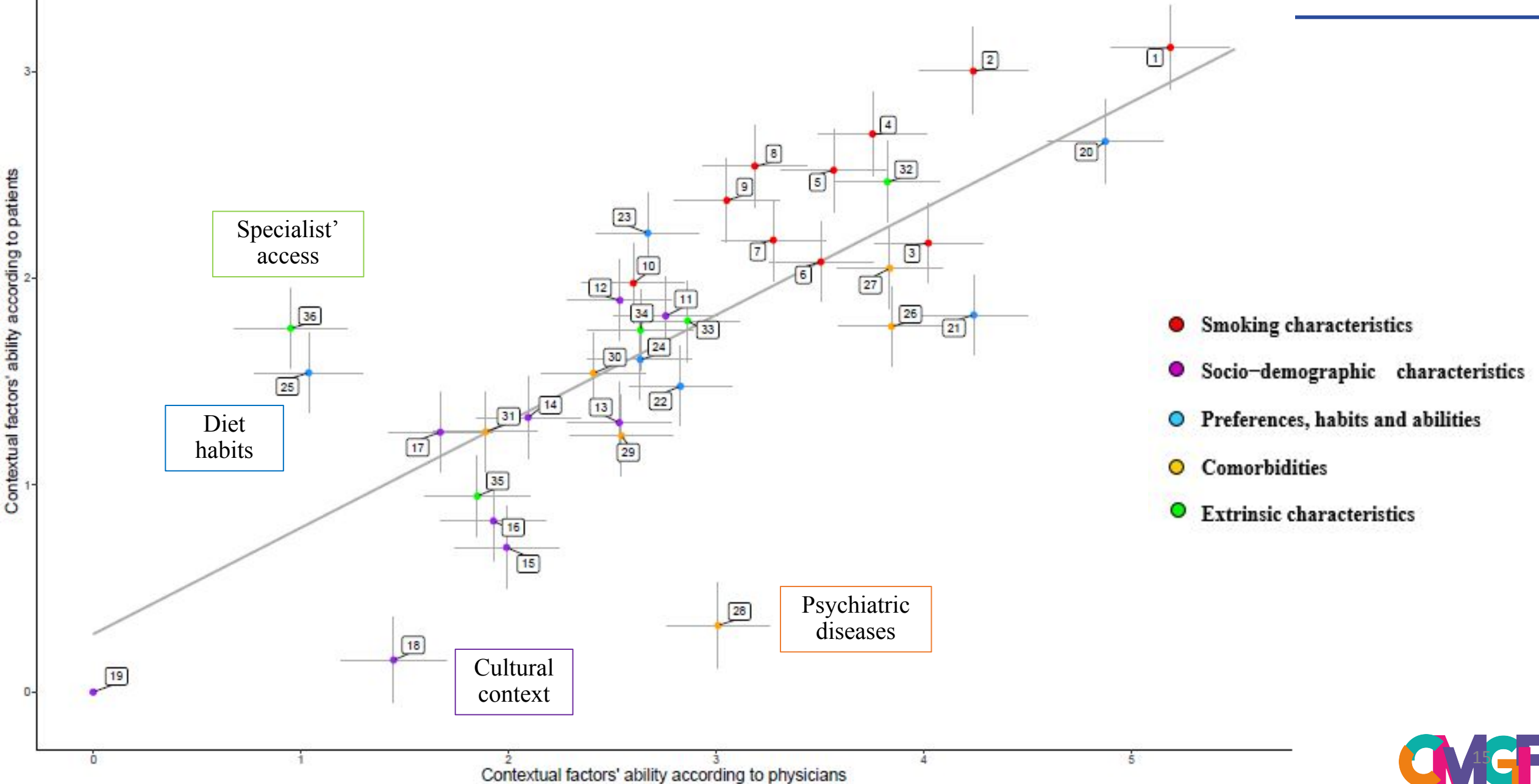- Comorbidities
- Extrinsic characteristics

Psychiatric diseases

Cultural context

Discrepancies

Strengths

Limitations

- **Use a wide range of sources to identify markers**

- **Use of paired comparisons to reduce participants' mental burden**

- **Standardized procedure that can be applied in a diverse range of contexts**

Strengths

Limitations

- **Non-exhaustive review**

- **Non-representative participants**

- **Nature and use of personomic markers**

Personalizing smoking cessation: motivation, patient preferences, smoking behavior.

Personalizing smoking cessation: motivation, patient preferences, smoking behavior.

Development of an EBM-inspired process for identifying personomic markers

Personalizing smoking cessation: motivation, patient preferences, smoking behavior.

Development of an EBM-inspired process for identifying personomic markers

Highlighting the variables of discrepancy

Personalizing smoking cessation: motivation, patient preferences, smoking behavior.

Development of an EBM-inspired process for identifying personomic markers

Highlighting the variables of discrepancy

The importance of involving patients:

- From the earliest stages of research (1)

- To better adapt interventions according to characteristics and preferences (2)

- To enable feasibility of interventions

(1)   Concannon, al, *J Gen Intern Med ; 2019.* (2) Head KJ, et al, *Soc Sci Med ; 2013*

Thank you for your attention !