Evaluating the Quality of Maternal and Child Health Services in Brazilian Primary Health Care: A Latent Transition Analysis

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Summary of presentation

1. Overview of CIDACS;

2. Main characteristics of PHC in Brazil

3. Challenges and strategies for measuring PHC Quality in Brazil

4. Evaluating the Quality of Maternal and Child Health Services in Brazilian Primary Health Care

5. Recommendations

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Cidacs: Center for the Integration of Data and Knowledge for Health

Cidacs is a center created to conduct and promote **interdisciplinary research** to produce **knowledge**, develop new scientific **methodologies** and promote professional **training** using linked large-scale databases and high-performance computational resources in a secure environment.

- Founded: 2016
- TWO Cohorts of <u>millions</u> of Brazilian individuals

International Journal of Population Data Science (2019) 4:2:04

International Journal of Population Data Science

IJPDS
International Journal of Population Data Science

Swansea University
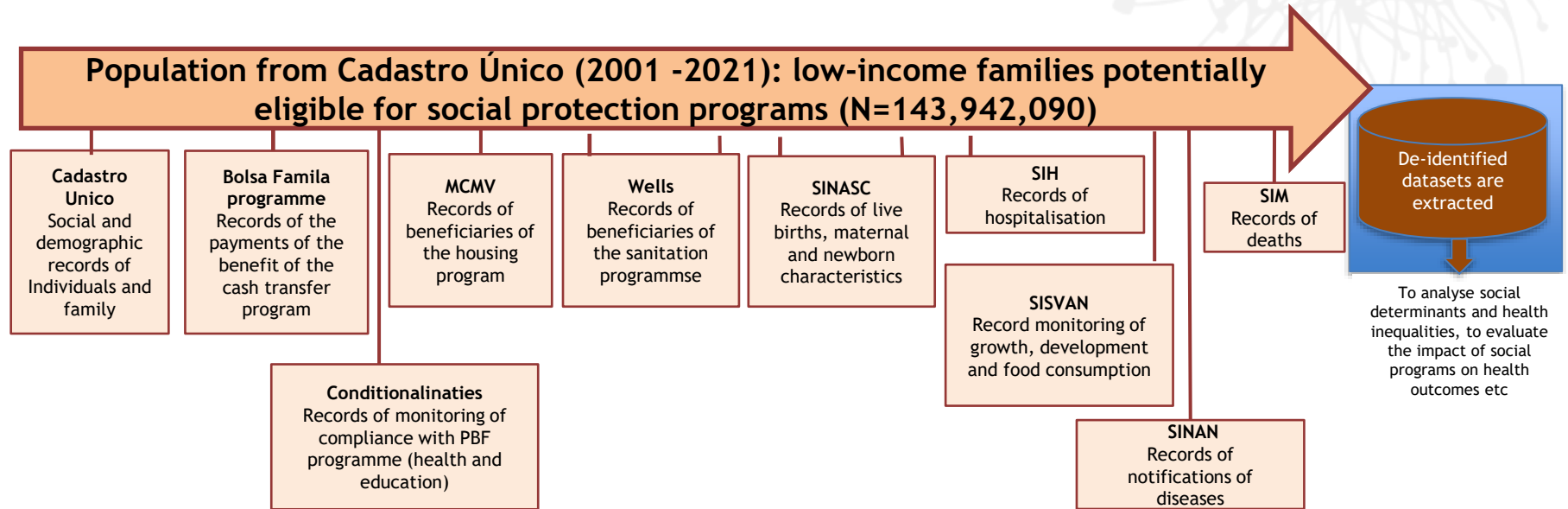Prifysgol Abertawe

Journal Website: www.ijpds.org

The Centre for Data and Knowledge Integration for Health (CIDACS): Linking Health and Social Data in Brazil

Barreto, ML[1,2*], Ichihara, MY[1,2], Almeida, BA[1], Barreto, ME[1,3], Cabral, L[1], Fiaccone, RL[1,4], Carreiro, RP[1], Teles, CAS[1], Pitta, R[1], Penna, GO[1,5,6], Barral-Netto, M[1], Ali, MS[1,7,8], Barbosa, G[1], Denaxas, S[9], Rodrigues, LC[1,8], and Smeeth, L[1,8]

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The 100 million Brazilians Cohort

Population from Cadastro Único (2001 -2021): low-income families potentially eligible for social protection programs (N=143,942,090)

Cadastro Unico
Social and demographic records of Individuals and family

Bolsa Famila programme
Records of the payments of the benefit of the cash transfer program

Conditionalinaties
Records of monitoring of compliance with PBF programme (health and education)

MCMV
Records of beneficiaries of the housing program

Wells
Records of beneficiaries of the sanitation programmse

SINASC
Records of live births, maternal and newborn characteristics

SIH
Records of hospitalisation

SISVAN
Record monitoring of growth, development and food consumption

SINAN
Records of notifications of diseases

SIM
Records of deaths

De-identified datasets are extracted

To analyse social determinants and health inequalities, to evaluate the impact of social programs on health outcomes etc
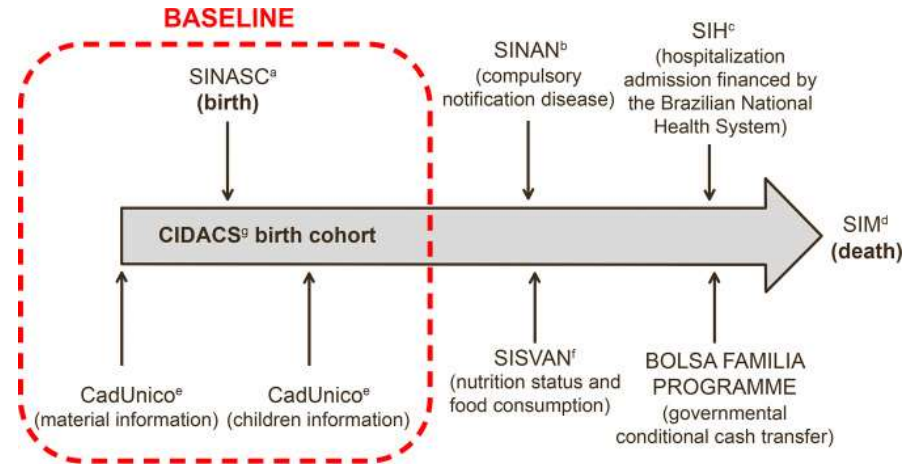
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CIDACS Birth Cohort

The individuals included in CIDACS Birth Cohort will be dynamically followed from birth to death
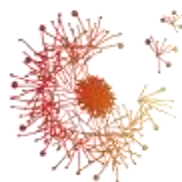
Brazil has several mandatory national health and social registries that allow us to track a range of events throughout the individual's life, including:

- ✓ infectious diseases occurrence,
- ✓ hospitalizations
- ✓ nutritional status,
- ✓ enrolment in social protection programmes,
- ✓ death.

What we study and what else we could study with our data
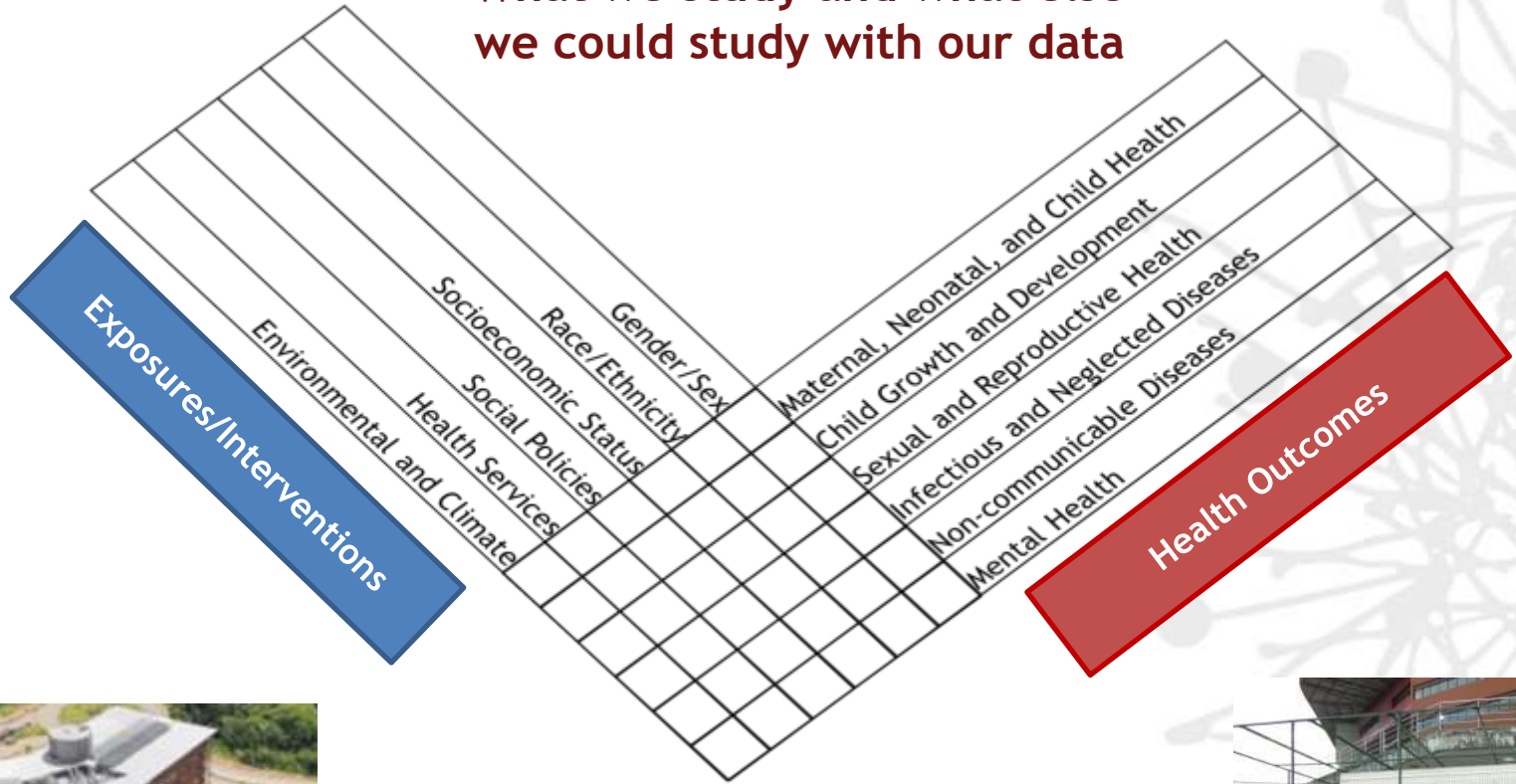
PHC in Brazil: a brief overview

Unified Health System (SUS)

Hospital Care

Specialized Ambulatory Care

Primary Health Care
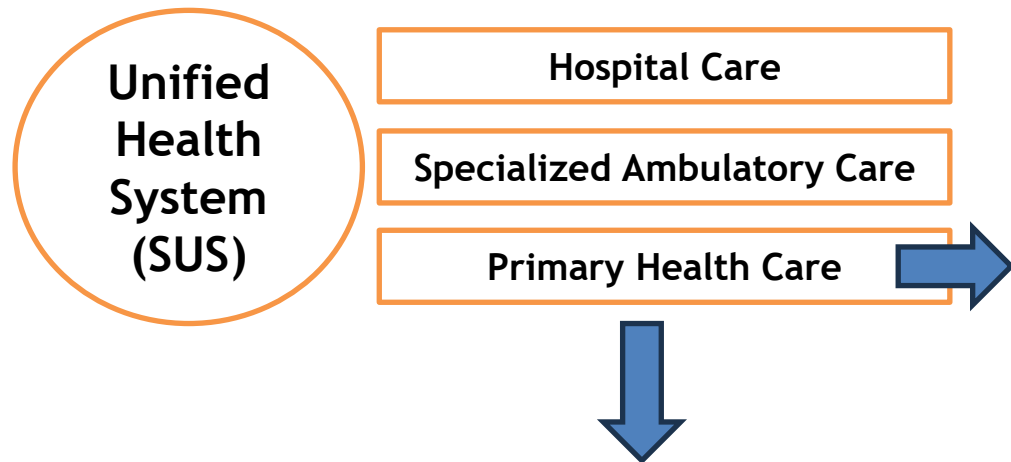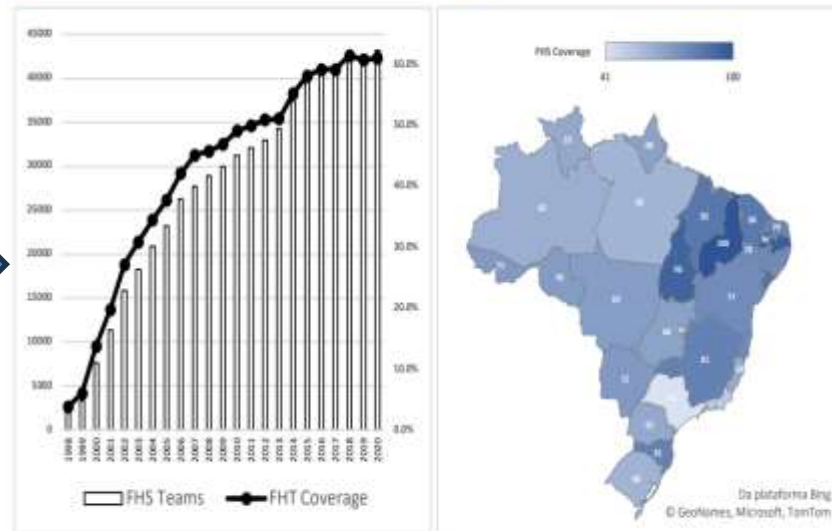
A broad range of services: **ambulatory care, promoting health activities and preventing diseases (consultations, vaccination, surveillance, home visits)**

Figure 2: Number of FHS teams and percentage of population covered

FHS Teams — FHT Coverage

FHS Coverage

Notes: data originally from MoH – PHC indicator panel. For the map, we used data on coverage as of January of 2020.

August/2024:
~50.000 PHC facilities

Aim

Evaluate the adequacy of maternal and child health services in PHC using quality standards based on a normative approach and examine changes over eight years using latent transition analysis.

Data Source: PMAQ

- ✓ Participation in PMAQ was voluntary;
- ✓ Pay-for-performance program (P4P);
- ✓ Assessing the structural adequacy of health centers and the characteristics of care provided by healthcare teams;
- ✓ Structural adequacy: Basic Health Units level;
- ✓ Characteristics of provided care: health care team level;
- ✓ Publicly available datasets;

Table. Participation in PMAQ and Resources Distributed, by PMAQ Cycle[a]

	Cycle 1 (2011/12) n (%)	Cycle 2 (2013/14) n (%)	Cycle 3 (2015/16) n (%)
Municipalities	3 965 (71.3)	5 211 (93.6)	5 324 (95.6)
FHS teams	17 483 (51.4)	30 523 (77.6)	38 865 (96.4)
Primary care support centers (NASF)	0 (0)	1 813 (46.5)	4 110 (93.2)
PMAQ-related investments (BR$, in millions)	770	4 200	TBD

Abbreviations: FHS, Family Health Strategy; PMAQ, National Program for Improving Primary Care Access and Quality.
[a]From the Department of Primary Care, Brazilian Ministry of Health.

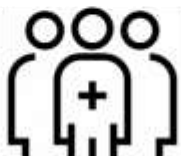# Challenges in Data Compatibilization process

Identifying the same PHC teams in the three rounds of PMAQ

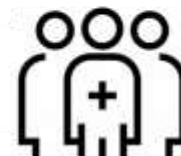| 1º Ciclo (2011/2012)	2º Ciclo (2013/2014)	3º Ciclo (2016/2018)	

Round 1: 8.776 teams

Round 2: 8.776 teams

Round 3: 8.776 teams

Which information remained in Round 2(2013/2014) and Round 3(2017/2018) compared to Round 1(2011/2012)?

Some variables and indicators were perfectly compatible across the three rounds of the PMAQ

Some closed questions had different answer options

Some variables had a different wording of the question across the different rounds of the PMAQ

Some variables were not available at all in either/both round 2 and 3 of the PMAQ

Reviewing the PHC quality framework, components, indicators, and variables

Public Engagement Workshop

CIDACS PHC Research Group Workshop

Quality of Maternal and Child Care at PHC

Antenatal and Postpartum

Prenatal exams and syphilis treatment offer

Risk classification for service offering

Strategies for postpartum care

Record for pregnant women follow-up

Scheduled offering of prenatal consultation

Immunization

Monitoring, guidance, and active search

Vaccine availability

Availability of services

Cold chain supplies

Child care

Surveillance activities

Record for child follow-up

Community outreach

Offering of child care

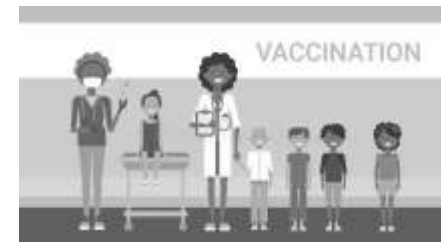Educational actions and promotion of breastfeeding

Descriptive analyses of the 14 indicators of the CLUSTERS OF SERVICES — 8.776 teams
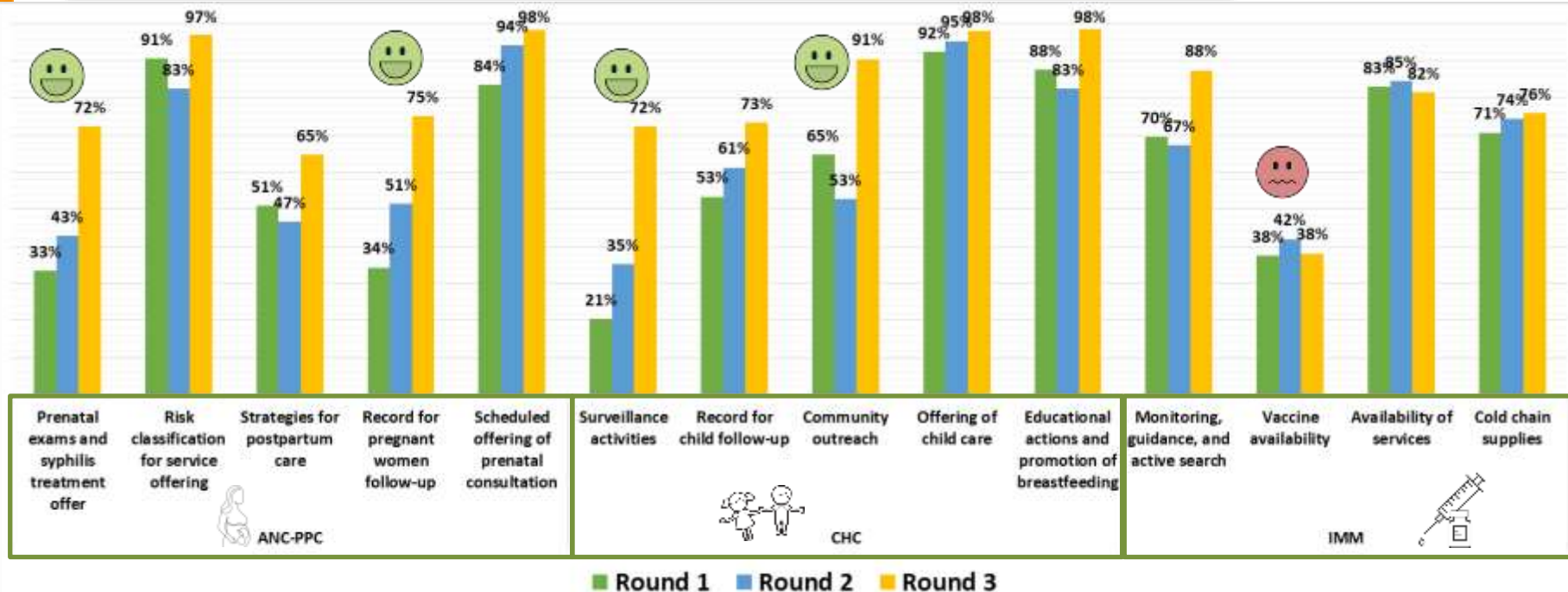
The indicators 'prenatal exams and syphilis treatment offer' (ANC-PPC), 'record for pregnant women follow-up' (ANC-PPC), 'surveillance activities for children' (CHC) and 'community outreach for children' (CHC) had the greatest improvements

The indicator 'vaccine availability' (IMM) saw no improvement over time

Measuring transition on MCH Quality: Latent Transition Analysis (LTA)

Extension of LCA (Latent Class Analysis) for longitudinal data

General Characteristics:

- **Why use?**
  To understand dynamic processes and patterns of change in characteristics or behaviors that are *not directly observable*.

- **How are the changes captured?**
  Probabilities of transitions among behavior patterns over time.

- **Assumptions:**
  Measure of the <u>same</u> behavior patterns over time (in the <u>same</u> sampling units), and individuals can move between these patterns (latent states).
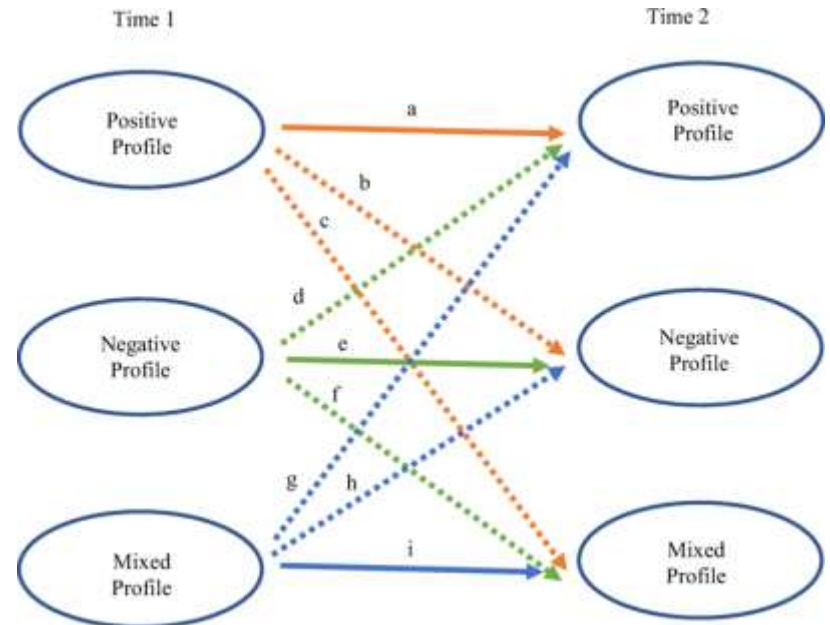
Tze et al (2022).

Measuring transition on MCH Quality: Latent Transition Analysis (LTA)

Identify and characterize quality (latent) patterns

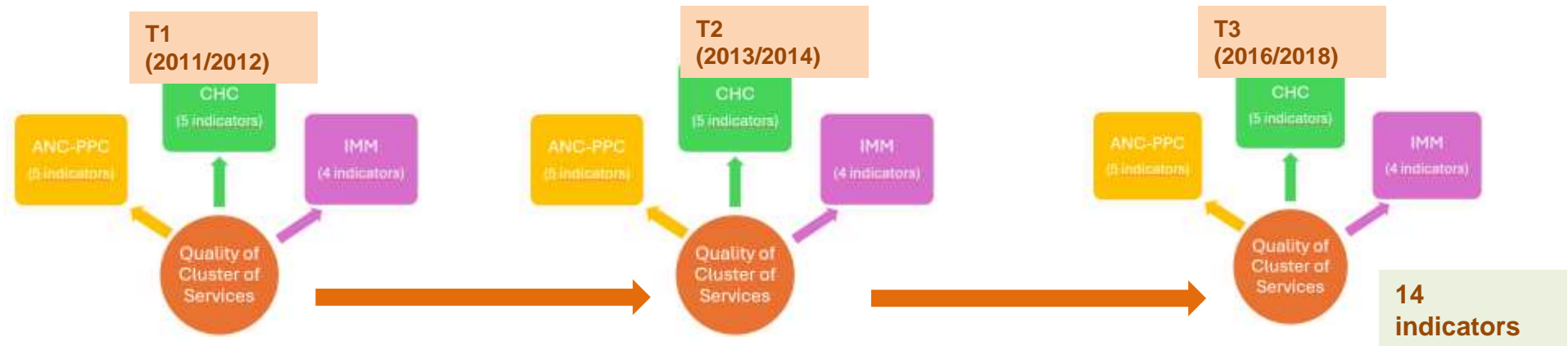Item-response probability (conditional probability)

Estimate prevalence of quality patterns over time

Prevalence of latent status

Capture dynamics among latent patterns over time

Probability of transitioning from each class at one time point to all others at the next time point

T1 (2011/2012)

CHC (5 indicators)

ANC-PPC (5 indicators)

IMM (4 indicators)

Quality of Cluster of Services

T2 (2013/2014)

CHC (5 indicators)

ANC-PPC (5 indicators)

IMM (4 indicators)

Quality of Cluster of Services

T3 (2016/2018)

CHC (5 indicators)

ANC-PPC (5 indicators)

IMM (4 indicators)

Quality of Cluster of Services

14 indicators

Identify and characterizing the quality of Maternal and Child Care (Latent Pattern)

Here we observe the two patterns of latent profiles corresponding to the latent states. In this case, the "Most adequacy" state exhibits higher conditional probabilities than the second("Least adequacy" state).

Conditional probabilities for the Cluster of Services indicators for the PMAQ's round
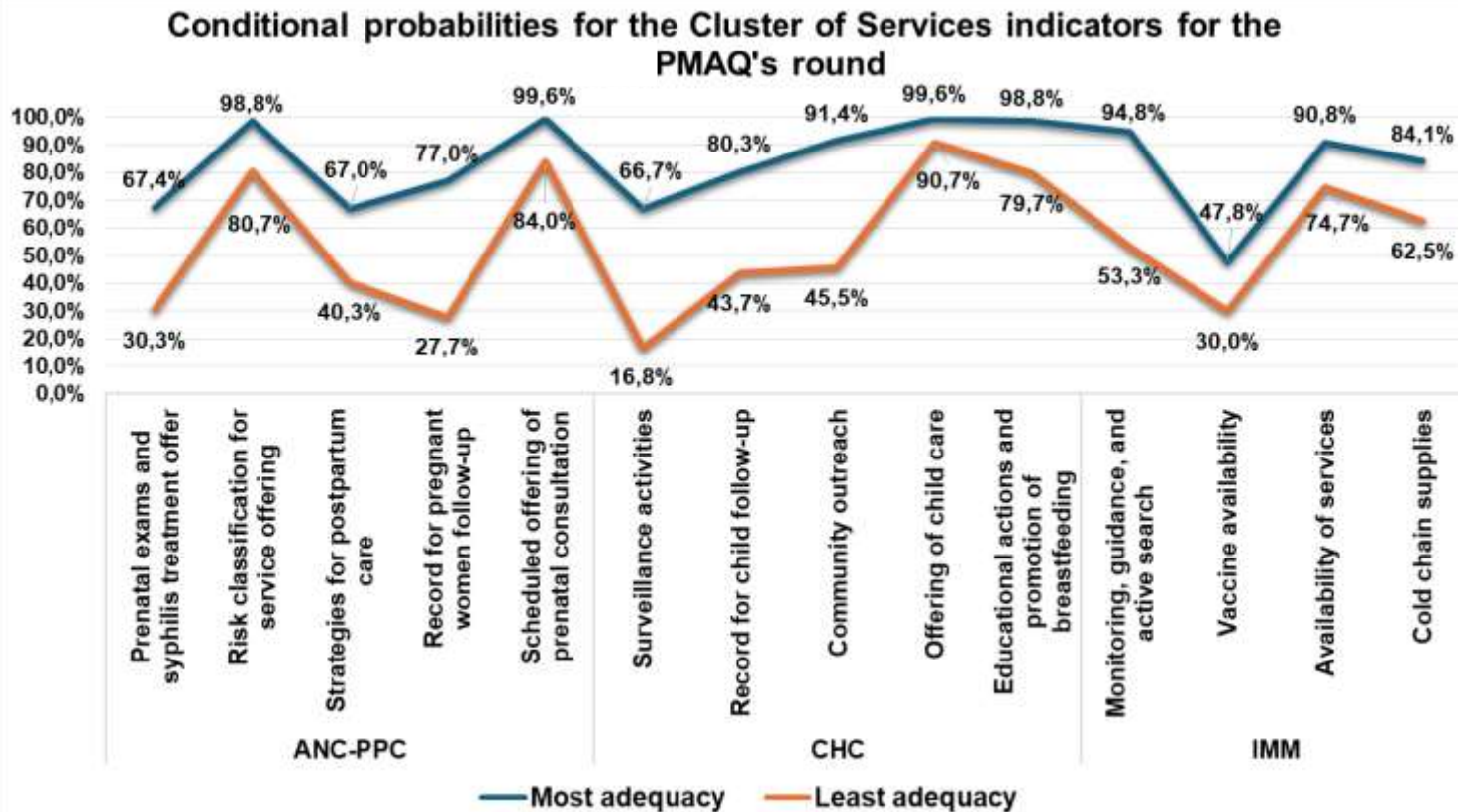
Quality of Primary Health Care: Latent Transition Analysis for Maternal and Child Health Services
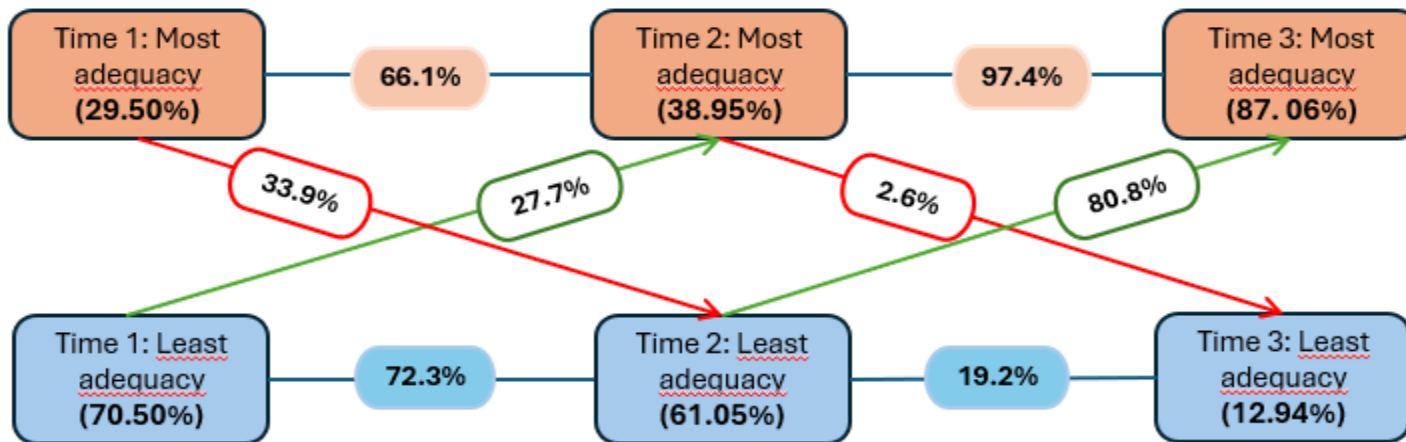
1) Over the three PMAQ rounds, the percentage of teams classified within the 'Most Adequacy' group increased from 29.3% to 89.5 %;
2) In the first round, only 29.3% of the teams were classified within the 'Most Adequacy' group in the Clusters of Services component. However, for these teams, the probability of remaining classified within the 'Most Adequacy' group in cycle 2 was 66.0%, and the probability of decreasing to the 'Least Adequacy' category was 34.0%. Nonetheless, for those classified within the 'Most Adequacy' group in round 2, the probability of staying in the same category was 97.6%, and only 2.4% had a probability of transitioning to the 'Least Adequacy' state.
3) In the first cycle, 70.7% of the teams were classified within the Least Adequacy' group. The probability of these teams improving and passing to the 'Most Adequacy' state in round 2 was 27.5%, with the majority (72.5%) of these teams staying in the same category in round 2. However, in round 2, whilst 60.8% of the teams were still classified within the Least Adequacy group , the probability of transitioning to the 'Most Adequacy' category was a promising 80.8%.

Main Findings

- Over the three PMAQ rounds, Brazilian Primary Health Care teams experienced a remarkable improvement in the quality of Maternal and Child Care component;

- Over time, the teams initially classified within the 'Least Adequacy' group had a substantially higher probability of transitioning to the "Most Adequacy" category, especially between round 2 and round 3, indicating a significant improvement in this component of Brazilian Primary Health Care between 2011 and 2018;

-Hypothesis to explain these results:

a) The evaluation process encouraged by PMAQ has been an inducer of improvements in processes because they 'spelled out' what _should_ be done;
b) At its core, the PMAQ is a pay-for-performance program, and these results indicate a substantial improvement in the quality of teams that have participated in this program since its inception.

Recommendations

- Identify regions or populations where improvements have lagged and implement targeted policies to reduce disparities in access and quality of PHC services.

- Improve real-time monitoring and feedback loops, allowing teams to track their progress more frequently and adjust interventions accordingly.

- Implement continuous professional development programs focusing on quality improvement processes and best practices in delivering PHC services.

OUR TEAM

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