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## Health worker's perspectives on asthma care coordination between primary and specialized health care in the COVID-19 pandemic: a protocol qualitative study in Ecuador and Brazil

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**Title: Health worker's perspectives on asthma care coordination between primary and specialized health care in the COVID-19 pandemic: a protocol qualitative study in Ecuador and Brazil**

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## ABSTRACT

**Introduction.** Asthma is a common long-term disorder and strategies to improve asthma control are still a challenge. Integrated delivery of health systems is critical for effective asthma care: there is limited information on experiences of care coordination for asthma from Latin American, especially on perspectives of health personnel and in the context of the COVID-19 pandemic.

**Methods and analysis.** This protocol details a qualitative approach to analyse health workers' perspectives of health care coordination for asthma control during COVID-19 pandemic in Ecuador and Brazil, at primary and specialized levels, through in-depth semi-structured interviews using a video communications platform. The analysis will identify knowledge and perspectives based on coordination of clinical information, clinical management, and administrative coordination. Theoretical sampling will be used to obtain approximately equal numbers of women and men within each level of healthcare; data saturation will be used to determine sample size. Transcripts will be analysed using content coding procedures to mark quotations related to major topics and sub-themes included in the interview guide, and narrative analysis will be based on a theoretical framework for health care coordination to identify new themes and sub-themes.

**Ethics and dissemination.** Ethical approval was obtained from the ethics committees of Hospital General Docente Calderón, Quito, Ecuador, and Universidade Federal da Bahia, Salvador, Brazil. The findings of this study will be disseminated through peer-reviewed articles, conference presentations and condensed summaries for key stakeholders and partners.

**Keywords:** *Asthma, COVID-19, Quality in health care, Organisation of health services, Health services administration & management*

## ARTICLE SUMMARY

### Strengths and limitations of this study

- This qualitative study protocol is the first to focus on the perspectives of healthcare workers on asthma care coordination between primary and specialized levels in the context of the COVID-19 pandemic.
- This study will use in-depth semi-structured interviews of healthcare workers from four cities in Ecuador and Brazil to compare perspectives on asthma care and healthcare system coordination between locations.
- Qualitative interviews will be done over the period of a year during the COVID-19 pandemic during that likely will affect coordination of asthma care.
- Although our recruitment method should identify key informants, we could not involve the best representatives from primary and specialized care levels.

## INTRODUCTION

Asthma has emerged as a major challenge for health care systems around the world accounting for millions of doctor visits, hundreds of thousands of emergency department visits and hospitalizations, and thousands of deaths (1,2). Among those who have asthma, children are the most affected group and asthma is now the most common chronic disease of childhood (3). While our knowledge on asthma has increased, we still have an incomplete understanding of its causes: factors including environmental exposures, changes in lifestyles and host genetics are likely to be important (1).

There are wide variations in the prevalence of asthma symptoms between countries (4). However, trends in asthma mortality and hospitalization have shown a progressive reduction or stabilization, especially in high income countries (HICs), where asthma prevalence reached epidemic levels four decades ago (5). Presently, although the prevalence of asthma has stabilized in HICs, it appears to be increasing in some low and middle-income countries (LMICs), regions that account for more than 80% of asthma deaths worldwide. Nonetheless, many cases of severe asthma and asthma deaths are preventable through optimal management using medications to relieve and control the disease and improvements in health care coordination (HCC) (1,6).

HCC has been shown to be a promising strategy to improve asthma management and control in HICs: improved care coordination results in reduced asthma symptoms and urgent health care utilization which is cost-effective (7). However, in LMICs health care coordination remains a challenge for asthma patients because most of the health systems in these regions are characterized by fragmentary organization and a lack of resources (8). Additionally, medical therapy is often hindered by fragmented disease-specific approaches to management (fostered by single-disease guidelines), use of acute care to manage chronic diseases, and inadequate integration of care across multiple levels, especially from hospital to home (9,10).

In Latin America (LA), HCC has been characterized by a reconstruction of the self-identity concept (11). There are few reports of HCC implementation (12,13), while asthma management and control are uncoordinated in most health systems, showing high rates of acute exacerbations, and use of urgent care with high hospitalization rates (14,15).



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3 The outbreak of infections with the novel coronavirus, SARS-CoV-2, in Central China,  
4 in December 2019 marked the beginning of the COVID-19 pandemic (16). Measures  
5 to reduce viral transmission were adopted in Ecuador and Brazil from March 2020 with  
6 enforced social isolation and restricted movement at local or national levels interfering  
7 with opportunities for interactions with health care. Although lockdowns had been lifted  
8 by the second half of 2020, there was still limited access to emergency rooms and  
9 outpatient care at primary and specialized levels for non-COVID-19 consults (17), a  
10 situation that continued into the 1<sup>st</sup> quarter of 2021.  
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17 This protocol details the methodological and analytical considerations using a  
18 qualitative approach in a study designed to understand and characterize healthcare  
19 workers' perspectives of care coordination for asthma control between primary and  
20 specialized levels of public health care systems in Ecuador and Brazil during the  
21 COVID-19 pandemic.  
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## 27 **METHODOLOGY**

### 28 **Study context**

29 The present study is part of a study ("Asthma Attacks Causes and Prevention Study  
30 in Urban Latin America (ATTACK)") developed since 2019 in collaboration with  
31 partners from the UK, Brazil, and Ecuador. The study seeks to understand better the  
32 causality of asthma attacks and of their recurrence and optimize strategies to improve  
33 asthma control and prevent asthma attacks in Latin America (LA).  
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### 41 **Study design**

42 A qualitative research design will be used to explore health workers' perspective in  
43 asthma control to characterize and compare health care networks in Ecuador and  
44 Brazil during the COVID-19 pandemic. Data will be analysed using a narrative  
45 approach focusing on the participants perception, whereby the researcher and the  
46 participant develop jointly results from an interactive conversation (18,19). Narrative  
47 theory aims to understand the succession of facts, situations, phenomena, processes,  
48 and events where thoughts, feelings, emotions, and interactions are involved, through  
49 the experiences told by those who experienced them (20). The study will be conducted  
50 between March 2021 and December 2021.  
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### **Theoretical framework**

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3 The present study is based on the theoretical framework of Integrated Health Care  
4 Networks (IHCN) (21). Health systems must be understood as IHCN, defined as  
5 networks of organizations that provide or make arrangements to provide equitable and  
6 integrated health services to defined populations that are accountable for their clinical  
7 and economic impacts as well as the health of the populations they serve (21). Among  
8 the IHCN objectives we can distinguish two groups: 1) Intermediate objectives: a)  
9 access, b) care coordination, c) continuous care; 2) Final objectives: a) equity in  
10 access and b) efficiency.

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12 In the present study we focus our efforts in the analysis of types of Care Coordination,  
13 represented by clinical information coordination, coordination of clinical management  
14 and administrative coordination (22).

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23 **Clinical information coordination.** This focuses on referrals between care levels and  
24 use of information from previous episodes and biopsychosocial situations relevant to  
25 the current patient consult. The way in which information is transmitted between  
26 healthcare professionals affects how current events are linked to previous events and  
27 how the current consult is thus adapted to the needs of the patient. For this study, this  
28 will be divided into two dimensions: clinical and psychosocial information referral  
29 where attributes consisted of documents for the referral, agile and timely access to  
30 information, pertinent content of the information and registry of the information by  
31 professionals, and the use of the information whose attributes are: transfer of  
32 information from the consultation and the incorporation of information into the clinical  
33 practice (22).

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43 **Coordination of clinical management.** The provision of healthcare in a sequential  
44 and complementary way, with a clinical management plan shared by the different care  
45 levels and participating services. It is defined by three dimensions, Care coherence  
46 (similar approximations among the professionals from different levels), Accessibility  
47 among levels (provision without interruptions) and Accurate follow up of the patient  
48 among levels (in the transitions from one care level to another) (22). The first  
49 dimension being the follow up of the patient that includes attributes such as existence  
50 of a physician responsible for patient follow up, communication with those responsible  
51 for making the referral and having a follow-up consult after the referral. The second  
52 dimension, accessibility among levels, focuses on the provision of attention without  
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3 interruption, and the third dimension, care consistency (or coherence), that centres on  
4 attributes like: shared objectives, treatment concordance between primary and  
5 specialized labels, patient transference consistent with the diagnosis and the  
6 duplication of exams, dates and medication.  
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10 **Administrative coordination.** This is defined as the coordination of patient's access  
11 along the care continuum according to needs. It works with the administrative circuits  
12 dimension, where attributes such as existence of mechanisms for the administrative  
13 circuit, administrative referral of the patient to a suitable unit and previous  
14 programming of consults, exams and treatment, are studied. The importance of HCC  
15 among health system levels constitutes a strategy to achieve continuous care, reduce  
16 costs and improve quality of care. The perception of the information dimensions and  
17 management of the HCC relies on factors of the professionals, existence and use of  
18 coordination mechanisms and organizational factors (22). The theoretical framework  
19 is shown in figure 1.  
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31 Figure 1. Theoretical Framework for Health Care Coordination. The Theoretical  
32 Framework is shown by type of coordination and attributes and dimensions of each.  
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### 35 **Study area**

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37 The study will be conducted in three cities in Ecuador and one city in Brazil. Ecuador  
38 is an upper-middle-income-country with a per capita income of \$6110. In 2009 the  
39 Integral Public Health Network (IPHN) became a Constitutional mandate, aiming to  
40 develop collaborations between private and public sectors. The Public institutions offer  
41 health care services to the entire population and are divided into different levels of  
42 care and distributed geographically (23). Social security health institutions offer  
43 services only to the affiliated salaried population. The private sector includes for-profit  
44 entities (hospitals, clinics, dispensaries, doctor's offices, pharmacies, and prepaid  
45 health insurance companies) which are generally located in the main cities of the  
46 country. Quito, the capital of Ecuador and one of the cities where the study will be  
47 conducted, is located in the Andean region at an altitude of 2,800 meters, is one of the  
48 most populous Ecuadorian urban area with 2'781,641 inhabitants and has greater  
49 socioeconomic and health indicators than the national average. The two other cities in  
50 the study are: Cuenca, located at altitude of 2550 meters with a population of 329,928  
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3 inhabitants, and Portoviejo located at altitude of 53 meters with a population of  
4 206,682 inhabitants (24–26). Public health care in Ecuadorian cities is divided  
5 geographically into sanitary districts: Quito with nine Cuenca with two, and Portoviejo  
6 with one. Districts chosen for study were 17D02, 01D01, and 13D01 in Quito, Cuenca,  
7 and Portoviejo, respectively.  
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12 Brazil is an upper-middle-income-country with a per capita income of \$9130 (24). The  
13 Brazilian health system has been characterized by the principle of universal healthcare  
14 access mandated by its constitution since 1988. The Unique Health System of Brazil  
15 (SUS) has different levels of care including primary and specialized in which the public  
16 and private sector participate, and is organized hierarchically and geographically with  
17 the aim of supporting SUS to the benefit of the population (27). The municipality of  
18 Salvador, capital of the state of Bahia, is the most populous in Northeast Brazilian with  
19 a population of 2,953,986 inhabitants living in the urban area (28). The organization of  
20 public health care in Salvador is territorial and divided into 12 Sanitary Districts. In  
21 Salvador, the Railway District was chosen.  
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### 30 **Participants: Study subjects**

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33 Family doctors, nurses, specialists, and public health representatives working in  
34 primary, secondary and tertiary care levels involved in the care of patients with asthma  
35 will be invited to participate. We will recruit a minimum of 20 participants per country  
36 to achieve speech saturation. Inclusion criteria are: a) Ecuadorian and Brazilian health  
37 professionals with at least 6 months experience; b) public health representatives with  
38 a wide range of experience 3) managers with senior positions (i.e directors) at levels  
39 of health care. A flow diagram for participant recruitment is shown in Figure 2.  
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46 Figure 2. Flow diagram for recruitment showing how health actors become  
47 participants.  
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### 49 **Data Collection, instruments, and procedures**

#### 50 **Data Collection**

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53 In-depth interviews will be used for data collection to explore health workers'  
54 experiences and views on HCC for asthma. Contacts due to the COVID-19 pandemic  
55 will be via cell phone, WhatsApp or email. Study documentation shared with the  
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3 participants are: information letter, informed consent for recording of video calls and  
4 for participation in the study, and the Participant information sheet.  
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7 Participants will be asked to openly describe their experiences and vision about care  
8 coordination. The interview will be conducted by two persons from the study team  
9 composed of an interviewer and an observer. Interviewers will use a semi-structured  
10 guideline including the following topics:  
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- 14 1. Asthma management in primary and specialized care levels.
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- 16 2. Availability and use of asthma guidelines or care protocols by health workers
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- 18 3. Care Coordination for asthma patients between primary and specialized care levels
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- 20 4. Transfer protocols between primary, secondary, and tertiary care levels
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- 22 5. Understanding of HCC and Integrated Health Network
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- 24 6. Strategies, interventions, and instruments in HCC
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- 26 7. Changes and adaptations of asthma control during the COVID-19 context.
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### 31 **Procedure**

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33 Procedures are planned as follows: a) informants will be contacted by gatekeepers in  
34 each city; b) an introductory letter (and informed consent forms) will be provided to  
35 each informant explaining the study; c) if the participant agrees to be part in the study  
36 and signs consent , it the following will be done; d) each interview, researcher and  
37 participant will be assigned an alphanumeric unique identifier code to ensure  
38 confidentiality; e) each interview will last approximately 50 minutes; and f) interviews  
39 will be audio-recorded and transcribed.  
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### 46 **Data Analysis tools and procedures**

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48 This study is based on narrative analysis of manifest content through a priori  
49 categories and using constant comparisons between the speech of each of the defined  
50 profiles as well as emerging categories. Narrative analysis will be segmented by case,  
51 type of actor and topic. The content of each interview will be read by the researcher,  
52 identifying significant fragments, classified by type of informant, with the purpose of  
53 identifying similarities and differences. We will use descriptive data regarding the  
54 Health Systems of Brazil and Ecuador to establish comparisons between the countries  
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3 (comparative table). In this study we will produce triangulations among informants,  
4 researchers, and the theoretical framework. Analysis will use NVivo (Neu, QSR  
5 International).  
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9 The triangulation process will allow us to work with three different levels of analysis.  
10 At the first level the significant phrases will be codified using the theoretical framework  
11 from the participants transcript interviews, aiming to saturate speech. At the second  
12 level two different researchers from each country will analyse the chosen significant  
13 phrases and decide if the significant phrases correspond to the categories or not. After  
14 this process, the second level and first level researchers meet up in a discussion of  
15 the results before moving on to the third level. At the third level with the consolidated  
16 information from the first two levels, the experts make an analysis of the significant  
17 phrases using the theoretical framework and comments made at other levels before  
18 deciding if a category is saturated. The information is once again discussed between  
19 the three levels before accepting it as a significant phrase.  
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28 Extensive training was provided to the researchers participating in the study at all  
29 levels aiming to standardize concepts and procedures.  
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### 32 **Patient and Public Involvement**

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35 No patient involved.  
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### 37 **ETHICS AND DISSEMINATION**

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39 The protocol was approved by the Ethics Committees of the Hospital General Docente  
40 Calderón (CEISH-HGDC 2019-001) in Ecuador and Faculdade de Medicina da Bahia  
41 da Universidade Federal da Bahia (CAAE: 04057518.0.0000.5577) in Brazil. The  
42 study will be done in accordance with the guidelines of the World Medical Association  
43 and the Declaration of Helsinki.  
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49 This study forms a part of the NIHR Global Health Research Group “Asthma Attacks  
50 Causes and Prevention Study in Urban Latin America”. We acknowledge that all  
51 participants must be available and be capable of participating in the study and that  
52 there is a small chance that the interviewees could create a role of power among the  
53 interviewers if the purpose of the research is not understood. To tackle these issues,  
54 we will inform all participants about the purpose of the research and will obtain written  
55 informed consent from each participant. Besides, designing an interview guide, we  
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3 have had to consider how to formulate questions in a way that minimizes feelings of  
4 discomfort, judgement and criticism among participants.  
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7 Our findings will be shared first with the participants of the study and researchers in  
8 collaborating institutions. The result will be presented as practical recommendations  
9 in each country (Ecuador and Brazil) at policy briefings and forums of healthcare  
10 professionals. Our results will also be presented at seminars, academic conferences  
11 and in peer-review scientific articles.  
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18 support.  
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### 23 **Author Contributions**

24 All the authors agree with the manuscript's contents. NRS, EA, ARS, ABO, MRF  
25 contributed to the design of the study. MJC, EG, CB, ALB will conduct the interviews,  
26 and coded the data. NRS, MRF and GP will advise throughout all phases of the study.  
27 AR, AC, and PC will be provided input. NRS, EA, ARS, ABO and MRF will conduct the  
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46 **Competing interests.** None declared.  
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52 **Provenance and peer review.** Not commissioned.  
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4 commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

### 7 **Data statement**

8  
9 Technical appendix, statistical code, and dataset available from the Dryad repository,  
10 DOI: ORCID iD Maria Cisneros-Caceres <https://orcid.org/0000-0001-5996-5147>

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13 **Word Count:** 2804

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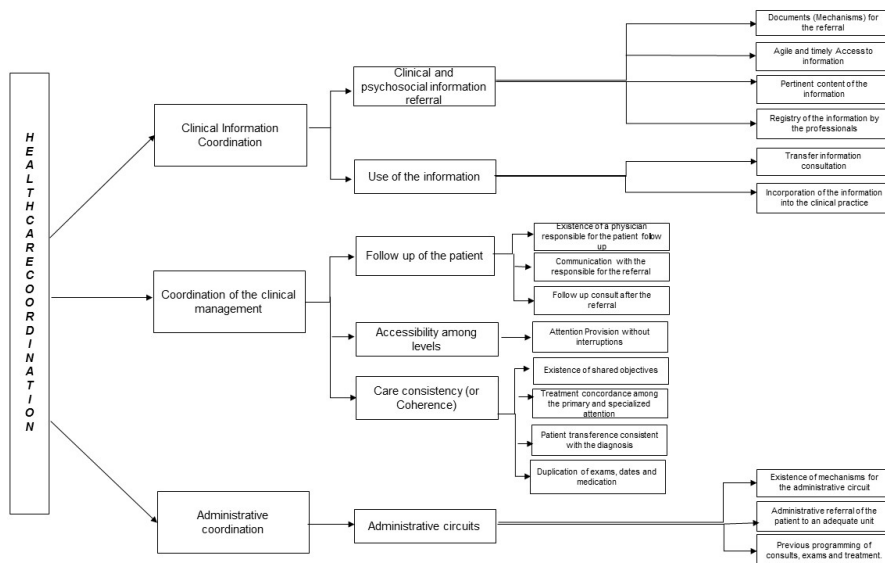
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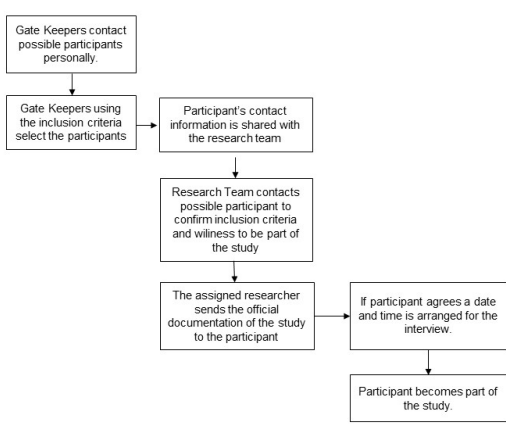
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Theoretical Framework for Health Care Coordination. The Theoretical Framework is shown by type of coordination and attributes and dimensions of each.

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Flow diagram for recruitment showing how health actors become participants.

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# BMJ Open

## Health worker's perspectives on asthma care coordination between primary and specialized health care in the COVID-19 pandemic: a protocol for a qualitative study in Ecuador and Brazil.

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3 **Health worker's perspectives on asthma care coordination between primary and**  
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5 **Ecuador and Brazil.**  
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## ABSTRACT

**Introduction.** Asthma is a common long-term disorder and strategies to improve asthma control are still a challenge. Integrated delivery of health systems is critical for effective asthma care: there is limited information on experiences of care coordination for asthma from Latin America, especially on perspectives of health personnel and in the context of the COVID-19 pandemic.

**Methods and analysis.** This protocol details a qualitative approach to analyse health workers' perspectives of health care coordination for asthma control during COVID-19 pandemic in Ecuador and Brazil, at primary and specialized levels, through in-depth semi-structured interviews using a video communications platform. The analysis will identify knowledge and perspectives based on coordination of clinical information, clinical management, and administrative coordination. Theoretical sampling will be used to obtain approximately equal numbers of women and men within each level of healthcare; data saturation will be used to determine sample size. Transcripts will be analysed using content coding procedures to mark quotations related to major topics and sub-themes included in the interview guide, and narrative analysis will be based on a theoretical framework for health care coordination to identify new themes and sub-themes.

**Ethics and dissemination.** Ethical approval was obtained from the ethics committees of Hospital General Docente Calderón, Quito, Ecuador, and Universidade Federal da Bahia, Salvador, Brazil. The findings of this study will be disseminated through peer-reviewed articles, conference presentations and condensed summaries for key stakeholders and partners.

**Keywords:** *Asthma, Coronavirus Infections, Care Coordination, Integrated delivery systems, Health Personnel*

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- This qualitative study protocol is the first to focus on the perspectives of healthcare workers on asthma care coordination between primary and specialized levels in the context of the COVID-19 pandemic.
- This study will use in-depth semi-structured interviews of healthcare workers from four cities in Ecuador and Brazil to compare perspectives on asthma care and healthcare system coordination between locations.
- Qualitative interviews will be done over the period of a year during the COVID-19 pandemic that likely will affect coordination of asthma care.
- Although our recruitment method should identify key informants, we could not involve the best representatives from primary and specialized care levels.

## INTRODUCTION

Asthma has emerged as a major challenge for health care systems around the world accounting for millions of doctor visits, hundreds of thousands of emergency department visits and hospitalizations, and thousands of deaths [1,2]. Among those who have asthma, children are the most affected group and asthma is now the most common chronic disease of childhood [3]. While our knowledge on asthma has increased, we still have an incomplete understanding of its causes: factors including environmental exposures, changes in lifestyles and host genetics are likely to be important [1].

There are wide variations in the prevalence of asthma symptoms between countries [4]. However, trends in asthma mortality and hospitalization have shown a progressive reduction or stabilization, especially in high income countries (HICs), where asthma prevalence reached epidemic levels four decades ago [5]. Presently, although the prevalence of asthma has stabilized in HICs, it appears to be increasing in some low and middle-income countries (LMICs), regions that account for more than 80% of asthma deaths worldwide. Nonetheless, many cases of severe asthma and asthma deaths are preventable through optimal management using medications to relieve and control the disease and improvements in health care coordination (HCC) [1,6].

HCC has been shown to be a promising strategy to improve asthma management and control in HICs: improved care coordination results in reduced asthma symptoms and urgent health care utilization which is cost-effective [7]. However, in LMICs health care coordination remains a challenge for asthma patients because most of the health systems in these regions are characterized by fragmentary organization and a lack of resources [8]. Additionally, medical therapy is often hindered by fragmented disease-specific approaches to management (fostered by single-disease guidelines), use of acute care to manage chronic diseases, and inadequate integration of care across multiple levels, especially from hospital to home [9,10].

In Latin America (LA), HCC has been characterized by a reconstruction of the self-identity concept [11]. There are few reports of HCC implementation [12,13], while asthma management and control are uncoordinated in most health systems, showing high rates of acute exacerbations, and use of urgent care with high hospitalization rates [14,15].

The outbreak of infections with the novel coronavirus, SARS-CoV-2, in Central China, in December 2019 marked the beginning of the COVID-19 pandemic [16]. Measures to reduce viral transmission were adopted in Ecuador and Brazil from March 2020 with enforced social isolation and restricted movement at local or national levels interfering with opportunities for interactions with healthcare. Although lockdowns had been lifted by the second half of 2020,

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3 there was still limited access to emergency rooms and outpatient care at primary and  
4 specialized levels for non-COVID-19 consults [17], a situation that continued into the first  
5 quarter of 2021.  
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8 This protocol details the methodological and analytical considerations using a qualitative  
9 approach in a study designed to understand and characterize healthcare workers'  
10 perspectives of care coordination for asthma control between primary and specialized levels  
11 of public health care systems in Ecuador and Brazil during the COVID-19 pandemic.  
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14 Based on the characteristics of the qualitative research, we are flexible with the completion  
15 date for the study. Still holding in-depth interviews as well as data collecting until we reach  
16 theoretical saturation, expecting to have results by the first quarter of 2022.  
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## 20 21 **METHODOLOGY**

### 22 23 **Study context**

24 The present study is part of a study ("Asthma Attacks Causes and Prevention Study in Urban  
25 Latin America (ATTACK)") developed in 2019 in collaboration with partners from the UK,  
26 Brazil, and Ecuador. The study seeks to understand better the causality of asthma attacks and  
27 of their recurrence and optimize strategies to improve asthma control and prevent asthma  
28 attacks in Latin America (LA).  
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### 33 34 **Study design**

35 A qualitative research design will be used to explore health workers' perspective in asthma  
36 control to characterize and compare health care networks in Ecuador and Brazil during the  
37 COVID-19 pandemic. Data will be analysed using a narrative approach focusing on  
38 the participants perception, whereby the researcher and the participant develop jointly results  
39 from an interactive conversation [18,19]. Narrative theory aims to understand the succession  
40 of facts, situations, phenomena, processes, and events where thoughts, feelings, emotions,  
41 and interactions are involved, through the experiences told by those who experienced them  
42 [20].  
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### 49 50 **Theoretical framework**

51 The present study is based on the theoretical framework of Integrated Health Care Networks  
52 (IHCN) [21]. Health systems must be understood as IHCN, defined as networks of  
53 organizations that provide or make arrangements to provide equitable and integrated health  
54 services to defined populations that are accountable for their clinical and economic impacts  
55 as well as the health of the populations they serve [21]. Among the IHCN objectives we can  
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3 distinguish two groups: 1) Intermediate objectives: a) access, b) care coordination, c)  
4 continuous care; 2) Final objectives: a) equity in access and b) efficiency.  
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7 In the present study we focus our efforts on the analysis of types of Care Coordination,  
8 represented by clinical information coordination, coordination of clinical management and  
9 administrative coordination [22].  
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12 **Clinical information coordination.** This focuses on referrals between care levels and use of  
13 information from previous episodes and biopsychosocial situations relevant to the current  
14 patient consultation. The way in which information is transmitted between healthcare  
15 professionals affects how current events are linked to previous events and how the current  
16 consult is thus adapted to the needs of the patient. For this study, this will be divided into two  
17 dimensions: clinical and psychosocial information referral where attributes consisted of  
18 documents for the referral, agile and timely access to information, pertinent content of the  
19 information and registry of the information by professionals, and the use of the information  
20 whose attributes are: transfer of information from the consultation and the incorporation of  
21 information into the clinical practice [22].  
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29 **Coordination of clinical management.** The provision of healthcare in a sequential and  
30 complementary way, with a clinical management plan shared by the different care levels and  
31 participating services. It is defined by three dimensions, Care coherence (similar  
32 approximations among the professionals from different levels), Accessibility among levels  
33 (provision without interruptions) and Accurate follow up of the patient among levels (in the  
34 transitions from one care level to another) [22]. The first dimension being the follow up of the  
35 patient that includes attributes such as existence of a physician responsible for patient follow  
36 up, communication with those responsible for making the referral and having a follow-up  
37 consult after the referral. The second dimension, accessibility among levels, focuses on the  
38 provision of attention without interruption, and the third dimension, care consistency (or  
39 coherence), that centres on attributes like: shared objectives, treatment concordance between  
40 primary and specialized labels, patient transference consistent with the diagnosis and the  
41 duplication of exams, dates, and medication.  
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50 **Administrative coordination.** This is defined as the coordination of patient's access along  
51 the care continuum according to needs. It works with the administrative circuits dimension,  
52 where attributes such as existence of mechanisms for the administrative circuit, administrative  
53 referral of the patient to a suitable unit and previous programming of consults, exams and  
54 treatment, are studied. The importance of HCC among health system levels constitutes a  
55 strategy to achieve continuous care, reduce costs and improve quality of care. The perception  
56 of the information dimensions and management of the HCC relies on factors of the  
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professionals, existence and use of coordination mechanisms and organizational factors [22]. The theoretical framework is shown in figure 1.

## Figure 1

### Study area

The study will be conducted in three cities in Ecuador and one city in Brazil. Ecuador is an upper-middle-income-country with a per capita income of \$6110. According to the World Health Organization's Global Health Workforce Statistics, the physicians per 1000 people for Ecuador and Brazil are around 2.2, and the nurses 10.1 for Brazil and 2.5 for Ecuador [23, 24]. In 2009 the Integral Public Health Network (IPHN) became a Constitutional mandate, aiming to develop collaborations between private and public sectors. The Public institutions offer health care services to the entire population and are divided into different levels of care and distributed geographically [25]. Social security health institutions offer services only to the affiliated salaried population. The private sector includes for-profit entities (hospitals, clinics, dispensaries, doctor's offices, pharmacies, and prepaid health insurance companies) which are generally located in the main cities of the country. Quito, the capital of Ecuador and one of the cities where the study will be conducted, is located in the Andean region at an altitude of 2,800 meters, is one of the most populous Ecuadorian urban area with 2'781,641 inhabitants and has greater socioeconomic and health indicators than the national average. The two other cities in the study are: Cuenca, located at altitude of 2550 meters with a population of 329,928 inhabitants, and Portoviejo located at altitude of 53 meters with a population of 206,682 inhabitants [26–28]. Public health care in Ecuadorian cities is divided geographically into sanitary districts: Quito with nine Cuenca with two, and Portoviejo with one. Districts chosen for study were 17D02, 01D01, and 13D01 in Quito, Cuenca, and Portoviejo, respectively.

Brazil is an upper-middle-income-country with a per capita income of \$9130 [26]. The Brazilian health system has been characterized by the principle of universal healthcare access mandated by its constitution since 1988. The Unique Health System of Brazil (SUS) has different levels of care including primary and specialized in which the public and private sector participate and is organized hierarchically and geographically with the aim of supporting SUS to the benefit of the population [29]. The municipality of Salvador, capital of the state of Bahia, is the most populous in Northeast Brazil with a population of 2,953,986 inhabitants living in the urban area [30]. The organization of public health care in Salvador is territorial and divided into 12 Sanitary Districts. In Salvador, the Railway District was chosen.

Both in Ecuador and Brazil, the health care models include general principles of distribution of tasks between the community level, first level and the specialist level, through referral and counter-referral, minimizing duplication of functions and competition between levels. Although guidelines are provided by each national health ministry, we would like to understand better how this coordination between levels functions using a chronic disease such as asthma as a model condition.

### **Participants: Study subjects**

Health actors are defined as individuals or groups with an interest in the health system [31]. Family doctors, nurses, specialists, and public health representatives working in primary, secondary, and tertiary care levels involved in the care of patients with asthma will be invited to participate. Gatekeepers which are health professionals that work on a regular basis with asthma patients and within the healthcare system in both countries, will be responsible for the first contact. We will recruit a minimum of 20 participants per country to achieve speech saturation. Inclusion criteria are a) Ecuadorian and Brazilian health professionals with at least 6 months experience; b) public health representatives with a wide range of experience 3) managers with senior positions (i.e directors) at levels of health care. A flow diagram for participant recruitment is shown in Figure 2.

Figure 2

### **Patient and Public Involvement**

No patient involved

### **Data Collection, instruments, and procedures**

#### **Data Collection**

In-depth interviews will be used for data collection to explore health workers' experiences and views on HCC for asthma. Contacts due to the COVID-19 pandemic will be via cell phone, WhatsApp, or email. Study documentation shared with the participants are an information letter, informed consent for recording of video calls and for participation in the study, and the Participant information sheet.

Participants will be asked to openly describe their experiences and vision about care coordination. The interview will be conducted by two persons from the study team composed of an interviewer and an observer. Interviewers will use a semi-structured guideline including the following topics:



- 1
- 2
- 3 1. Asthma management in primary and specialized care levels.
- 4
- 5 2. Availability and use of asthma guidelines or care protocols by health workers
- 6
- 7 3. Care Coordination for asthma patients between primary and specialized care levels
- 8
- 9 4. Transfer protocols between primary, secondary, and tertiary care levels
- 10
- 11 5. Understanding of HCC and Integrated Health Network
- 12
- 13 6. Strategies, interventions, and instruments in HCC
- 14
- 15 7. Changes and adaptations of asthma control during the COVID-19 context.
- 16
- 17
- 18

### 19 **Procedure**

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21 Procedures are planned as follows: a) informants will be contacted by gatekeepers in each  
22 city; b) an introductory letter (and informed consent forms) will be provided to each informant  
23 explaining the study; c) if the participant agrees to be part in the study and signs consent , it  
24 the following will be done; d) each interview, researcher and participant will be assigned an  
25 alphanumeric unique identifier code to ensure confidentiality; e) each interview will last  
26 approximately 50 minutes; and f) interviews will be audio-recorded and transcribed.

### 31 **Data Analysis tools and procedures**

32  
33 This study is based on narrative analysis of manifest content through a priori categories and  
34 using constant comparisons between the speech of each of the defined profiles as well as  
35 emerging categories. Narrative analysis will be segmented by case, type of actor and topic.  
36 The content of each interview will be read by the researcher, identifying significant fragments,  
37 classified by type of informant, with the purpose of identifying similarities and differences. We  
38 will use descriptive data regarding the Health Systems of Brazil and Ecuador to establish  
39 comparisons between the countries (comparative table). In this study we will produce  
40 triangulations among informants, researchers, and the theoretical framework. Analysis will use  
41 NVivo (Neu, QSR International).

42  
43 The triangulation process will allow us to work with three different levels of analysis. At the first  
44 level the significant phrases will be codified using the theoretical framework from the  
45 participants transcript interviews, aiming to saturate speech. At the second level two different  
46 researchers from each country will analyse the chosen significant phrases and decide if the  
47 significant phrases correspond to the categories or not. After this process, the second level  
48 and first level researchers meet up in a discussion of the results before moving on to the third  
49 level. At the third level with the consolidated information from the first two levels, the experts  
50 make an analysis of the significant phrases using the theoretical framework and comments



1  
2  
3 made at other levels before deciding if a category is saturated. The information is once again  
4 discussed between the three levels before accepting it as a significant phrase.  
5

6  
7 Extensive training was provided to the researchers participating in the study at all levels aiming  
8 to standardize concepts and procedures.  
9

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11 For the construction of the analysis and reporting of results we will follow the recommendations  
12 SRQR guideline [32].  
13

## 14 **ETHICS AND DISSEMINATION**

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16 The protocol was approved by the Ethics Committees of the Hospital General Docente  
17 Calderón (CEISH-HGDC 2019-001) in Ecuador and Faculdade de Medicina da Bahia da  
18 Universidade Federal da Bahia (CAAE: 04057518.0.0000.5577) in Brazil. The study will be  
19 done in accordance with the guidelines of the World Medical Association and the Declaration  
20 of Helsinki.  
21  
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23  
24 This study forms a part of the NIHR Global Health Research Group “Asthma Attacks Causes  
25 and Prevention Study in Urban Latin America”. We acknowledge that all participants must be  
26 available and be capable of participating in the study and that there is a small chance that the  
27 interviewees could create a role of power among the interviewers if the purpose of the  
28 research is not understood. To tackle these issues, we will inform all participants about the  
29 purpose of the research and will obtain written informed consent from each participant.  
30 Besides, designing an interview guide, we have had to consider how to formulate questions  
31 in a way that minimizes feelings of discomfort, judgement, and criticism among participants.  
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34  
35 Our findings will be shared first with the participants of the study and researchers in  
36 collaborating institutions. The result will be presented as practical recommendations in each  
37 country (Ecuador and Brazil) at policy briefings and forums of healthcare professionals. Our  
38 results will also be presented at seminars, academic conferences and in peer-review scientific  
39 articles.  
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43  
44 **Contributors.** All the authors agree with the manuscript's contents. NCR, EA, ARS, AAC,  
45 MRF contributed to the design of the study. MJC, EG, CB, ALB will conduct the interviews,  
46 and coded the data. NCR, MRF and GP will advise throughout all phases of the study. AR,  
47 AAC, and PC will be provided input. NCR, EA, ARS, and MRF will conduct the coding schema  
48 and all phases of analysis. All authors contributed to the write-up.  
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29 See: <http://creativecommons.org/licenses/by-nc/4.0/>.

30 **Word Count:** 3396

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32 Figure 1. Theoretical Framework for Health Care Coordination. The Theoretical Framework  
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34 is shown by type of coordination and attributes and dimensions of each

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36 Figure 2. Flow diagram for recruitment showing how health actors become participants.  
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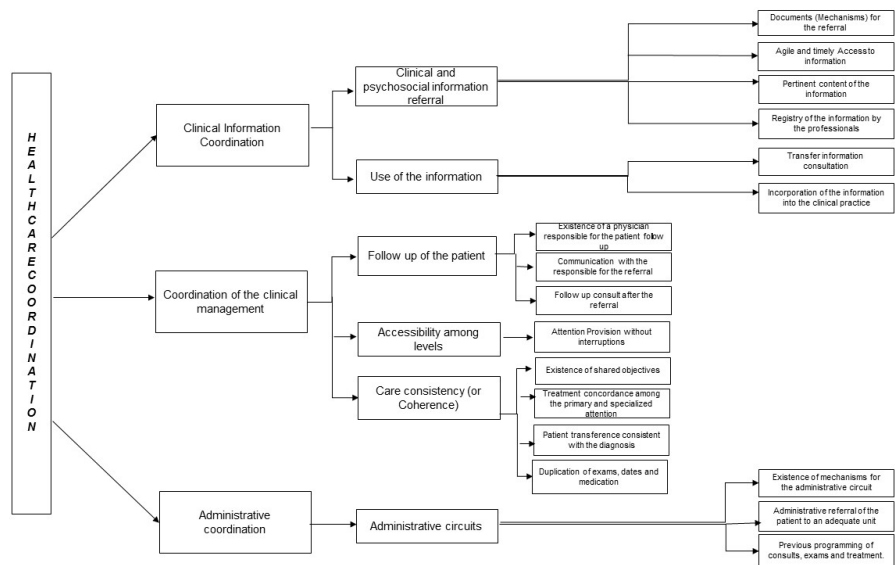
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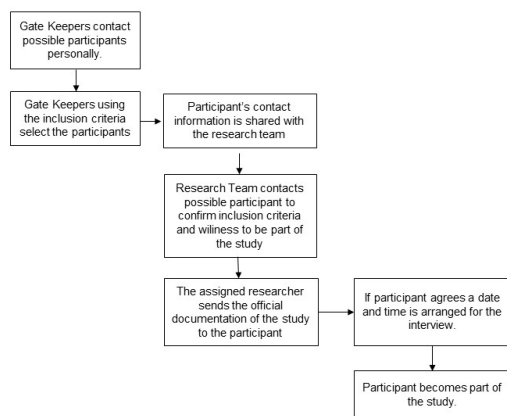
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Theoretical Framework for Health Care Coordination. The Theoretical Framework is shown by type of coordination and attributes and dimensions of each.

338x190mm (96 x 96 DPI)



Flow diagram for recruitment showing how health actors become participants.

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