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# Minimal resilience and insurgent conflict: qualitative analysis of the resilience process in six primary health centres in central Mali

Thomas Lerosier,<sup>1</sup> Laurence Touré,<sup>1</sup> Seydou Diabaté,<sup>1</sup> Yacouba Diarra,<sup>1</sup> Valéry Ridde <sup>2,3</sup>

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## SUMMARY

**Background** In the context of universal health coverage in the Sahel, the study focuses on primary health centres and the difficulties of their implementation in the context of insurgency conflicts in central Mali.

**Methods** This is qualitative research through a multiple case study. We selected six health centres according to a reasoned choice to bring together contrasting situations. We conducted 96 semistructured interviews and consulted secondary quantitative data on attendance. By focusing on community health centres, the conceptual approach focuses on the process of resilience that unfolds in a dual context of chronic health system dysfunctions and armed conflict.

**Results** The resilience strategies deployed by health professionals were relatively basic and uncoordinated. In the end, it was the individuals who showed absorption. However, their room for manoeuvre was limited. In the most isolated health centres, resilience was based on subordinate, poorly trained staff, often from the locality. Degraded working conditions and fear caused a form of resignation among health workers.

**Conclusion** The strategies and resources used showed a form of minimal resilience. This form is unfolding in a context marked by two structuring features. On the one hand, the Malian health system was relatively dysfunctional before the crisis, and on the other hand, the type of conflict was relatively low intensity that allowed health centres to remain open.

## INTRODUCTION

As part of the universal health coverage (UHC) objective,<sup>1</sup> this research focuses on the conditions of its deployment in the context of armed conflict in the Sahel. The WHO assumes that there is a link between the resilience of health systems and the deployment of UHC.<sup>2 3</sup> Starting from the case of Mali, this article uses the concept of resilience to question access to all primary healthcare in times of armed conflict.

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ The analysis of the resilience of health systems has led to the development of various theoretical and methodological tools.
- ⇒ Resilience processes are processes of absorption, adaptation and transformation that maintain the supply of care despite disruptions.
- ⇒ Studies on armed conflict have shown that health professionals are particularly at risk. However, they also have coping strategies to maintain the supply of care.

## WHAT THIS STUDY ADDS

- ⇒ The concept of resilience can be used to identify the main characteristics and challenges of a situation of disruption from a context-sensitive perspective.
- ⇒ In Mali, the resilience process takes a minimal form as strategies are very limited and relatively ineffective in a context of insurgency conflicts.
- ⇒ This type of resilience is largely determined by the state of initial dysfunction of the health system and the professional culture of health workers.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ Reproducing and fine-tuning the work of characterising resilience processes proposed here in other contexts could lead to a typology of the different modes of resilience and their characteristics.
- ⇒ On a more operational level, strengthening the resilience of the health system must take into account the daily experiences of health professionals, in order to be in tune with the reality of the field.
- ⇒ The study shows that support for resilience must involve support for healthcare professionals in order to combat their isolation, especially in the most remote areas.

Since 2014, the Ebola outbreak has highlighted the need to understand and promote the capacity of health systems to cope with crises. Studies on the resilience of health systems have done so and provide theoretical



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<sup>1</sup>Miseli, Bamako, Mali

<sup>2</sup>Université Paris Cité, IRD, Inserm, Ceped, F-75006, Paris, France

<sup>3</sup>Institut de Santé et Développement, Université Cheikh Anta Diop, Dakar, Senegal

## Correspondence to

Dr Thomas Lerosier;  
thomaslerosier@live.fr

and methodological tools.<sup>4-7</sup> These analytical frameworks are deployed at macroscopic scales (state, region, etc)<sup>8-11</sup> or following systemic approaches.<sup>12-13</sup> Some have focused on listing the main attributes of a resilient health system.<sup>5,6,14-16</sup> In contrast to the numerous studies focusing on crisis situations,<sup>9,15,17-20</sup> other researchers have proposed the concept of everyday resilience as an ability of a health system to cope with chronic disruptions that are part of the daily life of a health system.<sup>21,22</sup>

Other research in deteriorated security context has primarily focused on the attacks on health systems,<sup>23,24</sup> and the experience<sup>25</sup> and coping strategies deployed by health professionals.<sup>26-32</sup> Maternal and child health have been extensively studied.<sup>33-35</sup> Studies in Yemen and Syria, in particular, offer a stimulating comparative perspective as they relate to high-intensity conflicts involving considerable means of destruction and weaponisation of healthcare (ie, the use of the destruction of the health system as a component of the military strategy<sup>31</sup>) unknown in Mali at the time of this study. These studies show that healthcare professionals employ a variety of strategies to maintain the supply of care: reorganisation of their services to ensure the safety of agents (low profile, relocation, concealment), mobilisation of psychological or religious resources, do-it-yourself and resourcefulness, management of shortages and negotiation with belligerents.<sup>30,31,36-38</sup>

By being characterised by a new economy of violence,<sup>39</sup> situations of civil war or asymmetric war disrupt the functioning of institutions and the daily lives of agents. Periods of conflict may be characterised as a situation of 'normality of the abnormal'.<sup>40</sup> This oxymoronic formula is a useful safeguard for reporting on the daily practices of health professionals in conflict environments. It emphasises both the radical disruption of everyday life and the persistence of a form of daily life.<sup>41</sup>

Based on the case of Mali, as we could not carry out a detailed qualitative study on the whole health system, we studied the resilience of the health system from one of its components: the lowest level of the health pyramid. We are interested in the capacity of community health centres (CSCOMs) to deliver primary healthcare in a context marked by a deteriorated security situation and a chronic historical dysfunction of the health system.

## METHOD

### Study setting

A large Sahelian country, Mali, experienced the insurgency of an alliance of independent armed groups and jihadist elements from the North in 2012.<sup>42,43</sup> It has since been plagued by a multidimensional crisis whose security dimension is particularly volatile. In 2017, Mali had one of the lowest health service coverage indices in the world, and the entire health pyramid was experiencing a 'deep crisis'<sup>44</sup>. The health system is characterised by a low rate of achievement of the objectives, the inability of the health system to distribute and supervise staff

and to combat illegal practices and absenteeism, a structural use of voluntary or insufficiently remunerated staff, etc.<sup>34,45</sup> The Mopti region, in the centre of the country, is an exemplary case of this situation.<sup>46</sup> From 2016, it was affected by violence moving towards the centre of the country according to a complex dynamic of redeployment of jihadist groups, latent social and community tensions, and the emergence of self-defence groups.<sup>42</sup>

In Mali, at the operational level, the country is divided into 75 health districts (which are themselves subdivided into a thousand health areas).<sup>47</sup> Primary healthcare is widely provided in CSCOMs whose particularity is to be non-profit-making and managed by a user association, the Community Health Association (ASACO). They are composed of a dispensary, a maternity ward and a pharmaceutical repository. The CSCOMs, which constitute the area of analysis for this study, are supported by first-level hospital structures: the reference/district health centres (Csref). At a second level, there is one public hospital per health region. At the third level, there are five national public hospitals.

### Conceptual approach

Some authors have pointed out that the concept of 'health system resilience' (HSR) has a plurality of definitions.<sup>10,48</sup> In our view, this conceptual plasticity is less a limit than a force, provided that the conceptual variations share a certain consistency, less based on an unambiguous minimum definition, than on 'Family resemblance'.<sup>49</sup>

Starting from a minimal and open definition of the resilience of health systems, understood as how they (or one of their components) respond to external shocks, we intend to characterise the process of resilience, that is, the strategies deployed, the phenomena and the constraints on health professionals to maintain the supply of care. To understand this process aspect, we start with Karl Banchet's framing according to three levels of resilience (absorption, adaptation, transformation) mobilised and specified in particular by Mohamed Alameddine and his collaborators in the context of the Palestinian migration crisis caused by the war in Syria.<sup>6,9</sup> According to them, the absorption is the ability of a health system to continue to provide basic health services with the same level of resources and capacity. The adaptation is the ability of the health system to deliver the same level of healthcare services by relying on organisational adaptations to deal with a disruptive situation. Transformation is the ability of the health system to sustainably transform its functions and structure in response to a disruption. However, we define processes slightly differently, focusing less on the temporal dimension or the resource dimension of processes than on the scale at which they intervene. From our point of view, absorption is on the individual scale. It is the ability of agents to change their daily routines and find ad hoc solutions. Adaptation seems to us to be more of a collective capacity to adopt coordinated strategies

(reorganisation of the team, reorientation of resources, obtaining complementary resources, etc). The transformation seems to us to be at a more structural level. It is the ability of the system itself—in our case of the health centre—to evolve (by offering new services, eg).

In the discussion section, we make a proposal to further refine this conceptual framework based on the results of this study (table 1).

### Study design

We conducted a contrasting case study. For a primary healthcare study, we selected a sample of six CSCOMs in Bandiagara and Mopti health districts in central Mali (Mopti region). First, we selected these CSCOMs according to a method of reasoned choice designed to vary geographically (urban/rural) and in terms of attendance. These six CSCOMs were selected because it was possible to conduct field research under safety conditions acceptable to both researchers and participants. Our method is based on a qualitative method based on a socioanthropological approach involving semistructured interviews with health professionals, representatives of local authorities and users as well as field observations.

### Sampling and data sources

Our study used 96 semidirect interviews with an average duration of 60 min conducted entirely by SD and YD. We selected interviewees based on purposive sampling aimed at interviewing managers, junior officers (nurses, matrons, vaccinators)—often from the community—representatives of the ASACO, and representatives of the town hall for each health centre. We sought to maintain a certain balance between men (n=54) and women (n=42) as well as between the different CSCOMs. The data collection was carried out in two successive phases (October 2019 and August 2021). The first phase resulted in an interim analysis that collectively discussed preliminary results and adapted the collection tools for the second phase. In total, the research team created four interview guides and used them according to the types of respondents and thematic issues. The guides have been systematically tested by TL (remotely), YD and SD during the preparatory phases. These interviews were supplemented, in phase 2, by 6 weeks of field observation in the health centres by SD and YD guided by an observation guide indicating in particular the elements of interest and the topics to be addressed in informal interviews.

In addition, we have triangulated the qualitative data with the attendance data of the CSCOM collected via the Data Health Information System from 2016 (early of the crisis in the centre) to 2020: prenatal consultations, assisted deliveries and curative consultations with children under 5 years of age. We also contextualised the security environment of CSCOMs studied using the secure data from the database produced by The Armed Conflict Location & Event Data Project (ACLED).<sup>50</sup>

### Analysis

We conducted the interviews in Bambara and French. The interviews were then fully transcribed and translated into French when necessary. Qualitative data were systematically coded manually by TL using QDA Miner. A first code system, collectively validated by the research team at the beginning, was defined prior to the coding work oriented both towards the dimensions of a health system inspired by the analytical framework proposed by Ridde *et al*,<sup>7</sup> and towards the resilience processes inspired by the conceptual framework of resilience governance developed by Blanchet *et al* (absorption, adaptation, transformation).<sup>6</sup> This system has been enriched inductively from context elements and coding work itself and during discussions between all the authors, especially with SD and YD, which validated the analytical processes.

These data have also been contextualised using attendance data to get an idea of the performance of health centres and their evolution. In addition, in terms of risk exposure, we processed the ACLED data to get an idea of the degree of exposure of the centres. These factual data allowed us to triangulate discursive data in a way that minimises their natural biases (individual perceptions, confirmation bias, memory failure...).

### Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

### RESULTS

CSCOMs encounter daily disruptions. Some of them are of a direct security nature: feeling of insecurity, presence of armed elements, banditry and ambushes. Others are chronic disturbances. They are pre-existing the security situation, but most of them have intensified or complicated since the start of the crisis from 2016 onwards: lack of qualified personnel, low attendance, income weaknesses, late or lack of payment, degraded or insufficient infrastructure, lack of equipment, illegal practices, etc. Finally, security and chronic disruptions merge and hybridise and constitute a daily working environment. Through dealing with these dual disruptions, health professionals encounter new constraints and develop strategies to ensure the offer of care (regardless of its actual quality).

Before seeking to identify the process of resilience, it should be noted that the CSCOM studied do not consider themselves to be in a 'crisis management' situation. Health professionals seek to maintain routine activities and the full minimum package of services despite the constraints. The centres we surveyed delivered, with varying degrees of success, curative consultations and nursing care, immunisation, sexual and reproductive healthcare (assisted childbirth, prenatal and postnatal consultations) including family planning (the extent to

which it is operational is not known), as well as prevention and advanced strategy activities.

By looking at the practices, constraints and experiences of health workers, it is possible to identify the main characteristics of the process of resilience of the health system, which is being deployed, at least at the level of primary healthcare, in central Mali. We identified and presented the main components of this process by grouping them into three different themes: (1) the adjustment of daily work, (2) the strategies deployed to ensure the safety of health professionals and (3) the resignation of health professionals to fear. All these strategies are absorption strategies or very limited adaptation.

### Limited adjustments to daily work

On the day-to-day work plan at the health centre, one of the hallmarks of this resilience process is to rely on a form of inertia of professional routines and the deployment of relatively limited new strategies.

First, health professionals used a narrative centred on the fact that daily work is not disrupted and everyone continues to work normally.

No, we have never stopped working here because of insecurity. (Man, health professional, rural CSCOM, 2021)

We're doing our job. [ The fear ] doesn't stop us from working. It doesn't make any difference to our business. We work like the other days. (Woman, health professional, urban CSCOM, 2021)

Such a narrative contrasts with the complaints of health professionals about the difficulties they face on a daily basis. By never addressing the actual quality of care directly, it also suggests that it's a secondary concern.

Second, almost systematically, each disruption gives rise to a usual institutional response from health professionals. Everyone refers to the higher administrative body or to the one in charge of the issue concerned (town hall, ASACO, institutional hierarchy).

Third, to deal with the situation, healthcare professionals opted for the strengthening of routine practices, including when they are ineffective. A health worker explains that with the crisis, women no longer come to deliver at CSCOM:

Q\_: But when childbirth has decreased, what strategies have you had to make up for this decrease?

A\_: We're raising awareness.

Q\_: You didn't raise awareness before?

A\_: We were doing it, but we did more. [...]. We have increased the number of sensitizers. [...]

Q\_: But thanks to this, the women finally come to give birth?

A\_: No, no. (Woman, health professional, urban CSCOM, 2021)

Fourth, inaction constitutes an extreme case of the persistence of routines. The lack of resources is often the main reason of inaction. It may also be due to a lack of

technical or leadership skills. On the arrival of displaced peoples and the health issues involved, a manager explained:

No, we didn't do anything because we don't have the means. What can a CSCOM do in such a situation? (Man, health professional, rural CSCOM, 2021)

Although they often consider them ineffective, health professionals use abundantly these routines and these relatively modest and rather individual practices. It shows an inability of health professionals to provide collective responses to the difficulties they face. Those practices also relate to a form of 'feigning' and persistence of normality.

### Individualised security strategies

The way health workers seek to ensure their own safety also highlights the individualisation of strategies and the predominance of absorption into the resilience process. Many of the civil servants chose to flee by requesting their transfer to the city or another region.<sup>51</sup> For those who remain in post (often in urban areas) and contract agents (often recruited locally), seeking to ensure their own security is a central issue. Again, there is limited room for manoeuvre.

Indeed, the strategies are essentially deployed at an individual level. Strategies to deal with insecurity are 'tinkered with' locally alone or with a small group of colleagues: adjusting working hours to avoid night travel, collective guards to avoid being alone at night, changing the routes of vaccination campaign, etc. These are not institutional, standardised procedures provided by the health system. Resilience also does not rely on the self-organisation and coordination capacity of health professionals across the CSCOM. The disruptions rarely give rise to collective consultations and responses involving the entire CSCOM team. As with day-to-day work, we did not observe any institutional responses that would apply to the whole CSCOM and would be known to all.

In all CSCOMs, the main strategy is based on speech control and secrecy.

A\_ It's the security situation around me that worries me because we don't know who is who. It is not written on the forehead of such a person that he is a bandit or a terrorist.

Q\_ What solution have you put in place to address this issue of insecurity in the surrounding area?

A\_ I don't talk about insecurity with my colleagues. With users, I don't talk about it at all, because anything can happen. If you say something, it's possible that people who want to harm you will denounce you. It's like I told you, we don't know who is who, so I'm silent.

Q\_ Is there ever a case of whistleblowing here?

A\_ No, but it's a precaution. (Man, volunteer health professional, Urban CSCOM, 2021)

Speech control possibly aggravates professional habits where professional communication is already limited.

This further reduces the coordination capacity of health professionals mentioned above.

Secrecy and discretion are at the heart of security strategies, but paradoxically, security strategies are also based on the flow of information via telephone or social networks. Health professionals may receive information from residents about the arrival of armed men or the presence of bandits. In some places, where collective trust is lowest, security information flows between only two people who know and trust each other. In others, WhatsApp groups intended to produce secure information have been set up.

There were even days when the inhabitants [neighbouring villages] told us on WhatsApp or they called us to tell us that the armed groups said they would come attack [ our village ]. When we learn this news, we leave the village to hide in the bush. (Man, health professional, rural CSCOM, 2021)

Like any inhabitant in a conflict zone, health professionals develop a dynamic knowledge of the security context. They know dangerous roads and know how to identify periods of trouble and lull. They can mobilise local contacts (heads of villages, intermediaries allowing entry, notables).

### Resignation and the omnipresence of fear

Another characteristic of the CSCOM resilience process in central Mali is that it is based on a form of resignation of health professionals in the face of the need to operate in 'degraded mode'. Working conditions are particularly precarious: late wages, too narrow or degraded infrastructure, lack of equipment, shortages of medicines, lack of specific technical skills. To these precarious conditions are added, mainly in rural areas, the feeling of insecurity and the need to work and live in fear.

Q\_ So you work in fear?

A\_ Yes because we often come to work at very late hours of the night.

Q\_ You don't have a security guard?

A\_ Even the security guard is afraid.

(Woman, health professional, rural CSCOM, 2019)

What do you see here as security? There's nothing here that can secure us. You yourself, you're here, do you see a way to ensure our safety here? We are here, like that, in the hands of God. (Man, health professional, urban CSCOM, 2021)

Fear is pervasive in testimonies. It is a constitutive dimension of health professionals' experience of conflict. It only finds an answer only in faith or in forms of fatalism and resignation.

We were afraid, but we were still working. It is God who has the solution and it is he whom we pray that He will protect us every day. But on the other hand, we are really afraid. (Woman, Urban CSCOM: informal exchanges)

This resignation is rooted in a sense of isolation or even abandonment of health professionals, especially in the most remote areas.

You see, there is no state in this country. The population of XXX is abandoned. We are at the mercy of armed groups. (Man, health professional, urban CSCOM, 2021)

Finally, resilience is based, in the most remote CSCOMs or most vulnerable to insecurity, on a subordinate workforce often recruited locally (nurses, matrons, vaccinators and volunteers from the village or its surroundings). This workforce remains available because it has no other place to go to work. In the absence of a direct threat to health workers, continuing his work is part of this normality of the abnormal mentioned in the introduction.

[The Center Technical Director (DTC)] is from here, so he can't go anywhere else. But if he were a DTC from Bamako or Bandiagara city, he would have taken advantage of insecurity to leave, saying his life is in danger. That's why we chose someone from the community. (Man, representative ASACO, rural CSCOM, 2021)

## DISCUSSION

### Minimal resilience

To suggest a more general interpretation, by identifying the different strategies designed to deal with the security environment, we sought to identify the type or types of resilience that characterise the functioning of health centres in the context of the security crisis in central Mali. The contrasting case study shows a few notable differences between CSCOMs. The type of response is the same regardless of the urban or rural location of the CSCOM, the degree of exposure to insecurity or the degree of performance. This analysis identified the main characteristics of the resilience process in situations marked by a significant dysfunction of health systems and the emergence of low-intensity armed conflicts.

We believe that we can describe the specific form of resilience that develops as a 'minimum degree of resilience' for at least three reasons. First, this resilience is characterised by strategies of individual absorption and very limited collective adaptation capacities. It is marked by a form of inertia, that is, the persistence of routine practices, even when they are ineffective. In other words, this form of resilience can be described as minimal because it is characterised by two absences. On the one hand, we have not identified, at CSCOM level, any institutional response. On the other hand, we found a low capacity for coordination among health professionals at the local level resulting from a lack of leadership,<sup>13 22</sup> as well as low attention to the quality of care. As such, the strategies deployed do not differ from the practices of health workers who have been studied for 20 years in Mali and, more generally, in the Sahel.<sup>52-54</sup> Ultimately, the form of resilience that is unfolding is partly shaped by the professional culture of health workers, which itself stems from decades of dysfunction. Second, this form

of resilience is minimal because it is characterised by severely degraded working conditions and made particularly difficult by the atmosphere of fear and suspicion that the security crisis implies.<sup>30</sup> Third, to describe this resilience as minimal is justified by the feeling of isolation and resignation of health workers who, in the most remote centres, sometimes have no other option than to continue working despite insecurity.

The strategies that support the resilience of the health system identified in this article have mostly been identified in war contexts (Yemen, Syria, Iraq): need to deal with armed groups,<sup>32</sup> search for individual security and manage shortages,<sup>27</sup> psychosocial resources (fatalism, religion),<sup>27</sup> resourcefulness.<sup>30</sup> In Iraq, a study also points out that the adaptability of health centres is very limited, especially when they are cut-off from the support of the Ministry of Health or supplies.<sup>32</sup> However, the comparison with Syria suggests that the health system had more resources at the beginning of the conflict, which enabled it to develop more ambitious adaptation strategies despite a conflict of higher intensity.<sup>27</sup>

**Typology of resilience process components**

A limit to the concept of health system resilience seems to be semantic. The term ‘resilience’ intuitively implies a positive process. Talking about resilience is generally positive.<sup>55</sup> This axiological connotation seems to be an analytical difficulty because it makes difficult to emphasize the negative aspects and the suffering encountered on the ground. Thus, in table 1, we propose a positive and negative exploratory typology of the components of the resilience process based on our empirical study.

Analyses of resilience processes have massively used notions of absorption, adaptation and transformation (and sometimes anticipation).<sup>9 13 22 56 57</sup> We have also based our analysis on this approach. However, the adaptation/absorption/transformation typology is sometimes

limiting in accounting for the fact that some strategies or practices help maintain healthcare delivery despite the fact that some of their immediate or longer-term consequences are undoubtedly negative. Table 1 proposes to complement the analytical framework by including ‘negative components’ of the resilience process such as inaction, inertia, resignation and degradation. These components are strategies or attitudes that, while supporting the overall resilience of the health system, weaken or undermine some of its functions.

Other studies have pointed out that resilience does not necessarily lead to positive public health outcomes.<sup>12 55</sup> Taking into account positive and negative polarities of resilience thus reflects more the complexity of the reality encountered on the ground in Mali, the difficulties of health professionals, their misconduct or the ambivalence of certain practices. This is a first proposal that should be developed on a theoretical level. In addition, a new empirical confrontation of our typology proposal will allow us to refine it and discuss it in the light of another context. At the operational level, taking into account the experiences of health professionals—including negative aspects—at the lowest level of the health pyramid is an important prerequisite for the management and strengthening of the resilience of the health system. The study also points out that strengthening resilience requires technical, organisational and managerial support for front-line health workers.

**Limits**

This study had several limitations. First, the framing of the interviews focused on the actors in the field without including other people from the health system. The latter would have made it possible to learn more about the existence of support procedures for CSCOMs to deal with the crisis, their degree of operationalisation, if they exist, and why they are not mobilised at CSCOM level.

**Table 1** Typology of resilience process components

Typology of resilience process components					Collapse
Resilience (polarity +)	Anticipation	Absorption	Adaptation	Transformation	Collapse
	Anticipation of disruption, preparedness to deal with it	Individual initiatives, absence or weak team coordination, lack of hierarchy instruction	Collective or hierarchical initiatives, organisational level, minor structural changes without changing the nature of the CSCOM and its activity	Collective or hierarchical initiatives, structural level, strategic reorientation, organisational strengthening/improvement or redefinition of CSCOM’s mission	Total or partial closure, temporary or permanent; job abandonment by caregivers
Resilience (polarity –)	Inaction	Inertia	Resignation	Degradation	
	Lack of initiative, including when a disruption has been anticipated	Maintenance of routine practices that are not effective or not effective	Feelings of abandonment or isolation for health professionals, fatalism, acceptance of fear	Deterioration of the provision of care or the quality of services, deterioration of working conditions, cancellation of certain activities, illegal or contestable practices	

CSCOMs, community health centres.

It would be necessary to broaden our focus to analyse more widely the resilience of the health system as a whole and to understand how the various components of the health institution are coping with the security crisis and its immediate consequences. In the same way, we have not explored the question of existing crisis management mechanisms (contingency stock, supply, etc).<sup>58</sup> Second, the study would have benefited from integrating more interviews with users to strengthen the qualitative evaluation of the care offer and to have an idea of the confidence and degree of adherence of users to their CSCOM. Finally, due to threats particularly affecting Westerners, TL, LT and VR were not allowed to visit the field. This limit was partly offset by constant contact between researchers and the organisation of collective working sessions after each collection phase between all the authors of this article.

## CONCLUSION

One of the strengths of the concept of resilience of health systems lies more in its heuristic dimension than in its conceptual univocity. In the variety of possible uses of the concept, we have sought to identify the form that the resilience process takes in a specific contextual configuration. That is when primary health centres of a crisis health system face low-intensity armed conflict. In the case of central Mali, we described this process as minimal resilience.

It would be interesting to test this proposal on two lines. On the one hand, it would be useful to test this interpretation in similar contextual configurations, in order to see if we find this minimal form of resilience. On the other hand, our conceptualisation implies that other resilience processes can be identified in different contextual configurations, such as high-intensity conflicts or conflicts affecting strong and highly functional health systems. This work on characterisation and typology of resilience processes seems beneficial to us because it emphasises that the concept must take into account the context at the risk of producing standardised analyses or recommendations with little to do with the reality of health actors.

**Twitter** Valery Ridde @ValeryRidde

**Contributors** The order of authorship corresponds to the distribution of the intellectual contribution of the coauthors in the research process. VR and LT initiated and supervised the survey and contributed to the writing of the manuscript. SD and YD collected the data in the field and participated in the analysis. TL, as the guarantor, coded the data and took the lead in analysing the data and writing the manuscript. All coauthors contributed to the design of the collection tools, the analysis and the writing of the article.

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**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** The survey protocol was accepted by the ethics committee of the Institut National de Recherche en Santé Publique, give the number (acceptance by the ethics committee: decision N° 34/2018/CE-IRSP of December 26, 2018). All interviewees gave their oral consent to participate in the interviews. Individuals were free not to answer any question or to withdraw from the survey at any time. In addition, the article was written to respect anonymity.

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## ORCID iD

Valery Ridde <http://orcid.org/0000-0001-9299-8266>

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