

# Access to healthcare services in medical wastelands: the “first-aid line” as a tension absorber? The case of the french fire departments

*Accès aux soins en contexte de désertification médicale: un rôle tampon joué par la « chaîne de secours » ? Le cas des sapeurs-pompiers français*

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## ABSTRACT

This article, introducing the notion of “first-aid line” in the analysis of the “medical wasteland”, is carried out through a double exploratory approach. On one hand, it shows how first-aid line practitioners are forced to act as a tension absorber on a territorial scale when admittance to healthcare services is hindered by distance or poor geographical accessibility. On the other hand, it

highlights the internal transformations these organizations implement when they themselves face a lack of health professionals.

## Key-words

*Medical wasteland, healthcare accessibility, territorial disparities, medical emergency management, first-aid line*

## RÉSUMÉ

Cet article introduit la notion de “chaîne de secours” dans l’analyse du désert médical. Il s’inscrit dès lors dans un double mouvement exploratoire. D’un côté, il montre en quoi les acteurs de la « chaîne de secours » se voient contraints d’assumer, à l’échelle territoriale, un rôle tampon lorsque l’accès au soin se fait difficile. De l’autre, il met en évidence les transformations

internes que les organismes de secours mettent en œuvre lorsqu’ils sont eux-mêmes confrontés à une carence en matière de professionnels de santé.

## Mots-clés

*Désert médical, accès aux soins, inégalités territoriales, gestion du secours à personne, chaîne de secours*

<sup>1</sup> Alphabetically listed (each author has contributed equally to the production of this research).

## INTRODUCTION

Territorial inequalities in access to healthcare services - as specific categories of territorial health inequalities - are the subject of sustained public attention - particularly from the point of view of land-use planning – integrating the medical wastelands notion in this consideration. Most of the time, the issue is only raised in terms of health professionals and establishments density. Consequently, analyses are all about statistics, since this density is related to the estimated needs of the population. The meaning of the “medical wastelands” expression thus comes from the idea of a statistical deficiency: a territory with a lack of health supply which can be considered as requiring public intervention by the authorities.

The scientific relevance of this common expression may be questioned (Rousset and Girer 2016, pp. 21-22). It seems haphazard to approach inequalities in care accessibility as a simple average sub-concentration of professionals or equipment. However, the misuse of the “medical wastelands” term hides the plurality of concerns from the actors facing concrete issues in the organizational field. Therefore, it is crucial to understand what the actors mobilizing this notion are facing through their perceptions and the solutions they provide on practical terms.

This article is following the results of a first research published in the *Revue générale de droit médical*, illustrating the multidisciplinary nature of medical wastelands. We examined the “first-aid line” process and actors on the field. We bring together a series of successive activities that can mobilize different professionals in the management of medical emergencies (from receiving an emergency phone call to delivering care to the patient). Firefighters, on which our analysis will focus, are often the first link in the emergency chain for isolated areas – what is largely conditioning access to care.

We formulate our problematic in the following way:  
**is the concept of medical wastelands operating in the organization of rescue operations of fire departments? And if so, what are the accordingly developed management practices?**

Before evaluating the potential contributions of firefighters to face medical wastelands, it is necessary

to check if this notion makes sense for them and to observe its articulation with rescuing practices. The term “practices” is used in the meaning of Whittington (2007), who defines it as a set of tools, methods and models developed by practitioners. Although this definition is not completely stabilized in the literature (Rouleau *et al.*, 2007), it enables us to depict a way in which actions are conducted, in order to establish, in a specific context (Johnson *et al.*, 2007), a model of action guaranteeing an output. Therefore, if the medical wastelands are taken into account in rescue practices of fire departments, it will be relevant to highlight them for the purposes of potential reproducibility.

Through a series of semi-structured interviews with key actors in the first-aid line, we propose a qualitative exploratory analysis to bring a managerial perspective on territorial inequalities of access to healthcare services.

# 1. HOW THE “FIRST-AID LINE” FACES medical wastelands?

From a political sciences point of view, medical wastelands are defined as an analytical tool for national or local policies. Using this definition, we intend in the following paragraphs to highlight the operational issues aroused in France by this concept at an organizational level for the first-aid lines but also, considering the role of fire departments in the processing of medical emergencies, from a national civil security perspective.

## 1.1. Medical wastelands: a pragmatic perspective

The expression “medical wasteland” does not appear, as it is, in the French legislative texts. The idea seems to have resulted from a perception of a breach of equality regarding the healthcare system. In French public health regulations<sup>2</sup>, a fundamental right is stated regarding health protection, which *“must be implemented by every available mean to the benefit of any person. Healthcare professionals, institutions and networks, healthcare insurance funds or any other organization participating in prevention and care, and health authorities contribute, with users, to develop prevention, to assure equal access of any person to the treatment required by his or her state of health and to ensure care continuity and the best possible health safety”* (article L.1110-1 of *Code de la santé publique*).

This assessment of a breach of equality is mainly based on a statistical analysis, when a too wide disparity appears between density of professionals and equipment and the volume of population to provide with. As a public policy artefact, the notion covers a large variety of operational realities. If a medical wasteland is often associated with a lack of general practitioners, we can also analyze it in a more

detailed granularity, differentiating the lack of any type of practitioner or equipment. Consequently, the French healthcare system does not face one, but a plurality of potential medical wastelands, every one of them translating a specific concern related to a particular subsystem of healthcare access<sup>3</sup>. This language ambiguity around the “medical wasteland” expression brings confusion when taking a look at it in the field, especially as healthcare supply on the French territory is particularly segmented and vast (healthcare professionals, paramedical and equivalent professionals, healthcare facilities, pharmacists...). In terms of public policies, this state of affairs straightaway raises the issue of definition stability and, consequently, the relevance of selected data and indicators.

Thus, our position in this article is to consider the medical wasteland as an expression enabling a sense making around specific types of healthcare inequalities for local and national actors. The notion gathers protean realities which all come under the healthcare access thematic<sup>4</sup>. A population is indeed considered disadvantaged depending on its ability to access a specific healthcare supply. Thus, *“[...] medical wastelands would rather be an area of lesser healthcare accessibility, overstepping a simple lack or void of physicians. It would rather be a void of accessible physicians, would it be for reasons of accessibility, availability, utility or financial capacity. The main issue is still the one of accessibility.”* (Chasles & Denoyel-Jaumard, 2016:31).

Backed by this clarification, it is now up to us to question the operational reality hidden behind the medical wastelands for the fire department actors and to bring to the surface the issues that are ensued from them. In this study, we will show that fire departments, by their peripheral positioning, are meant to play for the local populations a buffering role considering healthcare accessibility inequalities just as much as the consequences of the medical wastelands on the territory.

<sup>2</sup> Article L. 1110-1 in *Code de la santé publique*.

<sup>3</sup> See Vignerot (2013), who provides an example in his study when isolating cataract surgeons to highlight a lack of specific healthcare professionals in certain areas.

<sup>4</sup> As Vignerot (2013), we consider here that the state of health inequalities (mortality rate, population vulnerability) and the healthcare accessibility inequalities (distance, access time) are distinct topics even if narrowly intertwined. Our position is to consider medical wasteland firstly as an issue of healthcare access whose consequences will translate into state of health inequalities.

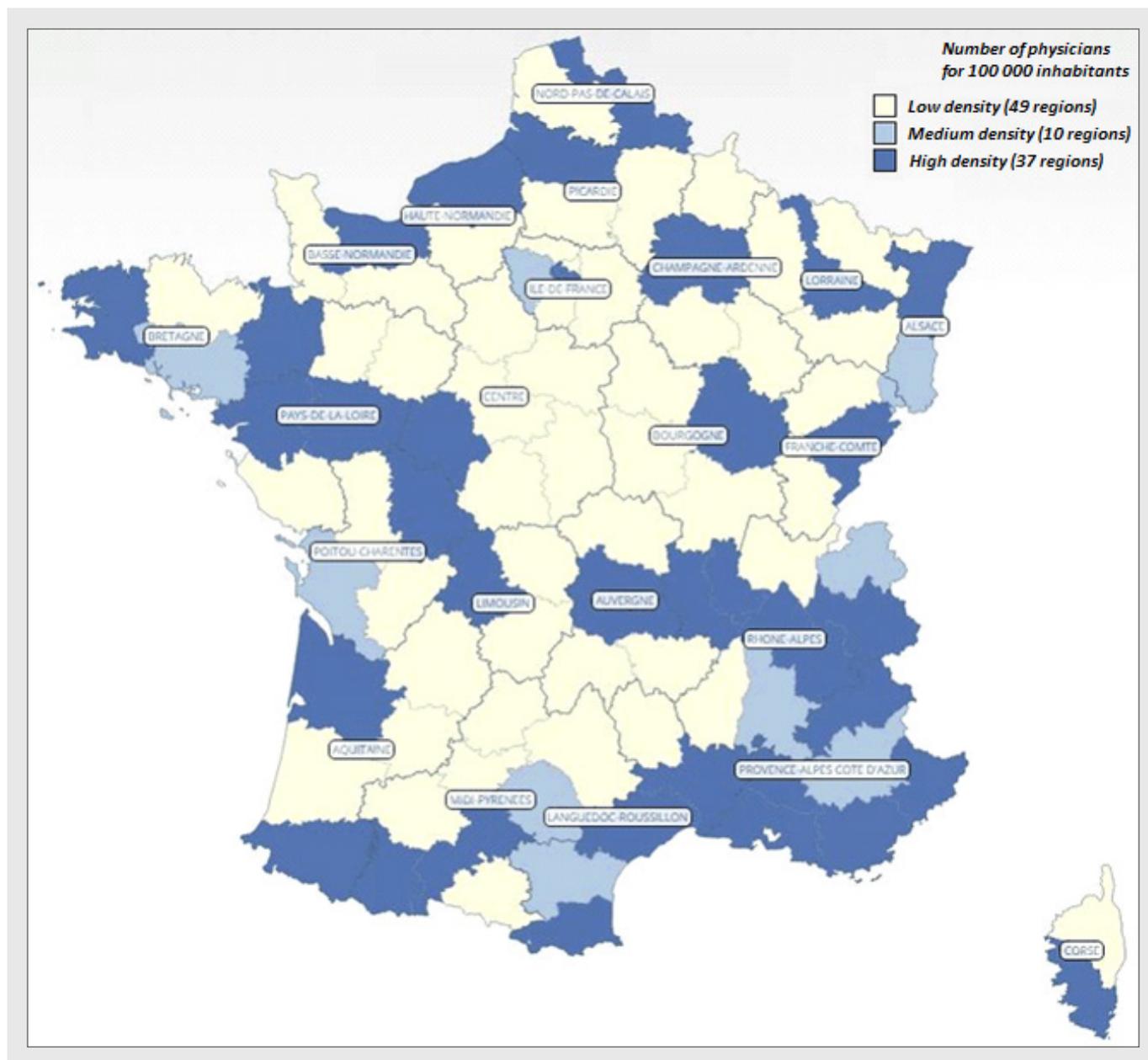


Figure 1 – Regional medical density in France (2015)  
Source : Le Breton-Lerouillois G., 2015

## 1.2. The fire departments' place in the first-aid line

Considering the medical wasteland notion refers to an issue of healthcare accessibility which can be very specific, it seems interesting to precise our approach by focusing our eye on the question of emergency services accessibility. This particular category of healthcare system includes all the assistance and care brought to a victim in the case of an accident, a catastrophe or a personal distress. This “first-aid line” is different from care brought to a patient who is not recognized as a “victim” or, to a larger extent,

from any medical situation which is not considered as an emergency, must it be life-threatening or not.

Regarding the emergency treatment, the French legislation distinguish the individual rescue service, non-medicalized, which is handled by civil security services as the fire departments and the emergency services provided by hospitals, which can be medicalized. However, on the field, a lot of emergency situations imply both systems in a very intertwined way. For modelling needs, we will assemble these two systems and all the activities they cover under the term “first-aid line”. This concept is meant to

enable a more settled conception to the emergency management dynamics and coordination mechanisms that are associated with them. This will also be helpful for a better understanding of the role of the different actors' action sequences.

The first-aid line can be split up in a generic way in five links of the chain: "1) *the assistance provided by witnesses*; 2) *the emergency call*; 3) *the first aid provided by laymen*; 4) *professional assistance and transfer to the accurate hospital and* 5) *hospital reception and treatment*." (Ribordy *et al.*, 2006:4). The evolution of medical dispatching practices in France<sup>5</sup> recently led the hospitals not to be the necessary point of arrival of any victim anymore, as the fifth step, transfer of the victim, can be executed toward other structures than emergency services (doctor's surgery, health center, etc<sup>6</sup>.) depending on the constraints met by the different actors in the first-aid line. Given that the time factor is a key element in the quality of the victim treatment in an emergency case, availability and accessibility of the different actors or equipment implied in the first-aid line happen to be critical. Yet, if the medical wasteland is theoretically an accessibility and availability of professionals and equipment issue, the healthcare accessibility should call the problem to the first-aid line actors' mind. Our research is aimed to support this proposition by focusing on the rescue operations led by the fire departments.

Within the scope of this research, we are interested in the firefighters intervention in the first-aid line. The missions of these civil security professionals, as defined in the legislation<sup>7</sup>, cover the protection of individuals, goods and environment, but also risks prevention, information, warning and evacuation of population in case of accidents, disasters or catastrophes. Applied in the medical field, the firefighters are then meant to rescue the victims of accidents, disasters or catastrophes and to organize their evacuation<sup>8</sup>.

This mission is handled by a territorial network constituted by the fire stations, which are coordinated by their headquarters, the fire department of the region. In fact, the rescue missions take a large percentage of their activities, exceeding 70% of their interventions on the French territory (Ministry of the Interior, 2015). At every region level, every fire department has an internal health service, headed by a professional or volunteering physician. This person is in charge of the firefighters health monitoring as well as an operational support provided during the missions, but can also intervene if necessary in the treatment of the victims.

## 2. MEDICAL WASTELAND AND INDIVIDUAL RESCUE: the construction of an exploratory research

The medical wasteland notion and the place occupied by the fire departments in the first-aid line, as well as their links within the scope of this research, are now clarified. This second part shows the methodological elements we used to explore the medical wasteland notion and the operational issue it raises by interviewing healthcare professionals in the French fire departments.

With an aim of sizing means and comparisons, the fire departments are ranked by the Directorate General of Civil Security and Crisis Management (DGCSCM) using five categories taking into account the volume of protected population in the region, the firefighters number (both professionals and volunteers) and the financial contribution the fire department receives (Ministry of the Interior, 2015)<sup>9</sup>. Thus, on December 31<sup>st</sup>, 2014, 246 900 firefighters distributed in 7015 fire stations have executed 4 294 400 interventions in a year on the French territory. 3 248 900 were individual rescue interventions.

<sup>5</sup> See inter-ministerial circular n° DGOS/R2/DGSCGC/2015/190 (june 5<sup>th</sup>, 2015) relating to the application of april 24<sup>th</sup>, 2009 decree relating to the implementation of a frame of references about individual rescue organization and medical emergency assistance.

<sup>6</sup> *Op. cit.*

<sup>7</sup> Article L. 1424-2 in *Code général des collectivités territoriales*.

<sup>8</sup> *Op. cit.*

<sup>9</sup> Since this study has been conducted, the DGCSCM's categorization has evolved in a 3-classes categorization dividing each Fire Department, according the same criteria as before, in A, B or C category.

<b>FIRE DEPARTMENTS IN THE 1<sup>ST</sup> CATEGORY (24)</b>				
<b>REGION</b>	<b>POPULATION</b>	<b>CONTRIBUTIONS PERCEIVED (M€)</b>	<b>PROFESSIONAL FIREFIGHTERS</b>	<b>VOLUNTEERING FIREFIGHTERS</b>
<b>NORD (59)</b>	2 620 067	197,66	2 139	3 696
<b>RHÔNE (69)</b>	1 775 953	134,21	1 245	3 882
<b>GIRONDE (33)</b>	1 494 064	156,25	1 866	2 823
<b>SEINE-ET-MARNE (77)</b>	1 361 031	127,16	1 278	2 954
<b>PAS-DE-CALAIS (62)</b>	1 490 514	102,16	1 133	3 191
<b>ALPES-MARITIMES (06)</b>	1 097 701	130,59	1 326	2 755
<b>BOUCHES-DU-RHÔNE (13)</b>	1 145 698	125,02	1 127	3 882
<b>YVELINES (78)</b>	1 441 147	114,74	1 191	2 109
<b>LOIRE-ATLANTIQUE (44)</b>	1 332 524	98,18	761	3 739
<b>ISÈRE (38)</b>	1 243 170	88,56	820	4 184
<b>VAR (83)</b>	1 030 355	100,74	938	4 366
<b>SEINE-MARITIME (76)</b>	1 276 908	82,42	890	2 334
<b>ESSONNE (91)</b>	1 244 311	94,02	1 028	1 475
<b>VAL-D'OISE (95)</b>	1 197 264	91,80	972	1 434
<b>HÉRAULT (34)</b>	1 080 823	80,36	728	2 712
<b>BAS-RHIN (67)</b>	1 118 885	67,64	624	4 864
<b>HAUTE-GARONNE (31)</b>	1 286 050	72,15	762	1 144
<b>HAUTE-SAVOIE (74)</b>	770 450	71,05	589	2 696
<b>MOSELLE (57)</b>	1 066 797	64,45	661	4 379
<b>ILLE-ET-VILAINE (35)</b>	1 024 246	62,44	643	2 743
<b>LA RÉUNION (974)</b>	837 617	77,34	853	1 167
<b>OISE (60)</b>	825 927	57,78	526	2 544
<b>GARD (30)</b>	734 923	70,23	658	2 014
<b>LOIRE (42)</b>	766 630	58,15	532	2 196
<b>FIRE DEPARTMENTS IN THE 5<sup>TH</sup> CATEGORY (8)</b>				
<b>REGION</b>	<b>POPULATION</b>	<b>CONTRIBUTIONS PERCEIVED (M€)</b>	<b>PROFESSIONAL FIREFIGHTERS</b>	<b>VOLUNTEERING FIREFIGHTERS</b>
<b>CANTAL (15)</b>	153 463	13,21	104	813
<b>GERS (32)</b>	196 143	12,83	64	1 156
<b>LOT (46)</b>	181 443	11,34	68	876
<b>HAUTES-ALPES (05)</b>	143 962	11,24	58	1 103
<b>TERRITOIRE-DE-BELFORT (90)</b>	146 935	12,37	125	385
<b>CREUSE (23)</b>	127 543	9,91	48	751
<b>ARIÈGE (9)</b>	157 936	9,50	48	663

Table 1 – Fire departments ranking in categories 1 & 5 depending on 3 criteria: protected population, financial contributions perceived and firefighters number  
Source: Ministry of the Interior, 2015: p.4-5.

	Medical density (2015) Cf. Figure 1		
	Low density	Medium density	High density
1 <sup>ST</sup> -CATEGORY FD	1	-	5
4 <sup>TH</sup> AND 5 <sup>TH</sup> -CATEGORY FD	5	1	-

Tableau 2 – Distribution of solicited Fire departments depending on their ranking in the DGCSCM categorization and the medical density in their region

The table 1 shows the visible differences between the biggest fire departments and the smallest.

Thus the 5<sup>th</sup>-categorized regions contain a population on average 8 times less numerous compared to 1<sup>st</sup>-categorized regions (if we compare Lozère and Nord, we end at 30 times less numerous population!). However, if we relate the budget used and the volume of the population, the proportions stay similar: around 80€ per inhabitant are spent in the 1<sup>st</sup>-categorized regions for civil security while the 5<sup>th</sup>-categorized regions are spending around 73€ per inhabitant<sup>10</sup>.

On the other hand, the 5<sup>th</sup> category fire departments must ensure their activity with a number of firefighters on average twice as numerous as in the 1<sup>st</sup>-category regions. Thus the 1<sup>st</sup>-category fire departments have on average 30 firefighters to protect 10 000 inhabitants while on average 59 in the 5<sup>th</sup>-category Fire departments<sup>11</sup>.

Within the scope of this exploratory research, we relied onto half-guided interviews made in 12 different fire departments. The sample was made using the DGCSCM categorization as we intended to include fire departments facing different situations. That is why we firstly chose fire departments in the 1<sup>st</sup> and 5<sup>th</sup> category. We were in contact with six 1<sup>st</sup>-category, five 5<sup>th</sup>-category and one 4<sup>th</sup>-category fire departments (see Table

2). Thus the selected variability criteria are:

- The volume of protected population,
- The number of professional and volunteering firefighters,
- The financial contributions perceived by the fire department,
- The medical density in the region.

It should though be noted that this fire departments categorization does not enable the assumption of the existence, or non-existence, of a medical wasteland on the region depending on their ranking. We only used this categorization in order to observe fire departments in contrasted situations. Indeed, if we compare Figure 1 and Figure 2, the second one presenting the results of the ranking using the DGCSCM categorization, we can then observe that:

- Among the 8 Fire departments of the 5<sup>th</sup>-category, 6 know a situation of low medical density on their territory, 1 has a medium density and 1 a high density.
- Among the 24 Fire departments of the 1<sup>st</sup> category, 16 face a high density medical situation, 2 present a medium density and 6 a low density.

<sup>10</sup> Significant disparities although exist regarding the budget granted within the categories. Thus in the 1<sup>st</sup> category, the Alpes-Maritimes Fire Department (FD) is allocated 119€ per inhabitant while the Haute-Garonne FD settles with 56€ per inhabitant. In the same way, in the 5<sup>th</sup> category, the FD of Cantal and Territoire de Belfort are functioning with respectively 86€ and 84€ per inhabitant while the Ariège FD settles with 60€ per inhabitant.

<sup>11</sup> Here again important disparities are spotted within the categories. In the 1<sup>st</sup>-category, the Var FD employs 51 firefighters to protect 10 000 inhabitants while the Haute-Garonne FD is constituted with 15 firefighters for the same amount of population to protect. In the 5<sup>th</sup> category, the Lozère FD has 92 firefighters for 10 000 while the Territoire de Belfort FD employs only 35 firefighters to protect 10 000 inhabitants.

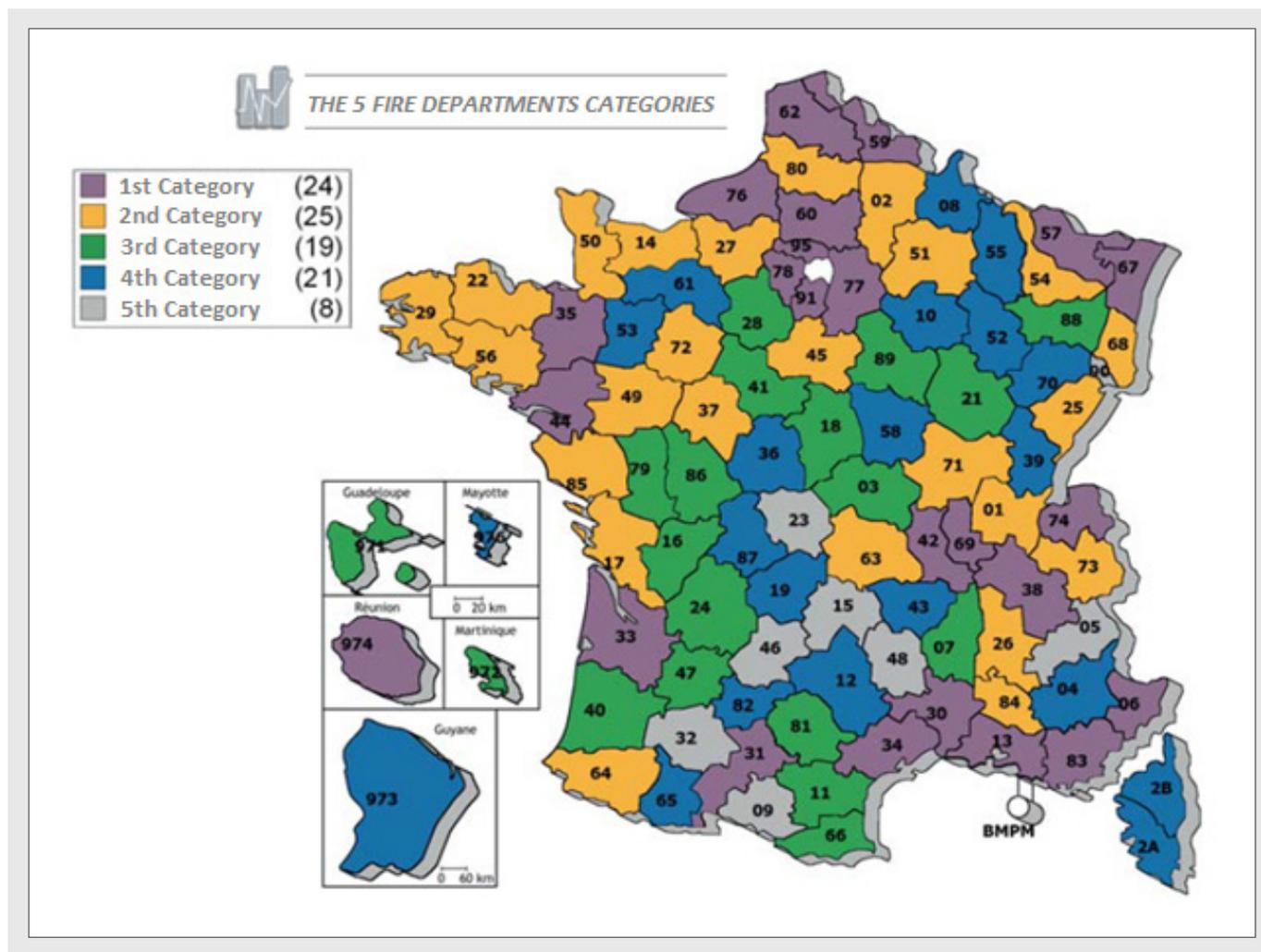


Figure 2 – The 5 fire departments categories distributed on the French national territory according to DGCSCM (2015)

Source: Ministry of the Interior, 2015: p.3

Two successive series of interviews were conducted on two periods: March-May 2015, and then June-July 2016 (33 solicited interviews distributed on 24 fire departments of the 1<sup>st</sup> category, 8 of the 5<sup>th</sup> category and 1 of the 4<sup>th</sup> category).

Despite a desire of exhaustiveness regarding the fire departments interviewed, we ended up by selecting these fire departments in order to realize the two-way process essential to this kind of qualitative research, as we intended to reach saturation point regarding the data contributing to answering fully the questions we raised (Thiétart, 2003). In other words, according to this criterion, the data collection stopped when the last analysed observations were not adding any more elements in our study. Finally, 32 interviews were initially planned but 12 interviews were enough to provide our analysis. These interviews lasted on average one hour.

We first questioned, when it was possible, the physicians heads of medical services in the fire departments, as they are the managers of health affairs in these organizations. When it was not possible, we interviewed his or her assistant. The medical services first take care of the firefighters health monitoring, provide a medical support during the missions but also contribute to rescuing people on the field. As such, every head physician plays a guiding role for his or her fire department regarding any health matter in rescue operations. He or she embodies a crucial interface with other public healthcare services and appears as one of the highest qualified functions to understand both issues of the region regarding health affairs and issues faced by the firefighters during their missions.

### 3. MEDICAL WASTELANDS AND “FIRST-AID LINE”:

from theoretical assumptions  
to practical implications

Results and discussion are firstly based on the impacts of medical wasteland phenomenon for the fire departments and the operational realities ensuing. In a second step, we discuss the coping strategies developed regarding this problematic with respect to the fire departments’ activity.

#### 3.1. The medical wastelands phenomenon: Which kind of reality for the first-aid line?

Questioned on their acceptance of the concept of “medical wasteland”, practitioners outline a combination of two parameters: a geographical aspect and a quantitative one of the availability of doctors (“*these are territories over which there is no or very few doctors settled, which makes it difficult for residents to reach a doctor - who is available, who has the time to see them, or to receive them in consultation in its office.*” MC1f). Sometimes, problematic temporalities reinforcing the problem are added to this (“*In epidemic periods, general practitioners are not available and the issues are overcome by emergency rooms.*” MC1c; “*In the evening, and during the night, there are some “blank” areas.*” MC1c).

Authorities and in particular the Regional Health Agencies identify medical wastelands using the density of doctors by zone. However, practitioners identify two types of medical staff rarefaction: on the one hand, the lack of doctors external to the fire departments, which can influence their activity, and on the other hand, the lack of doctors within the fire departments, which seem fewer and fewer inclined to give time as volunteer. Moreover, these two modes of medical staff rarefaction perceived by practitioners are linked: the lack of medical staff external to

the fire departments leads to a decline among the volunteer doctors to give time as firefighter:

*“There are fewer doctors, so they do not feel very ready for emergency care anymore. [...] In our department, for a very long time we had in our staff at least 70 liberal generalist doctors, and their activity has diminished so much that for a big department like ours, we find ourselves today with only 14 operational doctors. The others either have disappeared or are only doing medical check-ups, so no longer any emergency care”.* (MC1e).

*“We have a disappearance of on-call doctors, at least in the field”.* (MC5e).

*“Because there are so few doctors, they are a bit overworked, they have also changed their work habits<sup>12</sup>, and they are less willing to take on a volunteer firefighter’s job”.* (MC1c).

We therefore observe a change in the professional behavior of doctors, especially general practitioners, which is challenging the situation on the territory: the firefighters’ activity has to compensate in part for this loss in terms of proximity level since this change in the medical network on the territory leads to a shift in the care of patients over-stressing the emergency rescue chain.

Facing this crisis of doctor volunteerism, several phenomena are to be emphasized. First, the loss of emergency medicine skills raises a number of operational issues that will be addressed in the second part of our results. Secondly, this observation leads the firefighters’ activity to the management of new problematic situations given the required skills (death notification, geriatrics, etc.)<sup>13</sup>.

Combined with the injunction to rationalize public sector costs in recent decades, this naturally entails a paradoxical situation for the fire departments. They find themselves expanding their missions while controlling their expenses and workforce: “*Here we are in a phase in which budget is no longer growing*

<sup>12</sup> This change in their work habits is specified in the following manner by another respondent: “*We have passed, through this disappearance of general practitioners, to a reconversion to the activity of consulting room at the expense of visits.*” (MC1e).

<sup>13</sup> “*We are facing new things. I mentioned the problem of death. We also take care of the elderly person who is particular and not necessarily much discussed in the first-aid practices. These are problems that we will be facing more and more.*” (MC5e).

*at all, we are at best in stagnation, in the worst in decline and, moreover, the operational demand continues to increase!” (MC1f).*

Respondents also suggest that, from a practical point of view, it is not the absence of doctors who really makes a medical wasteland, but rather the difficult accessibility of the doctor: either because he is overloaded, either because he is at a further distance from the patients.

*“People cannot, as they used to, easily bring an on-call doctor to their home or go to a doctor who is not far from home... so, people go to the hospital”. (MC1f).*

*“People will suffer more from the medical wasteland in their need, I would say, of daily medical consumption, due to problems of transport, to go to the doctor who will not want to move anymore because he will not have the time to. Here is the real problem of medical wasteland”. (MC5b).*

This is accentuated by the removal of local health services, such as small hospitals, which is impacting the fire departments’ activity:

*“When we drop emergency services in some hospitals or when we drop the hospital outright, we impose growing transports to the fire departments. [...] That’s a huge constraint for them. You hear them complaining about it and rightly because it locks the volunteer and professional firefighters for a long time. So, by immobilizing the volunteer firefighters, their employers will complain, it makes sense, it costs us much more because we pay two hours instead of one and it wears the equipment twice faster. It has a very direct impact for the fire departments”. (MC1e).*

Hospital services are, of course, themselves affected by this increase in health transport budget: *“and everyone is in the throes of the explosion of the health transport budget, including the taxi, because families no longer have time, because everyone is working. It makes the primary health insurance funds screaming, it puts them in deficit”. (MC1e).*

Thus, with regard to the representation of the medical wasteland, the respondents suggest that the

general, specialist and emergency care offerings constitute three permeable networks on the territory. Effectively, a rarefaction of the supply in one of these chains will have consequences for the two others. Far from being disconnected, general medicine, specialist medicine and emergency medicine are interdependent:

*“We have noticed a much more frequent recourse to firefighters due to either request for the transport of non-emergency cases because of ambulance unavailability; or the spontaneous use of emergency personnel by the population who, unable to have their doctor and being lost in the search for a sanitary response, call on firefighters.” (IC5c).*

In the case of a rarefaction of the supply of generalist or specialist medicine, it is therefore the emergency chain that is used by the population, despite the inadequacy of the response, since the mobilization of a rescue vehicle and its rescue crew is not, in principle, the most efficient for transporting a patient in need of non-urgent consultation.

By these phenomena, the areas identified as medical wastelands by the authorities are, in fact, far from being the only ones to suffer from medical scarcity. The health network seems to be trying to make up for deficiencies observed, both in these medical wastelands and outside, in terms of doctors’ accessibility, while having consequences for the rest of the territory concerned (*“the system is breathless far beyond the small areas identified by the Regional Health Agencies, so, the question arises of the acceptability threshold.”* MC1d).

This analysis highlights the contradiction between the definition of a medical wasteland, for the authorities or the literature, and the difficulties encountered in reality by the actors in the field, on larger territories, because of medical scarcity. The term of “medical wasteland” reduces the notion to a geographical dimension where no doctor would be present, whereas the reality engendered by the medical scarcity is much more complex:

*“There are places where, theoretically, emergencies are covered but still, it takes 48 hours to have a general practitioner (GP) available. This is not a medical wasteland: there is someone! Except that*

*it takes 48 hours! Ditto for the emergency medical service (SMUR) ambulances when they are all engaged... We have to send a SMUR ambulance from elsewhere, so it's longer, it becomes as if it was a medical wasteland! When theoretically it is not so, if we operate with statistics. And we are in the same situation, there comes a time when we are saturated, with no more resources.” (MC1d).*

Therefore, it would seem appropriate to clarify the notion of medical wasteland so that it takes into account these dimensions, which are today poorly identified by the authorities. Beyond medically deserted areas, the territory concerned would suffer more precisely from an inadequacy of the response to the demand for healthcare. This latter is palliated by congested public services, in particular by an emergency chain designed for emergency transport and distorted to bring citizens closer to an often non-urgent medical supply.

This conclusion echoes to the words of Chasles & Denoyel-Jaumard (2016) making “accessibility” the core of the problem of increasing medical scarcity. However, the point of view of the emergency chain professionals brings out a broader problematic, because of the permeability of general, specialist and emergency care offerings, as interdependent networks. Rather than simply addressing the gap in the supply of care, it would be much more appropriate, in our case, to talk about “health network(s) under tension”, because of the strong resonance of the difficulties on all systems.

We have to notice that these elements are combined with the difficulty for citizens to understand the role of each public service: the population is more and more demanding concerning care or help (Rochet *et al.*, 2013). This puts the firefighters face to a particular difficulty of a gap between the expectations of the citizens and why the firefighters are engaged (their missions): “*sometimes we have reactions of incomprehension or we receive verbal abuses as: ‘but then, the firefighters are here for what?’ - The firefighters are here to treat vital emergencies!*” (MC1e).

Other tensions can also be identified, such as those between the different ministries and organizations involved, which bring out an interdepartmental

problem. Indeed, the missions of the emergency medical service and the fire brigade seem to partially overlap, which can lead to dual skills and conflict situations: “*The Ministry of Health is an entity. With the French emergency medical service, they claim the treatment of emergencies in the field. That is to say that they are the emergency managers and we, firefighters’ health services, we disrupt this strong prerogative of the emergency medical service.*” (MC1c). Indeed, if in the regulatory texts the missions of each entity seem relatively clear, in the field, hospital services often resort to firefighters because of their own congestion. These texts provide for the resort to firefighters - because of ambulance unavailability - to be financially compensated. However, this system is not without consequences (“*even if one is compensated, it can pose organizational problems because it will affect our operational coverage*” - MC1f) or even not well respected in practice (“*And we, when we ask for a number of refunds [...], we are told ‘Oh no, it’s not this, it’s not that’ ... And we have important unpaid debts that the Regional Health Agency does not want to honor. If you want, it’s your taxes, it’s mine, we all pay for the pot, but at some point there are political choices to be made to clarify the resources attributed to the Ministry of Health and to the Ministry of the Interior.*” - MC1d).

Finally, the different points of view gathered show that the categorization of firefighters departments retained by the Directorate-General of Civil Security and Crisis Management (DGSCGC) does not reflect the medical wastelands formally identified or not by the Regional Health Agencies. As one of our respondents says, “*there are no City Versus Country fire departments*” (MC1f). The categorization is in fact simply representative of the raw resources available to the fire departments. In fact, we did not meet any respondent, whatever the classification of his fire department, for which the idea of medical wasteland did not echo for his own territory. However, behind this apparent uniformity lies a great diversity of situations encountered (problems of medical density and / or availability, lack of volunteer doctors, sparsely populated and / or remote areas, lack of proximity equipment, problems with territorial coverage / health network, etc.).

### 3.2. Tension within the first-aid line, a drive for innovation

As we saw, medical wastelands issues are sources of tension within the first-aid line, as they constrain its resources and processes. French firefighters do not have influence on the causes of medical wastelands, and depend on other bureaucracies. As they cannot act themselves on their source of constraint, fire department must adapt on the field. “We don’t really deal with healthcare provisions [...]. So, we don’t actually respond to medical wastelands. On the other hand, we adapt our activity.” (MC1f). Adaptation is handled over the long term, following the evolution of the operational requirements. “It is not a brutal phenomenon, you know. It is a process over the long term. We adapted by necessity.” (MC1f).

Consistent with the firefighters’ experience, we will see how this growing tension stimulated innovation on two points of the first-aid line: phone-call processing and deployment (link 2); medical operations during rescue and patient transport to a proper establishment (link 4).

Phone-call processing is a critical point of the rescue operation. It is handled by firefighters in a regional call center, called “18”. This particular step leads to the deployment of resources – human and logistic – for a precise set of needs. Too few, the victim could not be helped properly; too much, the resources won’t be available for a future intervention.

“For me, quality in first evaluation is the critical factor. Everything depends on it. Today, we are more and more engaged in missions that I would call “doubt removal”. We go to evaluate a situation, to give the best information to the regulator because he needs to initiative the good course of care considering the technical support available.” (MC5e).

Because resources are scarce and travel times are increasing, the first decisions are more and more

crucial. Several decision making tools can be used by firefighters: for example, decision forms (MC1f) used by call center 18. But the logic can be extended to the emergency medical service and fire department duet: “Regarding the other sectors in the country, we have a particularity here. Our call center is held by the Region [...] and we use a common algorithm for decision-making. To keep it simple: wherever you ask for the 15 or 18, we have to treat it the same way. So we defined our priority missions with the emergency medical service: when we go and report to the medical regulator and when we regulate before engaging. This is for our four departments [...]. Working on this decision-making algorithm allows us to work on our problems of resource availability.” (MC5a).

It is important to add that inappropriate calls and over-calling from the population makes it essential for fire department to regulate, even to find ways of sanction<sup>14</sup> (IC5c; MC1e).

Increasing reliability in phone-call processing is combined with several operations of rationalization within the territories in order to better distribute human and logistic resources. Human resources being essentially composed of part time volunteers, mobilization within the human resource is also tense, depending on the availability of all members.

“We made a system that we call “operational and functional groups”, which allows ourselves to complete the mission even if the staff is not completed [...]. In the small centers which cannot provide enough staff, to deploy an ambulance for example – because you need to be three, or four – two staff members leave with a first aid kit and another center will provide the ambulance and two more agents [...]” (MC1c).

Concomitantly, fire department has to keep an appropriate fleet of vehicles, which has to be properly distributed and properly armed<sup>15</sup>.

<sup>14</sup> Cf. In accordance with Administrative circular of June 05 2015: “fire department is required only to intervene when according to its public service requirements, which are defined in Article L.1424-2 of the General Code of Territorial Administrations. In other cases, it is allowed to ask beneficiaries a contribution to costs, by decision of the executive board (Article L.1424-42 of the General Code)”.

<sup>15</sup> We have to dissociate, for example, the LNV (Light Nursing Vehicles – MC1f, MC5d) and the RAS (Rescue and Assistance Vehicles).

On intervention purposes only, and despite efforts on recruitments of medical personnel<sup>16</sup>, the persistent lack of physicians in firefighters forced fire department to recruit paramedics which operate now on emergency protocols<sup>17</sup>. “[...] *We applied the law that allows us, since 2000, to include paramedics in our staff. [...] We had to train them, we had to conceive medical protocols, and we had to control and animate all this, change the protocols... We are at our fourth version since 2003.*” (MC1e).

Nevertheless, these initiatives are not developed equally everywhere in France: “*we are currently thinking – we started a few years before, but now we are close – about Light Nursing Vehicle, in order to respond, not to the lack of physicians in itself, but to have a large range of responses: one more means between rescuer and medical intervention.*” (IC5d).

In several pioneer departments, this increase of paramedical work in rescue is seen as a real progress for emergency management, especially in rural sectors. “[...] *We are one of the large fire departments in France that developed a heavy paramedical activity, with paramedics. Outside of the urban sector, we included paramedics on duty with Light Nursing Vehicles. They are totally autonomous. [...] This allows us equal results in rural and urban sectors. [...] Usually, in rural sectors, patients die more frequently and quickly. With nurses helping firefighters, this is no more the case. It is really interesting and crucial.*” (MC1e).

This innovation in first-aid line is advantageous, but due to its hybrid nature, it also presents some restrictions: cultural, statutory and technical. Indeed, it tends to relegate the physician further to a regulatory role and to take him away from the patient.

“*A medical exam depends on the medical diagnosis. A nurse does not diagnose, it is the physician’s work.*”

*Paramedics work on protocols, execute treatments, but do not diagnose. It is a limit of the system: the paramedics, or the firefighters, are the doctor’s eyes, which must evaluate the situation remotely, without proper examination. Then, he must do prescriptions. You see where it is going! We are on a borderline because we allow the doctor to make prescriptions without actually doing an examination.*” (MC1e).

Regarding victims’ transport, a better cooperation with practitioners out of hospitals is also needed, considering time pressure. This is achieved by producing contracts and labels. “*Until now, firefighters were generally the one transporting victims to emergency services. Now, we try to enhance our process, by splitting missions – firefighters go on the spot and the ambulance comes after, [...] eventually carrying the victim to a certified doctor office. The practitioner has to agree and access to the office has to be easy. The same thing is happening with health care centers which are funded by the Regional Health Agencies and are available (most of the time, from 8 AM to 8 PM): we try to carry the patient there rather than systematically carrying him to emergency services.*”

Firefighters operational adjustments, which can reside in paramedical work during rescue or transport reorganization, seem to be based on partnerships with different entities, the most important of them being the emergency medical service.

Fire department adapts the structure of its interventions according to the constraints that arise on its territory. These adjustments are limited by financial and legal issues, but also imply confrontations between different professional cultures. “*Emergency medical service does not always understand the role played by firefighter paramedics in caring for victims. That is what we hear from discussions on the national level [...]. It brings a sort of “war” between “white and red”, you know?*” (MC1c).

<sup>16</sup> In terms of recruitment policy, we can see some inciting practices here: “The chief-doctor tries to approach young and new physicians by motivating them, guarantying them operational work and not only routine visits... We could also do formations, meetings between firefighters-physicians.” (IC5d); or different change of strategy on potential recruits seeking: “volunteers are less and less liberal practitioners, but more and more hospital physicians, on their free time.” (MC1e).

<sup>17</sup> Even if we saw that law distinguishes very clearly the competences of fire department and emergency medical service, complexity of emergency situations and institutional histories have created a “grey zone” between non-medical rescue and medical emergency: “*The difficulty is mainly to define what is in the mission. Where the non-medical rescue stops and becomes medical intervention or simple transportation, etc. It is really important to define the scope.*” (MC1f). Pressure is therefore handled by firefighter physicians, as they are competent to decide and medically intervene before hospital personnel takes charge. That intermediary role of emergency physician is currently transferred to firefighter paramedics.

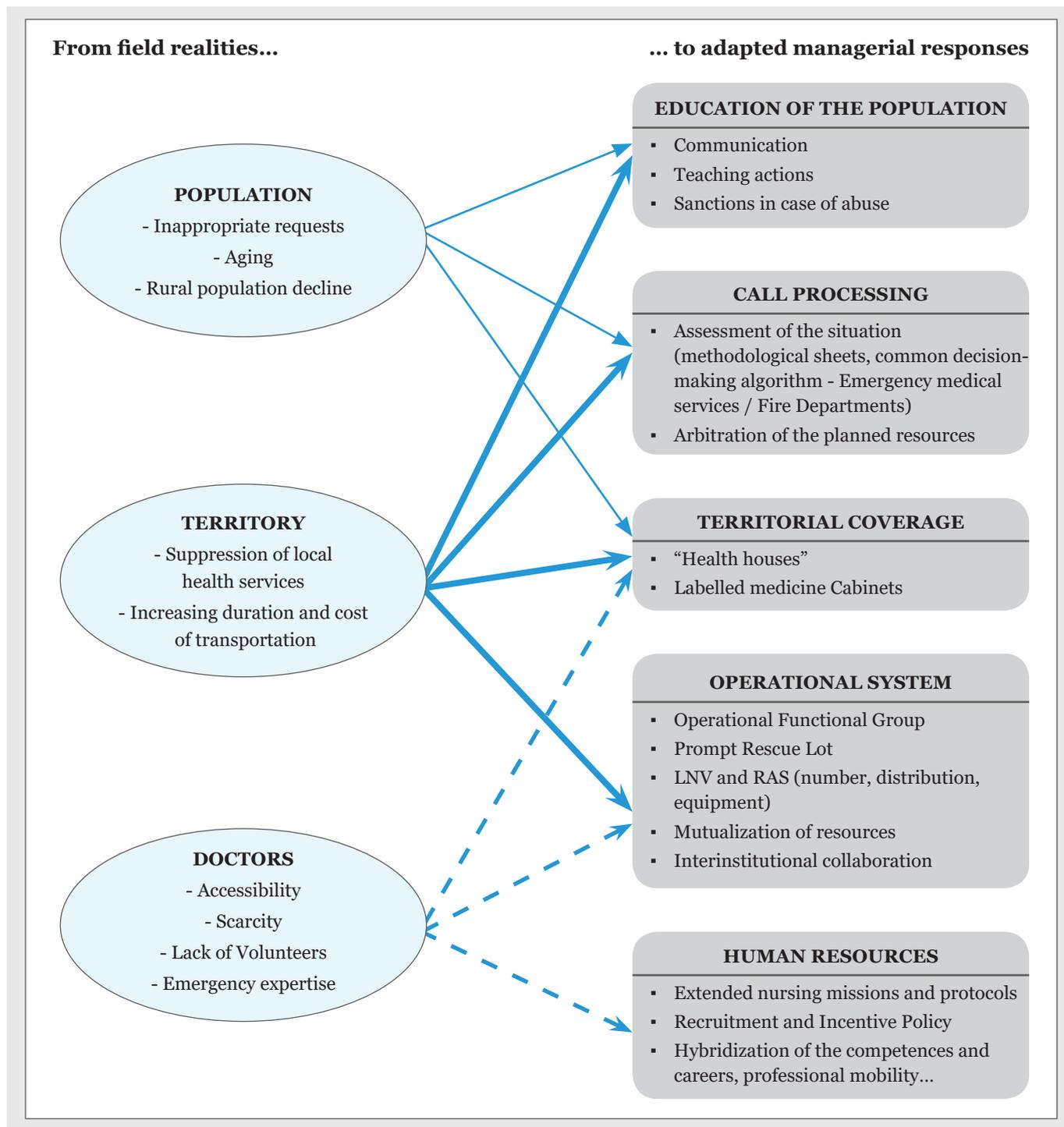


Figure 3 – Medical wastelands and individual rescue: summary of the results

Indeed, respondents strongly highlight that collaboration between these two organizations is a key element to confront the consequences of medical wastelands. This collaboration is often brought by individuals with mixed profile: *“as it happens, it is me, as director of emergency medical service, who implemented the last version of the protocols with the chief-doctor of firefighters, who was my*

*assistant when I was, myself, chief-doctor... So, to this day, we work in a good synergy.”* (MC1e).

Nevertheless, conflicts for resources between the two organizations create tensions, like the one following the creation of a new doctor function, the *“correspondent emergency medical service”*: *“The problem is that physicians that are “correspondent*

*emergency medical service” are often physicians from firefighters that changed side. Therefore, we did not see a benefit in terms of workforce. Red physicians became white, but in terms of availability, we still have the same problem.” (MC5e). “We were lucky, because – as I was saying – emergency medical services are well distributed, which prevented the problem. With the chief-doctor of emergency medical service, we did not have to ask ourselves if we should create correspondent emergency medical service positions. In our department, we don’t have any correspondent emergency medical service, luckily! With so little workforce, I don’t see a way to create such function in our territory.” (MC1c).*

Figure 3 synthesizes, as respondent presented it, the content of the problem implied by medical wastelands for the first-aid line. We pointed out and classified – even if they are all linked – phenomena that are caused by population, territory or physicians.

To face these challenges, several managerial responses has been deployed by actors of first-aid line: for example, ways of educating and informing the population; protocols designed to increase performance in alert response; initiatives to reweave a territorial network for local support; actions to streamline and ensure the smooth conduct of personal relief operations in the field; or, human resources management policies in terms of recruitment, training, animation of teams and different trade.

## CONCLUSION

### towards a proactive management of the first-aid line?

This exploratory research has enabled us to bring out the buffer role played by emergency professionals in the field of medical wastelands. This notion has a direct influence on the fire department activities. Often accepted as an external constraint on which the actors have little power they must compose while maintaining an identical level of response. We highlight that this strong constraint at the emergency care level requires from the actors some innovating skills to overcome the structural deficiencies that weaken the first-aid line. From a managerial point of view, the dynamics are becoming more and more prospective, aiming to anticipate as much as possible the situation effects on the territorial inequalities. From a progressive awareness: *“Desertification, we did not realize at first. What I measure now is that this question is more and more present, it’s there, everyone realizes that we will have to find solutions... the debate is launched, with the congestion of emergencies... all this goes together.” (MC1b).*

This willingness to anticipate future difficulties can be found at several levels, from the reliability in the call treatment to the paramedicalization of the interventions, until many problems of human resources management to face a loss of skills. The bricolage of the actors in the field is done at the technical level, as well as human, by the development of practices intended to maintain the level of quality required, even to increase the requirements.

However, the approach of the fire department and rescue operators such as the emergency medical assistance relies largely on the voluntary medical actors of the territory, whether doctors or - now - nurses. The weakening commitment felt by the actors on the ground thus risks to undermine the activity heart, in spite of a will of continuous improvement of the processes. Noting that the first-aid line can - and should - be understood as a set of actions dependent on each other, hence, it appears that the biggest challenge faced by relief operations lies in the forward planning of employment and skills at the territory level. This hypothesis of a renewal of the planning, regulated by territories, is not new in

itself, even if, as Bories-Azeau and Loubès (2013, p.158) emphasize, this theme is emerging and has not been the subject of much analyzes. To sum up, the main orientations of a territorial management of jobs and skills focus on the prevention on publics and fragile jobs as well as the territorialization of professional paths (Baron & Bruggeman, 2009). *“More specifically, territorial management of jobs and skills represents a new challenge and a change in human resources management because it can participate in this new method of territorial regulation by acting on the non-transferability of an “anchored” and territorialized workforce”* (Bories-Azeau & Loubès, 2013, p.158).

Among the limitations of this research, having exclusively questioned chief medical officers and head nurses can be a source of bias in the way of apprehending the concept of medical wastelands. Indeed, this concept may be received in a different way according to the professional culture involved (medical culture, emergency medicine, first responders, etc.). Also, the fact of focusing our research on the notion of “medical wastelands” conveys the contingent representations of this concept, marked by the professional practices and cultures of the interviewees. In this sense, questioning emergencies staff or professionals from different backgrounds could bring a differentiated and, therefore, a more complete view of the realities of the concept and the internal dynamics of the first-aid line.

Finally, the concept of rescue chain seems to us essential to jointly address the actions of fire department and staff of the emergencies on the territory. The coordination of these two professional groups would indeed result in a detailed assessment of the needs and available resources, giving full meaning to a territorial management of jobs and skills.

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## Sitography

[<http://www.sante.gouv.fr>] (sur le “Pacte territorial”)

[<http://www.legifrance.gouv.fr>] (Code de la Santé Publique, sur la notion de “Territoire de Santé” et le “Schéma Régional d’Organisation des Soins”).

## APPENDIX - INTERVIEW GUIDE

*“We are conducting research on the issue of access to care through the role played by the fire department in reducing territorial inequalities. In this, we would like to know how, from your practice point of view, the fire department integrate this issue on its territory.”*

- For you, what is a medical wasteland?
- Do you consider your territory as falling under this definition (even partially)? Why?
- How do you manage these aspects?
- Could you give us some examples?
- What are the critical factors that hold your attention? How are they monitored?
- Do you consider yourself innovative on these points or are they widespread systems?
- What could or should be put in place to better manage this issue of access to care in a context of medical wastelands?
- What do you think about the stated government objectives of a maximum intervention time of 30 minutes?
- What do you think about the proposed classification in terms of categories of fire department by the directorate general of civil security and crisis management (DGCSCM)?