

Models of hospital care during COVID-19 pandemic in Italy: results from a survey of physicians

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During COVID-19 pandemic, COVID Hospitals were created throughout Italy and several different models of care for COVID-19 patients were implemented.

Methods. We conducted a survey on physicians dedicated to the care of COVID-19 patients with the aim of describing specific models of hospital care that were implemented during the first wave of the pandemic in Italy. The survey included seven questions with an estimated response time of approximately 5 minutes. The questionnaire went through a face validation process and pilot testing. The final version of the questionnaire was disseminated through a national limited social platform for physicians involved in the care of COVID-19 patients.

Results. In the time period between May 1st, 2020 and July 1st, 2020, 350 physicians from all over the Country participated to the survey. In most cases, old departments were transformed to COVID units, and new units dedicated to COVID-19 patients were created. A multidisciplinary team of specialists was available in half of the models of care described. The geriatrician was always part of the multidisciplinary team. Over one third of the multidisciplinary teams for the care of COVID-19 patients also included infectious diseases specialists and pulmonologists.

Conclusions. According to findings from our survey, co-management of care and multidisciplinary models were available for half of COVID-19 patients during the first wave of pandemic. Such models may offer significant advantages in terms of favourable outcomes and mortality, especially in complex older adults.

Key words: geriatrics, co-management, COVID-19, SARS-CoV-2, comprehensive geriatric assessment

INTRODUCTION

In December 2019, a large number of patients suffered from a mysterious form of pneumonia in the city of Wuhan in China. A new coronavirus,

SARS-CoV-2 (Severe acute respiratory syndrome coronavirus 2), as it was defined by World Health Organization (WHO), was identified as the responsible agent ¹.

On March 11, 2020, the state of pandemic was declared by WHO ².

Italy is one of the most affected countries in the world, currently at thirteen place for number of deaths.

After one year since the beginning of the pandemic, 267.183.734 cases have been confirmed worldwide, 1.739.000 in Europe and 5.134.318 in Italy. To date, there have been reported 5.271.698 deaths caused by COVID-19 worldwide, 770.322 in Europe, and 134.380 in Italy (last data update December 8th, 2021) ^{3,4}.

The majority of those who are infected with COVID-19 (coronavirus disease 19) present with a self-limiting infection and recover. A small proportion of cases develop a severe disease, with 10% of cases requiring admission to intensive care unit. Old adults are at a significantly increased risk to develop severe forms of COVID-19. The complex old patients with SARS-CoV-2 infection are also those who are at highest risk of death ⁵. More than 95% of the deaths occurred in individuals over 60 years of age; among these deaths, half of them were in oldest old individuals (80 years of age or older). Finally, 8 out of 10 deaths occurred in individuals with at least one underlying chronic condition (e.g. cardiovascular disease, hypertension, diabetes) ⁵. The public health impact of COVID-19 may indeed be most significant in those countries with high percentage of aged individuals, such as European countries ³.

Many Italian hospitals had to rethink the whole hospital structure and organization to face up this pandemic and almost all their resources were directed to the fight against SARS-CoV-2.

On March 9th, 2020, Fondazione Policlinico Universitario A. Gemelli IRCCS (Rome, IT), one of the biggest hospitals in Italy, began to gradually and rapidly suspend the majority of the ordinary activities and reconverted almost all wards into dedicated COVID-19 Units. Most of the medical staff, regardless of their specialty, was quickly trained and transformed into COVID-19 teams. The hospital changed its appearance, and departments (eg internal medicine, gastroenterology, geriatrics, and so on) left room to COVID-19 Units.

Furthermore, dedicated COVID Hospitals risen up throughout the Country. On March, 16th 2020, the Columbus COVID-2 Hospital by Fondazione Policlinico Agostino Gemelli IRCCS started its activities, after part of the main hospital located in a separate building was rapidly renovated and dedicated to COVID-19 patients. The Columbus COVID-2 Hospital was led by an infectious disease specialist supported by a multidisciplinary team of physicians, including specialists in geriatrics, infectious diseases and pulmonology.

At that time, several different models of care for COVID-19 patients were conceived and implemented in Italy, based on the available resources and pre-existing structures and organizations.

In small hospitals, ordinary care units were converted to COVID units usually managed by a single specialist, without the direct support of any consultant. Co-management by different specialists and the availability of consultants may have been easily put in place in huge hospitals.

In this short paper, we describe the different models of hospital care that were in place during the first wave of the pandemic in Italy, through a survey of physicians who dedicated their activity to the care of COVID-19 patients.

METHODS

We conducted an e-survey with the aim of exploring and describing specific models of hospital care that were implemented during the first wave of the pandemic in Italy. The questionnaire was initially developed in Italian by a group of researchers from Columbus COVID-2 hospital. Seven questions were included in the survey (multiple choice and open-ended questions) with an estimated response time of approximately 5 minutes (Appendix, Figure 1 to 7. Survey questions and answers were translated in English to be reported in the present manuscript). Physicians were asked to report location and clinical setting where they operated. Their perception on which specialist was the most dedicated to the care of COVID-19 patients was also investigated. Finally, physicians were asked to report the type of structure and organization that were in place for the care of COVID-19 patients in their hospitals. The questionnaire was evaluated by a group of four experts in clinical research at Columbus COVID-2 hospital to assess face validity. The revised version of the questionnaire was then administered to a small pilot group of physicians dedicated to the care of COVID-19 patients at Fondazione Policlinico Universitario A. Gemelli IRCCS Gemelli hospital and Columbus COVID-2 hospital, and it was further revised according to their feedback. The final version of the questionnaire was then disseminated through a national limited social platform for physicians involved in the care of COVID-19 patients.

The research protocol and the survey were approved by the Fondazione Policlinico A. Gemelli IRCCS Ethics Committee (protocol number 0035682/20).

RESULTS

Data from fully answered questionnaires were analyzed and reported.

Overall, 350 physicians from all over the country answered the survey with the majority of them practicing in the North (42.9%) and in the Center of Italy (47.1%). Although numerous medical specialties were represented, most participants included intensivists, geriatricians, pneumologists, and infectious disease specialists.

More than half participants (51.4%) worked in a general hospital, and almost one third of them (27.1%) in a University hospital.

According to their experience, the specialists who were most frequently employed in the care of COVID-19 patients were infectious disease specialists (80.0%), pulmonologists (74.3%), and internists (72.9%).

With respect to specific changes to structure and organization of hospital care to face pandemic, in most cases either old departments were transformed in COVID-19 units led by a single specialty team supported by consultants, or new units specifically dedicated to the care of COVID-19 patients were created and led by a multidisciplinary team.

More specifically, a multidisciplinary team of specialists was available in half of the models of care described by participants. The geriatrician was always part of the multidisciplinary team. Over one third of the multidisciplinary teams for the care of COVID-19 patients also included infectious diseases and respiratory diseases specialists.

The specialists who were perceived by participants as predominant figures during the pandemic (excluding resuscitators and intensivists) included infectious disease specialists (34.3%), pulmonologists (31.4%), and internists (20.0%).

DISCUSSION AND CONCLUSIONS

COVID-19 is clinically described with a large number of manifestations, from mild symptomatic forms to acute respiratory failure ⁶. The most common clinical manifestations include fever, cough, asthenia, myalgia, shortness of breath, sore throat, headache. In addition, gastrointestinal symptoms such as diarrhea and vomiting were also described.

Most patients who contract SARS-CoV-2 infection experience a self-limiting course. However, a number of cases can manifest severe forms of disease, and 10% of patients may require admission to intensive care units (ICU).

Findings from this survey indicate that transformation of old structures and organizations, or creation of new care models occurred everywhere in Italian hospitals. Several specialists including infectious disease specialists, pneumologists, and internists were perceived

as 'COVID-19 specialists'. However, the relevance of co-management through the implementation of dedicated units led by a multidisciplinary team was also largely recognized. The geriatrician was systematically part of such multidisciplinary team. This may be of relevance in terms of better clinical and functional outcomes for old adults with COVID-19 requiring hospitalization.

It has been already demonstrated in other specific care settings such as orthopedics, oncology and cardiology, that co-management offers significant advantages in terms of clinical outcomes, health care resources consumption and mortality, when compared with other traditional care models for old adults ⁷⁻⁹. Such advantages result particularly relevant among complex old patients with COVID-19 who are characterized by multimorbidity, polypharmacy, and high risk of functional decline, disability and death. Indeed, geriatric syndromes, frailty, multimorbidity may definitely contributed to the excess mortality reported among old patients with COVID-19. The modern geriatrician disposes of the skills and technology to deal with such complexity, thus providing a significant contribution to the care of old patients with COVID-19.

The picture of care models drawn in our survey evokes what Bruera et al. theorized in the field of palliative care. These Authors described three models: the "only practice model", the "congress practice model", and the "integrated care model" ¹⁰.

The "solo practice" model is frequently realized in small communities where consultants are unavailable, so that a unique figure has to face all different problems. This is what may have occurred in small hospitals where COVID-19 Units were managed by a single specialists without the availability of consultants.

A leading doctor supported by several consultants is in charge of care in the "congress practice" model. This model is an attempt to offer interdisciplinary care. However, the lack of interaction among consulting specialists who are taking care of interconnected problems that the same patient is suffering can result in conflicting messages, adverse events due to drug interactions, and even worsening of the general clinical condition ¹¹.

The "integrated care" approach, on the other hand, always includes the consultation with other specialists for specific reasons, but also implies the availability of a multidisciplinary team that can manage the majority of problems. This model of co-management care may result as the most appropriate for the care of COVID-19 patients and especially of those with advanced age, comorbidity, frailty, functional impairment or disability. Such model is most likely to be adopted in huge hospitals, where adequate structural and organizational resources are available.

Several specialists may contribute to the multidisciplinary team for the care of COVID-19 patients and offer their expertise to target the complexity of such disease. The infectious disease specialist may take care of the specific antiviral treatments, and may deal with overlapping bacterial and nosocomial infections. The pulmonologist may specifically take care of respiratory complications, thus early identifying patients worth of treatment with noninvasive ventilation (NIV), and referring those who are rapidly worsening to the ICU. The geriatrician is in charge of managing multimorbidity and frailty, based on a comprehensive assessment finally aimed at tailoring the therapeutic approach to the complexity of the old patients.

The integrated multidisciplinary model that distinguishes geriatric medicine is potentially able to offer significant advantages in terms of more favorable outcomes and mortality. In particular, problems such as social isolation, nutritional status, motor deconditioning, delirium, all conditions that may contribute to the excess mortality in old patients with COVID-19, could be effectively addressed with an integrated model in which the geriatrician offers the competence and the method to deal with such complexity.

Future research comparing different models of hospital care for COVID-19 patients will help identify the most effective strategy to improve clinical and functional outcomes, and to optimize the consumption of health care resources.

Ethical consideration

The present survey was approved by the Fondazione Policlinico Agostino Gemelli IRCCS Ethics Committee (protocol number 0035682/20).

Consent to participate

Informed consent was obtained from all subjects involved in the survey.

Consent for publication

Data consent for publication was obtained from all subjects involved in the survey.

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Conflicts of interest

The Authors declare no conflict of interest.

Author contributions

Conceptualization: AB

Methodology: AB, RL

Data curation: AB, RL

Writing-original draft preparation: AB, RL

Writing-review and editing: CP, RM, MF

Supervision: FL, RB

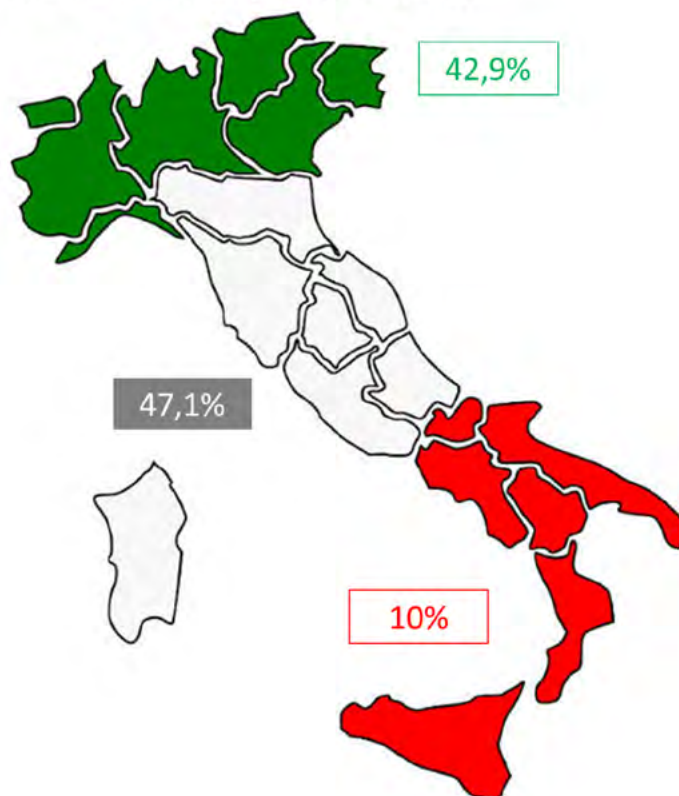
Project administration: RB

References

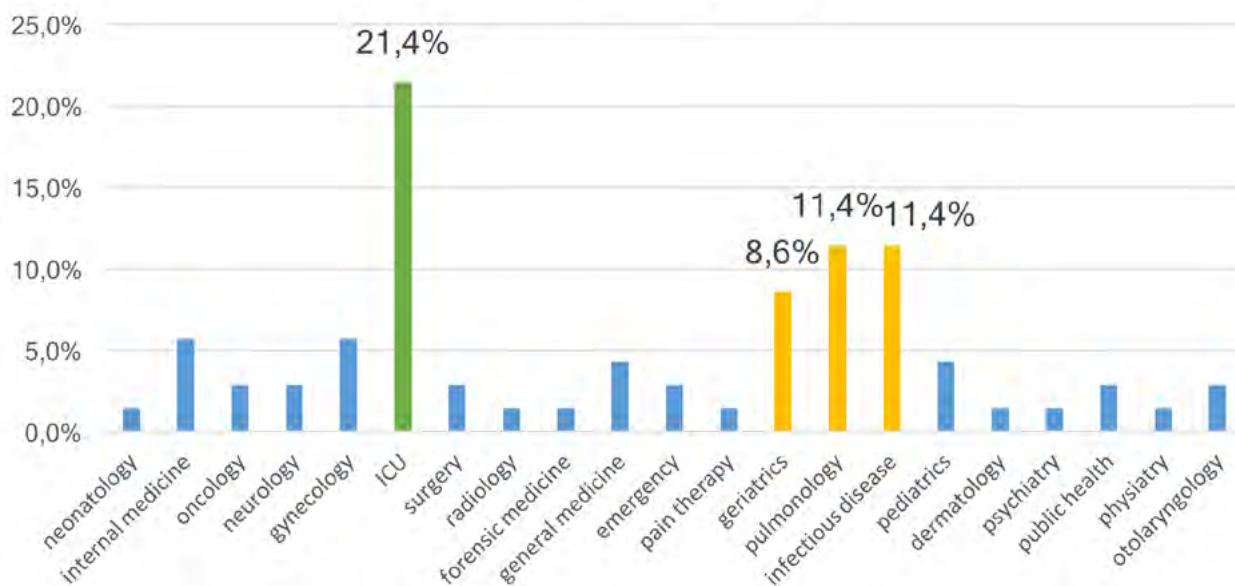
- Phelan AL, Katz R, Gostin LO. The novel coronavirus originating in wuhan, China: challenges for Global Health Governance. *JAMA* 2020;323:709-710. <https://doi.org/10.1001/jama.2020.1097>
- Coronavirus disease 2019 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>).
- COVID-19 Map - Johns Hopkins Coronavirus Resource Center (<https://coronavirus.jhu.edu/map.html>).
- COVID-19(<https://www.ecdc.europa.eu/en/covid-19-pandemic>).
- WHO/Europe | Coronavirus disease (COVID-19) outbreak – Statement. Older people are at highest risk from COVID-19, but all must act to prevent community spread (<https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/statements/statement-older-people-are-at-highest-risk-from-covid-19,-but-all-must-act-to-prevent-community-spread>).
- He F, Deng Y, Li W. Coronavirus disease 2019: what we know? *J Med Virol* 2020;92:719-725. <https://doi.org/10.1002/jmv.25766>
- Vidán M, Serra JA, Moreno C, et al. Efficacy of a comprehensive geriatric intervention in older patients hospitalized for hip fracture: a randomized, controlled trial. *J Am Geriatr Soc* 2005;53:1476-1482. <https://doi.org/10.1111/j.1532-5415.2005.53466.x>
- Extermann M, Aapro M, Bernabei R, et al. Use of comprehensive geriatric assessment in older cancer patients. *Crit Rev Oncol Hematol* 2005;55:241-252. <https://doi.org/10.1016/j.critrevonc.2005.06.003>
- Afilalo J, Alexander KP, Mack MJ, et al. Frailty assessment in the cardiovascular care of older adults. *Journal of the American College of Cardiology*. 2014;63:747-762. <https://doi.org/10.1016/j.jacc.2013.09.070>
- Bruera E, Hui D. Integrating supportive and palliative care in the trajectory of cancer: establishing goals and models of care. *J Clin Oncol* 2010;28:4013-4017. <https://doi.org/10.1200/JCO.2010.29.5618>
- Back AL, Arnold RM. Dealing with conflict in caring for the Seriously Ill. *JAMA* 2005;293:1374. <https://doi.org/10.1001/jama.293.11.1374>

APPENDIX

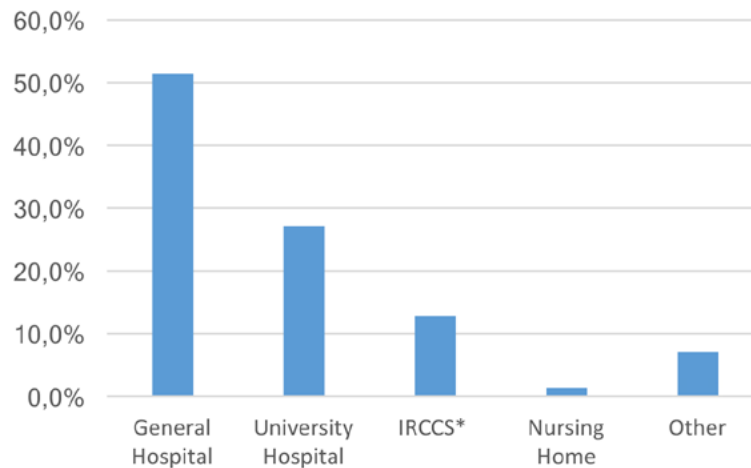
Q1. In which city do you work?



Q.2 What is your specialty?

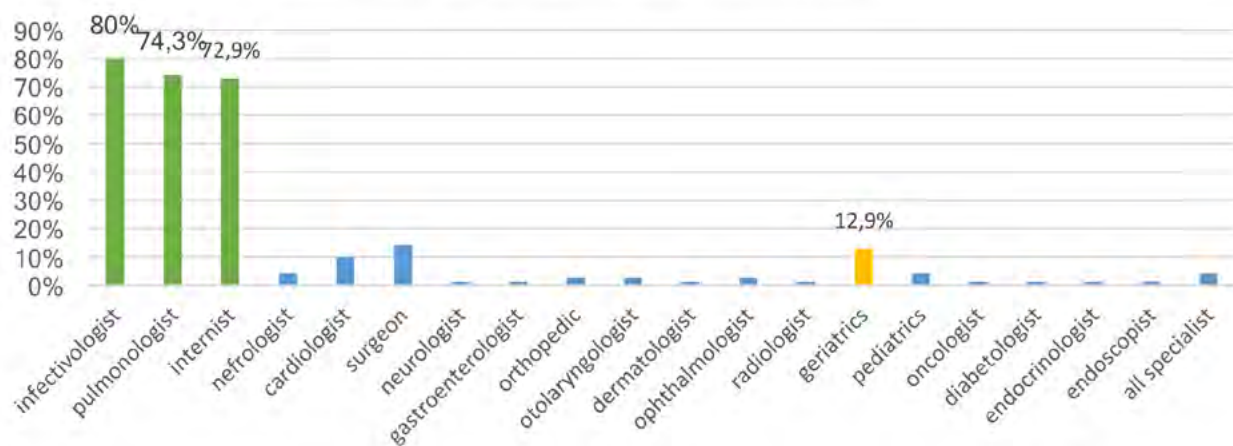


Q.3 In which clinical setting do you work?

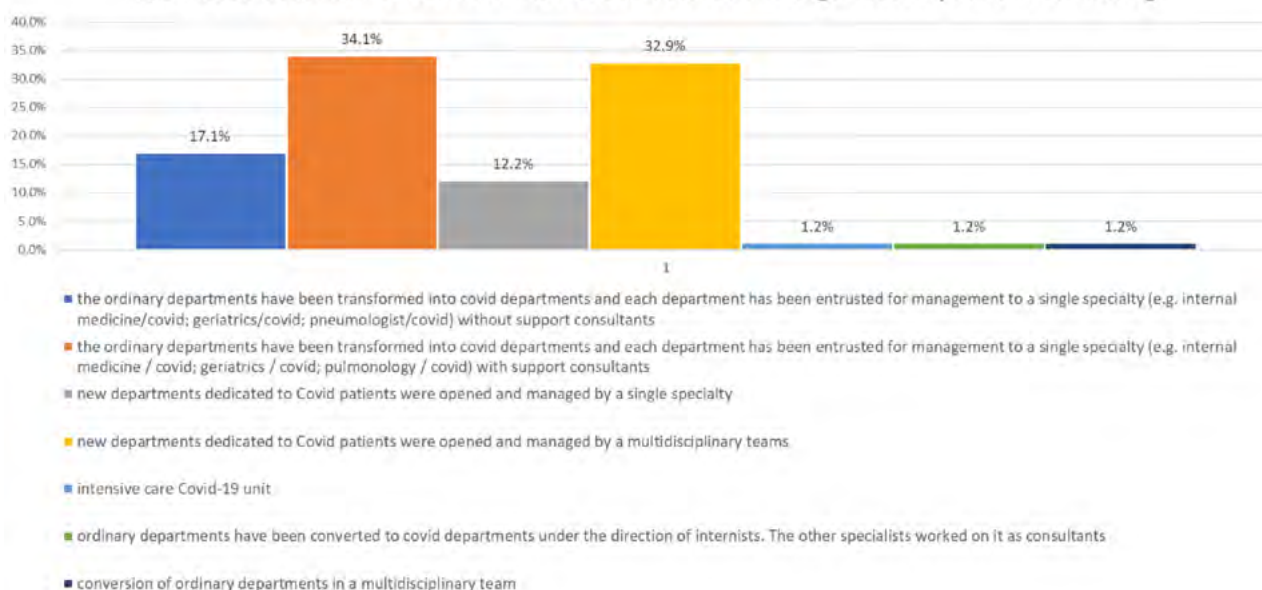


*(Scientific Institute for Research, Hospitalization and Health Care)

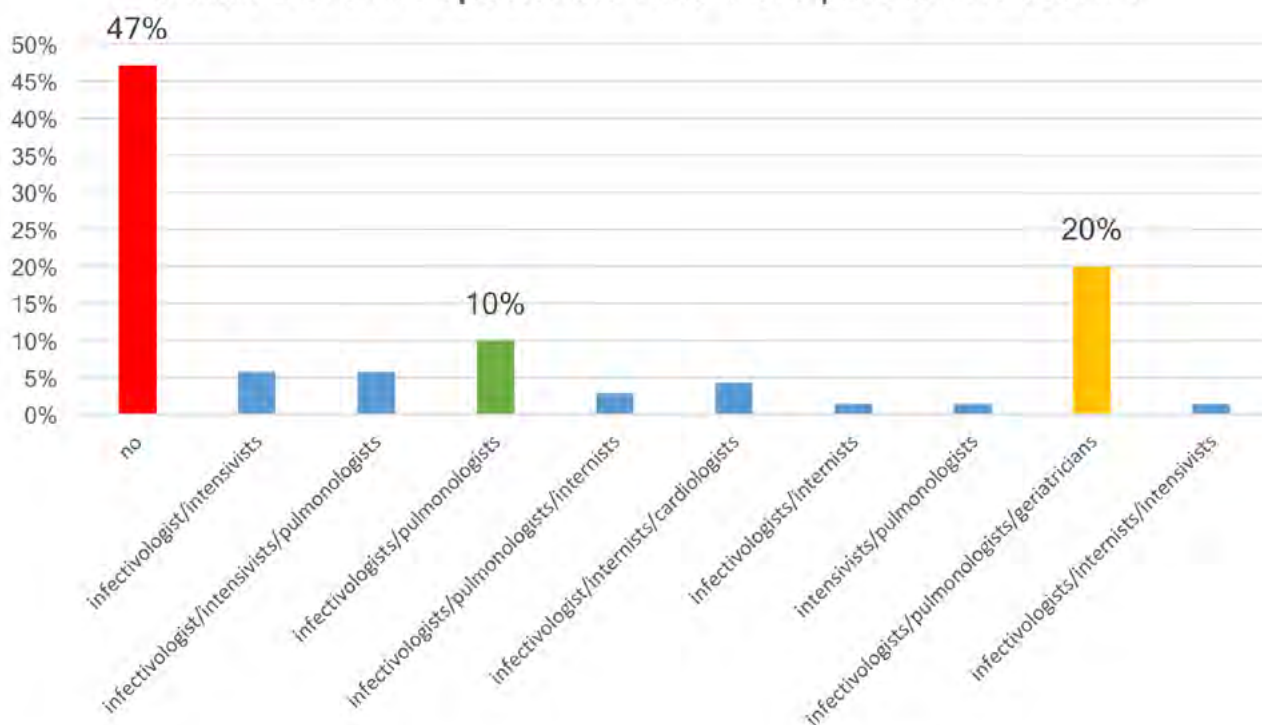
Q.4 Based on your experience, please report which specialists were most frequently dedicated to the care of Covid patients (excluding resuscitators and intensivists)



Q.5 Please describe how Covid Units were structured and organized in your clinical setting



Q.6 If a multidisciplinary team existed in your hospital, which were the specialists who were part of the team ?



Q.7 Which specialist do you think was the most predominant figure for the care of Covid-19 patients? (excluding resuscitators and intensivists)

