Clinical outcomes of SARS-CoV-2 infected people with diabetes who developed Severe Acute Respiratory Syndrome in Brazil

Caroline Marques de Andrade, Eduardo Alexandre Geumaro, Felipe Abrantkoski Borges, Ângelo César Fernandes Jacomossi

ABSTRACT

Objective: Compare the clinical outcomes of people with and without Type 2 Diabetes Mellitus (DM2), infected by SARS-CoV-2, who developed Severe Acute Respiratory Syndrome (SARS) in Brazil. **Methodology:** This is a cross-sectional study. The research was carried out by analyzing the compulsory notification form Severe Acute Respiratory Syndrome of hospitalized patients, obtained from DATASUS. Type 2 diabetic and non-diabetic men and women infected with SARS-CoV-2 and notified as SARS in the period February 2020 to May 2021 were analyzed. The outcomes were identified as: hospitalization, Intensive Care Unit (ICU) admission, and death. The percentage of each outcome among diabetic patients was compared with that of the infected non-diabetic patients in the same period using the Chi-square test, with a 95% confidence interval. **Results:** From a total of 384,805 patients, 111,046 were diabetic and 273,759 non-diabetic. Among the diabetic patients, 98.2% were hospitalized, 43.7% were admitted to the ICU, and 44.6% died. While among non-diabetics, 97.3% required hospitalization, 37.2% were admitted to the ICU, and 35.7% died. After the analysis with the Chi-square test, a statistically significant difference was found between the groups ($p<0.001$). **Conclusion:** The presence of DM2 was associated with a worse prognosis for COVID-19 compared to people without DM2, in the Brazilian population. However, further studies are needed to establish causality and elucidate the pathophysiology of this association.

Keywords: COVID-19, Diabetes Mellitus/complications, SARS-CoV-2.

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https://doi.org/10.11606/issn.2176-7262.rmrp.2022.192312

INTRODUCTION

Diabetes mellitus (DM) is a long-term (or chronic) metabolic disorder characterized by persistent hyperglycemia, resulting from deficient insulin production or difficulty in the action of insulin production, or in both mechanisms[1]. It has reached epidemic proportions, with an estimated 463 million people with DM worldwide[2]. The persistent hyperglycemic state has been associated with chronic micro and macrovascular complications, reduced quality of life, and increased morbidity and mortality. The most common type of DM, the object of study of this research, type 2 diabetes mellitus (DM2) covers people with relative insulin deficiency and peripheral insulin resistance, corresponding to 90–95% of all DM cases. It is a polygenic disease involving genetic and environmental components, including dietary habits and physical inactivity, which contribute to obesity[1]. DM2 is widely cited in the medical literature as a risk factor for complications and/or genesis of other pathological states: those with cardiac, vascular, renal, and peripheral nervous system origin stand out. Likewise, it can also be an aggravator in infectious states, such as infection with the new coronavirus (SARS CoV-2).

COVID-19 is caused by SARS CoV-2 and first emerged in December 2019, when a group of patients with pneumonia of unknown cause was recognized in Wuhan, China. In just a few months, more than 200 countries were affected, resulting in millions of identified cases with more than half a million confirmed deaths. SARS-CoV-2 belongs to the family of coronaviruses that are RNA, enveloped, single-stranded viruses found in humans and other mammals. They commonly cause respiratory, gastrointestinal, and neurological diseases. SARS-CoV-2 is the third coronavirus to spread globally in the last two decades (SARS-CoV, 2002-2003; MERS, 2012), causing severe disease in humans[3]. The clinical presentation of SARS-CoV-2 infection is diverse, ranging from asymptomatic, symptomatic, or even fatal. Among symptomatic patients with COVID-19, cough, myalgias, and headache are the most commonly reported symptoms. Pneumonia is the most frequent severe manifestation of infection, characterized mainly by fever, cough, dyspnea, and bilateral infiltrates on chest images. The main, potentially fatal complications include Acute Respiratory Distress Syndrome, cardiac and/or cardiovascular distress, and thromboembolic, neurological, and inflammatory issues[4].

According to an update from the Center for Disease Control and Prevention (CDC), DM2 represents one of the risk factors for severe COVID-19[5]. Furthermore, evidence has shown that the risk of a fatal outcome from COVID-19 is up to 50% higher in patients with diabetes than in those without[6]. However, the literature still lacks data that elucidate this correlation, which is a relevant topic for research since clarifying this relationship and the influence of other factors can lead to better clinical management of these patients.

Therefore, the objective of this study was to compare the clinical outcomes of people with and without DM2, infected by SARS-CoV-2, who developed Severe Acute Respiratory Syndrome in Brazil to understand the clinical evolution of COVID-19.

MATERIALS AND METHODS

This is an observational, cross-sectional, and documentary research carried out based on data from the compulsory notification forms of Severe Acute Respiratory Syndrome collected on the DATASUS platform, a Brazilian national database of the Ministry of Health.

The sample consisted of men and women with and without DM2, over 40 years of age, from all over the country, who were infected with SARS-CoV-2 in the period between February 22, 2020, and May 17, 2021, and evolved to the condition called Severe Acute Respiratory Syndrome (SARS) (person of any age, with flu-like syndrome and who has dyspnea or the following signs of severity: SpO2 saturation <95% in ambient air; Signs of respiratory distress or increase in respiratory rate assessed according to age; Worsening in the clinical conditions of the underlying disease; Hypotension in relation to the patient's usual blood pressure; or a person of any age with acute respiratory failure). Patients whose records did not contain the minimum necessary information were excluded from this research. The sample of people with DM2 consisted of 111,046

patients, and the sample of non-diabetic people was composed of 273,759 patients.

In the SARS compulsory notification form, the following variables were analyzed: Sex; Age (in years); Brazilian state of notification; Presence of diabetes; Test result for COVID-19; Need for hospital admission; Need for ICU admission; Case evolution (ignored, cured, and death). Regardless of the test result for COVID-19, those with a positive result in the molecular biology test for SARS-CoV-2 and/or antigenic test were considered positive.

After obtaining data, the following variables were categorized: sex: male or female; 'age: from 40 to 49 years old, 50 to 59 years old, 60 to 69 years old, 70 to 79 years old, 80 to 89 years old, 90 to 99 years old, and 100 years or over; Need for hospital admission: yes or no, and Need for ICU admission: yes or no; finally, the variable 'evolution' was categorized according to the filling in the notification form, divided into ignored, cured, and death.

The following variables 'hospitalization,' 'ICU admission,' and 'death' were considered the primary outcome. Forms with outcomes 'ignored' or did not contain information about the outcome were not considered for statistical analysis.

In addition to diabetes mellitus, comorbidities considered in the notification form were included in the analysis, namely: heart disease, hematologic disease, Down syndrome, liver disease, asthma, neurological disorders, pneumopathy, immunodepression, kidney disease, obesity, and others, to verify the influence of these comorbidities on the outcomes analyzed.

After the collection, the data were categorized in Excel ® and submitted to statistical analysis by the Biostat ® software. An ANOVA test showed that the data were non-parametric, and the Chi-Square Test for statistical inference compared the primary outcomes between the groups analyzed with a confidence interval of 95%.

RESULTS

From a total of 384,805 patients, 111,046 were people with DM2 and 273,759 without this disease. In the first group, the mean age was 67 years, and 52.7% were male. While for people without DM2, the average age was 63.9 years, and 57.3% were male. The other characteristics of each analyzed variable are shown in Table 1.

During the analyzed period, there were 369,735 hospitalizations, 135,344 ICU admissions, and 139,729 deaths, 96.0%, 35.1%, and 36.3%, respectively. Considering that the same patient could be hospitalized and admitted to the ICU, the data were considered as an absolute value, which includes the patient in more than one of the analyzed outcomes. The division between the diabetic and non-diabetic groups is shown in Table 1.

Hospitalizations in the group of people with DM2 were 108,063 (98.2%), slightly higher than the group of non-diabetics, which were 261,672 (97.3%). During the data analysis, 7,202 missing data regarding this outcome were recorded. The Chi-Square test found a statistically significant difference ($p<0.0001$) between the groups. Data regarding hospitalization in each group are shown in Table 2 and Graph 1.

The ICU admission found in the group of people with DM2 was 45,694 (43.7%), higher than that found in the non-diabetic group, 89,650 (37.3%). During the analysis of hospitalized patients, 36,166 missing data regarding ICU admission were recorded. The Chi-Square test found a statistically significant difference ($p<0.001$) between the groups. Data regarding ICU admission in each group are shown in Table 2 and Graph 1.

Deaths of diabetic patients were 47,188 (44.6%), higher than those of non-diabetics, which were 92,541 (35.7%). During the data analysis, 19,943 missing data regarding this outcome were recorded, 5,306 (4.7%) were diabetic, and 14,637 (5.3%) were non-diabetic. The Chi-Square test found a statistically significant difference ($p<0.001$) between the groups. Data regarding deaths in each group are shown in Table 2 and Graph 1.

In addition to diabetes, other comorbidities that may contribute to the outcome were considered, such as heart disease; hematologic disease; Down syndrome; liver disease; asthma; neurological disease; pneumopathy; immunodepression; kidney disease; obesity. These are listed in Table 1. The most prevalent in the groups analyzed were heart disease and obesity, among people with DM2 59.1% and 8.8%, and without DM2 31.8% and 5.0%, respectively.

Table 1. Sample baseline characteristics divided into their respective groups.

	People with DM2	People without DM2
Total	111,046	273,759
Female	52,503 (47.3%)	117,072 (42.7%)
Male	58,543 (52.7%)	156,687 (57.3%)
Age: Average	67	63.97
40-49 years	9820 (8.8%)	52918 (19.3%)
50-59 years	21104 (19%)	60760 (22.1%)
60-69 years	32549 (29.3%)	61560 (22.4%)
70-79 years	29130 (26.2%)	51872 (18.9%)
80-89 years	15409 (13.9%)	35841 (13%)
90-99 years	2945 (2.6%)	10293 (3.7%)
More than 100 years	89 (0.0%)	515 (0.1%)
Primary outcomes		
Death	47188 (44.5%)	92541 (35.7%)
Hospitalization	108063 (98.2%)	261672 (97.3%)
ICU admission	45694 (43.7%)	89650 (37.2%)
Comorbidities		
Heart disease	65691 (59.1%)	87000 (31.8%)
Hematologic	943 (0.8%)	2032 (0.7%)
Down syndrome	72 (0.3%)	508 (0.1%)
Liver disease	1418 (1.3%)	2314 (0.8%)
Asthma	2878 (2.6%)	6717 (2.4%)
Neurological disease	5173 (4.66%)	11842 (4.3%)
Pneumopathy	5299 (4.77%)	11502 (4.2%)
Immunodepression	2864 (2.6%)	7594 (2.7%)
Kidney disease	8343 (7.5%)	9182 (3.3%)
Obesity	9764 (8.8%)	13900 (5.0%)
Other Comorbidities	39759 (35.8%)	73649 (26.9%)

*The percentages presented refer to the total information, disregarding missing data.

DISCUSSION

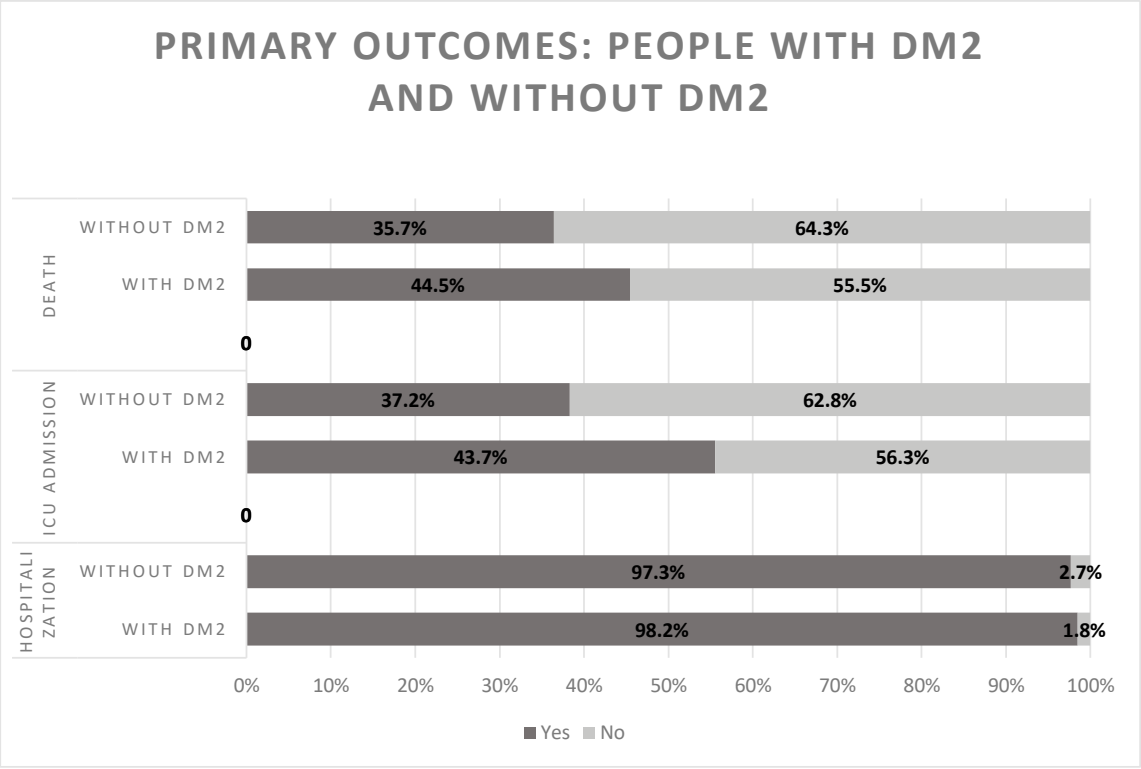
This study showed that among people with and without DM2 infected with SARS-CoV-2 , who developed SARS in the analyzed period, people with DM2 had a higher incidence of hospitalization, with 98.2% to 97.3%, ICU admission, 43.7% for 37.2%, and death, 44.5% for 35.7%. These results suggest that people with DM2 have a worse prognosis when compared to those without this disease, who had a similar clinical presentation.

This finding is in line with what is established in the literature. DM2 is a risk factor for complications and/or genesis of pathological states, especially those with an infectious cause with an associated inflammatory process. DM2 is associated with a chronic inflammatory state, with increased and constant production and release of pro-inflammatory cytokines. In addition, insulin resistance, the pathophysiological basis of DM2, is associated with a 50-60% higher risk of pulmonary infection[7,8]. The literature also suggests that when added to the inflammatory process caused by SARS-CoV-2, this condition triggers a severe clinical condition, consequently resulting in worse prognoses[8].

Table 2. Primary outcomes (Hospitalization, ICU admission, and Death), divided according to the presence of type 2 diabetes mellitus.

	With DM2	without DM2	Chi-Square	P-value
Hospitalization				
Yes	108063 (97.3%)	261672 (95.5%)	281.350	< 0.001
No	1617 (1.4%)	6251 (2.2%)		
Ignored	260 (0.2%)	947 (0.3%)		
Missing data	1108 (0.9%)	4890 (1.7%)		
ICU admission				
Yes	45694 (41.1%)	89650 (32.7%)	1426.066	< 0.001
No	36569 (32.9%)	144266 (52.6%)		
Ignored	2156 (1.9%)	6579 (2.4%)		
Missing data	6583 (5.95)	33266 (12.1%)		
Deaths				
Yes	47188 (42.4%)	92541 (33.8%)	2526.523	< 0.001
No	56644 (51.0%)	161587 (59.0%)		
Missing data	5183 (4.6%)	14637 (5.3%)		

*The percentages presented refer to the total value of each group. For statistical analysis, just the 'yes' and 'no' answers for each outcome were considered.



Graph 1. Comparison between the percentages of the primary outcome within the groups with and without DM2. Only 'yes' and 'no' answers were considered.

The results observed in this study are in line with those presented in epidemiological studies of regions affected by COVID-19. A Swedish retrospective cohort, which analyzed severe cases of COVID-19 in people with DM2, observed a 2-fold greater chance for each separate outcome: hospitalization, ICU admission, and death, compared to the non-diabetic Swedish population[9]. Another retrospective cohort, carried out in Wuhan, China, with 258 patients hospitalized with COVID-19, similar to this study, predominantly male with a mean age of 64 years, showed that people with DM2 are more likely to develop a more severe clinical outcome from COVID-19, with more complications, higher rate of need for respiratory support, whether invasive or non-invasive, progressing to death, compared to non-diabetic patients (11.1% vs. 4.1%)[10]. A single-center, retrospective, observational study carried out at Tongji Hospital, the main reference for the treatment of COVID-19, in Wuhan, China, evaluated 193 hospitalized patients with severe COVID-19, with a mean age of 64 years and a predominance of male patients (59.1%), found that there was greater admission to the ICU of people with DM2 than non-diabetics (66.7% vs. 41.4%), and higher mortality (81.3% vs. 47.6%)[11].

The conclusions regarding the results have a limited scope since studies suggest that the severity of COVID-19 is related to glycemic and metabolic control, measured by Glycated Hemoglobin (HbA1c), and the database used for this research did not have this information available[12,13]. In addition, another factor that influences the severity of COVID-19 includes the presence of other comorbidities. Due to the use of secondary data, information on adjacent comorbidities was inadequate[13]. Furthermore, it was difficult to analyze the document used to obtain data. The data requested by the notification form (Annex A) were incomplete since the document should be constantly updated according to the evolution of the patient's condition, the admission data referring to adjacent comorbidities contained much missing information, which is relevant to assess the probability of a worse prognosis. Due to the limitations presented, the results of this study should not be extrapolated to the entire DM2 population, considering its heterogeneity.

CONCLUSION

Despite the limitations presented, the results indicate that the risk for a worse prognosis in people with DM2, who have developed SARS due to COVID-19, is significant in Brazil. This finding indicates that such patients should receive special attention from health services, from health promotion to secondary prevention measures, including adequate treatment for DM2, with consequent metabolic control, improvement in quality of life, and reduction of risk of complications from diabetes. Moreover, further studies are needed to objectively demonstrate the real pathophysiological correlation between DM2 and SARS-CoV-2 to propose specific measures to prevent fatal outcomes in patients with this comorbidity who may develop COVID-19. It is also extremely important to develop a more objective document that provides information relevant to the patient's assessment and facilitates the proper completion of the requested data.

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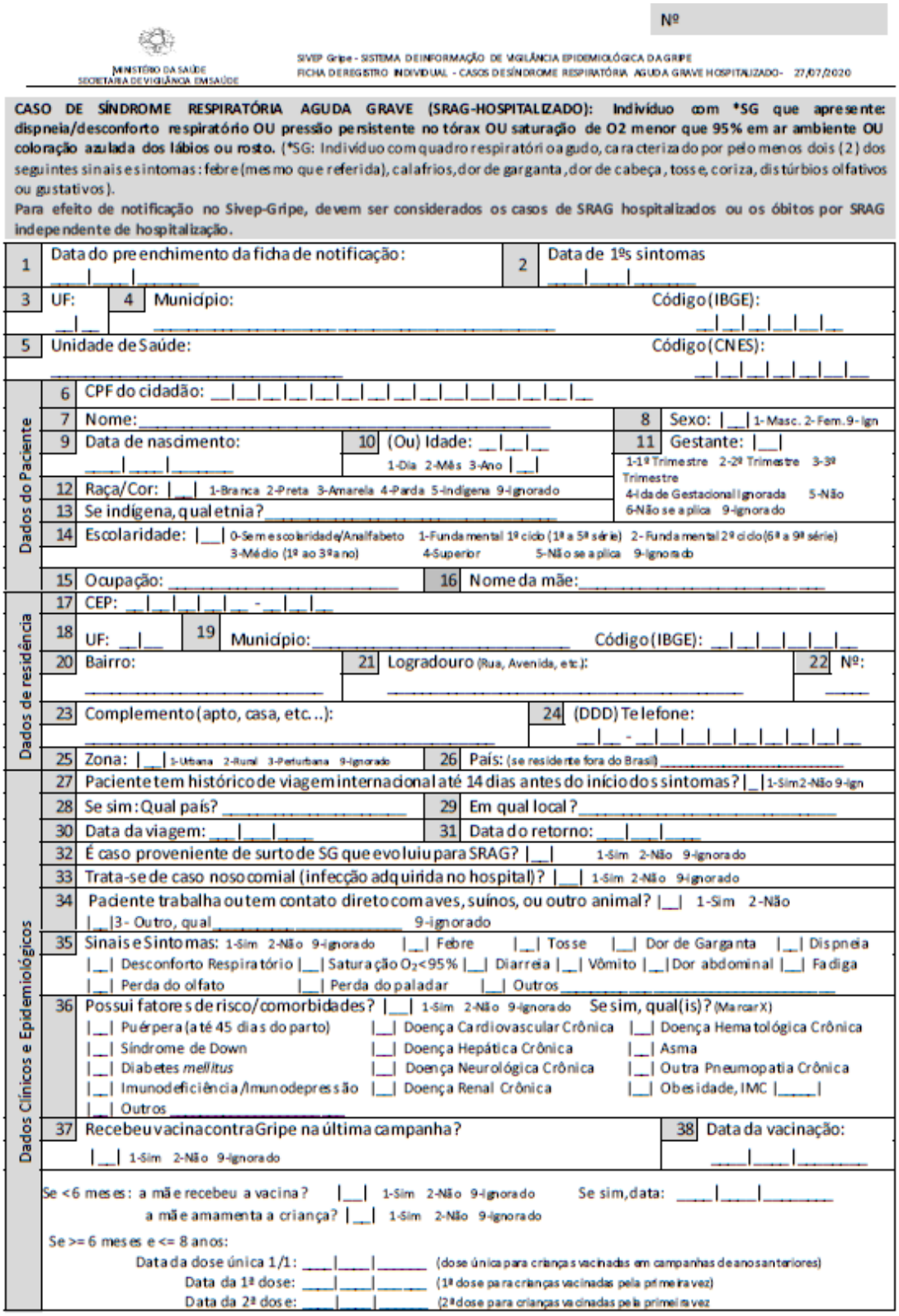
Annex A



Nº

MINISTÉRIO DA SAÚDE
SECRETARIA DE VIGILÂNCIA EM SAÚDE

SIVEP Gripe - SISTEMA DE INFORMAÇÃO DE VIGILÂNCIA EPIDEMIOLÓGICA DA GRIPE
FICHA DE REGISTRO INDIVIDUAL - CASOS DE SÍNDROME RESPIRATÓRIA AGUDA GRAVE HOSPITALIZADO- 27/07/2020

CASO DE SÍNDROME RESPIRATÓRIA AGUDA GRAVE (SRAG-HOSPITALIZADO): Indivíduo com *SG que apresente: dispneia/desconforto respiratório OU pressão persistente no tórax OU saturação de O2 menor que 95% em ar ambiente OU coloração azulada dos lábios ou rosto. (*SG: Indivíduo com quadro respiratório agudo, caracterizado por pelo menos dois (2) dos seguintes sinais e sintomas: febre (mesmo que referida), calafrios, dor de garganta, dor de cabeça, tosse, coriza, distúrbios olfativos ou gustativos).

Para efeito de notificação no Sivep-Gripe, devem ser considerados os casos de SRAG hospitalizados ou os óbitos por SRAG independente de hospitalização.

1 Data do preenchimento da ficha de notificação: __/__/____ | 2 Data de 1ºs sintomas __/__/____

3 UF: __ | 4 Município: _____ Código (IBGE): _____

5 Unidade de Saúde: _____ Código (CNES): _____

Dados do Paciente

6 CPF do cidadão: _____

7 Nome: _____ | 8 Sexo: __ 1-Masc. 2-Fem. 9-Ign

9 Data de nascimento: __/__/____ | 10 (Ou) Idade: __ 1-Dia 2-Mês 3-Ano __ | 11 Gestante: __ 1-1º Trimestre 2-2º Trimestre 3-3º Trimestre 4-Ida de Gestacional Ignorada 5-Não 6-Não se aplica 9-Ignorado

12 Raça/Cor: __ 1-Branca 2-Preta 3-Amarela 4-Parda 5-Indígena 9-Ignorado

13 Se indígena, qual etnia? _____

14 Escolaridade: __ 0-Sem escolaridade/Analfabeto 1-Fundamental 1º ciclo (1ª a 5ª série) 2-Fundamental 2º ciclo (6ª a 9ª série) 3-Médio (1º ao 3º ano) 4-Superior 5-Não se aplica 9-Ignorado

15 Ocupação: _____ | 16 Nome da mãe: _____

Dados de residência

17 CEP: __/__/__ - __/__/__

18 UF: __/__ | 19 Município: _____ Código (IBGE): __/__/__/__/__/__

20 Bairro: _____ | 21 Logradouro (Rua, Avenida, etc.): _____ | 22 Nº: ____

23 Complemento (apto, casa, etc...): _____ | 24 (DDD) Telefone: __/__ - __/__/__/__/__/__/__/__/__

25 Zona: __ 1-Urbana 2-Rural 3-Periurbana 9-Ignorado | 26 País: (se residente fora do Brasil) _____

Dados Clínicos e Epidemiológicos

27 Paciente tem histórico de viagem internacional até 14 dias antes do início dos sintomas? __ 1-Sim 2-Não 9-Ign

28 Se sim: Qual país? _____ | 29 Em qual local? _____

30 Data da viagem: __/__/____ | 31 Data do retorno: __/__/____

32 É caso proveniente de surto de SG que evoluiu para SRAG? __ 1-Sim 2-Não 9-Ignorado

33 Trata-se de caso nosocomial (infecção adquirida no hospital)? __ 1-Sim 2-Não 9-Ignorado

34 Paciente trabalha ou tem contato direto com aves, suínos, ou outro animal? __ 1-Sim 2-Não __ 3- Outro, qual _____ 9-Ignorado

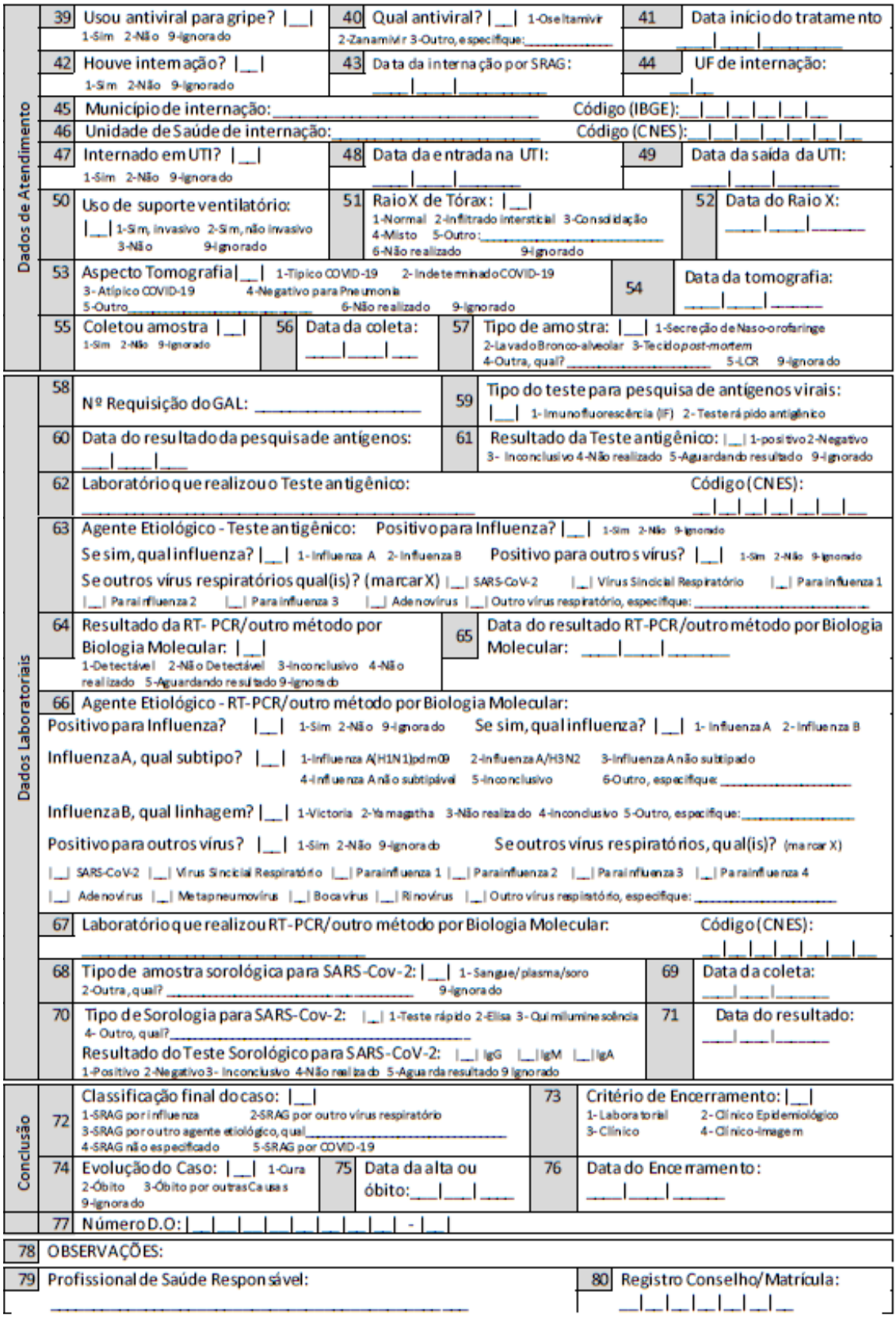
35 Sinais e Sintomas: 1-Sim 2-Não 9-Ignorado __ Febre __ Tosse __ Dor de Garganta __ Dispneia __ Desconforto Respiratório __ Saturação O_2<95% __ Diarreia __ Vômito __ Dor abdominal __ Fadiga __ Perda do olfato __ Perda do paladar __ Outros _____

36 Possui fatores de risco/comorbidades? __ 1-Sim 2-Não 9-Ignorado Se sim, qual(is)? (Marcar X)
__ Puérpera (até 45 dias do parto) __ Doença Cardiovascular Crônica __ Doença Hematológica Crônica
__ Síndrome de Down __ Doença Hepática Crônica __ Asma
__ Diabetes *mellitus* __ Doença Neurológica Crônica __ Outra Pneumopatia Crônica
__ Imunodeficiência/Imunodepressão __ Doença Renal Crônica __ Obesidade, IMC ____
__ Outros _____

37 Recebeu vacina contra Gripe na última campanha? __ 1-Sim 2-Não 9-Ignorado | 38 Data da vacinação: __/__/____

Se <6 meses: a mãe recebeu a vacina? __ 1-Sim 2-Não 9-Ignorado Se sim, data: __/__/____
a mãe amamenta a criança? __ 1-Sim 2-Não 9-Ignorado

Se >= 6 meses e <= 8 anos:
Data da dose única 1/1: __/__/____ (dose única para crianças vacinadas em campanhas de anos anteriores)
Data da 1ª dose: __/__/____ (1ª dose para crianças vacinadas pela primeira vez)
Data da 2ª dose: __/__/____ (2ª dose para crianças vacinadas pela primeira vez


Dados de Atendimento
39 Usou antiviral para gripe? |__| 1-Sim 2-Não 9-Ignorado
40 Qual antiviral? |__| 1-Oseltamivir 2-Zanamivir 3-Outro, especifique:_____
41 Data início do tratamento ____|____|_____
42 Houve internação? |__| 1-Sim 2-Não 9-Ignorado
43 Data da internação por SRAG: ____|____|_____
44 UF de internação: __|__
45 Município de internação:_____ Código (IBGE):__|__|__|__|__|__|__
46 Unidade de Saúde de internação:_____ Código (CNES):__|__|__|__|__|__|__
47 Internado em UTI? |__| 1-Sim 2-Não 9-Ignorado
48 Data da entrada na UTI: ____|____|_____
49 Data da saída da UTI: ____|____|_____
50 Uso de suporte ventilatório: |__| 1-Sim, invasivo 2-Sim, não invasivo 3-Não 9-Ignorado
51 Raio X de Tórax: |__| 1-Normal 2-Infiltrado intersticial 3-Consolidação 4-Misto 5-Outro:_____ 6-Não realizado 9-Ignorado
52 Data do Raio X: ____|____|_____
53 Aspecto Tomografia |__| 1-Típico COVID-19 2-Indeterminado COVID-19 3-Atípico COVID-19 4-Negativo para Pneumonia 5-Outro_____ 6-Não realizado 9-Ignorado
54 Data da tomografia: ____|____|_____
55 Coletou amostra |__| 1-Sim 2-Não 9-Ignorado
56 Data da coleta: ____|____|____
57 Tipo de amostra: |__| 1-Secreção de Naso-orofaringe 2-Lavado Bronco-alveolar 3-Tecido post-mortem 4-Outra, qual?_____ 5-LCR 9-Ignorado
Dados Laboratoriais
58 Nº Requisição do GAL: _____
59 Tipo do teste para pesquisa de antígenos virais: |__| 1-Imunofluorescência (IF) 2-Teste rápido antigênico
60 Data do resultado da pesquisa de antígenos: ____|____|____
61 Resultado da Teste antigênico: |__| 1-positivo 2-Negativo 3-Inconclusivo 4-Não realizado 5-Aguardando resultado 9-Ignorado
62 Laboratório que realizou o Teste antigênico: _____ Código (CNES): __|__|__|__|__|__|__
63 Agente Etiológico - Teste antigênico: Positivo para Influenza? |__| 1-Sim 2-Não 9-Ignorado
Se sim, qual influenza? |__| 1-Influenza A 2-Influenza B Positivo para outros vírus? |__| 1-Sim 2-Não 9-Ignorado
Se outros vírus respiratórios qual(is)? (marcar X) |__| SARS-CoV-2 |__| Vírus Sincicial Respiratório |__| Parainfluenza 1 |__| Parainfluenza 2 |__| Parainfluenza 3 |__| Adenovírus |__| Outro vírus respiratório, especifique: _____
64 Resultado da RT- PCR/outro método por Biologia Molecular: |__| 1-Detectável 2-Não Detectável 3-Inconclusivo 4-Não realizado 5-Aguardando resultado 9-Ignorado
65 Data do resultado RT-PCR/outro método por Biologia Molecular: ____|____|_____
66 Agente Etiológico - RT-PCR/outro método por Biologia Molecular:
Positivo para Influenza? |__| 1-Sim 2-Não 9-Ignorado Se sim, qual influenza? |__| 1- Influenza A 2- Influenza B
Influenza A, qual subtipo? |__| 1-Influenza A(H1N1)pdm09 2-Influenza A/H3N2 3-Influenza A não subtipado 4-Influenza A não subtipável 5-Inconclusivo 6-Outro, especifique: _____
Influenza B, qual linhagem? |__| 1-Victoria 2-Yamagatha 3-Não realizado 4-Inconclusivo 5-Outro, especifique:_____
Positivo para outros vírus? |__| 1-Sim 2-Não 9-Ignorado Se outros vírus respiratórios, qual(is)? (marcar X)
|__| SARS-CoV-2 |__| Vírus Sincicial Respiratório |__| Parainfluenza 1 |__| Parainfluenza 2 |__| Parainfluenza 3 |__| Parainfluenza 4
|__| Adenovírus |__| Metapneumovírus |__| Bocavírus |__| Rinovírus |__| Outro vírus respiratório, especifique: _____
67 Laboratório que realizou RT-PCR/outro método por Biologia Molecular: _____ Código (CNES): __|__|__|__|__|__|__
68 Tipo de amostra sorológica para SARS-Cov-2: |__| 1-Sangue/plasma/soro 2-Outra, qual? _____ 9-Ignorado
69 Data da coleta: ____|____|_____
70 Tipo de Sorologia para SARS-Cov-2: |__| 1-Teste rápido 2-Elisa 3-Quimiluminescência 4-Outro, qual?_____
Resultado do Teste Sorológico para SARS-CoV-2: |__| IgG |__| IgM |__| IgA 1-Positivo 2-Negativo 3-Inconclusivo 4-Não realizado 5-Aguarda resultado 9-Ignorado
71 Data do resultado: ____|____|_____
Conclusão
72 Classificação final do caso: |__| 1-SRAG por influenza 2-SRAG por outro vírus respiratório 3-SRAG por outro agente etiológico, qual_____ 4-SRAG não especificado 5-SRAG por COVID-19
73 Critério de Encerramento: |__| 1-Laboratorial 2-Clínico Epidemiológico 3-Clínico 4-Clínico-Imagem
74 Evolução do Caso: |__| 1-Cura 2-Óbito 3-Óbito por outras Causas 9-Ignorado
75 Data da alta ou óbito: ____|____|_____
76 Data do Encerramento: ____|____|_____
77 Número D.O: |__|__|__|__|__|__|__|__|__| - |__|
78 OBSERVAÇÕES:
79 Profissional de Saúde Responsável: _____
80 Registro Conselho/Matrícula: __|__|__|__|__|__|__

Contributions
- Substantial contribution to the study design or data interpretation; Andrade CM, Geumaro EA, Borges FA, Jacomossi ACF.
- Participation in the drafting of the draft version; Andrade CM, Geumaro EA, Borges FA.
- Participation in the review and approval of the final version; Andrade CM, Geumaro EA, Borges FA, Jacomossi ACF.
- Compliance with being responsible for the accuracy or completeness of any part of the study. Andrade CM, Geumaro EA, Borges FA, Jacomossi ACF.

Financing
Research with own funding source.

Acknoledgements
Teacher Dr. Fernanda Maria Veanholi Vechiato Rainha and Teacher. Dr. Larissa Martins Melo: Professors of the discipline "Development of the scientific project and clinical article". Theoretical foundation and guidance in all stages of research development.
Igor Jacomossi: Theoretical guidance on statistics and statistical analysis of research data.

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Editor:
Prof. Dr Felipe Villela Gomes

Received: nov 08, 2021
Approved: apr 13, 2022