

# Indonesian Journal of Tropical and Infectious Disease

Vol. 10 No. 2 May–August 2022

## Original Article

### Analysis of COVID-19 Surveillance System at Makassar City Health Office 2020

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Received: August 24<sup>th</sup>, 2021; Revised: December, 17<sup>th</sup> 2021; Accepted: June 21<sup>st</sup>, 2022

#### ABSTRACT

One of the infectious diseases that emerged in Indonesia in 2020 has been designated as a COVID-19 pandemic since March 11, 2020, and until now, the pandemic has not been completed. Surveillance has a role in providing information on targeted disease control activities; analyzed the COVID-19 surveillance system based on the current system approach at the Makassar City Health Office. Methods This research is a descriptive observational study conducted in September-October 2020. Data collection was carried out using in-depth interviews with people who were key informants of COVID-19 surveillance activities. There are four informants in this study. In addition, secondary data was obtained from the P2P field regarding COVID-19 cases. In general, the Input component has not been fulfilled; HR has multiple tasks, the job desk is irregular, and several important forms are not used in the methods section. The process component has been running but has not been maximized because there are still incomplete data, no reports based on the PE form, the All-Record TC-19 information system has not been used, and data analysis is still incomplete, data analysis is not equipped with data interpretation. In the Output component, the success rate for public health surveillance criteria has not been evaluated, and the dissemination of information has been carried out well across sectors. The implementation of COVID-19 surveillance at the Makassar City Health Office has been carried out well, but some things are still not optimal.

**Keywords:** COVID-19; input; output; proses; surveillance

#### ABSTRAK

Salah satu penyakit menular yang muncul di Indonesia pada tahun 2020 telah ditetapkan sebagai pandemi COVID-19, sejak tanggal 11 Maret 2020 dan sampai saat ini pandemi belum selesai. Surveilans memiliki peranan untuk memberikan informasi terhadap kegiatan pemberantasan penyakit tujuan ; melakukan analisis sistem surveilans COVID-19, berdasarkan pendekatan sistem yang sedang berjalan di Dinas Kesehatan Kota Makassar. Metode Penelitian ini merupakan penelitian deskriptif observasional yang dilakukan pada bulan September-Oktober 2020. Pengumpulan data dilakukan dengan cara indepth interview kepada orang yang sebagai informan kunci dari kegiatan surveilans COVID-19. Informan dalam penelitian ini ada 4 orang. Data sekunder diperoleh dari bidang P2P tentang kasus COVID-19. Pada komponen Input secara umum belum terpenuhi; SDM memiliki tugas rangkap, jobdesk yang tidak teratur, pada bagian metode terdapat beberapa formulir penting yang tidak digunakan. Pada komponen proses sudah berjalan namun belum maksimal karena masih ada data yang kurang lengkap, tidak ada laporan berdasarkan form PE, sistem informasi All- Record TC-19 belum digunakan, analisis data masih ada yang kurang lengkap, analisis data belum dilengkapi dengan

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interpretasi data. Pada komponen Output belum dievaluasinya angka keberhasilan kriteria surveilans kesehatan masyarakat dan penyebaran informasi telah dilakukan dengan baik dengan

*lintas sector. Dalam pelaksanaan surveilans COVID-19 di Dinas Kesehatan Kota Makassar telah terlaksana dengan baik, namun masih terdapat beberapa hal yang belum maksimal.*

**Kata kunci:** COVID-19; input; output; proses; surveilans

**How to Cite:** Fatmasari., Syahrul, F., Darajat, Z., Kusuma, E.F. Analysis of COVID-19 Surveillance System at Health Department of Makassar 2020. Indonesian Journal of Tropical and Infectious Disease. 10(2). 83–92. Aug. 2022.

## INTRODUCTION

Coronavirus Disease 2019 is one of the infectious diseases that coincide in Indonesia and other countries.<sup>1</sup> Based on research conducted by the CDC, China found that the cause of pneumonia in this group of patients was a new species of coronavirus, namely SARS CoV 2.<sup>2</sup> The coronavirus is spherical with a diameter of about 125nm as depicted in a study using cryo-electron microscopy.<sup>3</sup>

Covid-19 spreads through droplets released by an infected person and is symptomatic/symptomatic through coughing or sneezing. In addition to symptomatic people, this virus can also be transmitted to asymptomatic people. Cases of transmission from symptomatic hosts are generally because the host has a history of contact with positive COVID-19 people.<sup>4</sup> The CDC says that all people who have been in close contact with someone with COVID-19 should be quarantined for 14 days after their last contact with that person unless they meet the requirements.<sup>5</sup>

Around 80% of cases of COVID-19 are mild and moderate symptoms, 13.8% are seriously ill, and 6.1% are critical cases. The percentage of subjects with no symptoms can not be known. The typical clinical symptoms of this patient are fever, dry cough, difficulty breathing, headache, and pneumonia. Other symptoms that can be found are productive cough, shortness of breath, sore throat, headache, chills, nausea/vomiting, diarrhea, abdominal pain, hemoptysis, and conjunctival congestion.<sup>6</sup>

Coronavirus Disease 2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). On December 31, 2019, the WHO China Country Office reported a case of

pneumonia of unknown etiology in Wuhan City, China. On January 7, 2020, China identified the case as a new type of coronavirus. On January 30, 2020, WHO designated the incident as a Public Health Emergency of International Concern (PHEIC). On March 11, 2020, WHO declared COVID-19 a pandemic. Indonesia reported its first case on March 2, 2020. Cases continued to increase and spread rapidly throughout Indonesia. As of October 16, 2020, the Ministry of Health reported 353,461 confirmed cases with 12,347 deaths.<sup>7</sup>

The high inflow of tourists from abroad has caused Indonesia to Sulawesi, particularly vulnerable to the spread of transnational diseases such as COVID-19. South Sulawesi is one of Indonesia's provinces with a relatively high number of COVID-19 cases as of October 16, 2020, with 17,286 confirmed cases with 442 deaths.<sup>8</sup> Makassar is one of the big cities in South Sulawesi and has the most significant number of COVID-19 cases. Based on the Makassar City Health Service Report on October 17, 2020, 9,098 cumulative positive COVID-19 with 282 positive cases died. Makassar city has 16 sub-districts.

The highest COVID-19 cases occurred in the Rappocini sub-district, with 1,153 cases. The distribution of positive cases of COVID-19 by age group can be seen that the highest number of positive cases of COVID-19 occurred in the age group of 31-40 years, with 2303 cases, and the least number of positive cases of COVID-19 occurred in the age group > 80 years which is 28 cases.<sup>9</sup>

Maintenance of efforts prevention and control of infectious and non-infectious data support is required information through an epidemiological surveillance system disease routinely and integrated as part of the health

epidemiological surveillance system.<sup>10</sup> Surveillance is in the form of continuous and systematic observation for the sake of prevention.<sup>11</sup> The morbidity and mortality rates due to COVID-19 are increasing. Therefore, prevention and control efforts are needed, one of which is epidemiological surveillance.<sup>12</sup> Surveillance is crucial to provide information on disease control activities. The concept adopted by surveillance is the principle of epidemiology in identifying diseases based on variables of person, place, and time.<sup>13</sup>

Surveillance is an essential component of the health system in producing epidemiological information for health services so that diseases and risk factors can be detected early and effective and efficient responses can be made to health services. Surveillance activities are an inseparable part of quarantine. During the quarantine period, surveillance is carried out to monitor changes in the condition of a person or group of people.<sup>14</sup>

Surveillance also enables decision-makers to lead and manage effectively. Public health surveillance provides decision-makers and managers with early warning information about health problems that need attention in a population. The performance of the health epidemiological surveillance system is measured by input, process, and output indicators. The three indicators are one unit, where the weakness of one of these indicators indicates the performance of the surveillance system is not yet adequate. Evaluation is an essential tool for policymakers that help to improve the performance and productivity of health programs.<sup>15</sup> Evaluation surveillance system showed that the system was overall effective in estimating morbidity and mortality and monitoring the disease trend.<sup>16</sup> The rationale for evaluating public health surveillance systems is to determine if the disease is being observed efficiently and effectively.

Every surveillance system should be evaluated periodically with recommendations

to improve the surveillance system's usefulness, quality, and efficiency.<sup>17</sup> All surveillance components such as collection, processing, analysis, and interpretation of data, follow-up, and feedback must be carried out in a systematic and organized manner.<sup>18</sup> Sensitive surveillance in detecting disease trends and being active in finding cases of COVID-19 is very important in efforts to handle and monitor close contacts and people at risk.<sup>19</sup>

The COVID-19 problem requires adequate and comprehensive control efforts. These efforts must be supported by providing precise and accurate data and information systematically and continuously through a good surveillance system.<sup>20</sup> The results of surveillance activities will be used as input to reduce morbidity and mortality and improve health status.<sup>21</sup>

In general, the goal is to describe the COVID-19 Surveillance system based on a system approach (input, process, output) to analyze the existing health condition so that priority problems can be determined at the Makassar City Health Office in 2020.

The specific objectives to be achieved include: Obtain an overview of the regional situation at the Makassar City Health Office; Get an overview of the COVID-19 surveillance system at the Makassar City Health Office; Obtain an overview of the implementation of the COVID-19 surveillance program at the Makassar City Health Office based on a systems approach; Studying the problems of the COVID-19 surveillance program related to identifiable health problems and the quality of the data collected. Determining priorities for the COVID-19 Surveillance Program problem at the Makassar City Health Office. And planning an alternative solution to the COVID-19 Surveillance Program at the Makassar City Health Office.

## **MATERIALS AND METHODS**

This research design uses a descriptive observational design that aims to describe the

activities of the COVID-19 Surveillance Program at the Makassar City Health Office through problem identification and represents the priority of the problem determined based on the method used and alternative problem-solving.

The location of this research is at the Makassar City Health Office, which will be held from 26 September to 11 October 2020.

Data collection was carried out using in-depth interviews with the holders of the COVID-19 surveillance program, the Head of the Surveillance & Immunization Section, and employees involved in COVID-19 activities at the Makassar City Health Office, which was carried out on several people who were considered key informants of the COVID-19 Surveillance activity.<sup>22</sup>

Four informants in the activity consisted of 1 coordinator of the COVID-19 surveillance program, namely the Head of the Surveillance and Immunization Section and staff who joined the COVID-19 surveillance program, and one student.

The technique of determining the priority of the problem in this study is to use the CARL method. The CARL method is C is Capability (availability of resources), A is Accessibility (easiness), R is Readiness (readiness of implementing personnel and target readiness), and L is Leverage (how much influence one criterion has on another in problem-solving). This method aims to determine the problems that will be prioritized from the results of problem identification.<sup>23</sup>

The presentation of data in this activity report is in the form of tables, graphs, and images which are then analyzed using a straightforward narrative.

## RESULTS AND DISCUSSION

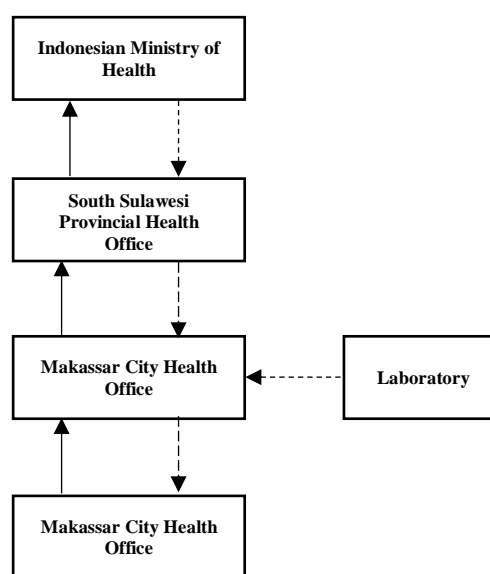
### Overview of the Makassar City Health Office Situation

Makassar City Health Office Vision “Healthy and Comfortable Makassar for All Towards a World City.” And Makassar City Health Service Mission: Improving quality

and affordable health services based on technology. Improving public health and community empowerment. Ensure public health through the health insurance system. And creating a healthy environment.

### Overview of the COVID-19 Surveillance System at the Makassar City Health Office (The flow of Reporting and Feedback on COVID-19 Case Management at the Makassar City Health Office).

The mechanism for reporting and feedback on the COVID-19 surveillance program as shown in Figure 1.



**Figure 1.** COVID-19 Surveillance Reporting & Feedback Mechanism<sup>9</sup>

### The Importance of COVID-19 Surveillance

The high number of COVID-19 cases in Makassar City has caused the local government to act to handle this case so that it does not continue to increase. However, the handling of this COVID-19 case needs intervention. Adequate Epidemiological Information is information that can provide an overview of the situation regarding COVID-19 in Makassar City, which includes variables of people, place, and time as well as risk factors that increase the occurrence of COVID-19. Therefore, the Makassar City Health Office conducted COVID-19 surveillance to obtain adequate epidemiological information. The implementation of COVID-

19 surveillance at the Makassar City Health Office is essential because it functions to evaluate programs and make recommendations so that the handling of COVID-19 cases can be right on target.

### **Overview of the Implementation of the COVID-19 Surveillance System at the Makassar City Health Office**

#### **Input**

The input components in the COVID-19 surveillance system include:

##### **a. Human Resources (HR)**

Human resources in COVID-19 surveillance at the Makassar City Health Office consist of 8 people from the disease prevention and control, including one program coordinator, namely the Head of the Surveillance and Immunization Section, assisted by several staff and contract workers. The latest educational background includes D3 (Nursing), S1 (Doctor and Bachelor of Public Health, and Master of Public Health). Meanwhile, human resources for COVID-19 surveillance activities at the health facilities level are doctors, nurses, midwives, and public health.

##### **b. Funding**

The current source of funds for COVID-19 surveillance comes from the Makassar City APBD through the Unexpected Cost for COVID-19 Control and comes from the APBN.

##### **c. Means and Types of Data**

1. Source and Type of Data The source of data on COVID-19 surveillance activities comes from the results of laboratory examinations reported to the Makassar City Health Office using form 7 (Form PDP Covid-19 ODP COVID-19 Research and Development Center for Biomedical and Basic Health Technology, Health Research and Development Agency). The data collected included the identity of the specimen sender, patient identity, treatment history, signs and symptoms,

date of onset, specimen collection, contact/exposure history, and comorbid diseases. In addition, the types of data collected are suspect case data, confirmation, close contact, death, PCR examination, serological surveillance (rapid test, rapid reactive test, RTPCR, and RTPCR +), isolation/quarantine. As well as confirmed, suspected, and probable cases.

2. Office Stationery, computer equipment, and internet network. Facilities and infrastructure for COVID-19 surveillance activities are adequate. The facilities and infrastructure for surveillance activities at the district/city level are insufficient because the availability of manual data collection forms is not yet fully complete, which is used only from form 7 (COVID-19 Examination Application Form using TCM/COVID Form 5). While form 3 (COVID-19 Case Finding Notification Report at Health Facilities), form 6 (COVID-19 Epidemiological Investigation Form) is not used correctly, form 4 (COVID-19 aggregate daily report) is filled in excel form but has not been consistent in filling it out. The office stationery is complete. There are several computer devices, but they also use personal laptops and printers to support the COVID-19 surveillance program.

##### **d. Methods**

The current COVID-19 surveillance activities are based on the COVID-19 prevention and control guidelines of the Ministry of Health of the Republic of Indonesia in July 2020.<sup>24</sup> All policies are available at the Makassar City Health Office starting with the revision guidelines I-V. Based on interviews, the guidelines for the prevention and control of COVID-19 are revised too often, so there are obstacles in the revised guideline 5 because there is no mention of swab control for those who have confirmed COVID-19. At the same

time, many people want swab control to ensure there is no virus in the body.<sup>25</sup>

Improving the quality of recording and reporting of COVID-19 data must follow the form or attachment in the revision 5 guideline, but based on direct observation during Field Work Practice at the Makassar City Health Office still using the old form and not up to date based on the attachment of the latest form in the guide Guidelines for the prevention and control of COVID-19 revision 5.

#### e. Market (Information Dissemination)

Dissemination of information on the results of the COVID-19 surveillance implementation at the Makassar City Health Office is actively carried out to the Provincial Health Office. As a result, many agencies or fields require or request the results of COVID-19 surveillance, starting from the District Level, BPPA, BAPPEDA, BPBD, TNI/POLRI, and the media. The information needed or requested by the agency or field is data on patients confirmed to be COVID-19.

### Process

#### a. Data Collection

The COVID-19 confirmed data collection activity came from the Health Service examination, sending specimens to the laboratory for analysis. A few days later, laboratory results from the Central Health Laboratory and the UNHAS Laboratory were submitted to the Health Office for further processing and presented to each Public Health Center for tracing and Epidemiological Investigation (EI). Based on interviews, data collection activities are carried out every day if there is a confirmed COVID-19, but it is not recorded using the attachment form 3 in accordance with the guidelines. And the EI Form was also not used because the officers were lazy to fill out the form, so there was less

information about the patient's close contact, and the EI Form was taken over by the Provincial Health Office.

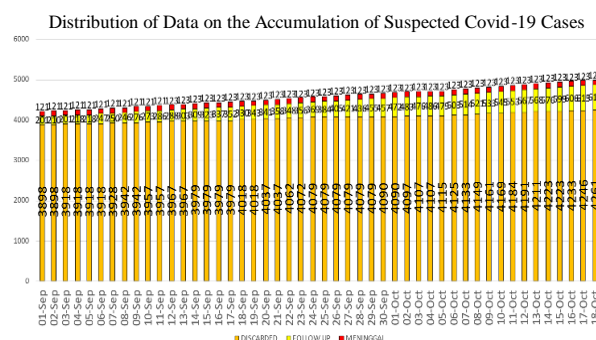
#### b. Data Compilation

Data compilation is done by using a computer/ laptop. Based on interviews and document studies, the data at the Makassar City Health Office has been grouped according to the variables of the person (gender, age), place and time, and daily data on COVID-19 cases.

#### c. Data Analysis

Data analysis is used to determine the success of controlling COVID-19 at the Regency/City/Provincial level following the indicators defined by the Ministry of Health.

The results of the analysis at the Makassar City Health Office as shown in Figure 2.



**Figure 2.** Distribution of Data on the Accumulation of Suspected Covid-19 Cases<sup>9</sup>

#### d. Interpretation

Based on the results of interviews, the COVID-19 surveillance officers at the Makassar City Health Service did not know how to interpret the data, the results and the presentation of the interpretation of the data (tables, graphs, diagrams) because everything was done by the Expert Team. However, based on the document study, the data analyzed in tables, graphs, and charts have not been equipped with data interpretation.

#### e. Information Dissemination

Data collected is disseminated by the coordinates of the COVID-19 surveillance program in the form of information on the epidemiology of COVID-19 in Makassar City to the public, media, local government, and other cross-sectors.

#### Output

The output is the result of the process of data collection, data analysis, and data interpretation. In information systems, the outcome can be in the form of information, suggestions, printed reports, etc.

The COVID-19 surveillance output is used as a basis for program improvement. Based on interviews with program managers, the work generated from analyzing and interpreting the data is the coverage obtained from program activities.

This coverage is compared with the indicators of the COVID-19 surveillance program as a measure of the progress or success of the program. The indicators used at the district/city level include the Epidemiological Criteria, the Health System Criteria, and the Public Health Surveillance Criteria as many as 24. However, this evaluation focuses on the Public Health Surveillance section, which consists of 10 Indicators covering surveillance systems, case investigations, and contact tracing. Then, from the data analysis results, epidemiological information about COVID-19 is made at the Makassar City Health Office and then reported to the Provincial Health Office.

The output from the COVID-19 surveillance data is not only used for monitoring and evaluation activities in measuring the achievement indicators of the City-scale COVID-19 control program but it is also used for the preparation of Makassar City Health Office reports such as Profile of the Makassar City Health Office; Daily Reports, Monthly and Annual Reports of Disease Control and Eradication Section; Makassar City Health Office Annual Report; Data for COVID-19 research purposes; Data

on cross-sectoral requests from relevant Regional Apparatus Units; and Data for NGO and Community Organizations.

#### Feedback

Feedback from COVID-19 surveillance activities is used in decision-making for the program and is used as a means for program improvement.

The feedback from the Makassar City Health Office to the Health Facilities was not only related to the completeness, accuracy, and validity of the data but also to evaluating the achievement indicators of the COVID-19 program at the health facility level. For example, in terms of the achievement of new case discovery and equipped with a notification form of new case discovery.

Likewise, feedback from the Provincial Health Office to the City Health Office can also be through technical guidance on problems faced in COVID-19 surveillance activities.

#### Identification of Problems in the Implementation of COVID-19 Surveillance Activities in Makassar City (Based on input, process, and output components)

Problem identification was carried out using in-depth interviews with several sources to know the COVID-19 surveillance program at the Makassar City Health Office. The in-depth interview results are then recapitulated to determine the priority of the problem later.

The input components' problem is that all those on duty in COVID-19 surveillance activities have dual responsibilities, and there is an irregular job desk. And not using form attachment 3 (COVID-19 Case Finding Notification Report at Health Facilities), form attachment 4 (COVID-19 Aggregate Daily Report) is not used consistently, and there is no attachment form 6 (COVID-19 Epidemiological Investigation Form) from Fasyankes because it was taken over by the Provincial Health Office.

The problem with the process components

is the Health Facilities report only uses an excel format, but officers are also sometimes lazy to in and result in incomplete data, not reported every day, only monthly accumulation, and there is no EI report based on the EI form, and there is a The TC-19 All record information system existed in July 2020 but was not used at that time, began to be used in December 2020. Data analysis is assisted by a team of experts. However, data analysis is still incomplete, and the data that has COVID-19 aggregate daily report format based on attachment form 4 (Aggregate Daily Report) but it is not consistent in filling it out,

only analyzing the release of COVID-19 cases; been analyzed has not been equipped with data interpretation.

The problem with the output component is the success rate of public health surveillance criteria has not been evaluated yet

### **Priority Determination of COVID-19 Surveillance Problems at the Makassar City Health Office (using the CARL Technique)**

Based on the results of calculations using the CARL technique, three priority problems are obtained as shown in Table 1.

**Table 1.** Priority Problem Based on CARL Method

No	Problem	C	A	R	L	Value	Total	Rank
1	There is no EI report based on the EI form from the Health Facilities, and there is a COVID-19 Aggregate Daily Report format based on attachment form 4 (COVID-19 Aggregate Daily Report). Still, it has not been consistent in filling it out, only analyzing case releases.	5	5	5	5	625	2371	I
		5	5	5	5	625		
		5	3	4	4	240		
		4	4	4	4	256		
		5	5	5	5	625		
2.	The Health Facilities report only uses an excel format, but officers are also sometimes lazy to fill in, resulting in incomplete data, not reported every day, only monthly accumulation.	5	5	4	5	500	1232	II
		3	5	5	5	375		
		2	2	4	3	48		
		4	4	4	4	256		
		3	3	4	4	144		
3	Do not use form attachment 3 (COVID-19 Case Finding Notification Report at Health Facilities), form attachment 4 (COVID-19 Aggregate Daily Report) is not used consistently, and there is no form attachment 6 (Covid-19 Epidemiological Investigation Form) from Health Facilities because taken over by the Provincial Health Office.	5	5	4	5	500	1244	III
		5	3	4	5	300		
		3	3	4	4	144		
		3	3	3	4	108		
		4	4	3	4	192		

### **Alternative Troubleshooting Plan**

The priority is on the Process component; namely, there is no Epidemiology Investigation (EI) report based on the EI form from the Health Facilities, and there is a COVID-19 Aggregate Daily Report format based on attachment form 4 (COVID-19 Aggregate Daily Report). Still, it is not consistent in filling it out, only analyzing the release coronavirus case. An alternative solution to this problem is developing a brief COVID-19 Epidemiological Investigation report through the Epiinfo application so that surveillance officers are willing and consistent in reporting COVID-19

Epidemiological Investigations. And the development of daily reports in the form of individual and aggregate data using a free application, namely google spreadsheet, to make it easier for users, in this case, the COVID-19 Surveillance Coordinator at the Makassar City Health Office. The individual and aggregate data obtained from the google spreadsheet application will be reported to the South Sulawesi Provincial Health Office easily, precisely, and quickly. South Sulawesi to the Makassar City Health Office.

The second priority is the Process component; the Health Service Report only uses an excel format. Still, officers are



sometimes lazy to fill in and result in incomplete data, not reported daily, only monthly accumulation. An alternative to solving this problem is the development of easy recording and reporting by developing the excel format based on a web application.

The third priority is the Input component, namely, not using form attachment 3 (COVID-19 Case Finding Notification Report at Health Facilities). Form attachment 4 (COVID-19 Aggregate Daily Report) is not used consistently. There is no form attachment 6 (Epidemiological Investigation Form COVID-19) from Health Facilities because it was taken over by the Provincial Health Office. An alternative solution to this problem is that the holder of the surveillance program at the Makassar City Health Office should require Health Facilities to fill out the notification report on the discovery of COVID-19 cases in Appendix 3 because this form is crucial for daily data recapitulation data. For the COVID-19 Aggregate Daily Report in Appendix 4, it is mandatory for one of the surveillance program officers at the Makassar City Health Office to fill in either manually or via excel consistently because the data contained in this form is crucial for data analysis.

## CONCLUSIONS

The description of the implementation of the COVID-19 surveillance system at the Makassar City Health Office is based on a system approach: input, process, output, and feedback. The results of identifying problems in implementing COVID-19 surveillance based on in-depth interviews were also based on a system approach: input, process, and output. As for the priority of COVID-19 surveillance problems that were obtained 3. As well as alternative problem-solving plans, there are also three alternatives according to the problems in COVID-19 surveillance at the Makassar City Health Office.

## ACKNOWLEDGEMENT

We would like to thank the Makassar City Health Office.

## CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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