



# Study on Centralized Sampling Management Methods for Large-scale Nucleic Acid Testing in Community

Xi Zi

Affiliated Hospital of Chengdu University, Chengdu 610081, Sichuan, China

DOI: 10.32629/aj.n.v3i1.981

**Abstract:** How to carry out nucleic acid testing in a scientific manner is a practical problem encountered in the normal production and life of epidemic prevention and control, which is especially true when there are a large number of inspectors. Besides, scientific management of centralized sampling in large-scale nucleic acid testing has become an important content. Focusing on the actual situation of the normalization of epidemic prevention and control, this paper studies the centralized sampling management method of large-scale nucleic acid testing. The author points out the effective management methods from four aspects, that is, scientific sorting of the key steps, scientific storage and effective handover of samples, paying attention to the management of sampling environment, and supervision and inspection of sampling quality.

**Keywords:** epidemic prevention and control, nucleic acid testing, centralized sampling, management methods

## Introduction

In the context of the normalization of epidemic prevention and control, nucleic acid testing has become a necessary prevention and control measure in production and daily life. The population range of nucleic acid testing proves to be wide. In the process of large-scale nucleic acid testing, how to effectively manage centralized sampling is very important. Since 2020, some medical institutions have explored the management methods of centralized sampling for nucleic acid testing, forming more scientific management methods and experience, which will help ensure the effectiveness and safety of nucleic acid testing. Nucleic acid testing and sampling staff shall, together with the testing personnel, jointly maintain the work order of nucleic acid testing and sampling, and put the sampling management methods into practice.

## 1. Key steps in a scientific manner

In the context of the normalization of epidemic prevention and control, the centralized sampling management of large-scale nucleic acid testing can be effectively implemented. Grasping key steps is the basis, which is mainly reflected in the following three aspects.

### 1.1 Prepare test tubes

The sampling staff should prepare the test tube for nucleic acid testing, check whether there is sufficient biological preservation liquid inside the test tube, whether the use range exceeds the expiry date, whether the external lid is tightened, whether the overall outer package of the test tube is damaged, etc. Other personnel should not take the test tube or the corresponding bar code to ensure that it is dedicated. The bar code of nucleic acid should be pasted on the test tube from the longitudinal angle, the upper end of the bar code should be 0.5 cm away from the outer cover of the test tube, and the overlap tilt between the label and the test tube itself is no more than 10 degrees, so as to ensure that the barcode of nucleic acid can be clear and complete, so as to quickly identify the information of the person to be detected.

### 1.2 Check the samples effectively

Sampling personnel need to check the information of test tubes and testers before, during and after nucleic acid sampling to ensure accurate operation and effective safety of information. Before sampling, check the basic information of the tester, check the bar code and check the test tube comprehensively; During the sampling process, in addition to re-checking the basic information of the tester, the nasopharyngeal swab sampler should be checked to see whether its outer packaging is damaged, and can only be used to ensure that it is in good condition. After sampling, place the nasopharyngeal swab quickly inside the tube and tighten the tube lid to prevent overflow of the biological preservation fluid inside the tube.

### 1.3 Understand the precautions related to sampling

The oropharyngeal swab sampler is a personal and disposable device. When the inspector cooperates with the sampling

staff for a long time, the original sampler needs to be thrown away and a new sampler needs to be used. Aseptic techniques should be strictly used in the process of operation, and contamination of specimens should be prohibited. Sampling personnel need to do a good job of strict protection, protective clothing and other protective equipment must be complete, in case of damage or other unexpected phenomenon, according to the "Emergency Plan for Damage of Protective Equipment during Nucleic Acid Sampling" standard rapid replacement. Before formal sampling, it is necessary to evaluate whether the oropharynx of the examinee is damaged, redness, congestion and other abnormal conditions. During the sampling process, the movement of the sampling staff should not only be skillful and fast, but also be gentle. When the tester has obvious symptoms such as sneezing, the sampling action should be stopped immediately. When the nucleic acid test is finished, the test subjects should be told to wear masks immediately.

## **2. Scientific storage and effective handover of samples**

After nucleic acid testing and sampling is completed, it shall be placed in prominent storage and transferred in a reasonable manner. First of all, nucleic acid samples should be stored at low temperature (virus sampling box at 4°C within 24 hours). Sampling staff nucleic acid detection task finished, after the check and be sure to sample sample in custom in advance, good foam board by the registration number of personnel to collect and check sample, nucleic acid testing for foam board sample specimens to be number one by one, and the sampling check total samples of each batch. The samples on each board shall use special outer packaging, and shall be handed over to the personnel responsible for distribution of samples. The handover label shall be affixed, which shall contain the handover time, handover batch, batch number of samples, total number of samples, handover party and receiver party, etc. Samples will be stored in custom-made transport containers and disinfected with 75% alcohol or 1000mg/L chlorinated disinfectant. Note that the samples should not be inverted.

Secondly, effective handover and management of samples should be done well. Samples from different batches are transferred by professionals who are trained in nucleic acid testing and sampling. Regarding the transfer personnel handover and management, the following contents should be highlighted in the training: the special sample delivery box should be kept in a low temperature and sealed state, disinfection and isolation systems should be carefully implemented, the distance and route required for sampling and sending, and the registration and handover of samples. Relevant departments should conscientiously perform their duties to achieve "four fixed", that is, fixed operators, fixed time, fixed locations and fixed delivery procedures, and carry out fine sampling division of labor. Nucleic acid test samples can be counted and transported 2 or 3 hours after sampling. More times of transportation can ensure the timely delivery of samples, so as to obtain test results as soon as possible.

## **3. Pay attention to the management of sampling environment**

The sampling environment management of nucleic acid testing is an important part of sampling management. On the one hand, it is necessary to create a good environment for nucleic acid testing and sampling. The number of sampling stations should be reasonably set up according to the total number of testers, including entrances and exits for single passage, area for changing protective clothing, area for scanning code (identification information input), nucleic acid sampling area, sample collection area and storage area for disinfection items. We have to carry out a reasonable layout of the whole space structure, and do a good job of marking in their respective areas. Through voice broadcast, medical staff, community staff and volunteers to maintain the entire sampling order. The sampling site for nucleic acid testing should be completed outdoors if there is no square warehouse. Ensure that the sampling site is ventilated. If it is rainy, tents should be set up to keep out rain and lighting should be added if necessary.

Each sampling point should also be marked with guidelines, and the detection personnel should be informed of the specific process of sampling and the main matters that should be paid attention to. Relatively independent staff should also be set near the exit area of the sample sampling area to prevent two-way or multi-directional personnel flow and form one-way personnel flow. At the same time, it is also necessary to implement the working requirements of the waiting distance between "one meter line" and strictly control the waiting density of testing personnel. The medical waste generated by nucleic acid testing should be loaded in a special yellow trash can. In addition, security personnel should be dispatched to the sampling site to maintain the sampling order and guide the public to regulate nucleic acid sampling facilities by dividing each area with a cordon.

On the other hand, the environment of sampling site should be well disinfected. Taking effective measures to disinfect the environment of sampling area and clean area. First of all, in terms of environmental disinfection in the sampling area, the surface disinfection of objects is mainly carried out by wet spraying with disinfectant wipes or alcohol. The ground shall be sprayed with 1000mg/L chlorine-containing preparation for disinfection, starting from the low-contaminated area and

gradually moving to the high-contaminated area. It is required to disinfect every sample collected at the sampling table, and the ground and other areas shall be disinfected at least once every 1H

#### 4. Implementation of sampling quality supervision and inspection

In order to meet certain quality standards of nucleic acid testing and sampling, supervision and inspection are indispensable. Sampling supervisors should be set up according to the number of sampling stations, general 6-10 sampling stations with a supervisor. During sampling, real-time supervision and inspection should be conducted on information input, collection methods, on-site disinfection and disposal, as well as temporary emergencies. Practical guidance should be provided if necessary. The supervision and inspection content should include whether the protective clothing of sampling staff is in accordance with the standards, and whether their hands are disinfected according to the requirements of "one person with one disinfection" and whether the information and data of the nucleic acid testing personnel are clear, whether the sampling bar code is accurate, whether the sampling staff uses the oral/nasopharyngeal swab correctly as required, whether the label on the sampling tube is accurate, and whether the sampling staff holds the oral/nasopharyngeal swab accurately as as whether sampling staff can effectively cooperate with nucleic acid detection personnel and so on. Once unqualified personnel are found, they should be corrected promptly. In the process of supervision and inspection, the publicity and guidance of nucleic acid testing personnel is also an important content. Sampling staff and supervisors should guide testing personnel to line up, open the health code and big data travel code in advance, and inform them of the requirements for participating in nucleic acid testing, so that testing personnel can better cooperate to complete nucleic acid testing sampling.

#### Conclusion

Proper and scientific management of nucleic acid testing and sampling can help improve the results of nucleic acid testing and ensure its effectiveness and safety. It is a basic skill that sampling staff should focus on and master. Medical professional institutions should strengthen the training of sampling staff, so that they can understand and master the steps and effective methods of centralized sampling management, so as to better devote themselves to nucleic acid detection work. As the epidemic normalized the appearance of the actual situation and development of large-scale nucleic acid detection concentrated sampling will be as the change of actual condition and derived some new management methods. Therefore, the sampling staff should constantly master the new skills of nucleic acid testing, so as to better adapt to the needs of centralized sampling management of large-scale nucleic acid testing.

#### References

---

- [1] Wang Weixian, Wu Lifan, Liu Yilan, Xionh Lijuan, Zhang Li, Zhou Fengqin, Wang Ling, Zhang Xiaoqing, Lu Yanjun, Wang Yundan. Emergency construction and management of COVID-19 isolation ward[J]. *Journal of Nursing Science*, 2020(10):62-64.
- [2] Wu Hongping, Song Hanchao, Dong Shu, Cui Liyan, Zhang Huizhi, Fu Wei, Xu Xuedong. Biosafety management practice of Novel Coronavirus nucleic acid test in medical institutions[J]. *Chinese Hospital Management*. 2020(03):90-92.
- [3] Shi Shaorui, Nie Bin, Guo Yu, Luo Li, Zhang Linlin, Li Wenquan, Xian Gongbing, Wu Jialiang, Lin Chunxing, Chen Xinzu. Virus nucleic acid detection results of multiple biological samples from COVID-19 cases [J]. *West China Medical Journal*, 2020(02):132-136.
- [4] Zhang Wenting, Liu Dan, Xie Chaojun, Shen Dong, Chen Zongqiu, Li Zhihao, Liu Yuan, Zhang Xiru, Chen Peiliang, Zhong Wenfang, Yang Pei, Huang Qingmei, Luo Lei, Mao Chen. Sensitivity and specificity analysis of nucleic acid detection in close contacts of COVID-19 cases in Guangzhou[J]. *Chinese Journal of Epidemiology*. 2021(08):1347-1352.