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Reporting on the implementation to set up a "care and isolation facility" for mild COVID-19 cases in Tokyo

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Abstract: The increasing number of COVID-19 cases has placed pressure on medical facilities. Against this backdrop, the Tokyo Metropolitan Government established a facility for mild and asymptomatic COVID-19 cases by using existing hotels. These kinds of facilities were established in several countries, and represented a spectrum from hotel-like to hospital-like care. In this article, we focused on implementation and related strategies for establishing such a facility in Tokyo as implementation research, while ensuring patient and staff safety. This facility had three functions: care, isolation, and buffering. For the implementation strategy, we used several strategies from the Expert Recommendations for Implementing Change (ERIC) to implement functions similar to an ordinary hospital, but using fewer inputs. This experience can be applied to other resource-limited settings such as that in less developed countries.

***Keywords*:** COVID-19, isolation facility, implementation research, ERIC, Tokyo, Japan

Introduction

The world has been impacted by COVID-19. The increasing number of COVID-19 cases has placed pressure on medical facilities, leading to a shortage of medical personnel, beds, and medical devices. Additionally, adequate medical care cannot be provided in severe cases even in well-equipped hospitals. Tokyo was not exempt from this serious situation. Consequently, even people with moderate or severe cases had to remain at home due to the shortage of hospital beds and other resources; in severe cases, people infected with COVID-19 may have died without adequate medical care.

In Tokyo, in the beginning of the COVID-19 outbreak in 2020, people with severe, moderate, mild, and asymptomatic cases of COVID-19 were hospitalized. However, it was reported in the neighboring prefecture of Tokyo that some people with mild cases who stayed at home rapidly declined and died before hospitalization (*1*). Against this backdrop, the Tokyo Metropolitan Government (TMG) established a facility for mild and asymptomatic COVID-19 cases by using existing hotels. The National Center for Global Health and Medicine (NCGM) was asked to help establish this facility for people with COVID-19 who needed to stay at home just after being diagnosed in April, 2020.

Similar facilities were reported in other countries. For instance, in China, institutional isolation was reported to be able to contain COVID-19 infections in the relatively early stage of the outbreak (*2*). Their functions, such as care or isolation, differed from country to country and facility to facility (*3-5*).

In this article, we describe the implementation process to set up this so-called "care and isolation facility" for mild and asymptomatic COVID-19 cases by using existing hotels, and report our implementation strategies to prepare for a future resurgent epidemic of infectious diseases such as COVID-19.

Preparatory measures for the "care and isolation facility"

Implementation facility

We used the hotel that was prepared by the TMG, located in Tokyo with more than 450 rooms, as a "care and isolation facility". This care and isolation facility for mild and asymptomatic COVID-19 cases was not a formal medical care facility, but an ordinary existing hotel. However, this facility had to take care of the positive COVID-19 nasopharyngeal PCR test cases who were just diagnosed and required to remain at home for two weeks. This means that there was the possibility that

some cases could evolve and worsen while at the hotel. Therefore, we had to set up some level of medical care to detect and handle the worsening cases among mild and asymptomatic cases of COVID-19 in this facility.

Since this care and isolation facility was not an officially designated medical facility, it did not have any medical equipment, medical gas including oxygen, prescribed medicines, and so on. At the time, the nasopharyngeal PCR test was not conducted in the facility even though space was prepared for testing to detect negative to discharge, because it required skilled medical personnel; the saliva antigen test had not yet been introduced (*6*). Therefore, when people showed signs of the illness worsening, those with more severe symptoms were actively referred to hospitals. The TMG had some experience in establishing and running this kind of isolation facility for patients who had already been hospitalized and were recovering prior to discharge while waiting for their negative nasopharyngeal PCR results. However, this was the first time the TMG set up a care and isolation facility for mild and asymptomatic COVID-19 cases who had just been diagnosed by PCR test. Therefore, it was unknown how to set up this kind of facility to handle cases who may maintain their mild symptoms or worsen over time and require hospital admission for intensive care.

Administration and general support was also conducted by the TMG staff, but medical doctors were from the Tokyo Medical Association, and nurses from one of the Tokyo Metropolitan hospitals and a private job placement agency for nurses arranged by the TMG. The NCGM, consisting of medical doctors, nurses, and administrative staff, focused on support to establish the new medical care systems, clarify facility arrangements and materials, create forms, manuals, and documents, and set procedures and activities for the care and isolation facility for mild and asymptomatic COVID-19 case management.

Data collection and analysis

We identified the necessary functions, activities, forms, and systems to run this facility appropriately and adequately through discussions with the TMG staff, and implemented necessary procedures and installed these items using implementation strategies. We remained at the facility for five days after it started to receive positive COVID-19 cases and also followed up one week later and 40 days later. We interviewed the main managerial-level staff in charge of the operation of the TMG as counterparts.

Based on this information, we reviewed the implementation process combined with a research article review to understand the necessary components of the care and isolation facility and implementation strategies to set up a care and isolation facility. Then, we coded implementation strategies using Expert Recommendations for Implementing Change (ERIC) (*7*). Implementation strategies were categorized into nine clusters (*8*): *i*) use evaluative and iterative strategies, *ii*) provide interactive assistance, *iii*) adapt and tailor to the context, *iv*) develop stakeholder interrelationships, *v*) train and educate stakeholders, *vi*) support clinicians, *vii*) engage customers, *viii*) utilize financial strategies, and *ix*) change infrastructure. Implementation strategies are originally operationalized and reported by the elements of actor, action, action target, temporality, dose, implementation outcome affected, and justification (*9*); we modified and simplified this Proctor's specification.

Moreover, we evaluated their effectiveness based on the facility functions. We understood that these kinds of facilities have three functions, namely, care, isolation, and buffer, as shown in Figure 1. As a care center, we expected the care of positive cases who are both recovering and in the disease severity phase, and to avoid a critical situation such as death. As an isolation center, we expected the reduction of infection chains in families and communities. As a buffer center, we expected the containment of mild or asymptomatic cases, consequently avoiding an increase in congestion or the overburdening of hospitals that treat moderate or severe cases.

The implementation, implementation strategy and effectiveness for the "care and isolation facility"

Implementation: Identifying the necessary items, rules, activities and procedures

We identified what kinds of systems, facility arrangements, materials, forms, documents, procedures, and activities should be installed in this care and isolation facility. Next, we tried to identify the necessary items to provide safer care for patients and to keep staff safe, especially those who were not medical professionals, such as ordinary TMG administrative personnel. We also tried to install common systems, procedures, or tools that

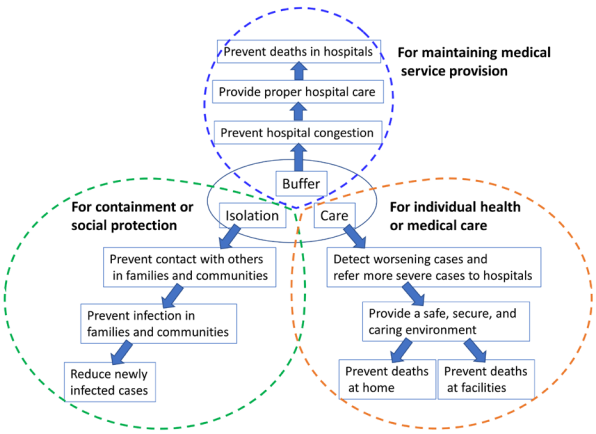

Figure 1. Three functions of the "Caring and Isolation Facility".

Table 1. Contents of implementation for the "care and isolation facility"

Items	Facility, Materials & Personnel	Forms & Documents	Procedures & Activities
Setting	- Zoning - PPE & sterilization materials - Communication tools with patients (telephone, *etc*.) - Doctors & nurses	- Registration form - Patient list	- Procedure to receive patients - Patient registration
Examination	- Daily medical examination by phone	- Daily individual patient medical records	- Vital sign check (BT, O2 saturation, BP, pulse) - Medical record keeping
Treatment	- Over-the-counter medicine		
Referral		- List of referral hospitals	- Special attention on worsening cases - Verbal examination
Administration on health	- Administration staff	- Daily work schedule - Daily patient schedule	- Handover meetings - General management meetings

are utilized in ordinary hospitals in Japan, namely, patient registration, individual patient medical records, checking vital signs, conducting daily medical examinations (doctor rounds), detecting more severe cases, referring them to the back-up hospitals, and so on.

These necessary items were considered based on evidence. For instance, the Medical Care Act of Japan stipulates that medical facilities should retain patient addresses, names, sex, age, disease names, chief complaints, treatments, dates of care, and so forth that are written in patient registration (*10*) and individual patients medical records (*11*). Moreover, the Japanese Nursing Association proposes that nursing records should be completed and retained (*12*). The purpose of nursing records are to prove nursing practice, secure the continuity of nursing care, and evaluate and improve nursing practice according to Nursing Work Standards (*12*).

The purpose of nursing records are as follows: *i*) to record all processes of nursing practice such as observation, assessment, planning, implementation, and evaluation; *ii*) to record the time taken to detect unusual events, as well as the situations of the events, procedures to deal with the events, and when unusual events or medical accidents occurred; and *iii*) to record contents that can be shared with other professionals, non-professionals, and persons who require nursing care (*12*). Moreover, making and keeping clinical records such as patient care records, prescriptions, laboratory test records, and hospital management records such as the number of inpatients and out-patients are stipulated in Japanese regulations (*10,13*).

Furthermore, this care and isolation facility had to handle infectious cases; therefore, it has to follow the rules of "securing infection control system in the medical facilities" as stipulated in the Regulation of Special Functioning Hospitals (*10*). The importance of zoning to manage dangerous communicable diseases is mentioned in the document (*14*), but this is generally common sense in the field of infection control. Other items were also based on common sense, such as the necessity of doctors and nurses.

It was unclear to what degree this care and isolation facility should follow these rules of medical care, since the facility was not a medical facility regulated by medical- or health-related laws, but merely a hotel. Therefore, we had to clarify what kinds of rules and activities should be in place to receive COVID-19 cases with the possibility of a rapidly changing health condition. According to this discussion, we decided to introduce and secure the activities and procedures shown in Table 1.

To determine the appropriate activities and procedures, we had to consider that the majority of staff from the TMG were ordinary administrative staff, not medical or health care professionals; therefore, we tried to not only reduce opportunities of direct contact between staff and patients with COVID-19, but also to secure a certain level of care by using a similar care level as that of medical facilities. Consequently, we introduced daily self-check interventions of body temperature and oxygen saturation, and information collection through a self-administered recording smartphone application and telephones as daily medical examinations. Furthermore, we had to prepare handover procedures, forms, and daily schedules for doctors from the Tokyo Medical Association, and nurses from one of the Tokyo Metropolitan hospitals and a private job placement agency, because they changed periodically (usually daily in the case of doctors); consequently, they may be unfamiliar with the care systems used in the facility, or uninformed about which systems had been installed, or the conditions of the patients. Based on these conditions, we had to consider specific implementation strategies.

Similar facilities were reported in Korea (*16*). One example was a "Life Treatment Center" that was used as an isolation facility. In this facility, "Doctors and nurses examine them twice a day through video calls. Medical data such as electrocardiogram (ECG), blood pressure, oxygen saturation, heart rate, and breathing rate were able to be acquired by vital sign monitors

and transmitted in real time to the monitoring center" (*17*). This facility utilized a very sophisticated system with medical devices. Another example was reported in China of a "medical isolation center" (*18*) or "temporary hospitals rapidly built by converting public venues, such as stadiums and exhibition centers, into health-care facilities to isolate patients with mild to moderate symptoms of an infectious disease from their families and communities, while providing medical care, disease monitoring, food, shelter, and social activities" (*3*). They recognized this facility as a hospital with social activities. In India, COVID Care Centers (CCCs) were established for individuals that returned positive PCR tests; individuals with asymptomatic and mildly symptomatic cases had to isolate. They used existing exhibition centers, trade centers, and educational institutions as isolation centers. Medical care, food, and shelter were provided in the CCCs, along with clinical monitoring by checking body temperature, blood pressure, oxygen saturation, pulse rate, and the provision of basic hematological and radiological interventions (*5*). In the UK, hotels were transformed into COVID-19 isolation centers to house patients who were recovering from the disease (*19*).

However, Japanese cases differed from those in Korea and China. In Japan, the facilities were not medical facilities such as hospitals, but merely accommodation in the form of hotels. In these non-medical facilities, they managed patients who were diagnosed with COVID-19 just before admission, but there were no sophisticated medical devices such as ECGs or other facilities for treatment. Hotel accommodation only has thermometers, oxygen saturation monitors, and PPE, but not oxygen concentrators or bulbs at this moment. Additionally, Japan's facilities did not require renovation or the massive construction of care hospitals as in China. Consequently, less input was necessary to set up the accommodation.

According to these examples, we can categorize these facilities as shown in Figure 2. The care facilities can be categorized midway between a hospital (medical care facility) and non-medical accommodation such as hotels, exhibition centers, and educational facilities. Therefore, the extent to which each care and isolation facility should be equipped depends on its needs. That is, the equipment can be changed according to the social and health situation. If the number of infected moderate cases should increase, the facilities would need to shift from hotel-like to hospital-like care.

Implementation strategy

We used several strategies to introduce the above procedures and activities to this care and isolation facility for mild and asymptomatic COVID-19 cases. The implementation strategies were coded using ERIC (*8*), and their results are summarized in Table 2.

	Non-medical		Medical
Fundamental functions	-Accommodation -Food		-Accommodation -Food
Examination	-Verbal rounds -BT, O_2 monitor	Intermediate	-Patient visits -BT, O_2 monitor -X-ray -Blood sampling (blood cell count)
Treatment	-Over-the-counter medicine	-O_2 cylinder -O_2 concentrator	-Prescribed medicine -Infusion -CPAP
Personnel	- Nurses (main), 24hrs		-Doctors & nurses, 24hrs

Figure 2. Spectrum of the "Care and Isolation Facility".

Several implementation strategies were used to perform implementations. However, the NCGM did not use implementation strategies to support clinicians, engage customers, and utilize financial strategies clusters in this facility. These implementation strategies were provided by the TMG.

Effectiveness

A shown in Figure 1, we used three dimensions, namely, care, isolation, and buffer, to think about efficacy. Regarding "care", around 140 individuals stayed in this facility (one hotel), which has a maximum capacity of 450 rooms; there were no deaths in the facility. It was reported in September 2021 that the first death occurred in one of the care and isolation facilities run by the TMG (*15*). Regarding "isolation", no staff were infected with COVID-19 during the first wave of the pandemic, and no cluster was observed in the facility. We were unable to evaluate the "buffer" aspect because we do not have comparative data of the burden of existing health facilities, and thus cannot conclude the real effects of this facility alone (with respect to patient numbers) on other hospitals.

However, the experience that was created at this care and isolation facility was later used in similar care and isolation facilities in Tokyo. Moreover, some of the manuals, forms, posters, and so forth were later placed on the website as general materials for use by other local governments.

Limitation

The question of whether it was permissible to collect personal health data and other information from the admitted individuals presented itself, since the care and isolation facility was not an officially-designated medical facility. In this regard, the kind of functions each care and isolation facility should have depends on the regulations or orders from national or local governments; therefore, perhaps only these authorities can definitively answer this question.

Furthermore, the contents of the manuals, documents, or procedures depends on the resources of the facility or

Table 2. Analysis by the Expert Recommendations for Implementing Change (ERIC)

Implementation strategies	Actor, Action, Target of the action, In the site	Temporality
Use evaluative and iterative strategies		
Conduct cyclical small tests of change	NCGM produced, tested, and revised records, manuals, and posters according to the daily practice after opening the facility.	First several days after opening the facility
Conduct local needs assessment	NCGM listened to the needs of TMG officials regarding what they wanted to do or what they expected us to do before starting the set-up of the new system to receive COVID-19 cases in this facility.	First several days after opening the facility
Develop and implement tools for quality monitoring	NCGM introduced criteria for referring patients to hospitals, such as oxygen saturation percentage in the initial stage.	First several days after opening the facility until handover to TMG staff
Develop and organize quality monitoring systems	NCGM introduced monitoring systems such as recording, reporting, and sharing information of admitted cases in the facility every day for the nurses, to check case conditions first, to record this information in all the case record books, and to share them with a doctor in charge and nurses the following day, and also the chief of the facility every morning and evening.	First several days after opening the facility until handover to TMG staff
Stage implementation scale up	NCGM organized opportunities for NCGM staff to observe other accommodations for mild or asymptomatic COVID-19 positive cases for airport quarantine that the NCGM had already supported before setting up this facility.	Several days before coming to this facility
Purposely re-examine the implementation	NCGM sent a new NCGM doctor to check the whole system to ensure that it works well and determine any areas that require correction for daytime duty and two doctors for night-time duty after the first installation of the new system. Approximately two weeks later, we conducted a discussion and hearing sessions with TMG officials and nurses in charge of case care.	Four days after the final days when we withdrew from the initial support
Provide interactive assistance		
Centralized technical assistance	NCGM sent our NCGM staff to this facility and advised TMG staff as medical/health assistance to set up this care and isolation facility every day in the initial stage.	First week
Facilitation	NCGM created, conducted, and confirmed handover processes from one shift of doctors and nurses to the next.	Initial four days
Facilitation	NCGM prepared the line list (all case list) on the white board and on PCs, amended some parts based on the discussion with TMG officials, and trained TMG officials on their use.	Initial four days
Adapt and tailor to context		
Promote adaptability	NCGM introduced and revised nurses' and doctors' work to check all cases by telephone instead of bedside care or patient rounds. Doctors only went into the each room if necessary.	First week
Develop stakeholder interrelationships		
Conduct local consensus discussions	NCGM discussed with TMG staff several changes of records, manuals, posters, and procedures in the daily discussion after starting the preparation and implementation of setting up the functions.	After starting the preparation and implementation of setting-up the functions
Visit other sites	NCGM visited other accommodations for mild or asymptomatic COVID-19 positive cases for airport quarantine before coming to the TMG site.	Before coming to the TMG site
Train and educate stakeholders		
Conduct ongoing training	NCGM conducted training several times on how to put on and remove PPE, how to use case lists, *etc*.	First week
Distribute education materials	NCGM prepared posters and manuals and posted them on the walls to share with relevant staff.	First week
Provide ongoing consultation	NCGM provided several consultations on infection control or other documents such as certificates to be given to cases that are going to be discharged.	The first two weeks
Use train-the-trainer strategies	NCGM trained the first batch of TMG staff as trainers, and we expected them to train the next batch.	First week
Change infrastructure		
Change physical structure and equipment	NCGM arranged case flows under the zoning and PPE changing spaces. In addition, the TMG prepared thermometers and oxygen saturation meters for all cases, and installed administrative equipment such as computers for case registration and white boards for case lists and referral contact information, *etc*.	First week
Change record systems	NCGM arranged and introduced new record systems of cases in this facility, such as lists of daily case names and other related information on the white board, and all case lists in the registration forms on PCs to register and record.	First week
Change service sites	TMG lent a hotel and set up zoning, food, room telephones, and other facilities. They sent their staff for logistics training to learn how to run the facility. We, the NCGM, used these settings to set up and manage this care and isolation facility.	First week

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local and national governments. For instance, the TMG had many oxygen saturations monitors; therefore, one monitor was placed in each room. However, in other hotels run by other organizations or local governments, there were only two monitors per floor. Therefore, the products that were used and made available differed from accommodation to accommodation. Thus, each organization should change the relevant standards, forms, or contents of manuals and posters so as to suit each facility.

Conclusion

Regarding implementation, Japan's facilities did not require renovation or the massive construction of care hospitals as in China. Looking at how policy makers could set up care and isolation facilities, especially in resource-limited settings, it is evident that it was easy to establish facilities with the three functions of care, isolation, and buffer by using existing facilities such as hotels instead of constructing new buildings or installing beds and other equipment. Consequently, less input was needed to set up the accommodation.

Regarding the implementation strategy, we used several strategies in ERIC to set up similar functions of an ordinary hospital by using fewer inputs. We think this can be applied to other resource-limited settings such as those found in less developed countries.

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