

Tanaka Sigeto. “Was Japan’s cluster-based approach toward coronavirus disease (COVID-19) a fantasy?:  
Re-examining the clusters’ data of January–March 2020”  
東北大学文学研究科研究年報 (*Annual Reports of Graduate School of Arts and Letters, Tohoku University*)  
75:96–83 (2026) ISSN:1346-7182

Author manuscript: 2026-03-18  
<http://tsigeto.info/26a>

## **Was Japan’s cluster-based approach toward coronavirus disease (COVID-19) a fantasy?**

Re-examining the clusters’ data of January–March 2020

TANAKA Sigeto

**BACKGROUND:** The Japanese government and experts stated that, in early 2020, they implemented the “cluster-based” approach to curb the spread of coronavirus disease 2019 (COVID-19) by identifying clusters through the retrospective tracing of infection sources. Moreover, they considered this approach a significant contributor to the prevention of outbreaks. However, this claim is not corroborated by existing literature, which consistently describes COVID-19 clusters as comprising a relatively small proportion of the total number of cases detected during this period. This study was aimed to determine whether Japan successfully implemented the cluster-based approach in January–March 2020.

**METHODS:** Publicly available data of 25 clusters (groups of five or more COVID-19 cases that came into contact at a common venue) reported by the Ministry of Health, Labour, and Welfare as of March 31, 2020, were collected. The clusters were classified either retrospectively found or prospectively found. The number of cases related to each cluster was then determined.

**RESULTS:** Among the 1953 COVID-19 cases confirmed until the end of March 2020 in Japan, 4% were related to the three clusters found by retrospective tracing, 45% were related to the 22 clusters found by prospective tracing, and 51% were unrelated to any cluster.

**CONCLUSIONS:** Japan’s COVID-19 response in early 2020 did not follow a cluster-based approach. Retrospective tracing has a limited contribution to detecting infectious cases and preventing further transmission. The surveillance system primarily detects non-cluster cases and cluster-related cases using prospective contact tracing.

## 1. Background

In the early phase of the coronavirus disease 2019 (COVID-19) pandemic in 2020, the Japanese government [1] and experts [2] asserted the effectiveness of their unique strategies. The “cluster-based approach” was one of its features. This approach emphasized a retrospective (or backward) search for the common infection source among two or more COVID-19 cases that were independently identified. By investigating the estimated common infection source, tracers from the Public Health Center (PHC) can detect clusters created by superspreading in temporal gatherings. By tracing and isolating possible infections further, they can prevent or control outbreaks.

This approach depends on the following two underlying assumptions: COVID-19 spreads mainly through superspreading [3] and superspreading always occurs in a temporary gathering. The first assumption suggests that small-scale infections play a limited role in the spread of COVID-19. The second assumption suggests that prospective (forward) tracing is ineffective for identifying clusters resulting from superspreading as it involves tracing individual who had contact with a confirmed case during that case’s infectious period. Prospective tracing cannot reach the temporary gathering where superspreading occurred because the gathering would have already ended before the period, except on fortunate occasions where the confirmed case itself was the superspreader.

Japanese experts used the aforementioned assumptions to justify their cluster-based approaches. They focused on the identification of large-scale infections through retrospective tracing. Therefore, they rejected requests to expand opportunities to conduct polymerase chain reaction (PCR) tests to confirm infection in isolated cases [4,5]. After the first wave of the COVID-19 pandemic in Japan subsided in May 2020, the Japanese government and experts publicized the advantages of the cluster-based approach [1,2,5]. Their theory [2] assumes a strategy to search for a common venue or event among the activities of two or more known cases (Raymenants et al. [6] calls this strategy “source investigation”), rather than directly identifying the source case for each confirmed case. They also argued that, given limited resources, the primary focus should be on detecting large-scale infections through retrospective tracing [7]. According to them, the identification of small-scale infections and isolated cases is of secondary importance [8]. Some authors [9,10] assert that this strategy originated in the anti-tuberculosis operations of Japanese PHCs since their establishment in the 1930s.

## 2. Questions

Despite extensive theory-based discussion of cluster-based approaches, no data-based evaluation of their effectiveness has been conducted [11]. Had the cluster-based approach worked as intended, most reported COVID-19 cases could have been linked to clusters identified through retrospective tracing. Is this argument supported by the data?

Literature suggests that this argument contradicts the data. According to reports by Nishiura et al. [12], Hamaoka [13], Furuse et al. [14], and Kurita et al. [15], as well as documents prepared by Oshitani for government meetings [16,17], clusters (defined as five or more cases coming in contact at a common place or event) or superspreading (five or more secondary cases that were estimated as infected from the same primary case) comprised a small portion of all reported COVID-19 cases in Japan. Most COVID-19 cases did not belong to any cluster. These findings suggest that the first assumption for cluster-based approaches is false.

Another question pertains to the type of cluster. Since mid-March 2020, infections in hospitals and welfare institutions increased, comprising the majority of reported clusters [14]. Retrospective tracing has no advantage for detecting such clusters. In medical/welfare institutions, infections often occur within a persistent social group with continuous mutual contact between staff and patients/users, rather than in a temporary gathering at a one-day event. Moreover, such institutions were on high alert during that period, because patients/users were often vulnerable and at a high risk of serious consequences if they contracted a viral infection. Therefore, infections in hospitals and welfare institutions are often initially identified by testing a suspected patient, even though he or she has not been linked to known cases; other cases are then found by prospectively tracing his/her close contacts in the same institution. Thus, the second assumption for cluster-based approaches is false for this type of cluster.

Moreover, even if the theoretical assumptions were correct, it is unlikely that the Japanese surveillance system would have prioritized detecting large-scale infections through retrospective tracing. Some experts [18,19] have explained how retrospective tracing was of secondary importance for contact tracing. The standard manual for the tracers prepared by the National Institute of Infectious Diseases (NIID) [20–22] limited the target of investigation to COVID-19 patients diagnosed with a PCR test and their close contacts since the day of their symptom onset. Despite a requisite documentation of the diagnosed patient's activities up to two weeks before symptom onset, the manual offered no guidance on contact tracing for that period [10]. Although the collected records of patients' activities enabled tracers to estimate the infection source, investigations of the identified location or individual would not be carried out if the NIID manual's guidance was strictly followed [23]. This contrasts with the mandatory procedure that the manual described in detail for prospective tracing to identify and handle individuals who were in close contact with an infected person during her/his infectious period. Additionally, the manual did not focus on large-scale infections. Instead, it used the term "cluster" as an alarm for any group of COVID-19 patients with the potential to spread viral infections, even for a group of few people [24]. Thus the NIID did not guide the tracers to focus on large-scale infection. These findings suggest that, contrary to common perception of Japan's cluster-based approach, the Japanese contact tracing system was not truly cluster based.

### **3. The aim of this study**

Thus, the Japanese government's assertion of a cluster-based approach to COVID-19 is unconvincing. However, due to the lack of systematic data-based evaluation, it remains unclear whether the Japanese government's statements were accurate.

First, under the cluster-based approach, tracers should investigate not only the clusters themselves, but also the entire network of individuals connected to each identified cluster. Hisada et al. [25], Nakajo and Nishiura [26], and Furuse et al. [27] described instances of COVID-19 clusters for which contact tracing identified epidemiological links with many non-cluster cases. However, for most of the other reported clusters, the size of the entire chain of infected individuals has not yet been determined. Seto et al. [10], Hamaoka [13], and Andalibi et al. [28] mapped networks of infection chains; however, their data were incomplete or limited to one or two prefectures.

Second, there has been no systematic analysis of the data on known clusters concerning their detection. The only exception was the report by Furuse et al. [27], which suggested that only one large COVID-19 cluster was found via retrospective tracing, among 28 large clusters up to July 2020. However, they limited their analysis to relatively large clusters and did not provide details of the tracing processes.

The Japanese government has not released detailed information on COVID-19 clusters or the chains of transmission between infected individuals [13]. However, this information is publicly available through various channels. In early 2020, local governments released daily information on newly confirmed cases. The media reported the information in detail, as it had great news value for the audience, who had begun to realize the threat of this new infectious disease. Journalists and scholars have utilized such information to analyze virus transmission patterns and the response of public health authorities. Data obtained through these channels is valuable for ascertaining the actual implementation of Japan's cluster-based approach to the COVID-19 pandemic.

This study aims to examine whether Japan's cluster-based approach was successfully implemented in the first COVID-19 wave. The following section reports the methodology used in this study to collect and analyze publicly available information for a precise evaluation of the actual performance of the cluster-based approach.

### **4. Methods**

Information about the clusters plotted on the latest (April 2, 2020) version of a map (全国クラスターマップ) [29] published by the Ministry of Health, Labour, and Welfare (MHLW) was collected. That was the third version of the map on which the MHLW plotted all reported clusters in Japan, whose

first version was published in March 15, 2020. Before the number of COVID-19 cases rapidly increased in late March 2020, tracers from PHCs managed to trace all close contacts of all confirmed cases by following the mandatory procedure. However, their capacity may have been overwhelmed in some prefectures by April 7, when the government declared an emergency in the prefectures. There have been no new versions of the map since the third version was published on April 2, 2020. The latest map [29] plotted 26 clusters that were roughly defined as five or more COVID-19 cases that had come into contact at a common venue or event as of March 31, 2020.

The following two problems were observed in identifying the clusters plotted on the map:

- Although the map featured two clusters at medical institutions in Gunma Prefecture, there was only one such cluster in the prefecture. The other may have been mistakenly plotted on the map, as argued in a local newspaper [30]. I accepted this estimation and adopted only one cluster from Gunma Prefecture.
- The map plotted four clusters that occurred in medical institutions or restaurants in Tokyo Prefecture. Among these, three were easily identifiable; however, the fourth was difficult to determine as long as the aforementioned conditions were strictly applied as of March 31, 2020. By expanding the duration, a cluster of five cases was found by April 1, 2020 in a hospital in Chuo Ward in the prefecture. This cluster was included in the data.

Thus, the data comprised 25 clusters.

For each cluster, additional information was collected from various sources, such as media news, case reports by local governments, and other publicly available information on the Internet.

Based on the collected information, cases connected to the cluster via the network of infection chains were counted, except for those detected through the investigation of other clusters. In cases where the information sources reported different numbers, the largest one was used. Additionally, when counting the number of cases, those detected in April 2020 were included. This implies that there is a bias toward increasing the number of cases related to the clusters.

The direction of tracing (prospective/retrospective) was distinguished using the following criteria (“Day 0” denotes the onset day of the symptoms of a known case):

- (A) If the source seems to use technical terms correctly, surveillance of close contacts (“濃厚接触者” in Japanese) would be regarded as prospective, while surveillance of the infection source (“感染源” in Japanese) would be regarded as retrospective. These were based on the definitions

of the terms in the Japanese surveillance system [20–22].

- (B) If the cluster was found by tracking the behavior of a known case on Day 0 or later, this would be via prospective tracing.
- (C) If the cluster was found by tracking known case's behavior on Day -1 or earlier, it would be probably via retrospective tracing. However, this must be carefully verified, because some local health authorities expanded the period for prospective tracing to Day -2, as a response to possible infections caused by asymptomatic patients [31].
- (D) If the cluster is reachable both via retrospective tracing and prospective tracing, the decision should be made comprehensively based on all available information.

The collected data is available on the Open Science Framework site [32]. For each cluster, the identification number is made up of five digits for municipality and four digits for the date when the cluster was identified, concatenated with a hyphen.

## 5. Results

Among the 25 clusters, 18 were determined as found prospectively based the criteria A or B. Criterion C was applied to four clusters:

- Banquet on a houseboat in Tokyo Prefecture (13100-0215): Determined as found retrospectively, because the PHC started the investigation of the houseboat when one of the attendees of the banquet, whose symptoms had begun 11 days after the banquet, tested positive [33].
- Sport gym in Aichi Prefecture (23100-0222): Determined as found prospectively, because the local health authority required tracing of close contacts from Day -2, following the assumption that patients could be infectious before their symptom onset, and a confirmed case visited the sport gym during the extended period [31].
- Chorus group and sport gym in Gifu Prefecture (21214-0326): Determined as found retrospectively, because the PHC tracked the behavioral history of two confirmed cases to investigate the probable source of their infection [34].
- Restaurant in Miyagi Prefecture (04100-0331): Determined as found retrospectively, because the PHC investigated the restaurant after the coming forward of a patient who had contacted two previously announced COVID-19 patients before their symptom onset (on Days -3 and -4) at the restaurant [35].

Criterion D was applied to three clusters:

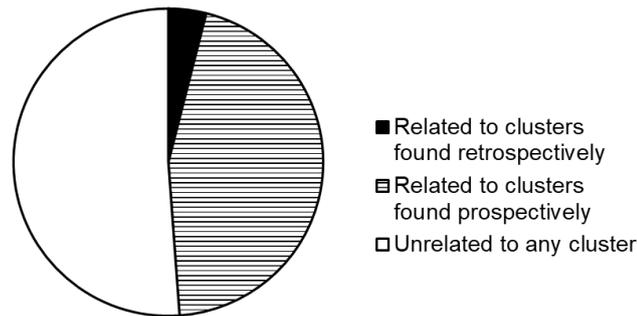
- Exhibition in Hokkaido Prefecture (01208-0228): Found by tracing close contacts of a confirmed case who were symptomatic during the exhibition and attended it [36]. The PHC had not investigated the exhibition until then, despite two other attendees (whose symptoms began after the exhibition) already testing positive [25]. This was determined as found prospectively.
- Live music concerts in Osaka Prefecture (27100-0302): Although the first confirmed cases related to this cluster had been two people working for the concerts before symptom onset [37], the investigation of the concert venue was not conducted until another case turned positive, who had been in the audience there during the symptomatic period [38]. This was determined as found prospectively.
- Banquets in Kyoto Prefecture (26100-0329): Two cases (returnees from Europe) were first detected. They had attended two banquets on their Days  $-2$ ,  $-1$ , and  $0$  [39]. Because the cluster was reported to be secondary infections caused by returnees from Europe [40], this was determined as found prospectively.

Table 1 classifies the 25 clusters and 954 related cases. Among them, three clusters (at a restaurant, a banquet on a houseboat, and a chorus group and a sports gym) were detected through retrospective tracing, and 77 cases were related to these clusters. In contrast, many cases (877) were related to the 22 clusters detected through prospective tracing. Most of them (614 cases) were related to 15 clusters of medical and welfare institutions. There were also several cases (263) related to seven clusters at live music concerts, banquets, two sports gyms, a live music bar, an exhibition, and a table tennis school that were detected through prospective tracing.

**Table 1: Overview of the clusters from January to March 2020 in Japan**

Found retrospectively		Found prospectively		
	Cases		(Clusters)	Cases
Restaurant (Miyagi)	34	Medical institution	(9)	338
Banquet on a houseboat (Tokyo)	25	Welfare institution	(6)	276
Chorus group and sports gym (Gifu)	18	Live music concerts	(1)	108
		Banquets	(1)	65
		Sports gym	(2)	44
		Live music bar	(1)	20
		Exhibition	(1)	14
		Table tennis school	(1)	12
<b>Total (3 clusters)</b>	<b>77</b>	<b>Total</b>	<b>(22)</b>	<b>877</b>

Total 954 cases related to 25 clusters.



**Figure 1: Breakdown of COVID-19 cases until March 31, 2020 in Japan**

In total, 1953 cases were reported as of March 31, 2020 (Ministry of Health, Labour, and Welfare).

Since the first confirmation of a COVID-19 case in January, Japan had confirmed a total of 1953 cases by March 31, 2020, according to the MHLW’s report on the day [41]. Based on this number, Figure 1 shows that 4% of the cases were related to clusters detected by retrospective tracing. Clusters detected by prospective tracing accounted for a larger proportion (45%) of the total cases. Cluster-related cases thus accounted for 49% of all cases. The majority of confirmed COVID-19 cases (51%) were unrelated to any cluster.

## 6. Discussion

This result contradicts what has been publicized regarding Japan’s cluster-based approach. Between January and March 2020, retrospective tracing contributed little in the detection of COVID-19 cases. Most of the clusters were discovered through prospective tracing. Furthermore, cluster-related cases did not constitute a large proportion of total cases. More than half of the reported COVID-19 cases were unrelated to any cluster.

Although this result is in line with those of previous studies [12–17], this study made two improvements to the measurement. First, I counted not only the cases in a cluster, but also those connected to it. Thus, the results show that cluster-related cases did not comprise the majority of cases in Japan’s first COVID-19 wave, even when those connected to clusters via the network of infection chains were counted. Second, the direction of contact tracing was distinguished. The results revealed a small contribution from retrospective tracing.

These results suggest that Japan’s COVID-19 response was not cluster based. Rather, it focused on non-cluster infections. Contrary to the governmental headquarters’ inaccurate statement, actual frontline operations followed the procedures outlined in the NIID manual—specifically non-cluster-based prospective tracing.

Thus, we need to re-evaluate Japan’s surveillance system from a non-cluster-based perspective. To

evaluate how the surveillance system has contributed to Japan's response to COVID-19, the first focus should be on detecting small-scale infections. As confirmed above, the Japanese system identified many non-cluster-related cases. This may contribute to preventing the spread of the virus. The second focus should be prospective tracing to detect clusters growing in persistent human relationships with daily mutual contact, particularly in medical and welfare institutions. Retrospective tracing should be of third relevance to Japan's COVID-19 response.

Finally, it is also possible that the two aforementioned theoretical assumptions of the cluster-based approach are false. Therefore, the validity of these two assumptions should be reexamined.

## Notes

An earlier version of this paper was released on March 17, 2023 as a preprint at Research Square (doi: 10.21203/rs.3.rs-2647575/v1). There were differences in the results owing to additional data and changes in the classification criteria. The results were included in a paper presented at a Japanese studies conference at Tohoku University on March 16, 2025 [42]. The datasets for this study are available from the Open Science Framework repository [32]. This study was conducted without external funding and the author has no competing interests to declare. The author thanks Editage (www.editage.com) for the English language editing.

## List of abbreviations

COVID-19: Coronavirus disease 2019 (新型コロナウイルス感染症)

MHLW: Ministry of Health, Labour, and Welfare (厚生労働省)

NIID: National Institute of Infectious Diseases (国立感染症研究所)

PCR: Polymerase chain reaction

PHC: Public Health Center (保健所)

## References

1. Nishimura Y. How Japan beat coronavirus without lockdowns: a focus on contact tracing and 'cluster busting' has allowed us to avoid harmful economic restrictions. *Wall Street Journal*. July 7, 2020. (<https://www.wsj.com/articles/how-japan-beat-coronavirus-without-lockdowns-11594163172>. Accessed March 2, 2023.)
2. Omi S, Oshitani H. Japan's COVID-19 response. Press conference on the situation of the COVID-19 by related ministries of Japan, June 1, 2020. (<https://www.mhlw.go.jp/content/10900000/000635891.pdf>. Accessed November 1, 2020.)
3. Endo A, Centre for the Mathematical Modelling of Infectious Diseases COVID-19 Working Group, Leclerc QJ, et al. Implication of backward contact tracing in the presence of overdispersed transmission in COVID-19 outbreaks [version 3; peer review: 2 approved]. *Wellcome Open Research* 2021;5:239. (doi: 10.12688/wellcomeopenres.16344.3.)
4. Shimizu K, Tokuda Y, Shibuya K. Japan should aim to eliminate covid-19 (Editorials). *BMJ* 2021;372:n294. (doi: 10.1136/bmj.n294.)
5. Borovoy A. The burdens of self-restraint: social measures and the containment of covid-19 in Japan. *Asia-Pacific Journal: Japan Focus* 2022;19(2):5759. (<https://apjjf.org/2022/19/Borovoy.html>. Accessed October 30, 2025.)
6. Raymenants J, Geenen C, Thibaut J. et al. Empirical evidence on the efficiency of backward contact

- tracing in COVID-19. *Nature Communications* 2022;13:4750. (doi: 10.1038/s41467-022-32531-6.)
7. Oshitani H, Saijo M. Cluster-based approach to coronavirus disease 2019 (COVID-19) response in Japan, from February to April 2020 (*Laboratory and Epidemiology Communications*). *Japanese Journal of Infectious Diseases* 2020;73(6):491-493. (doi: 10.7883/yoken.JJID.2020.363.)
  8. Oshitani H. 感染症対策「森を見る」思考を：何が日本と欧米を分けたのか ([Cover story interview] *Infectious disease measures: “seeing the forest” instead of the wood – What were the differences between Japan and Europe/U.S.?*). *外交 (Diplomacy)* 2020;61:6-11. ([http://www.gaiko-web.jp/test/wp-content/uploads/2020/06/Vol.61\\_6-11\\_Interview\\_New.pdf](http://www.gaiko-web.jp/test/wp-content/uploads/2020/06/Vol.61_6-11_Interview_New.pdf). Accessed October 30, 2025.)
  9. Imamura T, Saito T, Oshitani H. Roles of Public Health Centers and cluster-based approach for COVID-19 response in Japan. *Health Security* 2021;19(2):229-231. (doi: 10.1089/hs.2020.0159.)
  10. Seto J, Aoki Y, Komabayashi K, et al. Epidemiology of coronavirus disease 2019 in Yamagata Prefecture, Japan, January-May 2020: the importance of retrospective contact tracing. *Japanese Journal of Infectious Diseases*, 2021;74(6):522-529. (doi: 10.7883/yoken.JJID.2020.1073.)
  11. Shimizu K, Negita M. Lessons learned from Japan’s response to the first wave of COVID-19: a content analysis. *Healthcare* 2020;8(4):426. (doi: 10.3390/healthcare8040426.)
  12. Nishiura H, Oshitani H, Kobayashi T, et al. Closed environments facilitate secondary transmission of coronavirus disease 2019 (COVID-19). *medRxiv*. April 16, 2020. (doi: 10.1101/2020.02.28.20029272.)
  13. Hamaoka Y. COVID-19 対策の諸問題 (2): 積極的疫学調査という名の消極的な調査への批判的検討 (Problems in Japan’s counter covid-19 policy (2): critical examination of Japanese active surveillance). *科学 (Kagaku)* 2020;90(11):978-998.
  14. Furuse Y, Sando E, Tsuchiya N, et al. Clusters of coronavirus disease in communities, Japan, January-April 2020 (*Dispatches*), *Emerging Infectious Diseases* 2020; 26(9):2176-2179. (doi: 10.3201/eid2609.202272.)
  15. Kurita J, Hata T, Sugawara T, Ohkusa Y, Hata A. Estimating SARS-CoV-2 reproduction number by infection location in Japan. *medRxiv*. May 14, 2021. (doi: 10.1101/2021.04.13.21255296.)
  16. Oshitani H. 最近のクラスターの解析. Material for the 21st meeting of the Subcommittee on Novel Coronavirus Disease Control, January 8, 2021, pp. 39-44. (<https://www.cas.go.jp/jp/seisaku/ful/bunkakai/corona21.pdf>. Accessed January 8, 2021.)
  17. Oshitani H. クラスター報道件数推移. Material 3-1 for the 45th meeting of the Advisory Board for Countermeasures against COVID-19, the Ministry of Health, Labour, and Welfare, July 28, 2021, pp. 51-68. (<https://www.mhlw.go.jp/content/10900000/000812896.pdf>. Accessed August 11, 2021.)
  18. Iwanaga N. 宴会 2 時間でも「大丈夫というわけではない」：新型コロナ第一波から学ぶべき教訓 (Interview of Wada Koji). *BuzzFeed News*. August 17, 2020. (<https://www.buzzfeed.com/jp/naokoiwanaga/covid-19-wada-12>. Accessed March 2, 2023)
  19. Iwanaga N. ワクチン接種と変異ウイルスのスピード勝負：感染症専門医が五輪を延期したほうがいいと考える理由 (Interview of Iwata Kentaro). *BuzzFeed News*. June 10, 2021. (<https://www.buzzfeed.com/jp/naokoiwanaga/covid-19-olympic-iwata-1>. Accessed March 2, 2023)
  20. Infectious Disease Surveillance Center, National Institute of Infectious Diseases. Manual for active epidemiological surveillance of patients with novel coronavirus infection (provisional version): addition for the implementation of rapid detection of clusters (populations) of patients. February 27, 2020. (<https://www.niid.go.jp/niid/images/epi/corona/2019nCoV-02-200227-en.pdf>. Accessed December 31, 2022.)
  21. Infectious Disease Surveillance Center, National Institute of Infectious Diseases. 新型コロナウイルス感染症患者に対する積極的疫学調査実施要領 (暫定版): 患者クラスター (集団) の迅速な検出の実施に関する追加. February 27, 2020. (<https://www.niid.go.jp/niid/images/epi/corona/2019nCoV-02-200227.pdf>. Accessed December 11, 2020.)
  22. Infectious Disease Surveillance Center, National Institute of Infectious Diseases. 新型コロナウイルス感染症患者に対する積極的疫学調査実施要領 (暫定版): 患者クラスター (集団) の迅速な検出の実施に関する追加. March 12, 2020. (<https://www.niid.go.jp/niid/images/epi/corona/2019nCoV-02-200312.pdf>. Accessed November 28, 2020.)

23. Oshitani H. 日本の対策 (積極的疫学調査). 正林督章, 和田耕治 (eds.) 新型コロナウイルス感染症対応記録 (令和4年度 地域保健総合推進事業). Japan Public Health Association. 2023, pp. 222-227. ([http://www.jpha.or.jp/sub/topics/20230427\\_2.pdf](http://www.jpha.or.jp/sub/topics/20230427_2.pdf). Accessed March 6, 2025)
24. Tanaka S. 日本の COVID-19 対応における多義語「クラスター」の用法: 2020 年の記録 (Equivocality of the term “cluster” in Japan’s COVID-19 response: changes in 2020). 文化 (Bunka) 2023;86(3/4):239-219,208. (<http://hdl.handle.net/10097/0002000300>.)
25. Hisada S, Murayama T, Tsubouchi K, et al. Surveillance of early stage COVID-19 clusters using search query logs and mobile device-based location information. *Scientific Reports* 2020;10:18680. (doi: 10.1038/s41598-020-75771-6.)
26. Nakajo K, Nishiura H. Transmissibility of asymptomatic COVID-19: data from Japanese clusters. *International Journal of Infectious Diseases* 2021;105: 236-238. (doi: 10.1016/j.ijid.2021.02.065.)
27. Furuse Y, Tsuchiya N, Miyahara R, et al. COVID-19 case-clusters and transmission chains in the communities in Japan (Letter to the editor). *Journal of Infection* 2022;84(2):248-288. (doi: 10.1016/j.jinf.2021.08.016.)
28. Andalibi A, Koizumi N, Li MH, Siddique AB. Symptom and age homophilies in SARS-CoV-2 transmission networks during the early phase of the pandemic in Japan. *Biology* 2021;10(6):499. (doi: 10.3390/biology10060499.)
29. Ministry of Health, Labour, and Welfare. 全国クラスターマップ. March 31, 2020. (<https://warp.da.ndl.go.jp/info:ndljp/pid/11537253/www.mhlw.go.jp/content/10900000/000618504.pdf>. Accessed March 8, 2022.)
30. Jomo Shinbun. 国のクラスターマップ 県の認識と食い違い: 館林の病院も含む?. 上毛新聞 #gunma. April 5, 2020. (<https://www.jomo-news.co.jp/articles/-/21600>. Accessed May 22, 2022.)
31. Asahi Shimbun. 国の基準では感染者見落とすかも…名古屋市の仮説その後. 朝日新聞 DIGITAL. June 20, 2020. (<http://www.asahi.com/articles/ASN6M6F38N6DOIPE00W.html>. Accessed February 19, 2023.)
32. Tanaka S. COVID-19 clusters by March 31, 2020, Japan (Version 2). Open Science Framework. March 15, 2025. (doi: 10.17605/OSF.IO/52NVS.)
33. Asahi Shimbun. 屋形船、独り歩きした感染経路／初のクラスター、発生源未解明 (プレミアム A 東京 100 days 新型コロナウイルスの記録). 朝日新聞. May 17, 2020 (朝刊 東京本社) pp. 1-2.
34. Yomiuri Shimbun. 新型コロナ 可児 クラスター発生か: 合唱団とジムで感染者. 読売新聞. March 27, 2020 (中部朝刊 岐阜) p. 23.
35. Kahoku Shimpo. 秋田の ALT と接触か 仙台で 2 人感染 市内のパブで立ち話. 河北新報 ONLINE. 河北新報社. March 30, 2020. (<https://kahoku.news/articles/20200330kho000000001000c.html>. Accessed January 28, 2025.)
36. Sapporo City. 新型コロナウイルスに関連した新たな患者の発生について. Ministry of Health, Labour, and Welfare. February 27, 2020 (<https://www.mhlw.go.jp/content/10906000/000601148.pdf>. Accessed September 10, 2024.)
37. Sugano N, Ando W, Fukushima W. Cluster of Severe Acute Respiratory Syndrome Coronavirus 2 infections linked to music clubs in Osaka, Japan. *Journal of Infectious Diseases*. 2020;222(10):1635-1640. (doi: 10.1093/infdis/jiaa542.)
38. Yomiuri Shimbun. 新型肺炎 感染 3 人 同じライブに: 大阪で先月 15 日 約 100 人が参加. 読売新聞. March 1, 2020 (大阪朝刊 社会) p. 35.
39. Kyoto City. 新型コロナウイルス感染症患者の発生について (本市 27~30 例目). 京都市 新型コロナウイルス感染症対策本部. March 29, 2020. (<http://web.archive.org/web/20200807041134/https://www.city.kyoto.lg.jp/hokenfukushi/cmsfiles/contents/0000267/267637/200329oshirase%2827-30%29.pdf>. Accessed October 29, 2025.)
40. Asahi Shimbun. 京産大生中心に拡大 (4 日間で 50→100 人、加速度的: 感染経路不明が増加 府内の新型コロナ). 朝日新聞. April 9, 2020 (朝刊 京都府) p. 16.

41. Ministry of Health, Labour, and Welfare. 新型コロナウイルス感染症の現在の状況と厚生労働省の対応について (令和2年3月31日版). 厚生労働省. March 31, 2020.  
([https://www.mhlw.go.jp/stf/newpage\\_10636.html](https://www.mhlw.go.jp/stf/newpage_10636.html). Accessed January 13, 2025.)
42. Tanaka S. 数年前のことを描きなおす: 新型コロナウイルス感染症「クラスター対策」の虚構. Japanese Studies Workshop, 2025 Conference at Tohoku University. March 16, 2025.  
(<http://tsigeto.info/25z>. Accessed March 18, 2025.)