

Situation Report: first generation of local transmission outside of China

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Summary

In the last day, three countries— Germany (<https://www.ecdc.europa.eu/en/news-events/ecdc-statement-following-reported-confirmed-case-2019-ncov-germany>), Japan (<https://afludiary.blogspot.com/2020/01/japan-moh-2-coronavirus-cases-one.html>), and Taiwan (<https://afludiary.blogspot.com/2020/01/taiwan-moh-announces-1st-locally.html>) –have confirmed local transmission of nCoV. All three locally-acquired cases had direct contact with travelers from Wuhan, China, and so represent the first generation of onward transmission outside of China. We should expect to see more examples in the next 10 days, after which time we expect to have more information about transmission dynamics shortly following importation.

Both the German and Japanese cases provide evidence of transmission prior to the onset of symptoms that are detectable by lay people in suspected contacts. The German case also provides strong evidence of shedding during clinically-mild disease.

At this time, isolation prior to transmission is likely the most effective intervention for preventing onward transmission. The observations above indicate that public health agencies should consider broadening the suspected case definition (https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-criteria.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fclinical-criteria.html) to include persons with mild symptoms and suspected contact with travellers from affected regions in China, regardless of whether the contacts are known. And this definition may broaden further with evidence of secondary transmission outside China. Furthermore, to accommodate a more sensitive suspected case definition, public health agencies may consider working with external laboratory partners with excess capacity to test samples safely and efficiently. The development of rapid diagnostic tests will be critical to enable efficient case detection in communities where suspected case loads exceed laboratory diagnostic capacity.

Update 28 Jan 2020, 5:30 PM PST. Another local transmission event in Vietnam was reported in NEJM today (https://www.nejm.org/doi/full/10.1056/NEJMc2001272?query=featured_home), and the German case appears to be part of a cluster (<https://flutrackers.com/forum/forum/-2019-ncov-new-coronavirus/germany-2019-ncov/825276-germany-report-of-first-confirmed-case-4-cases>). The conclusions summarized above are unchanged, but additional comments are provided below.

Case reports

The locally-infected German case (<https://www.ecdc.europa.eu/en/news-events/ecdc-statement-following-reported-confirmed-case-2019-ncov-germany>) was a man in his 30s that was infected by a coworker who visited from Shanghai. Prior to her trip to Germany, the coworker was visited by her parents from Wuhan. DW reports that (<https://www.dw.com/en/germany-confirms-human-transmission-of-coronavirus/a-52169007>) that she began to feel sick on the flight home on Jan 23, and was confirmed positive for nCoV upon returning to China on Jan 23. DW further reports that (<https://www.dw.com/en/germany-confirms-human-transmission-of-coronavirus/a-52169007>) “the man developed bronchitis-like symptoms over the weekend, but recovered and felt well enough to go to work on Monday [Jan 27].” Upon notification that the Chinese colleague had tested positive, the man

sought testing and was confirmed the evening of Jan 27. The time from exposure to symptom onset is unclear in public reports, but it is likely a few days as the contact visited for a training event the week prior to symptom onset. At the time of writing, this case has been symptomatic for 4 days and presented with relatively mild symptoms with transient intensity. It will be important to monitor the progression of symptoms for this patient as they may provide a clue about how the initial presentation of the disease differs from clinically-severe cases.

The locally-infected Japanese case (<https://afludiary.blogspot.com/2020/01/japan-moh-2-coronavirus-cases-one.html>) is a man in his 60s who is a tour bus driver and was exposed to tourists from Wuhan between Jan 8-11 and again from Jan 12-16. The man began to experience chills, cough, and joint pain on Jan 14. He had an outpatient visit on Jan 17. On Jan 22 symptoms got worse, and he was only admitted for lower respiratory symptoms following a radiograph on Jan 25. Given the timing of events, the case was likely infected no more than 6 days prior to showing symptoms, and he was symptomatic for 12 days prior to containment. We are not aware of any reports describing confirmed cases from the travellers on the bus, nor their current location.

The locally-infected Taiwanese case (<https://afludiary.blogspot.com/2020/01/taiwan-moh-announces-1st-locally.html>) is a man in his 50s whose wife recently returned from mainland China and is also a confirmed case. We're aware of no further details at this time.

Interpretation

Both the German and Japanese cases exhibited varying symptom severity at onset. The German case showed acute transient symptoms that would have gone unreported thus far without notification that the contact tested positive. The Japanese case was discharged without suspicion of severe disease risk from outpatient care, preceeding an increase in symptom severity 5 days later. These both provide evidence of an early period where active nCoV infections occur with low probability of clinical detection.

The German case reveals direct transmission prior to the onset of symptoms significant to lay people. Both the German and Japanese case indicate incubation periods to mild symptoms of a few days.

Together, these cases suggest a hypothesis about the progression of infection and disease. The latent phase prior to significant viral load may be a few days, and the onset of shedding may be marked by acute expression of moderate or negligible, possibly transient symptoms. Following the onset of shedding, cases are capable of transmission. And only some progress to severe disease. The overdispersed incubation period observed in hospitalization reports from China (https://github.com/InstituteForDiseaseModeling/nCoV-public/blob/master/analyses/individual_dynamics_estimates/nCoV_incubation_period.md) may reflect this mix of acute and severe symptomatic periods. The distribution of shedding durations remains unknown at this time, although we believe 5-12 days—marking the time from shedding onset to severe disease or recovery—is likely.

Surveillance Recommendation

Suspected Case Definition. Given the evidence above, public health agencies should consider broadening the suspected case definition (https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-criteria.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fclinical-criteria.html) to include persons with mild symptoms and suspected contact with travellers from affected regions in China, regardless of whether the contacts are known. And this definition may broaden further with evidence of secondary transmission outside China.

Testing capacity. To accomodate a less specific, and likely more sensitive suspected case definition, public health agencies may considering seeking partnerships with external laboratory partners with excess capacity to test samples safely and efficiently. Furthermore, The development of rapid diagnostic tests will be critical to

enable efficient case detection in communities where suspected case loads exceed laboratory diagnostic capacity.

Expectations for continued detections in next 10 days. Given that international travel from Wuhan only ceased on Jan 23 (and other major cities remain open at this time), and that the incubation period is as long as 14 days, we should expect to see more local cases pop up in the next 10 days. At that time, we'll be able to make stronger inferences about the strength of local transmission outside China from the ratio of local to imported cases as well as any contact tracing information.

Additional notes following update on 28 Jan 20120, 5:30 PM PST

For the Vietnam local transmission event reported in NEJM today (https://www.nejm.org/doi/full/10.1056/NEJMc2001272?query=featured_home), the index case with travel history from Wuhan got low-grade fever and fatigue 4 days after returning from Wuhan. 8 days later, he required oxygenation. The son got a cough and fever 1 to 3 days after infection from the father, during the time after the father's fever started but before oxygenation. The son's condition is stable but I think he's still in the hospital.

Also, the German case is now part of a cluster (<https://flutrackers.com/forum/forum/-2019-ncov-new-coronavirus/germany-2019-ncov/825276-germany-report-of-first-confirmed-case-4-cases>). There remains a question of if the index case was really asymptomatic prior to Jan 23 or just ignoring mild symptoms. It matters for fully characterizing the disease and determining surveillance objectives, but not that much for human behavior – asymptomatic vs ignorable symptoms probably aren't that different practically.

These plus the earlier ones fit a picture of a 3ish day latent period, followed by flu-like symptoms that probably coincide roughly with the start of shedding, and then people are infectious for some still indeterminate duration after that, either progressing to pneumonia or presumably recovering.

The original incubation data (https://github.com/InstituteForDiseaseModeling/nCoV-public/blob/master/analyses/individual_dynamics_estimates/nCoV_incubation_period.md) appears to have been mixing acute onset with severe onset, and hence a range of 2-14 days.

As this data continues to come in unfortunately, we will soon have a much clearer picture of infection, shedding, and disease progression which will narrow uncertainty around transmission dynamics and requirements for surveillance.