

RAG ADVICE ON QUARANTINE FOR CONTACTS AND TRAVELERS

1. Questions

In Belgium, the current recommendation is to quarantine people for 14 days when they have been a high risk contact with a confirmed COVID-19 case or when they return from a region classified as a Red Zone.

A first PCR test is performed as soon as possible after identification of the high risk contact or return from Red Zone. If the test is negative, a 2nd PCR test can be performed minimum 9 days after high risk contact/return from Red Zone. If the 2nd test is also negative the quarantine period can be terminated, so minimum 10 days after high risk contact/return from Red Zone.

Confirmed COVID-19 cases (PCR +) must remain isolated for minimum 7 days after testing/symptom onset or until complete disappearance of symptoms.

An advice from the RAG was requested to evaluate the possibility of reducing the quarantine period for asymptomatic contacts and/or travelers, while maintaining protection of the population by limiting virus transmission.

The questions analysed in this assessment include the following:

- What is the best moment to test to reduce the probability of false negative ?
- Can a second test shorten the quarantine ? If yes, is it worth changing the testing strategy to allow 2nd test for all close contact no matter the epidemiological situation ?
- If only one test is performed, when should it be done (beginning or end of quarantine period)?
- For returns from red zone, could a test be performed after 5 days and limit the quarantine to 7 days if negative test ?
- Should travelers and high risk contacts have different quarantine regimes?

2. Advice

The experts did not reach a consensus and the following options were proposed:

1. Safest option:

- 14 days quarantine for high risk contact and travelers;
- Test as soon as possible for high risk contacts (13% of high risk contacts are positive at first test) and at day 5 after arrival for travelers.
 - this would cover 96% of the persons who will develop symptoms.

2. Option with acceptable risk, based on scientific arguments:

- 10 days quarantine for high risk contact and travelers;
- Test as soon as possible for high risk contacts (13% of high risk contacts detected) and at day 5 after arrival for travelers. Strictly apply the 6 gold measures.
 - 90% of the cases who will develop symptoms will do so within the 10 day period

3. Option with acceptable risk based on psycho-social argument :

- 7 days quarantine could be proposed for high risk contact and travelers.
- Test day 6 for high risk contacts (13% of high risk contacts detected) and at day 5 after arrival for travelers.
- Wear a mask in any public places/limit strictly your contacts, monitor the health and pay extra attention to even minor symptoms up to for 14 days and isolate immediately/perform test at the onset of symptoms compatible with COVID19.
 - Note that by 5-7 days (median incubation time), 50% of eventually symptomatic cases will have developed symptoms and limiting the quarantine to that period to avert transmission will potentially have a moderate effect, but the waning adherence may mean short quarantines are as effective as longer ones. This assumption has nevertheless to be further investigated.

3. Elements of discussion

3.1. KEY DATA

- The **mean incubation period of SARS-CoV-2 is 5-7 days**, meaning that 50% of eventually symptomatic cases will have developed symptoms by that time.
- However, the **incubation period is dispersed** and a fraction of patients become positive more than 10 days after a high risk contact:
 - If quarantine period is limited to 14 days, 96% of symptomatic patients will be detected.
 - If quarantine period is limited to 10 days, 90% of symptomatic patients will be detected.
- Given the dispersed incubation period of SARS CoV 2, a negative test 5 days after contact would be insufficient to terminate quarantine of high risk contacts.
- Results of **contact tracing call centre**:
 - 90% of the high risks contacts are answering to the call from contact centre
 - 80% of high risk contacts have a first test with a 13% positivity rate
 - 25% of those with a negative first test, have a second test done.
 - The second test is positive in 6%
- Results from the PLF (**Passenger Locator Form**):
 - 74% of people coming back from red zones are tested
 - 2,1 % of the travelers that are tested have a positive result
 - the test-positivity rate is high variable depending on country of origin and ranges from 14% (Kosovo) to 0.9% (France)
- Testing centers and health care facilities are overwhelmed,

3.2. EXPERT OPINION

- The experts stress that **quarantine remains the most effective measure** to interrupt transmission chains.
- The experts agree that the same quarantine regimes should be applied to travelers from red zones and high risk contacts.
- The expert agree that quarantine should be combined with molecular testing.
- The experts agree that a balance should be found between protection of the population and adherence to the measure. On this basis, most of the experts agree that the duration of the quarantine could be shortened.
- **There was no consensus among the experts on whether to shorten the quarantine period from 14 days to 10 or 7 days.** A 10- day quarantine would allow detection of 90 % of positive cases while a 7- day quarantine is believed to lead to better compliance.
- Compliance with quarantine could also be increased with other compensations :
 - o Facilitate financial compensation
 - o Communication following recommendations of experts in psychology/ sociology/ health care promotion
- Discussion points also included the number and timing of PCR tests:
 - o A single test would save resources and decrease the burden on patients
 - o A single test performed at the beginning of the quarantine period is important for early contact tracing
 - o A single test at the end of the quarantine period would detect contacts still in incubation period
 - o Two tests would provide both information for contact tracing and increased sensitivity

4. Background information

4.1. BACKGROUND INFORMATION

On the 4th of September 2020, EU health ministers met to define and agree on a coordinated approach to quarantine and test regimes for cross-border/non-essential travel within the European Union (EU). The proposal was a quarantine period of (at least) 10 days without a test or a quarantine period of (at least) 5 days in combination with a negative test. No Member State advocated for a quarantine- and test regime of less than 10 days. Based on this, there was broad support among Member States for a quarantine regime of at least 10 days with the option to extend this period.

On August 27, an expert advice was requested to the ECDC about reduction of the quarantine period from 14 to 10 days for contacts of confirmed cases. **Based on literature, ECDC considered that there was not sufficient evidence to support a decrease in the COVID-19 incubation period and therefore a decrease in quarantine from 14 to 10 days.**

4.2. RECOMMENDATIONS IN OTHER COUNTRIES

- **CDC (update 31/08/20):** 14 days quarantine for asymptomatic contacts
<https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/contact-tracing-plan/contact-tracing.html>
- **WHO (19/08/20)** 14 days quarantine for contacts
https://apps.who.int/iris/bitstream/handle/10665/333901/WHO-2019-nCoV-IHR_Quarantine-2020.3-eng.pdf?sequence=1&isAllowed=y
- **RIVM (update 19/08/20)** <https://www.rivm.nl/en/novel-coronavirus-covid-19/quarantine>
Quarantine period has been reduced from 14 to 10 days mid-August. Data from the NL shows that only 1% of contacts develop symptoms after 10 days.
- **RKI (09/09/20)**
https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Kontaktperson/Management.html#doc13516162bodyText3
In Germany quarantine period for high risk contacts is 14 days, no shortening even with a negative test a day 5-7
- **Norway** 10 day quarantine (no testing required at 10 days)
<https://www.fhi.no/en/op/novel-coronavirus-facts-advice/facts-and-general-advice/social-distance-quarantine-and-isolation/>
- **France (update 15/09/20)**
<https://www.santepubliquefrance.fr/dossiers/coronavirus-covid-19/covid-19-outils-pour-les-professionnels-de-sante>
Quarantine period of at least 7 days, after 7 days a test can be performed and quarantine stopped when negative result.

Note: for all the above mentioned countries, quarantine guidelines are the same for contacts and for travelers coming from high risk zones.

4.3. LITERATURE REVIEW

4.3.1. Incubation time

Several meta-analysis were carried out to better understand the incubation period of SARS-CoV-2. **Median incubation period ranged between 5 and 6 days (1)(2)**

However, the analysis performed by the ECDC expert team on the basis of the publication of Wei et al, showed that **a quarantine period of 14 days was estimated to allow detection of 96 %** of the cases, while on a **quarantine period shortened to 10 days, 90 % of the infected contacts** would be detected. This implies that an additional 6 % of cases would be captured by a 14-day quarantine compared to a 10-day quarantine. This also implies that 4% of the cases are expected to develop symptoms after the 14 day period.

The study of Yang et al as well as a preprint study support the analysis performed by the ECDC, showing that 5% of the cases would be missed on a 14-day quarantine. In the study of Yang et al, 95 % of symptomatic cases showed symptoms by 13.7 days (95% CI 12.5–14.9) and 99% showed symptoms by 17.8 days (95% CI 15.9–19.7) (3) .

Preliminary data from Sciensano also indicates that a significant proportion of patients would be missed on a shortened quarantine regime (see below).

4.3.2. Viral shedding kinetics, optimal time for PCR test and probability of false negative tests

Peak viral load in upper respiratory tract appears to occur early during infection. The analysis of Wolfel et al on 9 cases showed a peak viral load in throat swabs on day 4 after symptom onset (4). A meta analysis of 21 studies aiming at understanding antibody and viral RNA detection kinetics during SARS CoV 2 infection, found that detection of RNA from upper respiratory tract samples was higher at symptom onset (5). In a study from He et al on 94 patients with confirmed COVID19, the highest viral load was also observed in throat swabs at symptom onset (6).

These observations are in line with the analysis of Kucirka et al. where the false negative rate of RT-PCR in symptomatic patients was estimated based on the time since their exposure. Day 5 was used as an estimate for the onset of symptoms. The probability of a false-negative result decreases from 100% (95% CI, 100% to 100%) on day 1 to 67% (CI, 27% to 94%) on day 4. On the day with onset of symptoms the probability of a false-negative rate was 38% (CI, 18% to 65%). This decreased to 20% (CI, 12% to 30%) on day 8 (3 days after symptom onset) then began to increase again, from 21% (CI, 13% to 31%) on day 9 to 66% (CI, 54% to 77%) on day 21(7) . These numbers cannot be extrapolated to asymptomatic patients.

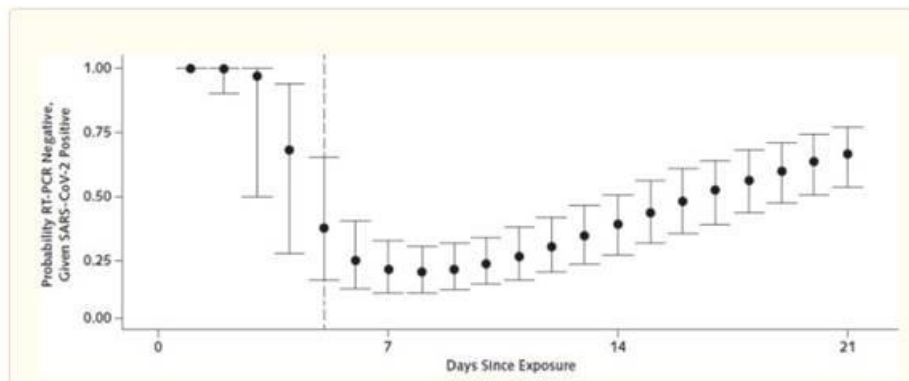


Figure 1 from Kucirka et al. (7) Probability of having a negative RT-PCR test result given SARS-CoV-2 infection, by days since exposure

4.3.3. Modeling analysis of different quarantine / test scenarios

Clifford et al. used simulation models to evaluate the ability of different quarantine and/or testing strategies to reduce transmission risk through air travelers. They showed that a quarantine period of 8 days on arrival with a PCR test on day 7 could reduce the number of infectious arrivals released into the community by a median 94%, compared to a no quarantine, no test scenario. A 14-day quarantine, as currently recommended in many countries, is predicted to achieve a 99% reduction of infectious travelers entering a community (8) .

Clifford and Quilty also adapted their model to analyse whether the quarantine period could be reduced if combined with PCR testing. They showed that a 10-day quarantine with test on day 8 can reduce the median transmission potential by 68 %, as compared to a 14-day quarantine with no test averting 70% of transmission potential. Reducing the delay for tracing secondary cases would also decrease transmission potential.

4.3.4. Population compliance to quarantine and/or isolation requests

A study carried out in Norway on 1704 adults analysed adherence to COVID-19-related quarantine and / or isolation requests in April, May, June and July 2020. Self-reported adherence to quarantine/isolation requests was overall low (42 %). Adherence was higher in April (66 %) compared to May, June, July (33-38 %) and higher among individuals experiencing COVID-19 compatible symptoms (71 %), only 28 % of individuals requested to isolate/quarantine complied with the measure if they had no symptom (9).

It has been shown that factors affecting adherence to quarantine measures include perceived risk and knowledge of the disease, knowledge about and perceived benefits of quarantine, social norms and practical issues such as financial consequences (10)

4.4. PRELIMINARY DATA (SCIENSANO)

4.4.1. Data from the contact tracing database

Preliminary analyses from the contact tracing database available at Sciensano showed that 80 % of contacts are tested. 13 % of those are tested positive.

25 % of the negatives will do a second test 4 to 14 days after the first, 6 % will test positive. Index cases are notifying about 4 high risk contacts (up to 10). The number of daily contacts is varying a lot depending of the age and activity but we can assume that 4 high-risk contacts by index case is probably an under-notification even if the mean number of households in Belgium is 1.2.

The graph below shows the percentage of high risk contacts that had a positive COVID-19 test, by delay between contact and positive test.

According to these data, 10% of contacts with a positive test are tested positive more than 10 days after the contact. It has to be noted that we do not know whether a positive contact on a given day would have already been positive if tested earlier.

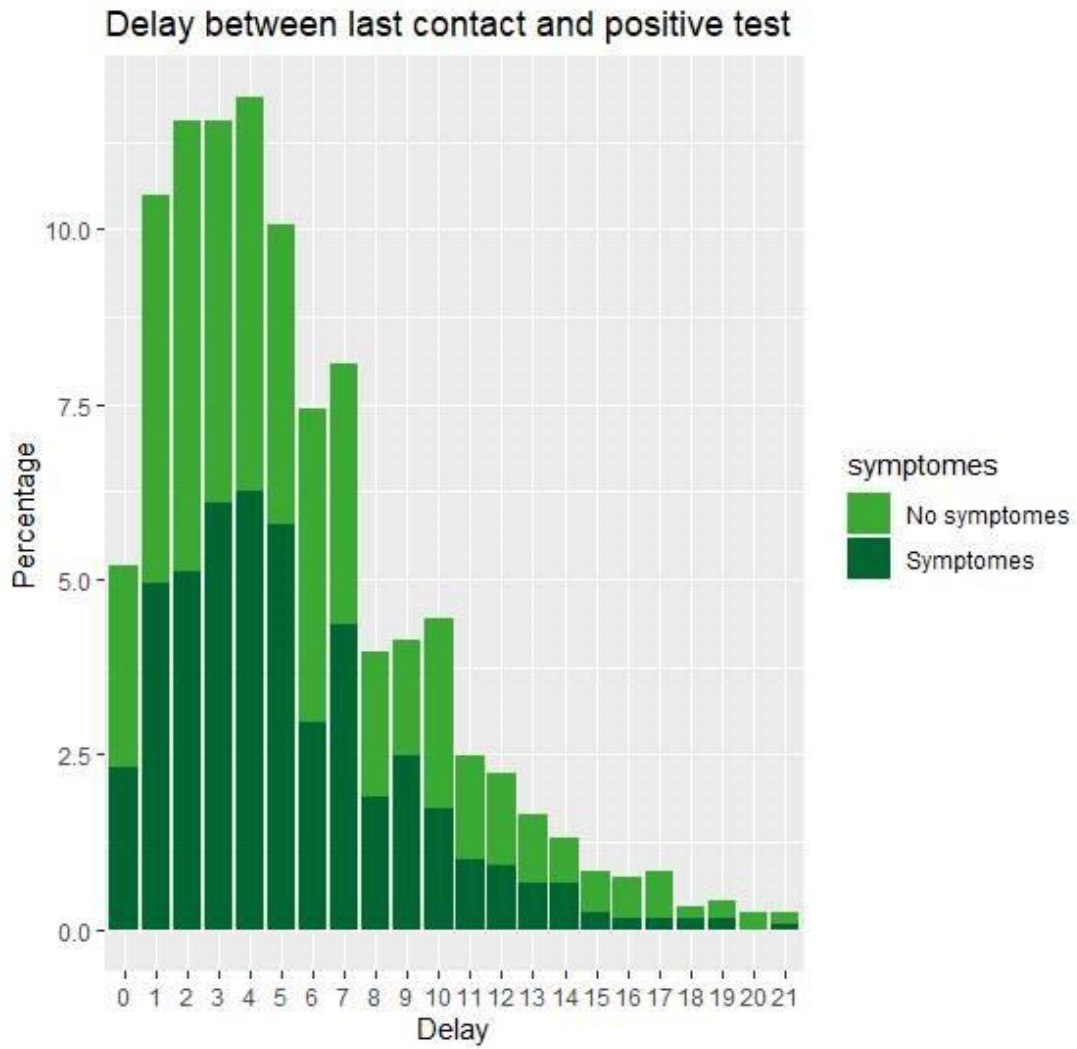


Figure 2: Belgian data 4/05 – 8/09: proportion of contacts with a positive test result by delay between exposure and first positive result (N=17 382)

4.4.2. Data from the Paloma platform (PLF) 1/08 – 14/09

74% of travelers coming from a Red Zone are tested; of those 2,1 % are tested positive.

	Total number of arrivals	Number of arrivals from a red zone	Total number of people to test (of which NISS available)	Total number tested RED (/total to test with NISS)	Positive tests RED (/positivity ratio)
BELGI(QU)E	1603301	108431	106575 (78321)	58024 (74%)	1239 (2,1%)
Bruxelles/Bru ssel	282748	33978	33386 (21001)	14538 (69%)	426 (2,9%)
Antwerpen	194967	14027	13783 (11110)	9207 (81%)	310 (3,4%)
Vlaamse Brabant	171886	10767	10556 (8137)	5970 (73%)	95 (1,6%)
Oost Vlaanderen	182611	6208	6123 (4738)	3751 (79%)	47 (1,3%)
West Vlaanderen	173362	10455	10298 (8652)	7270 (84%)	116 (1,6%)
Limburg	75242	5181	5111 (4364)	3800 (87%)	70 (1,8%)
Brabant wallon	82340	4832	4734 (3934)	2501 (64%)	31 (1,2%)
Hainaut	131260	8187	8055 (6432)	4163 (65%)	61 (1,5%)
Liège	123962	8536	8398 (5882)	4004 (68%)	45 (1,1%)
Luxembourg	48534	1378	1348 (1132)	787 (70%)	6 (0,8%)
Namur	61791	3262	3190 (2490)	1747 (70%)	31 (1,4%)
<i>Data on province : missing</i>	74598	1620	1593 (496)	286 (64%)	8

5. References

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