Rapid Communication

Rapid assessment of regional COVID-19 community transmission through a convenience sample of health care workers.

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On 27 February 2020 the first case of COVID-19 was diagnosed in the Netherlands. By 6 March this had increased to 128 cases. Most of these cases had a travel history to northern Italy or had been in close (household) contact with a confirmed case. However, in the province of Noord Brabant, the source of infection for xx cases could not be established while some cases elsewhere in the Netherlands were linked to Noord Brabant. Furthermore, several hospital health care workers (HCW), in a hospital in the province that offered low threshold testing for employees with respiratory complaints, had tested positive for SARS-CoV-2. On Friday 6 March the Dutch National Outbreak Management Team (OMT) convened to discuss the COVID-19 situation in the Netherlands. The OMT decided that an urgent rapid assessment was needed of possible community transmission in the province of Noord Brabant. The results were required to be available by Monday 9 March to advise governmental decision makers about possible control measures.

Study.

It was decided to address the assessment of possible community transmission in Noord Brabant through sampling of HCW in hospitals in the province. A focus on HCW would make sampling at such short notice of adequate numbers of persons with mild respiratory symptoms and without a known

epidemiological link for SARS-CoV-2 feasible. Furthermore, knowledge of the status of SARS-CoV-2 infection among HCW would provide important insight for the participating hospitals in the infection status among their personnel and would inform hospital policies on testing algorithms for their personnel and infection prevention measures.

Seven hospitals in the province of Noord Brabant were approached Friday afternoon and Saturday morning, 6 and 7 March 2020 with the request to test HCW with mild respiratory symptoms (coughing and/or sore throat and or cold) and without an epidemiological link for SARS-CoV-2, through Sunday 8 March. Some hospitals indicated that they had already started sampling HCW, as part of hospital policy. Others had no such policy but were testing all patients that presented at the emergency ward with severe acute respiratory infections (SARI). In addition, two hospitals just outside Noord Brabant with a large proportion of staff residing in the province participated in the assessment (figure 1). The participating hospitals were asked to submit the results of the testing by 14:00 Monday 9 March 2020.

The participating hospitals were also asked to submit SARS-CoV-2 clinical samples to Erasmus Medical Centre in Rotterdam for sequencing.

Results

In the period 6-8 March 2020, a total of 1097 HCW in 9 hospitals were tested for SARS-CoV-2 by RT-PCR on throat and/or nasopharyngeal swabs of whom 45 (4.1%) were found positive (figure 1). Six hospitals had positive HCW of which two (Amphia in Breda and Elisabeth-TweeSteden in Tilburg) accounted for 38 of the 45 positive HCWs. The percentage positive HCW per hospital varied

between 0% and 9.5% with the highest percentages in Bernhoven (5.6%), Amphia (4.2%) and Elizabeth Twee Steden (9.5%) hospitals. Additionally, seven hospitals had already tested HCW in the period 27 February - 6 March 2020. They reported 10 positive HCW among 400 HCW tested (2.5%). The percentage positive HCW per hospital varied between 0% and 5.6% in this period.

In total, in the period 27 February - 8 March 2020, four of the nine hospitals had tested 786 SARI patients of whom 27 (3.4%) were positive. In Bernhoven hospital (Uden) 16.2% (16/99) of SARI patients tested positive. The percentage positive SARI patients varied between 1.1% and 16.2%

Background and Discussion

Since its first emergence in China in December 2019, a novel human pathogenic coronavirus named SARS-CoV-2 has caused a pandemic affecting xx countries with a total of xx cases with xx deaths as at xx March 2020. SARS-CoV-2 causes a disease named COVID-19 that is characterized by a spectrum of illness ranging from subclinical/mild respiratory disease to severe acute respiratory illness. As at 12 March 2020, the Netherlands had registered 614 patients with the majority of cases in the South-western parts of the country. Currently (12 March 2020), evidence is accumulating for unnoticed community transmission in provinces Noord Brabant and Limburg with sporadic cases with unknown sources of infection elsewhere in the country.

A two day rapid study among 9 hospitals with HCW working and/or residing in an area of the Netherlands with suspected community transmission showed that 3.9% of hospital staff with mild respiratory symptoms were infected with SARS-CoV-2. The observed geographic differences in positivity rates among HCW demonstrated focality of SARS-CoV-2 infection with a focus in the region Breda – Tilburg and Uden. SARS-CoV-2 infections amongst SARI patients were primarily found in the hospital in Uden. These patients were at the time immediately subjected to source and contact investigation by the regional public health service.

The results of the rapid assessment confirmed suspicions that unnoticed community transmission was ongoing in parts of Brabant. The results directly informed decision making in a meeting between leadership of the Netherlands Centre for Infectious Disease Control and government representatives on 9 March 2020. The study supported the implemented mitigation policy that was decided upon by the OMT on Friday 6 March in anticipation of the results of the assessment. Furthermore it informed additional measures by the government to further control the outbreak. The preliminary measures were for Noord Brabant to practice social distancing and limit their social contacts and to stay at home if they have a cold, cough and/or fever. These measures were ratified once more when the study results were known and in addition the government called upon the Dutch population to stop shaking hands in the afternoon of 9 March 2020.

Here, we used SARS-CoV-2 infection rates among HCW without an epidemiological link (travel to high risk areas, close contact with confirmed case) as a proxy for community transmission. As the study had to be conducted under enormous time constraints (to be started and completed within two days) to be able to rapidly inform urgent decision making, there was no opportunity to roll out a standardized study protocol. Nevertheless, data provided by the WHO-China joint mission on COVID-19, supports our approach. The mission report indicated that there were 2055 laboratory confirmed cases of COVID-2019 among HCW from 476 hospitals in China. Close investigation into these cases revealed that most of these could be traced back to exposure in households rather than in a health care setting.

We interpret the prevalence of almost 4% among health care workers with mild respiratory illness and no epidemiological link as high and disturbing. It suggests unnoticed community transmission, with a high risk of nosocomial transmission. Further evidence for ongoing community transmission is provided by the primary care sentinel surveillance for influenza-like illness (ILI). While this is a small group of 40 practices covering 0,8% of the Dutch population, by 12 March four ILI patients had tested positive. The epidemiological situation in the Netherlands, and elsewhere is rapidly

developing, and by 12 March, we consider the province of Noord Brabant, and part of the adjacent province of Limburg to be in mitigation phase, while other provinces are still in containment phase.

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References

Will follow