Rapid Communication

Rapid assessment of regional SARS-CoV-2 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 [1]. By 6 March the number of cases had increased to 128 [2]. Most of these cases had a travel history to northern Italy or had been in close (household) contact with a laboratory confirmed case. For 15 of the 128 cases the source of infection had not been determined. In the province of Noord-Brabant, the source of infection could not be established for 7 of the total of 35 cases in the province while some cases elsewhere in the Netherlands were also linked to Noord-Brabant (own data RIVM). Furthermore, in a hospital that offered low threshold testing for employees with respiratory complaints, a few health care workers (HCW) 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 risk assessment was needed of possible community transmission in the province of Noord-Brabant. The hospitals were asked to offer the screening to HCW and share the results by Monday 9 March to advise governmental decision makers about additional control measures.

Study

It was decided to approach the assessment of possible community transmission in Noord-Brabant through sampling of HCW in hospitals in the province. A focus on HCW would simplify sampling at such short notice of adequate numbers of persons with mild respiratory symptoms (coughing and/or sore throat and/or common cold) without a known epidemiological link for SARS-CoV-2 (travel to high risk areas, close contact with confirmed case). 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 on 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 through Sunday 8 March. Some

hospitals indicated that they had already started sampling HCW, as part of their hospital policy. Others had no such policy but were testing all patients that presented at the emergency ward with respiratory complaints. In addition, two hospitals just outside Noord-Brabant with a large proportion of staff residing in the affected province participated in the assessment (figure 1). The participating hospitals were asked to offer the screening to HCW and share the results of the testing by 14:00 Monday 9 March 2020. Upper respiratory tract specimens (throat and/or nasopharyngeal swab) were collected. Testing was based on an uniform national protocol based on Corman et al., [V] that was rolled out by two central laboratories in the Netherlands. Testing was done either locally or in one of the two central laboratories in the Netherlands. Ethical approval was not required for this study as only anonymous aggregated data were used, and no (medical) interventions were made on human subjects. Sampling of HCW or patients was part of hospital policy.

Results

In the period 6-8 March 2020, a total of 1097 HCW in nine hospitals (range 11-294) were tested for SARS-CoV-2 of whom 45 (4.1%) were found positive (figure 1). Six hospitals had positive HCW of which two (Amphia hospital in Breda and Elisabeth-Tweesteden hospital 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 Amphia hospital (4.2%), Bernhoven hospital in Uden (5.6%) and Elizabeth Tweesteden hospital (9.5%). Additionally, seven hospitals (Amphia, Bernhoven, Jeroen Bosch hospital in 's-Hertogenbosch, Bravis hospital in Roosendaal, Catharina hospital in Eindhoven, Elisabeth Tweesteden, Radboudumc in Nijmegen), had already tested HCW in the period 27 February - 6 March 2020. They reported 10 positive HCW among 400 tested (2.5%). The percentage positive HCW per hospital varied between 0% and 5.6% in this period with the highest percentage in Jeroen Bosch hospital.

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

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 134 countries with a total of 142,539 cases with 5393 deaths by 14 March 2020 [Y]). 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. Fatal outcome was reported in the largest study from China to be 2,3 % [Wu and McGoogan, 2020]. As at 15 March 2020, the Netherlands had officially registered 1135 patients with the majority of cases in the south-western part of the country [c]. Currently (15 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 nine 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 foci in the region Breda–Tilburg and Uden. SARS-CoV-2 infections amongst patients with respiratory complaints were primarily found in the hospital in Uden. Source and contact tracing was started by the regional public health service upon positive testing in the patients.

The results of the rapid assessment confirmed the suspicions at the OMT meeting on 6 March 2020 that unnoticed community transmission was ongoing in parts of Noord-Brabant. The results directly informed decision making for control measures at the national level (9 March) and subsequently for

additional regional measures (10 March). The study supported the implemented mitigation policy that was advised by the OMT on 6 March in anticipation of the results of the assessment [x]. The additional measures undertaken by regional authorities involved enforcing social distancing by requesting inhabitants of Noord-Brabant to practice self-isolation at home when they developed a cough, symptoms of common cold and/or a fever. Furthermore, a ban of public events involving more than 1000 people was implemented in this province [d]. As the epidemiological situation developed, on 12 March 2020, self-isolation upon mild respiratory symptoms was implemented for the whole country, together with a ban of events with more than 100 people [e]. Tailored advice was issued for the elderly, persons belonging to medical risk groups and for persons involved with their care.

Here, we used SARS-CoV-2 infection rates among HCW with mild respiratory complaints without an epidemiological link 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 [f].

We interpret the prevalence of almost 4% among HCW with mild respiratory illness and no epidemiological link as high and of concern. It suggests unnoticed community transmission, with a potential risk of nosocomial transmission. Further evidence for ongoing community transmission is provided by the Nivel Primary Care Database sentinel surveillance for influenza-like illness (ILI) and other acute respiratory infections (ARI). While this is a small group of about 40 practices covering 0.8% of the Dutch population, by 14 March eight ILI or ARI patients had tested positive, 1/109 (0.9%) with a collection date in week 10 and 7/84 (8.3%) in week 11 so far. The epidemiological situation in

the Netherlands, and elsewhere is rapidly developing, and additional measures involving further restrictions in the social life in the country are being prepared.

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