PaxSyriana Foundation

Protecting Refugee Camps From COVID-19: The Case Of Northwest Syria

Policy Report

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Abbreviations

CCTC: Community-Based Treatment Centre
COVID-19: Coronavirus Disease 2019
CSO: Civil Society Organisation
IDP: Internally Displaced Person
IHD: Idlib Health Directorate
NSAG: Non-State Armed Group Controlled Area
NES: Autonomous Administration of North and East Syria
NGO: Non-Governmental Organisation
NWS: Northwest Syria
OCHA: Office for the Coordination of Humanitarian Affairs
PPE: Personal Protective Equipment
SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2
UN: United Nations
US: United States
USD: United States Dollars
WHO: World Health Organisation

01

Executive summary

This report is based on research that proposed a community-based approach to containing an outbreak of COVID-19 in Northwest Syria. The research has been pre-published on MedRxiv on the 1st of September 2020 [1], and has been submitted for peer-review publication.

A limited number of containment and mitigation measures are currently in place in Northwest Syria, with the majority focused primarily on health system strengthening. However, many humanitarian experts have expressed concerns about the catastrophic impact of a COVID-19 outbreak if prevention measures are not implemented.

Internally displaced persons living in the region's refugee camps are extremely vulnerable to severe illness due to COVID-19, given their abject poverty and lack of safety and security. Concomitant outbreaks in just a small number of camps would overwhelm and collapse the already fragile healthcare system in the region, leaving large numbers of severely ill and vulnerable people without any care. Furthermore, an outbreak in the camps may be a potential source of transmission to other regions in Syria and neighbouring countries. It is therefore essential to centre the Northwest Syria COVID-19 response on the refugee camps.

In order to better understand how an outbreak would spread in camps hosting internally displaced persons, epidemiological models simulated the outcome of an outbreak in a camp with and without preventive measures. The interventions were various combinations of low-cost, practical measures including reducing potentially contagious contacts between individuals (self-distancing), isolating symptomatic cases (self-isolation), and preventing the exposure of the most vulnerable members of the population to the virus (safety zone).

If implemented, these interventions would significantly protect the populations living in camps, and help alleviate the burden on the exhausted health system. Implementing the three interventions in tandem would be most effective, potentially saving up to 85,000 lives and delaying the time until the peak of the outbreak by one to three months.

The COVID-19 preparedness and response plan set by the United Nations-led Task Force for Syria needs to be revisited to integrate a response specific to the internally displaced populations in the camps. Effective coordination between local actors and United Nations agencies will be necessary to mitigate the anticipated epidemic. An integrated plan involving various international and local actors, as well as a multi-faceted containment approach needs to be coordinated and implemented rapidly. Instrumentally, the effectiveness of interventions relies on the involvement and engagement of local communities in Northwest Syria's refugee camps.

02

Background

> “ In war-torn countries such as Syria, forecasts predict an inevitable collapse of the already fragile healthcare system in the event of a COVID-19 outbreak ”

COVID-19 is an infectious disease caused by the novel coronavirus, SARS-CoV-2. Emerging in 2019, the virus spread worldwide and was declared a pandemic in March 2020 [2]. To control the COVID-19 pandemic, global health authorities called on countries to “flatten the curve” of infected cases per day in order to not overwhelm health system capacity [3]. This relies on controlling the spread of the disease through social distancing, testing, contact tracing, case isolation, sanitation and hygiene measures, and generalised use of personal protective equipment (PPE), while increasing the capacity of healthcare systems to treat critical cases, especially those needing intensive care [4].

Implementing these measures in low- and middle-income countries and/or countries entrenched in conflict is a challenge given resource constraints. However, some low-income countries have been successful, despite having limited-resources. Cambodia, Vietnam, Thailand, and Laos managed to control their COVID-19 outbreaks by implementing confinement measures, with mandatory quarantine for new arrivals, nationwide lockdowns, and nationwide use of masks [5,6].

In war-torn countries such as Syria, forecasts predict an inevitable collapse of the already fragile healthcare system in the event of a COVID-19 outbreak [7,8]. Although this report focuses on the case of Northwest Syria (NWS), its implications extend well beyond the region.

A political vacuum

The war in Syria has been an ongoing, complex conflict, drawing in multiple domestic and foreign forces and factions. This has resulted in a major humanitarian crisis, which has been particularly acute in NWS for the last three years. As the last opposition-held bastion, it has been the focus of military campaigns led by the Syrian government and Russian Federation.

NWS is composed of two distinct areas in terms of governance. The regions of North Aleppo and Afrin, also known as the Euphrates Shield and Olive Branch regions, are de facto administered by Turkey. Although the responsibility and accountability of Turkey is not well-defined, Turkey is the main actor in this area. Therefore, unless there was a radical change in the balance of local powers, Turkey would likely lead the COVID-19 response in the area.

The second part of NWS encompasses a portion of Idlib province. Due to the rising conflict in the province, there have been massive and repeated internal displacements from the disputed areas of North Hamah and South Idlib to the rest of Idlib province [8]. The United Nations (UN) defines this region as the Non-State Armed Group Controlled Area (NSAG) of NWS. Since 2016, populations from several areas in Syria were forcibly displaced to the NWS of Syria [9]. About one million people were displaced in NWS in the first quarter of 2020 [8]. Today, Idlib's NSAG hosts a total population of about 2.6 million, including about one million IDPs living in camps, whether informal or planned [8]. In terms of governance, this area is a political vacuum, where various forces compete to control different sectors, including health care.

The United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and the World Health Organisation (WHO) are in charge of the planning and implementation of the Preparedness and Response Plan (PRP) for COVID-19 in NWS. This is achieved through coordination with several clusters, various local administrations, and humanitarian organisations in Idlib. Because of the lack of trust in the UN [10] by the Syrian opposition and undefined accountability mechanisms of the UN [11], civil society leaders have called for a Syrian-led response, which led to the creation of the "National Response Team for COVID-19 epidemic in Syria" [12].

“Nearly one million people were displaced in NWS in the first quarter of 2020 ”

Furthermore, a vibrant and resilient civil society exists in NWS and particularly in the NSAG. Multiple non-governmental organisations (NGOs), local administrations such as the Health Directorate and Local Councils, the Syrian Civil Defence (also known as the “White Helmets”), and other Civil Society Organisations (CSOs) have responded to complex humanitarian crises through the nine years of protracted war. Notably, the director of Idlib’s Health directorate, Dr Munzer Alkhalil, publicly called for volunteers on social media through the “Volunteered against Coronavirus” campaign [16], gathering more than 3,000 volunteers and 200 NGOs and CSOs ready to act under the guidance of the Health Directorate [17]. Idlib’s Health directorate has demonstrated leadership in responding to the COVID-19 threat, even in the absence of formal political leadership.

A fragile health system

Although all countries face the challenge of infection prevention control and medical treatment, countries entrenched in conflict face additional burdens as their health systems are often weakened and under-resourced.

With nine years of war and deliberate attacks on health facilities, Syria's health system is in crisis. Only 64% of hospitals and 52% of primary healthcare centres were reported to be functional, and up to 70% of healthcare workers have left the country [18].

In NWS, as of the 25th of August 2020, there were seven active hospitals ready to respond to a COVID-19 outbreak, with a total of 645 available beds, 114 intensive care unit (ICU) beds out of 188 planned, 86 available ventilators out of 159 planned, one polymerase chain reaction (PCR) testing laboratory out of 3 planned, 8 community-based treatment centres (CCTCs) out of 30 planned, and 330 CCTC beds out of 1,410 planned [19,20].

A study published in March 2020 estimated the province of Idlib could treat a maximum of 400 cases of COVID-19 before the healthcare system was vulnerable to collapsing [7]. Furthermore, a preliminary study projected that a COVID-19 outbreak in NWS would result in drastic numbers of cases and deaths, and that the healthcare system would be overwhelmed within only four to eight weeks after the start of an outbreak in the region [21].

The first official positive case in NWS was declared on the 9th of July 2020 [22]. As of the 28th of August 2020, 69 confirmed cases of COVID-19 have been reported [23]. Health system strengthening in NWS as a primary measure to address an outbreak is likely insufficient, given the limited time before a rapid rise in COVID-19 cases, the lack of resources, and continued conflict. Therefore, alternative preventative measures need to be prioritised.

“ Health system strengthening in NWS as a primary measure to address an outbreak is likely insufficient ”

Refugee camps are "outbreak firecrackers"

There are more than one million IDPs living in over 1,000 camps in Idlib [24]. Humanitarian experts have warned it would be near impossible to gain control over an outbreak if the IDP camps remain in their current state. Most of the camps lack adequate access to quality healthcare, water, sanitation, and hygiene facilities, and face issues of overcrowding, poor shelter, scarce resources, and limited access to reliable information [25]. Given the conditions, humanitarian organisations such as Mercy Corps [26] and others [27-29] have warned that COVID-19 "could spread like wildfire" in NWS.

Given the challenging conditions faced by IDPs in the camps, these communities are extremely vulnerable to an outbreak and severe illness [29], and need support. Moreover, an outbreak in the camps would place significant strain on the regional health system. The healthcare system may collapse with a drastic rise in patients seeking treatment, and the infection and death of medical staff, a scenario witnessed in Yemen [30]. An outbreak in the camps may be a catalyst of a larger outbreak that spreads through other communities in NWS and beyond.

Currently there is no adequate, specific response that has been proposed for IDP camps in NWS. Despite these challenges, a glimmer of hope comes from the demographic features of the NWS population. Approximately half of the population is under the age of 18, and thus at low-risk of COVID-19, whereas only about 5% of the population is over 60 years and at high-risk [31, 32].

" a glimmer of hope comes from the demographic features of the NWS population "

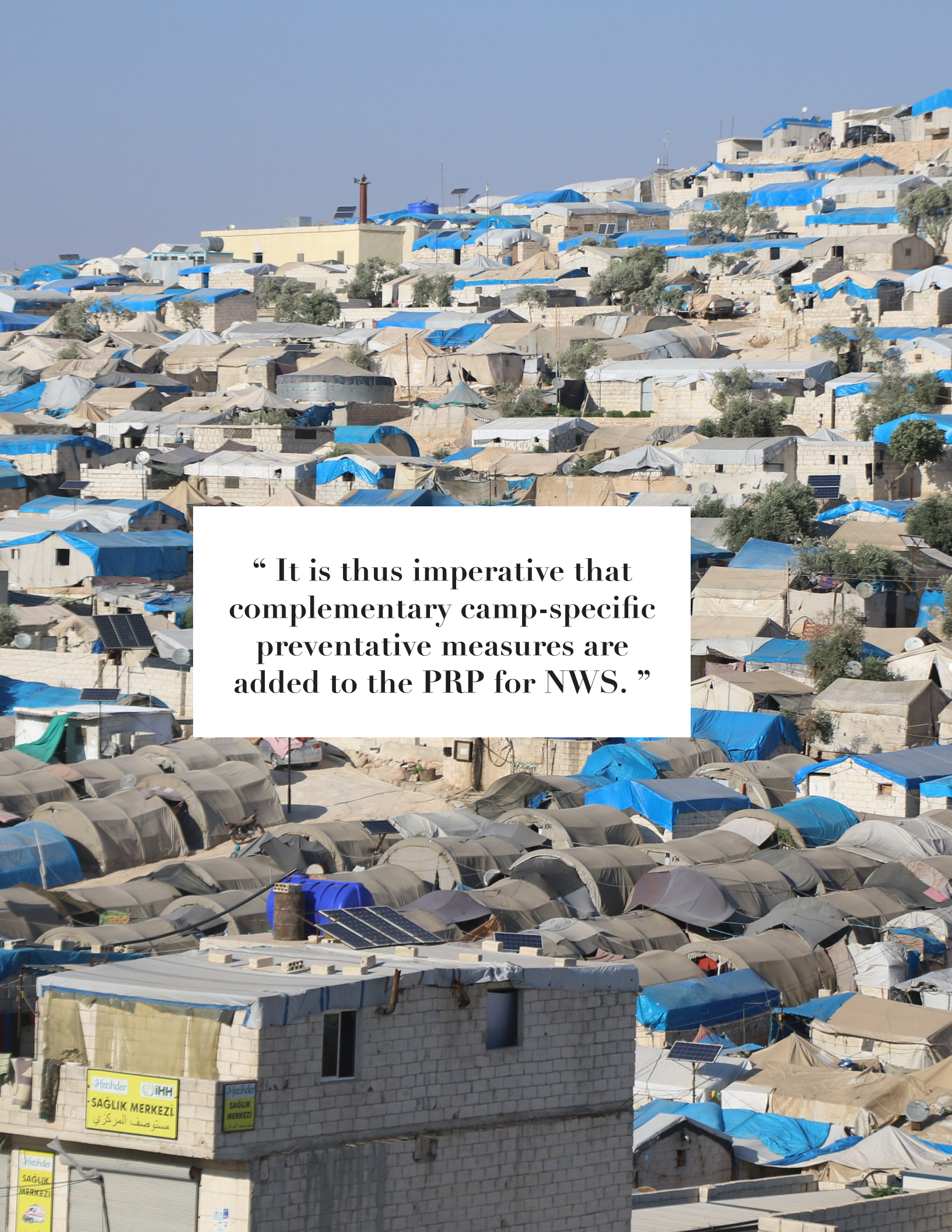
Gaps in the WHO Preparedness and Response Plan

The Preparedness and Response Plan (PRP) published by the WHO for NWS encompasses health, shelter, and water, sanitation, and hygiene (WASH) initiatives, as well as strategic communication [33,34]. However, discussions around community engagement are near absent from the plan, despite the WHO highlighting the central role community engagement played in the fight against other infectious disease outbreaks, such as Ebola [35].

Furthermore, the COVID-19 response organised by the UN for NWS has prioritised scaling-up the healthcare system. The UN has requested $384 million USD to respond to COVID-19 in Syria, with $131 million already granted [36]. Forty one percent of the requested funds are devoted to the health system compared with only 2% for camp management and coordination. Furthermore, the Syria Cross-Border Humanitarian Fund has a dedicated budget of $20.5 million USD for COVID-19 pandemic response to complement the COVID-19 PRP for NWS. However, $19.2 million USD are allocated to healthcare initiatives, and only $1.3 million USD to WASH programmes, indicating a very healthcare system-centric response for NWS [37].

The PRP for NWS, although relevant for the general population, does not tackle the specific challenges of the IDP camps [33, 34]. Addressing the camps' vulnerabilities beyond inadequate access to healthcare and incorporating community engagement into the response would help prevent fatalities within the IDP population, thereby alleviating the burden on the regional healthcare system, and potentially mitigating transmission to neighbouring provinces and countries. It is thus imperative that complementary camp-specific preventative measures are added to the PRP for NWS.

“ Addressing the camps' vulnerabilities beyond inadequate access to healthcare and incorporating community engagement into the response would help prevent fatalities within the IDP population ”



> “ It is thus imperative that complementary camp-specific preventative measures are added to the PRP for NWS. ”

03

Assumptions and models

Science-based evidence is needed to develop a robust response plan for camps with IDPs. Compartmental epidemic models were used to simulate the spread and impact of an outbreak in a camp in NWS. The availability of detailed, up-to-date datasets about the population living in these camps provided the foundation for these models. We used these mathematical models to analyse the effects of potential interventions compared with scenarios where no interventions were implemented.

Assumptions

In creating the model, four key assumptions and decisions were made:

01 The model focuses on IDP camps, as we assumed that the WHO PRP would be the relevant response for the rest of the population in NWS.

02 Given the health system's low capacity and high risk of collapsing early in an outbreak, we assumed critical cases requiring intensive care would not have access to intensive care units (ICU) and would die.

03 To simulate a more realistic intervention, individuals that needed to be isolated because they were at a high-risk of developing severe illness, could meet their families and friends in a buffer zone, consisting of an open tent where meetings could occur under strict rules of social distancing (mandatory masks and keeping a distance of six feet apart).

04 We assumed a closed population. Specifically, we did not incorporate migration, births, nor deaths due to non-COVID-19 related causes in the model, since they are small enough in magnitude to not significantly impact the course of an outbreak, assuming additional conflict does not erupt.

05 We assumed the camps were empowered with the knowledge and means to self-organise, and that aid can be coordinated to fit with the proposed interventions.

“ We used a mathematical model (discrete-time stochastic) to simulate the spread of the virus in a typical IDP camp ”

Model

We used a mathematical model (discrete-time stochastic) to simulate the spread of the virus in a typical IDP camp of up to 2,000 inhabitants. The model is divided in compartments, containing individuals at different possible epidemiological stages along the progression of the disease. The model additionally considers that the population is divided in different classes depending on age-structure and comorbidities.

The simulation begins with a population of susceptible individuals and one exposed individual. The progression of the disease in the individual goes through a series of infectious stages: a pre-symptomatic stage, and then either a symptomatic or asymptomatic stage, where additional susceptible individuals can become infected. Individuals are no longer infectious when they recover or die. The simulations run for 365 days, and we verified that a steady state was reached before the limit of each simulation was achieved.

In total, we tested 70 single interventions or combinations of different interventions that could be applied to IDP camps, and compared their impact to a baseline scenario in which no interventions were implemented. More than 100,000 simulations were run to verify the robustness of the results and a public repository is available to reproduce or extend this research [38].

“ we tested 70 single interventions or combinations of different interventions that could be applied to IDP camps, and compared their impact to a baseline scenario in which no interventions were implemented ”

Potential interventions

Intervention A: Self-distancing

Self-distancing reduces the number of contacts of an individual living in the camps. All measures to reduce the chances of potentially infectious interactions between individuals are grouped under the self-distancing intervention. This includes reducing visits between individuals, reducing movements inside and outside the camp ("stay at home" policy), wearing face masks, improving access to water for hand washing, and sanitising common spaces (i.e. WASH programmes).

We considered scenarios in which the population reduced the mean number of contacts (i.e. potentially infectious interactions) by 20% or 50%. To be consistent with the context of overcrowded camps, these parameters maintain the number of contacts above the average household size in the camps of NWS (around 5.5 individuals [39, 40]).

> " Self-distancing reduces the number of contacts of an individual living in the camps "

Intervention B: Self-isolation of potentially symptomatic individuals

Self-isolation is a challenge in informal settlements, where the living space consists of a single, often small space. While the WHO PRP for NWS proposes 30 CCTCs be established for mild cases, these centres would only be able to accommodate 1,410 beds. We assumed the populations of the camps would not have access to the CCTCs as they would be rapidly filled to capacity. Similarly, we considered that the populations of the camps would not have access to PCR-testing to confirm a diagnosis of COVID-19 as only 12,000 PCR tests and three PCR thermocyclers to run the tests are planned by the PRP for NWS.

Nevertheless, we considered the possibility that symptomatic individuals who may have COVID-19 could self-isolate in individual tents in dedicated parts of the camps, or next to the tents of their relatives. We simulated this intervention with various numbers of isolation tents per camp.

“ symptomatic individuals who may have COVID-19 could self-isolate in individual tents ”

To simulate a more realistic scenario, we considered a minimum time for an individual to recognise their symptoms before self-isolating, with a period ranging from 12 to 48 hours. Secondly, mildly symptomatic isolated individuals would require support and care. By implementing a buffer zone, care-givers could provide supplies to isolated individuals and interact with them by respecting distancing rules and wearing proper personal protective equipment (PPE).

Intervention C: Safety zone

This intervention involves protecting high-risk groups by creating a "safety zone", whereby the camp is divided into two areas: a safety zone at one side of the camp, in which vulnerable, high-risk people and their accompanying companions resettle (also known as a "green" or "shielded" zone in other studies [41]), while the remaining population would continue to live in what is known as the "exposed" zone.

Majority of COVID-19-related mortality is among older people and people with comorbidities [42]. Preventing infection among these high-risk groups must be considered to reduce fatalities. Because challenging living conditions are often associated with poorer health outcomes [43], we considered "elderly" individuals to be aged 51 and older. We calculated the population of elderly and people with comorbidities to be approximately 12% of the total population in the camps of NWS.

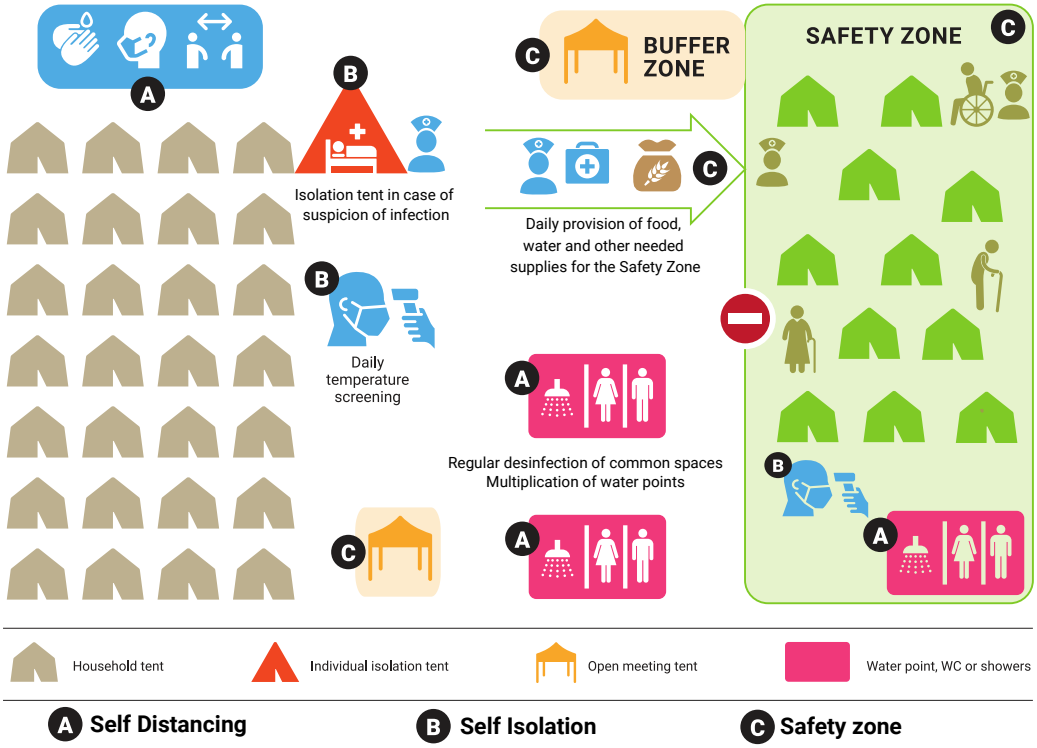
To allow for the inclusion of an optimal number of accompanying companions in the safety zone, we ran simulations where the total population in the safety zone represented 20%, 25%, or a maximum of 30% of the total population of a camp. Community-based arrangements may need to be considered to minimize the number of low-risk individuals accompanying those who are at a higher risk to the safety zone. For example, young children (0-6 years old) may be settled in the safety zone, whereas older children (7-13 years old) could possibly stay with other relatives in the exposed zone.

In the simulations, we assumed that the first positive case belonged to the exposed zone. We also assumed individuals living in the safety zone could not leave, which meant supplies for this population would need to be provided by individuals from the exposed zone. We assumed supplies would be delivered to a buffer zone at the entrance of the safety zone.

Other sets of measures were also applied, including the creation of meeting areas (analogous to previously described "buffer zones") where people from both sides of the camp could meet a limited number of times per week. We further considered the implementation of a partial lockdown of the safety zone, where the number of contacts in buffer zones is reduced by 50% or a maximum of 90% should an outbreak occur in the exposed zone.

Notably, this intervention serves to reduce the number of contacts between high-risk individuals and people who are likely to have many contacts or be asymptomatic. However, this intervention maintains the regular living conditions in either zone e.g. distance between tents, rate of daily contacts per individual, etc.

Figure 1 - Summary of possible interventions in a camp



The first intervention (A), self-distancing, encourages residents to reduce physical contact with each other, wear face masks, and wash their hands regularly. The researchers estimated that reducing the number of contacts by 20% to 50%, could reduce mortality up to about one third.

The second intervention (B) consists of isolating symptomatic cases as early as possible. In the absence of validation by a diagnostic test, simple temperature checks could be feasibly implemented with digital thermometers. A practical and affordable intervention would be to equip each camp with 5 to 15 individual tents per 1,000 inhabitants, typically igloo washable tents, where people suffering from any potential symptom of COVID-19 could self-isolate until three days after the disappearance of their symptoms. Such an intervention would require the local community to ensure aid and care were provided to self- isolated persons.

The third intervention (C) consists of splitting a camp into two zones: an "exposed zone" where most of the residents of the camp would stay, and a smaller "safety zone" where 10% to 30% of the camp would be protected and self-organised. The safety zone would protect the fraction of the population that is highly vulnerable to COVID-19, i.e., the elderly, persons with chronic diseases, and a limited number of accompanying persons to ensure appropriate care for those in need. Meetings between both sides of the camps could be organised in a "buffer zone", consisting of an open tent, as long as simple measures such as wearing a face mask and a 6-feet distance were adhered to. The local community would have to organise for the provision of food and all necessary aid to the protected population.

Strikingly, when all three non-medical measures were applied, mortality could be reduced up to an 80%. By extrapolating these values to all NWS camps, up to 85,000 lives could be saved in Northwest Syria alone.

04

Main findings

“ A 20% reduction in the number of contacts resulted in a 10% decrease in fatalities”

Detailed results of the research underlying this report have been recently pre-published [1].

Self-distancing had a notable effect on the probability of outbreak. A 20% reduction in the number of contacts resulted in a 10% decrease in fatalities. Halving the number of contacts led to a 35% decrease in fatalities. Self-distancing also had an effect on the time until symptomatic cases peak, which increased from an average of 55 days when there was no intervention in place to an average of 110 days when the number of contacts was halved.

Self-isolation of symptomatic individuals led to a 30% decrease in deaths when only 10 individual tents were available for a population of 2,000 individuals (0.5% of the total population). Notably, these results assumed individuals were able to recognize their symptoms within 24 hours. The intervention became less effective as individuals took longer to identify their symptoms, emphasising the need for daily screening as well as education and awareness of COVID-19 symptoms. Importantly, increasing the number of tents above 50 did not significantly improve the reduction in fatalities.

The probability of observing an outbreak and the time until symptomatic cases peaked were optimised when 20 to 25 individual tents were available for a camp of 2,000 inhabitants, i.e. one tent per 80 to 100 inhabitants.

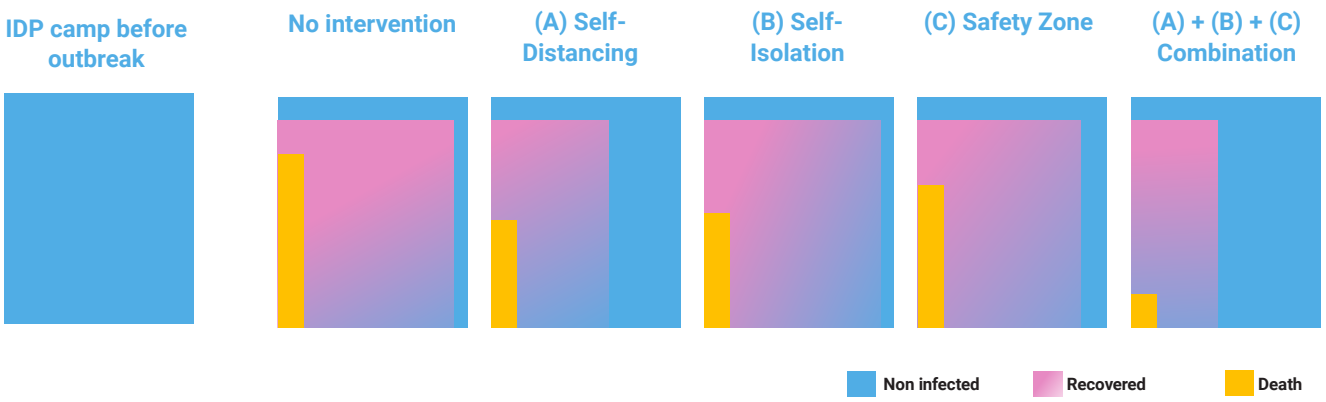
Creating a safety zone significantly reduced the probability of an outbreak in the high-risk population by almost 60%. Despite grouping all high-risk individuals in the same zone and increasing their probability of interaction, the percentage of deaths among these individuals when an outbreak was simulated was lower than if the intervention were not applied. This is likely because high-risk individuals are more exposed to the virus when living with younger individuals who have a much higher contact rate.

In addition, this intervention raises the time until symptomatic cases peak by approximately 10% in the general population and 60% for the high-risk population in the safety zone. Most significantly, we observed that this intervention had synergistic effects when combined with other measures (i.e. self- distancing, self-isolation, lockdown of the safety zone).

“ When self-distancing, self-isolation and a safety zone for high-risk people to live in were applied to a camp, mortality could be reduced up to an 80%. By extrapolating these values to all NWS camps, up to 85,000 lives could be saved in Northwest Syria alone. ”

The effects of the interventions build upon each other when they are implemented together. When self-distancing, self-isolation and a safety zone for high-risk people to live in were applied to a camp, mortality could be reduced up to an 80%. By extrapolating these values to all NWS camps, up to 85,000 lives could be saved in Northwest Syria alone. Moreover, the combination could delay the time until the peak of the outbreak by one to three months. This not only benefits the people living in the camps, but also alleviates the burden on the regional healthcare system.

EFFECT OF COVID19- OUTBREAK AT STEADY-STATE



No intervention: the camp remains in its current situation, no specific intervention is implemented to prevent a Covid-19 outbreak in the camp.

Intervention A: "Self-distancing". It involves reducing individual contacts up to 50%, encouraging the use of face masks and regular hand washing.

Intervention B: "Self-isolation". It involves regular temperature checks and self-isolation if someone has any symptoms of Covid-19. The self-isolation individual tent is placed inside the camp, 2 meters away from any other tent. Self-isolated people can return to their home after 3 days without symptoms.

Intervention C: "Safety-zone". It involves splitting the camp in two sides. The safety zone comprises 10-30% of the total population of the camp, including the vulnerable fraction of the population (elderly and and people with co-morbidities). People from both zones can meet in a "buffer zone" under strict distancing rules. Food and other needed supplies are left at the entrance of the safety zone.

05

Conclusion and recommendations

As demonstrated by epidemiological modelling, implementing self-distancing measures (reducing contacts, wearing masks, and improving WASH programmes), isolating symptomatic individuals, and creating a safety zone for high-risk individuals and select companions to live in, greatly reduces the probability of a COVID-19 outbreak and the number of deaths, while increasing the time until symptomatic cases peak if an outbreak were to occur [1].

The findings of our research highlight the effectiveness of non-medical and non-pharmaceutical interventions to protect the IDP populations living in the camps of NWS. Furthermore, they highlight the importance of engaging and empowering local communities to implement camp-specific responses, in addition to the response plan developed by the WHO. This is particularly important as the complex balance of power between camp managers, local administrations, civil society organisations, and armed groups will make it extremely difficult for a single actor to manage a response on their own from the top-down.

“ The findings of our research highlight the effectiveness of non-medical and non-pharmaceutical interventions to protect the IDP populations living in the camps of NWS. Furthermore, they highlight the importance of engaging and empowering local communities to implement camp-specific responses. ”

Need for local coordination

“ grassroots actors should be in charge of the coordination to ensure a response plan meets camp-level needs and implementation plan fits with the local context”

Local coordination is needed to ensure aid is adequately distributed to camps. This is of particular relevance to the allocation of resources required for setting up safety zones in each camp. For that, we recommend that grassroots actors be in charge of the coordination to ensure a response plan meets camp-level needs and an implementation plan fits with the local context. Community leadership is required for effective:

- coordination with the various UN agencies and local clusters, in particular to ensure that the ongoing WHO PRP and a camps-focused PRP would be complementary.
- engagement with local communities and fostering of volunteer networks.
- implementation of COVID-19 awareness and educational initiatives to encourage compliance with the proposed interventions.

In NWS, several organisations are well respected locally and internationally, and have experience in dealing with health and humanitarian crises. The Syrian Civil Defence (also known as the “White Helmets”) and the Idlib Health Directorate (IHD) for instance are both suited to lead a COVID-19 community response given their existing network of volunteers, regional experience, and community engagement.

Additionally, local councils could play an important role as they can issue local decrees and official announcements, despite not having the required level of authority to enforce them directly. Importantly, camp managers, where they exist, as well as the NGOs and CSOs already active in camps should be involved directly as primary responders.

Given 90% of households in the camps own at least one smartphone and use it daily, with Facebook being the primary social media platform [44], local media and activists should be engaged in promoting the need for interventions in the camps, volunteers, and education and awareness of COVID-19 symptoms, especially among children.

Starting point for implementation

As with most interventions, there are challenges to implementation. First, in certain camps, the diverse origins of the population can lead to a lack of social cohesion, which impacts the likelihood that measures will be adopted. Second, various local actors, ranging from camp managers to active armed groups and criminal organisations, may oppose intrusion in camp affairs. These challenges are critical, given community support and engagement are central to the success of the interventions.

Notably, the population of informal camps often originate from the same clan, village, or neighbourhood, and are isolated in rural areas, such as agricultural fields. Although they often have less infrastructure than planned camps and therefore may require more renovations, interventions are likely to be more successful in informal camps, given their common bonds. Furthermore, the distance from urban areas may delay the introduction of COVID-19, providing additional time to implement the proposed protective measures.

Successful implementation in the informal camps would provide on the ground evidence that the interventions are feasible, which can be communicated to other camps. Communicating positive local solutions has been fruitful previously, with grassroots media reporting solutions to common problems; e.g. lack of electricity, internet, heating and cooking devices etc., being implemented in one area and adopted elsewhere [44].

Shifting the priorities of the PRP and the role of international donors

The epidemiological model demonstrates that nearly all inhabitants of a camp could be infected with COVID-19 in a short time period (an average of 55 days to the peak of symptomatic cases) [1]. Assuming the camps remain in their current state, concomitant outbreaks in only a dozen average-sized camps would overwhelm the healthcare system in Idlib.

Although important, scale-up of the healthcare system in NWS is likely insufficient given the lack of time and resources, and continued conflict. Therefore, there is an immediate need to shift the priorities of international stakeholders towards alternative prevention strategies to alleviate the burden on the local healthcare system.

For an effective COVID-19 response, the camps need the support of international donors in providing and supporting:

01 WASH programmes, specifically installing additional water distribution points, installing the required amenities in the safety zone, providing soap, disinfectant, and hand sanitiser, and improving sewage systems throughout the camps.

02 Five to 15 individual washable tents for self-isolation per 1,000 people. For all camps in Idlib, this represents 5,000 to 15,000 individual isolation tents.

03 Habitation tents (small and medium sized) to facilitate the creation of a safety zone for the high-risk people to live in. Assuming that emptied tents from people moving to the safety zone will be recycled by transferring them into the safety zone, we estimate the average need to be about 10 to 20 tents per 1,000 people. For all camps in Idlib, this represents 10,000 to 20,000 tents.

04 Digital thermometers for daily temperature screening to be performed by volunteers to identify and isolate potential COVID-19 cases. Assuming an average of 4 thermometers per camp, this would represent a total of 4,000 thermometers for Idlib camps.

05 Food assistance for the camps implementing a safety zone for vulnerable, high-risk people. If safety zones were implemented in all camps in Idlib, about 200,000 people would require food assistance for 4 to 6 months.

06 Masks or support of local production of masks in the camps.

> “ there is an immediate need to shift the priorities of international stakeholders towards alternative prevention strategies ”

Impact beyond NWS

Although the presented research was performed using datasets for the camps of NWS, the results are relevant to the other regions in Syria hosting IDP camps, whether the regions are under the control of the Autonomous Administration of North and East Syria (NES) or under the control of the Syrian government.

Mitigating an outbreak in the camps protects vulnerable people. Given the challenging living conditions of the camps and high transmission of COVID-19 without intervention, preventing an outbreak in the camps may prevent outbreaks in other regions of Syria and neighbouring countries.

Similarly, this research and these interventions can be applied to settings with refugee and IDP camps worldwide, and in similar contexts where resources are limited, population density is high, and the demographic characteristics are similar, such as in slums.

In all these cases, the engagement of the community is central, and they will need to be empowered with the knowledge and means to implement the proposed interventions. Community-based COVID-19 prevention strategies not only save lives, but they also provide time for authorities to implement other strategies to mitigate the pandemic, such as strengthening health systems.

06

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