Supplementary information

1. Description of the model

The quarantine-isolation policy of Israel was analyzed using the SEQIJR model (Gumel et al., 2004; Koonprasert et al., 2013; Siriprapaiwan et al., 2018). This is a deterministic compartmental model, which was originally developed to analyze the transmission dynamics and control of the SARS epidemics in Toronto, Hong Kong, Singapore and Beijing. The model consists of 7 equations, where each equation is dedicated to a class. The classes are: S – susceptible (Eq. 1), E – exposed or pre-symptomatic (Eq. 2), Q – pre-symptomatic in quarantine (Eq. 3), I – symptomatic and infectious (Eq. 4), J – symptomatic in isolation (Eq. 5), R – recovered (Eq. 6) and D – deceased (Eq. 7).

$$\frac{dS}{dt} = \pi - \beta\frac{S(t)}{N}\left[I(t) + \varepsilon_E E(t) + \varepsilon_Q Q(t) + \varepsilon_J J(t)\right] - \mu S(t) \tag{1}$$

$$\frac{dE}{dt} = p + \beta\frac{S(t)}{N}\left[I(t) + \varepsilon_E E(t) + \varepsilon_Q Q(t) + \varepsilon_J J(t)\right] - (\gamma_1 + \kappa_1 + \mu)E(t) \tag{2}$$

$$\frac{dQ}{dt} = \gamma_1 E(t) - (\kappa_2 + \mu)Q(t) \tag{3}$$

$$\frac{dI}{dt} = \kappa_1 E(t) - (\gamma_2 + d_1 + \sigma_1 + \mu)I(t) \tag{4}$$

$$\frac{dJ}{dt} = \gamma_2 I(t) + \kappa_2 Q(t) - (\sigma_2 + d_2 + \mu)J(t) \tag{5}$$

$$\frac{dR}{dt} = \sigma_1 I(t) + \sigma_2 J(t) - \mu R(t) \tag{6}$$

$$\frac{dD}{dt} = d_1 I(t) + d_2 J(t) \tag{7}$$

Where, the model's parameters are as follows:

- β - Effective contact rate (S$\rightarrow$E)
- κ_1 - Rate of development of clinical symptoms for the exposed-not-quarantined class (E$\rightarrow$I)
- κ_2 - Rate of development of clinical symptoms for the quarantined-exposed class (Q$\rightarrow$J)
- γ_1 - Rate of entry into quarantine from the exposed class (E$\rightarrow$Q)
- γ_2 - Rate of entry into isolation from the symptomatic-not isolated class (I$\rightarrow$J)
- σ_1 - Recovery rate from the infectious-not-isolated class (I$\rightarrow$R)
- σ_2 - Recovery rate from the infectious-in-isolation class (J$\rightarrow$R)
- d_1 - Mortality rate from the infectious-not-isolated class (I$\rightarrow$D)
- d_2 - Mortality rate from the infectious-in-isolation class (J$\rightarrow$R)
- μ – natural mortality daily ratio
- π - daily net population growth
- p – daily number of infected individuals arriving from abroad into the population
- N – total size of the population
- ε_E – modification factor for the infectivity of the exposed class
- ε_Q – modification factor for the infectivity of the exposed-in-quarantine class
- ε_J – modification factor for the infectivity of the infectious-in-isolation class

R_0, the basic reproduction rate, which is the expected number of secondary infections produced by a single index case, is defined in the SEQIJR model (equations (1)-(8)) when no control measures are in place, i.e., $\gamma_1 = \gamma_2 = 0$:

$$R_0 = \beta\left[\frac{\varepsilon_E}{\kappa_1 + \mu} + \frac{\kappa_1}{(\kappa_1 + \mu)(d_1 + \sigma_1 + \mu)}\right] \tag{8}$$

Generally, when control measures are implemented, R_0 becomes a theoretical concept, while the effective, or "observed" reproduction number is smaller (Maier and Brockman, 2020). In the case of the SEQIJR model, when the quarantine-isolation policy is fully implemented, R_e, the effective reproduction number is calculated using the following equation:

$$R_e = \beta\left[\frac{\varepsilon_E}{D_1} + \frac{\kappa_1}{D_1 D_2} + \frac{\varepsilon_Q \gamma_1}{D_1 D_4} + \frac{\varepsilon_J \kappa_1 \gamma_2}{D_1 D_2 D_3} + \frac{\varepsilon_J \gamma_1 \kappa_2}{D_1 D_3 D_4}\right] \tag{9}$$

where $D_1 = \gamma_1 + \kappa_1 + \mu$, $D_2 = \gamma_2 + d_1 + \sigma_1 + \mu$, $D_3 = \sigma_2 + d_2 + \mu$, $D_4 = \mu + \gamma_2$

The value of β was determined by using its definition which is $\beta = c \cdot P$ where *c* is the number of contacts an individual makes per unit of time and *P* is the probability that a contact with a susceptible individual results in transmission (Martcheva, 2015). The number of contacts per day, *c*, was taken as 19.77. This number is the daily average number of contacts reported for people in Italy during a survey that was conducted in eight European countries (Mossong et al., 2008). This number from Italy was chosen as representative to the contact patterns of people in Israel, as it was found that a model describing the transmission dynamics of varicella zoster virus (VZV) resulted the best fit to serological data from Israel when the contact characteristics of Italy were used (Santermans et al., 2015). The probability, P, was taken as 3.3% (Luo et al., 2020). These lead to β of 0.6524.

The values of mortality and recovery rates were determined using the following formulae:

$$\sigma = \frac{(1-\delta)}{\tau} \tag{10}$$

$$d = \frac{\delta}{\tau} \tag{11}$$

Where δ is the confirmed case fatality rate and τ is the expected time until recovery or death. The COVID-19 case fatality rate is estimated between 5.3%-8.4% (Jung et al., 2020). In this study, δ was taken as the lower estimated value of 5.3%. τ_1 and τ_2 were taken as 14.5 days and 8.6 days accordingly, with regard to the mean time from symptoms' onset to death and the mean time from hospital admission to death (Linton et al., 2020).

It is plausible to assume that the length of the incubation period is similar, whether or not the exposed person is in quarantine. Therefore, it is possible to define γ_1 and κ_2 as a function of κ_1:

$$(\kappa_1)^{-1} = (\gamma_1)^{-1} + (\kappa_2)^{-1} \tag{12}$$

$$(\gamma_1)^{-1} = \phi \cdot (\kappa_1)^{-1} \tag{13}$$

$$(\kappa_2)^{-1} = (1-\phi) \cdot (\kappa_1)^{-1} \tag{14}$$

Where, ϕ is the ratio dividing the incubation time to the period before and in quarantine. In this study, ϕ was taken as 0.2 (scenario 1) and 0.8 (scenario 2, beginning on 13th March 2020).

The daily number of infected individuals entering undetected into the population, p, was based on the analysis of epidemiological investigations reports that was conducted in this study. The parameter p was set to 6.3 people per day, because during the 30 days period from 21st February 2020 to 21st March 2020 a total of 189 of the investigations reports involved imported cases (infected travelers arriving from abroad).

The model parameters' values are as follows:

Parameter	Value	Reference	Notes
β	0.6524 day^{-1}	Santermans et al., 2015; Luo et al., 2020	See explanation in the text.
κ_1	$(5.6\ days)^{-1}$	Linton et al., 2020	Mean incubation time including Wuhan residents
κ_2	Scenario 1: $(4.48\ days)^{-1}$ Scenario 2: $(1.12\ days)^{-1}$	Equations (12)-(14)	See explanation in the text.
γ_1	Scenario 1: $(1.12\ days)^{-1}$ Scenario 2: $(4.48\ days)^{-1}$		
γ_2	$(4.3\ days)^{-1}$	Linton et al., 2020	Pooled mean time from onset to hospital (for either hospitalization that ended with dead or recovery)
σ_1	0.0653 day^{-1}		See explanation in the text.
σ_2	0.1101 day^{-1}		See explanation in the text.
d_1	0.0037 day^{-1}		See explanation in the text.
d_2	0.0062 day^{-1}		See explanation in the text.
p	6.3 day^{-1}		See explanation in the text.
π	465 people/day	Central Bureau of Statistics (2020)	
μ	1.425×10^{-5}	Central Bureau of Statistics (2020)	
ε_E	0.48	Ganyani et al., 2020	The proportion of pre-symptomatic transmission in Singapore
ε_Q	Scenario 1: 0 Scenario 2: 0.48		
ε_J	Scenario 1: 0 Scenario 2: 0.2	Gumel et al., 2004	During the SARS epidemic ε_J was estimated as 0.2 (Singapore), 0.36 (Canada) and 0.82 (China). For scenario 2, the lower of these values was chosen.

TABLE. 1. Parameter values for the SEQIJR model

The model was programmed in R (R Core Team, 2019) using the deSolve package (Soetaert et al., 2010). The calculation of R_0 based on the confirmed cases data was performed using the package R0 (Boelle and Obadia, 2015).

2. Daily number of tests, new cases and positive results

It may be suggested that the abrupt change that occurred around Purim is really the result of the rise in the daily number of PCR tests performed. This claim may be supported by the fact that during the first three months of the COVID-19 outbreak in Israel, the daily number of tests exhibited similar trend as the daily number of new cases (Fig S2). However, these two numbers parted during the fourth week, where the rate of change in the daily new cases was much greater than the rate of change in the number of tests. Moreover, while at first the daily percent of positive tests was 2-3%, around Purim, this percent rose to 5-6% and then, near the end of March even rose over 8% (Fig S2). Therefore, while some of the new cases around Purim may be attributed to the rise in tests, it is far from fully explaining the deductions given in this study.

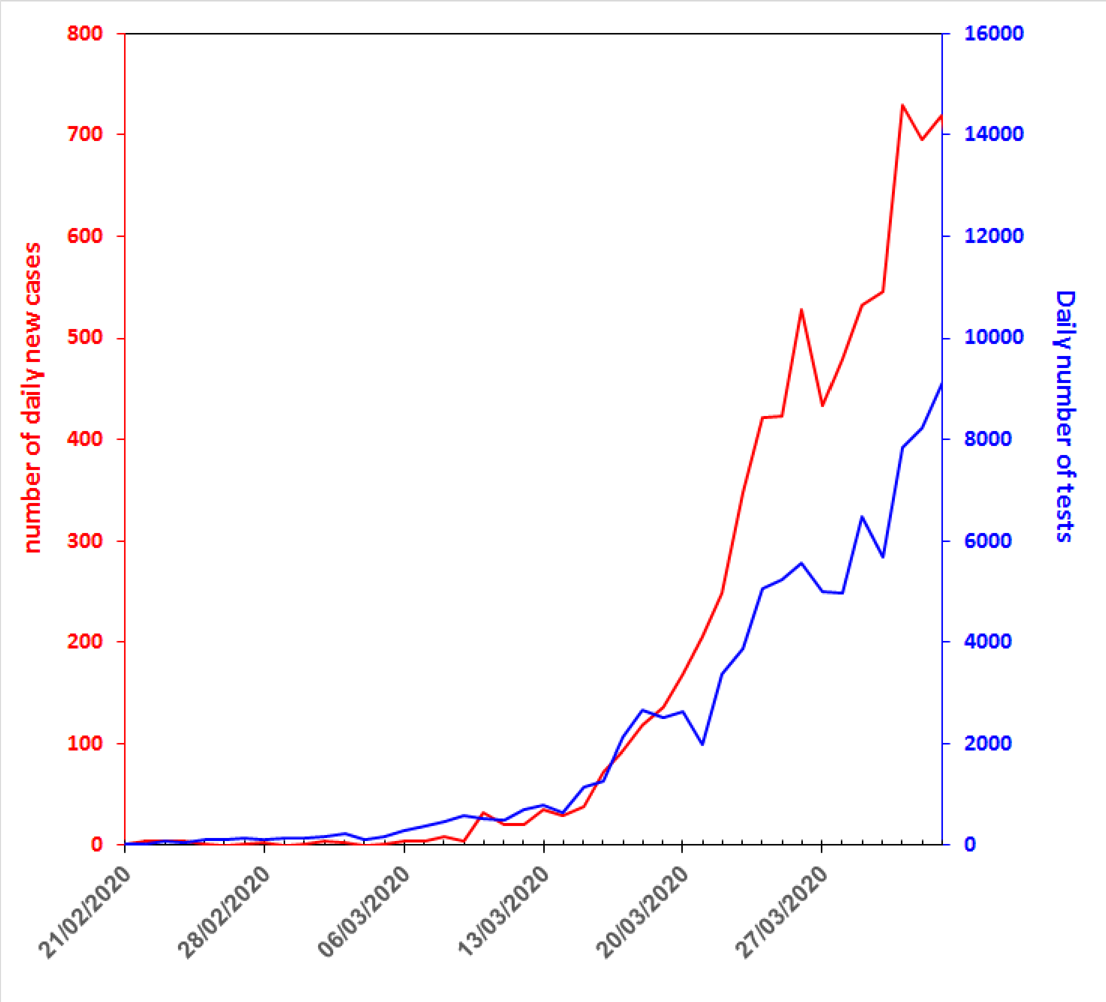

FIG. S1. Daily number of tests (blue) and daily number of new cases (red) during the first 6 weeks of the COVID-19 outbreak in Israel

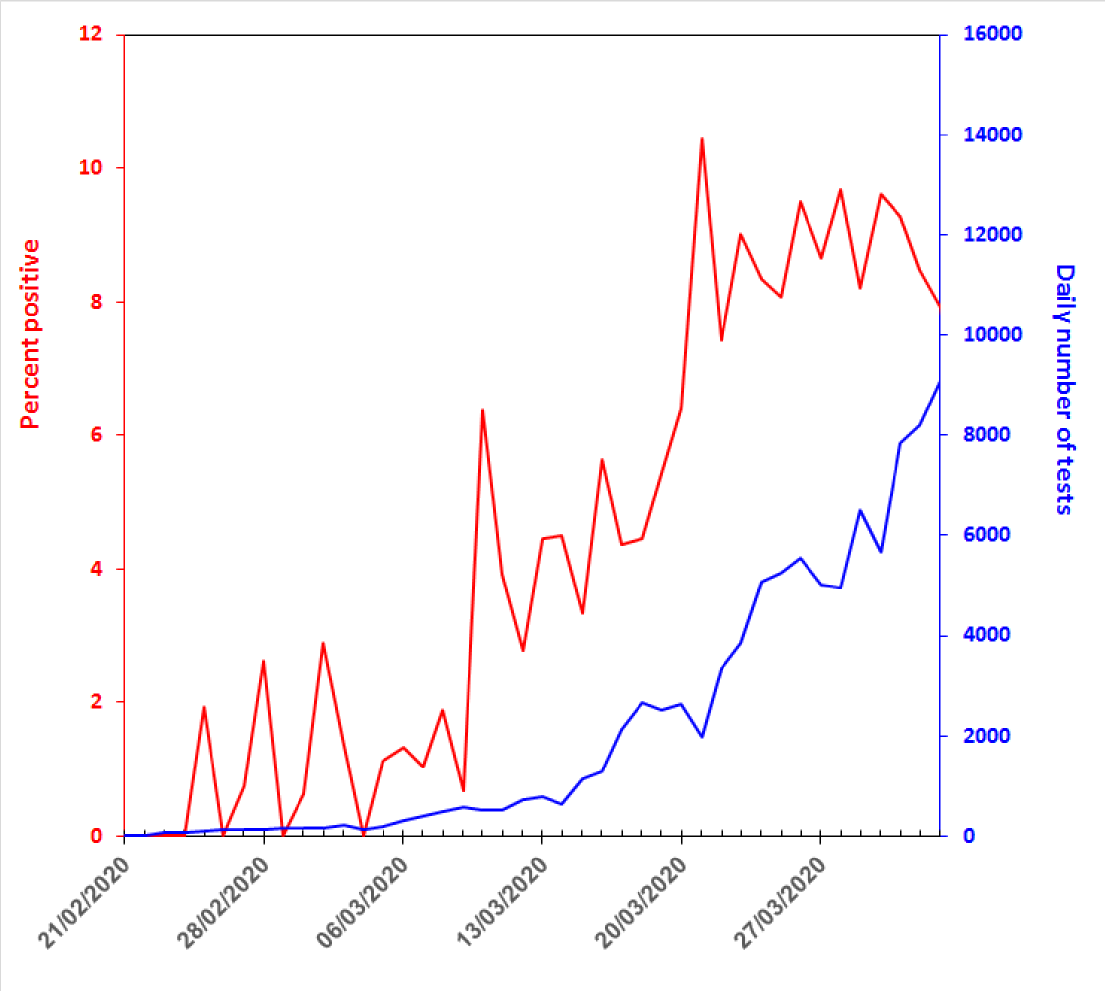

FIG. S2. Daily number of tests (blue) and daily percent positive test (red) daily during the first 6 weeks of the COVID-19 outbreak in Israel

3. Examples of epidemiological investigation reports

The following were translated from Hebrew by the authors, from the original epidemiological investigation reports released by the Israeli Ministry of Health (Corona – Ministry of Health, 2020).

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Notification to the public - corona patient - case number 190
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Sunday, 15.3, 15:00

The patient is male in his thirties from central Israel, who was in
contact with a known patient.
The close contacts of the patient were already located and were
individually debriefed.

Train between 8.3 to 11.3:
To: On 7:05 from Savidor-center station in Tel-Aviv to Yitzhak
Navon in Jerusalem with an interchange in Hagana station in Tel
Aviv on 07:21.
Fro: On 18:03 from Yitzhak Navon in Jerusalem to Savidor-center
station in Tel-Aviv with an interchange in Hagana station in Tel
Aviv on 18:40.
12.3: Train on 07:05 from Savidor-center station in Tel-Aviv to
Yitzhak Navon in Jerusalem with an interchange in Hagana station in
Tel Aviv on 07:21.
Fro: On 11:03 from Yitzhak Navon in Jerusalem with an interchange
in Hagana station in Tel Aviv on 11:47.
8.3: Hub Cross Namal Fit Gym on Tel-Aviv port 19, between 20:00-
21:00
9.3: Purim party in Sura Mare club, 24 Saadia Gaon St., Tel-Aviv
from 23:00 to 00:30 the next day.

Every person that traveled in these trains or visited the locations
noted hereby during the detailed time periods is requested to get
into home quarantine by the warrant of the Ministry of Health and
to report it on the ministry of health website http://bit.ly/MOH-
Corona or the Health Ministry's call center *5400
Or the HMOs' call centers:
Clalit *2700
Maccabi *3555
Meuhedet *3833
Leumit *507

For official, validated and timely information:
* The Health Ministry website:
http://bit.ly/MOH-Corona
* Telegram:
https://t.me/MOHreport
* CoronApp application

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Eyal Basson
The Israeli Health Ministry spokesman
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Notification to the public – corona patient – case number 198
>>>>>>>>
Sunday, 15.3, 15:00

Male in his twenties from central Israel, contact of tourists from USA.

7.3 22:00-23:00 Chateau Shual wine bar, Malkhi Yisrael St 19, Tel-Aviv
9.3 23:00-03:00 Purim party in "Sura Mare" club, 24 Saadia Gaon St., Tel-Aviv.
10.3: 14:00-19:00 Purim party of the Interdisciplinary Center Herzliya college, at "Kokhav HaYam" banquet hall in Caesaria, Kibbutz Sdot-Yam.
10.3: 22:00-23:00 party on "Reading 11", in Hangar 11, Tel-Aviv port.

Other contacts of this patient were notified individually.

Every person that visited these locations during the detailed time periods is requested to get into home quarantine by the warrant of the Ministry of Health and to report it on the ministry of health website http://bit.ly/MOH-Corona or the Health Ministry's call center *5400.
Or the HMOs' call centers:
Clalit *2700
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*
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Notification to the public – corona patient – case number 252 >>>>>>>>
Tuesday, 17.3, 7:00

The patient is his twenties, from central Israel.
A contact of a confirmed patient.

8.3: 14:00-16:00 "Gan Sipur" café, 7 Hatzionut st., Hod HaSharon.
00:30-03:00 (9.3) "Kuli Alma" club, 10 Mikve Israel St., Tel-Aviv

9.3: Between 15:30-16:30 Nona Café, 44 Ibn Gabirol st. Tel-Aviv
21:00-02:00 participation in a celebration in "Sheva" banquet hall, 21 HaTsfira St., Tel-Aviv

10.3: 15:00-18:30 "Kokhav HaYam" banquet hall in Kibbutz Sdot-Yam – A Purim party of the Interdisciplinary Center Herzliya college.
19:30-20:30 "Tabun", 90 Ramatayim rd., Hod HaSharon.

11.3: 00:30-04:30 party on "Reading 11", in Hangar 11, 1 Yordei HaSira St., Tel-Aviv.

Family members, acquaintances and colleagues were personally notified.
Entered quarantine on 13.3.

Every person that visited these locations during the detailed days and times is requested to get into home quarantine by the warrant of the Ministry of Health and to report it on the ministry of health website http://bit.ly/MOH-Corona or the Health Ministry's call center *5400.
Or the HMOs' call centers:
Clalit *2700
Maccabi *3555
Meuhede *3833
Leumit *507

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*** Telegram:**
https://t.me/MOHreport
*** CoronApp application**

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Eyal Basson
The Israeli Health Ministry spokesman

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