1. Objective:

To produce estimates on the potential scope of the Covid-19 s pandemic in the first two months after its introduction to the countries in different scenarios, in order to assist with information in the planning of health services.

2. Method:

2.1 Estimation of the number of cases for different scenarios.

In a first stage, we estimate the number of cases expected daily for 60 days, using different R0, after the introduction of X number of cases in a population. The "R0" package (Obadia, 2015; Obadia et al., 2012; R Core Team, 2019) is used, specifically using the package command to simulate an "sim.epid" outbreak, based on the following parameters:

- **For the number of outbreaks (the equivalent of the number of imported cases), for different scenarios (5, 20, 40) to simulate different introductions.**
- **As a distribution of the generation time (that is, time between infection of the primary case and infection of the secondary cases), the serial interval (time between onset of clinical signs between the primary and secondary cases) was used as the proxy variable. For this, the published parameters for a Weibull distribution for the serial interval for Covid-19 were used: mean (± SD) of 4.8 ± 2.3 days (Lui et al., 2020; Nishiura et al., 2020; Peak et al. 2020).**
- **For R0 2.5 is used.**
- **The duration of the epidemic was established for 60 days, with daily simulation results.**
- **A Poisson distribution is used to simulate daily incidence. This distribution was used to simulate the Daegu epidemic in South Korea (Korean Society for Infectious Diseases, 2020), in the scenario the mean and Sd were very similar. Furthermore, other authors have used this distribution to model Covid-19 (Zhang et al., 2020).**
- **As this is a stochastic model, 1000 simulations were performed for each scenario and the median and Interquartile IQR range were extracted, that is, quartile 1, Q1 and quartile 3, Q3.**
- **Expected breakdown of case severity: Using the model results (median and IQR), a breakdown of the expected proportion of case severity was estimated, according to the parameters obtained from the literature (Lui et al., 2020):**
  - **Mild: 81%**
  - **Serious: 14%**
  - **Critical: 5%**

Based on these data, the number of hospital beds required is estimated as the epidemic progresses for severe cases (assuming a cumulative stay of 14 days) and the number of ICU beds for critical cases (assuming a cumulative stay of 21 days)

3. **Limitations:**

- **In the model:**
  - **The parameters may still be imprecise and may change in different country settings.**
  - **The simulation in the model does not take into account the ad hoc interventions they introduce. The general control is represented by the chosen R0.**
  - **The model assumes a random contact / transmission based on a homogeneous mixture, a closed population and no intervention during the outbreak, whereas in reality the interaction between people could be grouped.**

- **In the breakdown of cases by severity:**
  - **A difference in this severity breakdown is expected between countries according to the age distribution, not entered in the model.**

4. **Results:**

Scenario 1, based on an R0 = 2.5, 5 Outbreaks

5 outbreaks are assumed, which may correspond to a minor challenge, and can be interpreted as:

- **Five cases introduced in a short space of time**
- **A moderate number of cases introduced where transmission was initially controlled through protective measures.**

Table 1 presents the estimates of cases and the severity breakdown for scenario 1. The data represents the median of the estimates and the IQR is presented in parentheses. At the same time, the number of hospital beds in use (accumulated for 14 days for severe cases) and the number of ICU beds in use (accumulated for 21 days for severe cases) are presented.

Day	Accumulated Cases	New Daily Cases	New Daily Mild Cases	New Daily Serious Cases	New Daily Critical Cases	Hospital Beds in Use	ICU Beds in Use
7	21 (17-25)	5 (3-6)	4 (2-5)	1 (0-1)	0 (0-0)	3 (2-4)	1 (1-1)
14	102 (77-129)	24 (17-28)	19 (14-23)	3 (2-4)	1 (1-1)	14 (11-18)	5 (4-6)
21	469 346-600)	101 (74-119)	82 (60-96)	14 (10-17	5 (4-6)	63 (46-81)	23 (17-30)
28	2015 (1472-26010)	390 (292-487)	316 (237-394)	55 (41-68)	20 (15-24)	268 (195-346)	100 (73-129)
35	8536 (6184-113870)	1193 (805-1913)	966 (652-1550)	167 (113-268)	60 (40-96)	1129 (817-1510)	422 (305-563)
42	39392 (29044-52180)	7226 (6607-9381)	5853 (5352-7599)	1012 (925-1313)	361 (330-469)	5233 (3860-6941)	1946 (1435-2579)
49	174230 (128886-238368)	30399 (25611-49027)	24623 (20745-39712)	4256 (3586-6864)	1520 (1281-2451)	23197 (17178-31777)	8611 (6371-11788)

Scenario 2, based on an R0 = 2.5, 20 Outbreaks

20 original outbreaks are assumed, which may correspond to a moderate challenge, and can be interpreted as:

- **A moderate number of cases introduced in which the transmission has not been satisfactorily controlled initially through protection measures**

Table 2 presents the estimates of cases and the severity breakdown for scenario 2. The data represents the median of the estimates and the IQR is presented in parentheses. At the same time, the number of hospital beds in use (accumulated for 14 days for severe cases) and the number of ICU beds in use (accumulated for 21 days for severe cases) are presented.

Day	Accumulated Cases	New Daily Cases	New Daily Mild Cases	New Daily Serious Cases	New Daily Critical cases	Hospital Beds in Use	ICU Beds in use
7	82 (74-90)	17 (15-18)	14 (12-15)	2 (23	1 (1-1)	11 (10-13)	4 (4-5)
14	415 (361-473)	85 (69-97)	68 (56-79)	12 (10-14	4 (3-5)	58 (51-66)	21 (18-24)
21	1868 (1605-2139)	368 (300-435)	298 (243-352)	51 (42-61	18 (15-22)	250 (214-287)	93 (80-107)
28	8421 (7279-9634)	1728 (1446-1946)	1399 (1171-1576)	242 (202-272	86 (72-97)	1121 (969-1283)	417 (360-477)
35	36729 (31056-42266)	7095 (5126-8368)	5747 (4152-6778	993 (718-1172)	355 (256-418)	4880 (4123-5618)	1816 (1535-2090)
42	161409 (138243-186169)	28375 (23829-34492)	22983 (19301-27939	3972 (3336-4829)	1419 (1191-1725)	21418 (18335-24715)	7977 (6832-9202)
49	719728 (622739-837333)	142867 (126339-168932)	115722 (102335-136835	20001 (17687-23650)	7143 (6317-8447)	95620 (82836-111309)	35565 (30773-41385)

Scenario 3, based on an R0 = 2.5, 40 Outbreaks

40 original outbreaks are assumed, which may correspond to a serious challenge, and can be interpreted as:

- **40 cases entered in a short period of time and it has not been satisfactorily controlled through protection measures.**

Table 3 presents the estimates of cases and the severity breakdown for scenario 3. The data represents the median of the estimates and the IQR is presented in parentheses. At the same time, the number of hospital beds in use (accumulated for 14 days for severe cases) and the number of ICU beds in use (accumulated for 21 days for severe cases) are presented.

Day	Accumulated Cases	New Daily Cases	New Daily Mild Cases	New Daily Serious Cases	New Daily Critical cases	Hospital Beds in Use	ICU Beds in use
7	167 (156-180)	37 (34-41)	30 (28-33)	5 (5-6)	2 (2-2)	23 (22-25)	8 (8-9)
14	833 (761-907)	163 (148-175)	132 (120-142)	23 (21-25)	8 (7-9)	117 (107-127)	42 (38-45)
21	3759 (3405-4167)	692 (619-808)	561 (501-654)	97 (87-113)	35 (31-40)	503 (455-558)	188 (170-208)
28	16919 (15126-18573)	3296 (2884-3540)	2670 (2336-2867)	461 (404-496)	165 (144-177)	2252 (2011-2473)	838 (749-920)
35	74070 (66901-82222)	13588 (12360-15551)	11006 (10012-12596)	1902 (1730-2177)	679 (618-778)	9844 (8889-10928)	3662 (3307-4066)
42	328540 (292524-366306)	61374 (55309-68534)	49713 (44800-55513)	8592 (7743-3427)	3069 (2765-3427)	43627 (38836-48683)	16239 (14456-18107)
49	1453234 (1286794-1593211)	262383 (229864-286702)	212530 (186190-232229)	36734 (32181-40138)	13119 (11493-14335)	193083 (170785-211538)	71816 (63583-78732)

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