



Rapid

Response

Informing Lebanon's  
Response to the COVID-19  
Pandemic

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# Rapid Response

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**K2P Rapid Response**

# Informing Lebanon's Response to the COVID-19 Pandemic

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# Key Messages

# Key Messages

## Lebanese Context

- On March 11, 2020, the World Health Organization declared COVID-19 a pandemic, signaling to the world that continued spread is likely, and that countries should prepare for the possibility of widespread community transmission.
- The first case of COVID-19 in Lebanon was confirmed on 21 February 2020; since then, the number of cases has continued to grow exponentially.
- As of March 16, 2020 (end of day), 120 cases of coronavirus have been confirmed with a death toll of 3 cases. The total number of COVID-19 cases in Lebanon is likely higher than what is being reported due to inherent difficulties in identifying and counting mild and asymptomatic cases.
- Cases now comprise those that are travel related and those that are the result of internal spread, including occupational transmission.

## Measures Adopted in Lebanon

- Lebanese government has enacted a range of measures to control the epidemic, starting with temperature screening at the airport and testing of suspected cases (including contact tracing) before moving to closure of schools, universities and nurseries (February 29 - March 2, 2020); banning of large gatherings, closing restaurants, cafes, and bars (March 10, 2020); and more recently, travel restrictions to and from highly affected areas (March 11, 2020). On March 15 (23 days after the first confirmed case in Lebanon), the government declared a state of health emergency.
- Initially, the responsibility of handling all coronavirus cases in the country has been mostly assumed by one hospital, namely Rafic Hariri University Hospital (RHUH). With increased demand on the laboratory testing, four additional laboratory centers were licensed by the MOPH to perform the COVID-19 test, provided the cost does not exceed 150,000 L.L per test
- On March 13, 2020, the MOPH issued the 'Regional Preparedness and Response Plan for COVID-19', aiming at scaling up the preparedness and response capacities in Lebanon for prevention, early detection, and rapid response to the disease.



- Still, there is no clear plan in terms of tailoring the pandemic response to vulnerable populations (e.g. refugees, prisoners elderly, etc.), providing financial/social assistance schemes for vulnerable groups and sectors affected by social distancing measures, and also providing mental health support for the people in need

### **Need to scale up efforts**

***Scaling up existing efforts is crucial, given the expected exponential growth in number of cases, and the challenges in the existing health system which may undermine current response.***

*Expected exponential growth in number of cases:*

- Evidence show that significant numbers of COVID-19 infections are spread by pre-symptomatic individuals. This means that isolating people only once they start to show clinical signs is less effective than hoped. Furthermore, the effectiveness of isolation and contact tracing methods depends on the proportion of transmission that occurs before symptom onset.
- Sheer speed of both the geographical expansion and the sudden increase in numbers of cases can quickly overwhelm health and public health services.
- Given the high transmission and prominence of community spread of COVID-19 where speed could mean the difference between containment and outbreak, the government did not act decisively, quickly and early before and after the first case was detected in Lebanon:
  - Measures were more reactive than proactive. Given the limited resources, the technical measures that have been taken by the Ministry of Public Health (MOPH) are critical and useful to contain and delay transmission. However, that there were some considerations that delayed the swift response including political ones
  - Lack of mandatory quarantine for suspected cases
  - Poor readiness and preparedness of many of the public and private hospitals (including primary healthcare centers) at the time of crisis
  - Limited coordination among other sectors beyond health (including municipalities)

- .....> Limited community awareness (which hindered effectiveness of social distancing measures)
- .....> Recently adopted measures may not have come in time to prevent the surge of cases.

*Challenges in existing health systems:*

In Lebanon, the healthcare system suffers from various deficiencies which may subsequently undermine Lebanon's response to the coronavirus outbreak

Inefficient public health system:

- .....> Existing health system is curative-oriented with little attention to preventive care (around 5% of MoPH budget is allocated to primary health care)
- .....> Since end of civil war, public sector has not been supported by government due to political and confessional reasons
- .....> Public sector is underfunded, understaffed and ill-equipped (only 1.8% of MoPH budget is invested in public hospitals while more than 80% is invested in private hospitals and pharmaceuticals)
- .....> Only 15% of hospital beds in Lebanon belong to the public sector (while 85% belong to the private sector)

Weak and fragmented information systems

- .....> At the beginning of an outbreak, readily available information is important to detect outbreak as early as possible to trace the source of outbreak and prevent massive transmission of the infectious disease
- .....> Health information system in Lebanon is fragmented and patchy.
- .....> Limited capacity to collect, analyze and interpret health data to produce strategic information for effective and efficient decision-making
- .....> Gaps in real time data for specific geographical areas, and utilization rates of hospitals and response capacity etc. which are critical to guide decisions during such outbreak

### Poor engagement of the private sector in early response

- .....> Despite its predominance, majority of private hospitals have not been involved yet in the management of coronavirus cases. Delay is most likely due to high treatment costs, the high need for safety and infection control measures, and mostly the delayed third party payers' remuneration.
- .....> Lack of clear enforcement of infectious disease Law 1957 with regards to authority, responsibility and coordination of different sectors including reinforcement of mandatory isolation and engagement of private sector, civil society groups and municipalities in the response including financial coverage
- .....> This may have weakened the capacity for rapid testing and tracing of suspected individuals in the earlier phases of the infection trajectory when such measures are most effective
- .....> Till now, there is no clear operational plan for the coordination between private and public hospitals including surge capacities

### Limited availability of needed supplies and equipment.

- .....> Available healthcare capacities and resources (ICU beds, respirators) may not be sufficient to respond to the COVID-19 outbreak
- .....> The biggest fear would be that the number of seriously ill exceed local hospitalization and ICU capacities, similar to what happened in Italy, leaving healthcare workers faced with drastic decisions.

### **Consequences of Delayed response**

- .....> If the outbreak is not contained in a timely manner, the Lebanese health system will be overwhelmed; patients with coronavirus or other urgent medical conditions will not receive their needed care, and a substantial number of unnecessary deaths will become inevitable
- .....> Data from the Chinese Center for Disease Control and Prevention indicate that 13.8% of cases had a severe condition requiring hospitalization, and 4.7% were critically ill requiring Intensive Care Unit (ICU). In Italy, the percentage of patients admitted to intensive care units reported daily from March 1 to March 11 2020, was consistently between 9% and 11% of actively infected patients
- .....> Countries that are prepared and act swiftly will likely experience a fatality rate of less than 1% (such as in South Korea, Singapore)

whereas countries that are overwhelmed will likely suffer from a fatality rate of ~3%-6% (such as in Wuhan and Italy)

- ..... Failure to contain the epidemic will only exacerbate the situation as it would further require governments to take more drastic measures which will further disrupt the economy.
- ..... In practice, the health care system cannot sustain an uncontrolled outbreak, and stronger containment measures are now the only realistic option to avoid the total collapse of the health system. The adoption of such measures will help in delaying the onset of widespread community transmission, reducing peak incidence and its impact on public services, and decreasing the overall attack rate, slowing down spread until effective vaccines become available.

### **What other countries are doing**

With the number of new reported cases of infection declining or being contained in certain countries (e.g. China, Taiwan, Singapore, Hong Kong, South Korea) but soaring in others (Italy and Iran), it is worth highlighting the experiences and strategies of countries to see what can be learned. In countries that seem to have contained the spread, the response has been swift, proactive, transparent, and data driven with seemingly broad societal buy-in while the public health system has managed to cope with a surge in cases.

#### *Measures adopted by countries with more successful outcomes*

- ..... Being alert and proactive in realizing the crisis by initiating screening and testing before actual identification of cases
- ..... Organizing cross-departmental government emergency responses
- ..... Taking quick and decisive actions to impose travel restrictions and protect borders
- ..... Extensive and aggressive contact tracing and mandatory quarantine with punitive measures for non-compliance
- ..... Leveraging big data and technology for case identification and containment
- ..... Practicing high level of openness and transparency early on in relation to the situation including number of cases
- ..... Educating the public on the risks and necessary precautionary measures, and getting their buy-in
- ..... Strict social distancing measures (school closures, banning of public gathering, working from home)

- .....> Preparedness of healthcare facilities (protocols to follow, availability of supplies and equipment, isolation rooms)
- .....> Financial compensation/support for businesses and vulnerable groups affected by the epidemic and containment measures

*Measure adopted by countries with less successful outcomes:*

- .....> Delay in acknowledging the magnitude of the disease
- .....> Being reactive instead of proactive as measures weren't taken until after the number of cases sharply increased
- .....> Delay in taking appropriate measures such as travel bans, quarantine of infected regions, closure of schools and universities and other crowded spaces such as touristic sites in Italy and religious sites in Iran.
- .....> Slow response to the outbreak due to political reasons.
- .....> Delay in taking precautions at the health facilities levels leading to wide infection among health care workers.
- .....> Incautious individual behavior due to the lack of information provided and measures taken by the government

### **Roadmap for action**

Effective prevention and control of COVID19 relies on implementing a comprehensive and cross-sectoral roadmap for action to COVID-19 that involves public, private sector and civil society sectors. Measures are to be implemented according to the following pillars:

- .....> National-level coordination, planning and monitoring
- .....> Community-level and organizational-level initiatives
- .....> Healthcare facility-level initiatives and case management (including providing financial and non-financial support of healthcare providers to improve morale and strengthen resilience to healthcare providers)
- .....> Information Sharing
- .....> Surveillance and case investigation
- .....> Travel and Entry
- .....> Specimen testing and laboratories

.....> Operational logistics and financing including financial/social assistance schemes for vulnerable groups (poor, unemployed, refugees, elderly, etc.) affected by social distancing measures

Measures should not discriminate against vulnerable groups (e.g. refugees, people in prison, under-privileged individuals).

### **Re-imagining Lebanon's public health system and preparedness response**

The world is witnessing the worst public health crisis in recent history, exposing deficiencies in public health systems and pandemic preparedness

COVID-19 experience is an opportunity to re-imagine Lebanon's public health system and preparedness response by reshaping efforts and making the right investment at the public health sector level, broader healthcare system level, country-wide level, and global level.

# الرسائل الأساسية

## السياق اللبناني

- ← في 11 آذار 2020 ، أعلنت منظمة الصحة العالمية أن فيروس كورونا المستجد وباء، مشيرة للعالم أن توسع الانتشار أمر محتمل وأنه على الدول الاستعداد لإمكانية انتشار الفيروس مجتمعياً على نطاق أوسع.
- ← تم تأكيد أول حالة لـ فيروس كورونا المستجد في لبنان في 21 شباط 2020؛ منذ ذلك الحين، ازداد عدد الحالات بشكل مطرد.
- ← اعتباراً من 16 آذار 2020 (نهاية اليوم) ، تم تأكيد 120 حالة إصابة بفيروس كورونا المستجد وثلاث حالات وفاة. من المحتمل أن يكون العدد الإجمالي لحالات فيروس كورونا المستجد في لبنان أكبر مما يتم الإبلاغ عنه بسبب الصعوبات الموجودة أساساً المتعلقة في تحديد وحساب الحالات الخفيفة والتي لا تظهر أعراض.
- ← تشمل الحالات الآن تلك المستوردة (جاء السفر) وتلك التي ظهرت نتيجة انتشار داخلي، بما في ذلك النقل لأسباب مهنية وعملية.

## الإجراءات المعتمدة في لبنان

- ← أخذت الحكومة اللبنانية مجموعة من الإجراءات للسيطرة على الوباء، بدءاً بفحص درجة الحرارة في المطار واختبار الحالات المشتبه بها (بما في ذلك تعقب اتصالها بأفراد آخرين) قبل الانتقال إلى إغلاق المدارس والجامعات ودور الحضانه؛ حظر التجمعات الكبيرة وإغلاق المطاعم والمقاهي والحانات؛ ومؤخراً، فرض قيود على السفر من وإلى المناطق المتأثرة بشدة بفيروس كورونا المستجد، وبلغت ذروتها بإعلان حالة الطوارئ الصحية في 15 آذار 2020.
- ← تم تنفيذ التدابير بشكل تدريجي، وإن كان ذلك مع بعض التأخيرات بعد أول حالة مؤكدة لفيروس كورونا في لبنان في 21 شباط 2020.
- ← في البداية ، تحملت مسؤولية معالجة جميع حالات فيروس كورونا المستجد في لبنان من قبل مستشفى واحد، وهو مستشفى رفيق الحريري الجامعي (RHUH). مع زيادة الطلب على الفحوصات المخبرية، تم ترخيص أربعة مختبرات إضافية من قبل وزارة الصحة العامة لإجراء اختبار فيروس كورونا التاجي، بشرط ألا تتجاوز التكلفة 150.000 ل.ل. لكل فحص.
- ← في 13 آذار 2020، أصدرت وزارة الصحة العامة " خطة التأهب والاستجابة الإقليمية لـ فيروس كورونا المستجد " ، بهدف زيادة قدرات التأهب والجهوزية والاستجابة في لبنان للوقاية والكشف المبكر والاستجابة السريعة للمرض.

← ومع ذلك، لا توجد خطة واضحة فيما يتعلق بكيفية الاستجابة للوباء للفئات المجتمع الأضعف (مثل اللاجئين والسجناء المسنين) ، وتوفير خطط المساعدات المالية / الاجتماعية للفئات والقطاعات المتأثرة بتدابير التباعد الاجتماعي، بما في ذلك تقديم الدعم النفسي المحتاجين.

### **الحاجة إلى زيادة الجهود**

إن زيادة الجهود الحالية أمر في بالغ الأهمية، نظراً إلى النمو المتوقع في عدد الحالات، والتحديات في النظام الصحي الحالي والتي قد تقيد الاستجابة الحالية. النمو المتوقع في عدد الحالات:

← تشير الأدلة إلى أن حالات كثيرة من العدوى بفيروس كورونا المستجد تنتشر من قبل الأفراد الذين يُظهرون الأعراض. وهذا يعني أن عزل الأشخاص بمجرد أن يبدأوا في إظهار العلامات السريرية (الأعراض) هو أقل فعالية مما كان مرتجى. علاوة على ذلك، تعتمد فعالية العزل وتتبع اتصال الحالات على نسبة انتقال العدوى قبل ظهور الأعراض.

← إن السرعة الهائلة لكل من التوسع الجغرافي والزيادة المفاجئة في عدد الحالات سيؤدي إلى عبء كبير على الخدمات الصحية حيث لا تستطيع تلبية الاحتياجات

← نظراً لقابلية انتشار الفيروس العالية في المجتمعات - حيث يمكن أن تحدد هذه السرعة الحدّ الفاصل بين احتواء وتفشي الوباء-، لم تتصرف الحكومة بشكل حاسم وسريع وفي وقت مبكر قبل وبعد اكتشاف الحالة الأولى في لبنان:

← كانت الإجراءات تفاعلية أكثر من ما كانت استباقية؛ وبالرغم من الموارد المحدودة، فإن التدابير التقنية التي اتخذتها وزارة الصحة العامة (MOPH) هي حتى الآن ضرورية وفعالة لاحتواء الفيروس وتأخير انتشاره. ولكن، كانت هناك بعض الاعتبارات التي أضرّت الاستجابة السريعة بما في ذلك الاعتبارات السياسية.

← عدم فرض الحجر الإلزامي للحالات المشتبه بها

← ضعف الاستعداد والجهوزية للعديد من المستشفيات العامة والخاصة (بما في ذلك مركز الرعاية الصحية الأولية) في وقت الأزمات

← تنسيق محدود بين القطاعات المعنية الأخرى غير القطاع الصحي (بما في ذلك البلديات)

← ضعف الوعي المجتمعي المحدودان (الذي أعاق فعالية تدابير التباعد الاجتماعي)

← من المرجح أنه لم يتم اتخاذ التدابير المعتمدة مؤخرًا في الوقت المناسب لمنع زيادة الحالات.



## التحديات في النظام الصحي القائم

يعاني نظام الرعاية الصحية في لبنان من عوائق على مختلف الأصعدة التي قد تعيق في وقت لاحق استجابة لبنان لتفشي فيروس كورونا المستجد.

*عدم كفاءة نظام الصحة العامة:*

- ← النظام الصحي الحالي يعتمد مقارنة علاجية مع تفليل الاهتمام بالرعاية الوقائية (يتم تخصيص حوالي 5% من ميزانية وزارة الصحة العامة للرعاية الصحية الأولية)
- ← منذ نهاية الحرب الأهلية، لم يتم دعم القطاع العام من قبل الحكومة لأسباب سياسية وطائفية
- ← القطاع العام يعاني من نقص التمويل وقلة في العاملين وسوء التجهيز (1.8% فقط من ميزانية وزارة الصحة العامة تستثمر في المستشفيات العامة بينما تستثمر أكثر من 80% في المستشفيات الخاصة والأدوية)
- ← 15% فقط من أسرة المستشفيات في لبنان تعود إلى القطاع العام (بينما 85% تعود إلى القطاع الخاص)

## نظام المعلومات الضعيف والمتجزأ.

- ← في بداية تفشي الفيروس، تُعد المعلومات والبيانات المتاحة مهمة، للكشف عن تفاصيل تفشي المرض في أقرب وقت ممكن لتتبع مصدر التفشي ومنع انتقال الأمراض المعدية على نطاق واسع
- ← نظام المعلومات الصحية في لبنان مجزأ وغير متجانس. لا يغطي نظام الترصد الوبائي المختبرات والمرافق الصحية في جميع القطاعات العامة والخاصة ونقاط الدخول للنظام الإستشفائي الأخرى.
- ← قدرة محدودة على جمع البيانات الصحية وتحليلها وتفسيرها لإنتاج معلومات استراتيجية من أجل اتخاذ قرارات فعالة.
- ← الثغرات في البيانات الفورية لمناطق جغرافية محددة، ومعدلات استخدام المستشفيات وقدرات الاستجابة وما إلى ذلك، والتي تعتبر حاسمة لتوجيه القرارات أثناء هذا التفشي

## ضعف مشاركة القطاع الخاص في الاستجابة المبكرة

- ← على الرغم من هيمنتها ، إلا أن غالبية المستشفيات الخاصة لم تشارك في إدارة حالات فيروس كورونا المستجد. يعود التأخير على الأرجح إلى ارتفاع تكاليف العلاج، والحاجة الشديدة إلى تدابير السلامة ومكافحة العدوى، وبسبب تأخر مدفوعات الطرف الثالث.

- ← عدم وجود تطبيق واضح لقانون الأمراض المعدية لعام 1957 فيما يتعلق بالسلطة ومسؤوليتها والتنسيق بين مختلف القطاعات بما في ذلك تعزيز الحجر الإلزامي وإشراك القطاع الخاص ومجموعات المجتمع المدني في الاستجابة بما في ذلك التغطية والمساهمة المالية
- ← قد يكون هذا ما أضعف القدرة على إجراء الفحوصات والتتبع السريع للأفراد المشتبه بهم في المراحل المبكرة من مسار العدوى، وهو الوقت الذي تظهر فيه هذه التدابير فعاليتها
- ← حتى الآن، لا توجد خطة عملية واضحة حول التنسيق بين المستشفيات الخاصة والعامّة، بما فيها زيادة القدرات الطبية واللوجيستية لاستقبال المرضى

### **توافر محدود من الإمدادات والمعدات الطبية اللازمة.**

- ← قدرات وموارد الرعاية الصحية المتاحة حالياً (أسرّة العناية المركزة، وأجهزة التنفس الإصطناعي) ليست كافية للاستجابة لتفشي فيروس كورونا التاجي
- ← الخوف الأكبر هو أن يتجاوز عدد المصابين بأمراض خطيرة قدرات المستشفيات المحلية ووحدات العناية المركزة، على غرار ما حدث في إيطاليا، تاركين العاملين في مجال الرعاية الصحية يواجهون قرارات صارمة.

### **عواقب الاستجابة المتأخرة**

- ← إذا لم يتم احتواء هذا الفيروس في الوقت المناسب، سيتم إرهاق النظام الصحي اللبناني؛ لن يتلقى المرضى المصابون بالفيروس التاجي أو الحالات الطبية العاجلة الأخرى الرعاية اللازمة، وسيؤدي إلى زيادة عدد الوفيات غير الضرورية أم التي يمكن معالجتها.
- ← تشير البيانات الصادرة عن المركز الصيني لمكافحة الأمراض والوقاية منها، إلى أن 13.8% من الحالات كانت تعاني من حالة خطيرة تتطلب دخول المستشفى، و4-7% من هذه الحالات كانت في حالة حرجة تتطلب الدخول إلى وحدة العناية المركزة (ICU). في إيطاليا، كانت النسبة المئوية للمرضى الذين تم إدخالهم إلى وحدات العناية المركزة التي يتم الإبلاغ عنها يومياً من 1 آذار إلى 11 آذار 2020، بين 9% و 11% من المرضى المصابين.
- ← من المرجح أن تشهد الدول المستعدة والتي تصرفت بسرعة، معدل وفيات أقل من 1% (كما هو الحال في كوريا الجنوبية وسنغافورة) في حين أن الدول المنهكة على الأرجح ستعاني من معدل وفيات ما بين 3% و 6% (مثل في ووهان وإيطاليا)
- ← الفشل في احتواء الوباء لن يؤدي إلا إلى تفاقم الوضع لأنه سيفرض على الحكومات اتخاذ تدابير أكثر صرامة من شأنها أن تزيد من التداعيات الاقتصادية.

← من الناحية العملية، لا يمكن لنظام الرعاية الصحية أن يستمر في تفشي المرض بشكل غير منضبط، حيث أصبحت تدابير الاحتواء الأقوى هي الخيار الواقعي الوحيد لتجنب الانهيار التام للنظام الصحي. سيساعد اعتماد مثل هذه التدابير في تأخير بدء انتشار الفيروس مجتمعياً على نطاق واسع، والحد من ذروة حدوثه وتأثيره على الخدمات العامة، وتباطؤ الانتشار حتى تصبح اللقاحات الفعالة متاحة.

### تجارب الدول الأخرى

مع انخفاض عدد الحالات المبلغ عنها الجديدة من الإصابة في بعض البلدان (مثل الصين وتايوان وسنغافورة وهونغ كونغ وكوريا الجنوبية) وازديادها في دول أخرى (إيطاليا وإيران)، يجدر تسليط الضوء على تجارب واستراتيجيات البلدان لمعرفة ما يمكن تعلمه. في البلدان التي يبدو أنها احتوت الانتشار، كانت الاستجابة سريعة واستباقية وشفافة، ومبنية على البيانات العلمية مع التزام مجتمعي واسع النطاق، حيث تمكن نظام الصحة العامة أيضاً من التعامل مع زيادة الحالات.

#### التدابير التي اتخذتها البلدان التي نجحت في احتواء فيروس كورونا التاجي

- ← أن تكون الدولة متيقظة واستباقية للتحقيق في الأزمة من خلال بدء الفحوصات قبل التحديد الفعلي للحالات
- ← تنظيم استجابات الطوارئ الحكومية المشتركة بين مختلف المعنيين
- ← إجراءات سريعة وحاسمة لفرض قيود على السفر وحماية الحدود
- ← تتبع اتصال الأفراد المشتبه بهم المكثف والصارم وفرض الحجر الإلزامي مع تدابير عقابية لعمن لا يلتزم
- ← الاستفادة من البيانات والتقنيات العلمية الضخمة لتحديد الحالات واحتواء الانتشار
- ← ممارسة درجة عالية من الوضوح والشفافية في وقت مبكر حول وضع انتشار الفيروس والحالات بما في ذلك عددها
- ← تثقيف المواطنين حول المخاطر والإجراءات الاحتياطية اللازمة والحصول على دعمهم
- ← إجراءات إبعاد اجتماعي صارمة (إغلاق المدارس، حظر التجمعات العامة، العمل من المنزل)
- ← استعداد مرافق الرعاية الصحية (البروتوكولات الواجب اتباعها، وتوافر الإمدادات والمعدات الطبية اللازمة، وتجهيز غرف العزل)
- ← تقييم التعويضات/ الدعم المالي للشركات والفئات المتضررة من الوباء وتدابير الاحتواء
- ← التدابير المتخذة في البلدان التي لم تنجح في احتواء فيروس كورونا التاجي:
- ← التأخر في الاعتراف بحجم الوباء

- ← اعتماد مقارنة تفاعلية بدلاً من أن تكون استباقياً حيث لم يتم اتخاذ التدابير إلا بعد زيادة عدد الحالات بشكل حاد
- ← التأخر في اتخاذ التدابير المناسبة مثل حظر السفر والحجر الصحي للمناطق المصابة وإغلاق المدارس والجامعات وغيرها من الأماكن المزدحمة مثل المواقع السياحية في إيطاليا والمواقع الدينية في إيران.
- ← استجابة بطيئة لتفشي المرض لأسباب سياسية.
- ← التأخير في اتخاذ الاحتياطات على مستوى المرافق الصحية مما يؤدي إلى عدوى واسعة بين العاملين في مجال الرعاية الصحية.
- ← السلوك الفردي غير الواعي بسبب نقص المعلومات المقدمة والتدابير التي اتخذتها الحكومة.

### خارطة طريق للعمل

- تعتمد الوقاية والتحكم الفعالين لفيروس كورونا التاجي على تنفيذ خارطة طريق شاملة ومتعددة القطاعات للعمل على احتواء فيروس كورونا التاجي تتضمن القطاعين العام والخاص والمجتمع المدني. يتم تنفيذ الإجراءات وفقاً للأركان التالية:
- ← التنسيق والتخطيط والمراقبة على المستوى الوطني
  - ← مبادرات على مستوى المجتمع وعلى مستوى المنظمات
  - ← المبادرات على مستوى مرافق الرعاية الصحية وإدارة الحالات (بما في ذلك توفير الدعم المالي وغير المالي لمقدمي الرعاية الصحية لتحسين الروح المعنوية وتعزيز المرونة لمقدمي الرعاية الصحية)
  - ← مشاركة المعلومات
  - ← المراقبة والتحقيق في الحالات
  - ← تدابير السفر ودخول البلاد
  - ← اختبار العينات والفحوصات
  - ← الخدمات اللوجستية والتمويل التشغيلي بما في ذلك خطط المساعدة المالية / الاجتماعية للفئات الضعيفة (الفقراء، العاطلين عن العمل اللاجئين، المسنين، إلخ) المتأثرين بتدابير التباعد الاجتماعي
  - ← يجب ألا تهتمّس التدابير الفئات الضعيفة (مثل اللاجئين والأشخاص في السجون والأفراد المهمشين).

## إعادة تصوّر نظام الصحة العامة في لبنان ونظام الاستجابة

- ← يشهد العالم أسوأ أزمة للصحة العامة في التاريخ الحديث، ما يكشف عن ضعف في أنظمة الصحة العامة وقلة الجهوزية لمواجهة الأوبئة
- ← تجربة فيروس كورونا التاجي هي فرصة لإعادة تصور وتمكين استجابة لبنان لمتطلبات الصحة العامة والتأهب بشكل أقوى من خلال إعادة تمكين الجهود والقيام بالاستثمار الصحيح على مستوى قطاع الصحة العامة، وعلى مستوى النظام الصحي بشكل عام، وعلى مستوى الدولة، وعلى الصعيد العالمي.

# Content

# Preamble

On December 8, 2019, respiratory illness caused by a new coronavirus (COVID-19) was first identified in Wuhan city, China and subsequently reported to the public by the end of the year (Chen & Yu, 2020). Spreading to 25 countries in less than 2 months, the virus has now affected more than 150,000 people in over 110 countries and territories. On March 11, 2020, the World Health Organization declared COVID-19 a pandemic, signaling to the world that continued spread is likely, and that countries should prepare for the possibility of widespread community transmission.

While health systems in high-income countries would be stretched by the outbreak, the most devastating effects would be in countries with weak health systems, ongoing conflicts, or existing infectious disease epidemics. In these countries, it is imperative to rapidly detect and contain the virus at points of entry to prevent community transmission and health systems from being overwhelmed (Lancet 2020). In Lebanon, the first case of coronavirus infection was confirmed on February 21, 2020. With cases continuously growing, questions arise regarding the sufficiency of existing measures and the capacity of the health system to respond efficiently to the growing demands.

As of March 16, 2020, the COVID-19 pandemic registered 170, 237 cases, with 6, 526 death and 77, 789 recovery globally (WorldoMonitor)

With the Lebanese government under increased pressure to stop the outbreak from spiralling, this rapid response aims to guide Lebanon's response plan and minimize the health and economic costs of the COVID-19 epidemic in Lebanon. Specifically, it (1) describes Lebanon's current response to COVID-19 and (2) the need to scale up efforts, (3) presents the evidence on key successful and failure measures,

## Background to K2P Rapid Response

A K2P Rapid Response responds to urgent requests from policymakers and stakeholders by summarizing research evidence drawn from systematic reviews and from single research studies. A systematic review is an overview of primary research on a particular question that relies on systematic and explicit methods to identify, select, appraise and synthesize research evidence relevant to that question.

K2P Rapid Response services provide access to optimally packaged, relevant and high-quality research evidence over short periods of time ranging between 3, 10, and 30-day timeframe.

This rapid response was prepared in a 3-day timeframe and involved the following steps:

- 1) Formulating a clear review question on a high priority topic requested by policymakers and stakeholders from K2P Center.
- 2) Establishing what is to be done in what timelines.
- 3) Identifying, selecting, appraising and synthesizing relevant research evidence about the question
- 4) Drafting the K2P Rapid Response in such a way that the research evidence is present concisely and in accessible language.
- 5) Submitting K2P Rapid Response for Peer/Merit Review.
- 6) Finalizing the K2P Rapid Response based on the input of the peer/merit reviewers.
- 7) Final Submission, translation into Arabic, validation, and dissemination of K2P Rapid Response

The quality of evidence is assessed using the AMSTAR rating which stands for A Measurement Tool to Assess Systematic Reviews. This is a reliable and valid measurement tool to assess the methodological quality of systematic reviews using 11 items. AMSTAR characterizes quality of evidence at three levels:

- 8 to 11= high quality
- 4 to 7 =medium quality
- 0 to 3 = low quality

drawing on other countries' experiences, (4) provides a road map for action in Lebanon, (5) and concludes with a need to re-imagine public health systems in Lebanon.

## **Lebanese Context**

### **Current COVID-19 situation in Lebanon**

In Lebanon, the first case of COVID-19 was confirmed on 21 February 2020: a Lebanese woman who was aboard a plane coming from Iran (MoPH, 2020). Since then, the number of cases has progressively increased. On March 6, MoPH announced the virus was no longer contained due to a "miscalculation" from four unsuspected cases (coming from countries not listed as highly infected) (Naharnet, 2020). First death due to coronavirus was recognized on March 10, 2020, to an unfortunate 56-year-old person arriving from Egypt, whose diagnosis with coronavirus was delayed.

Cases continue to grow exponentially especially within the past few days (a trend consistent with the exponential trajectory observed in Italy where the number of cases started slowly and then expanded rapidly) (Remuzzi et al, 2020). As of March 16, 2020 (end of day), 120 cases of coronavirus have been confirmed with a death toll of three cases (figure 1). Cases now comprise those that are travel related and those that are the result of internal spread, including occupational transmission.

In theory, the true number of persons with COVID-19 infection cannot be accurately determined regardless of the detection measures used (Chen & Yu, 2020). Therefore, the total number of COVID-19 cases in Lebanon is likely higher than what is being reported due to inherent difficulties in identifying and counting mild and asymptomatic cases (Wu & McGoogan, 2020).



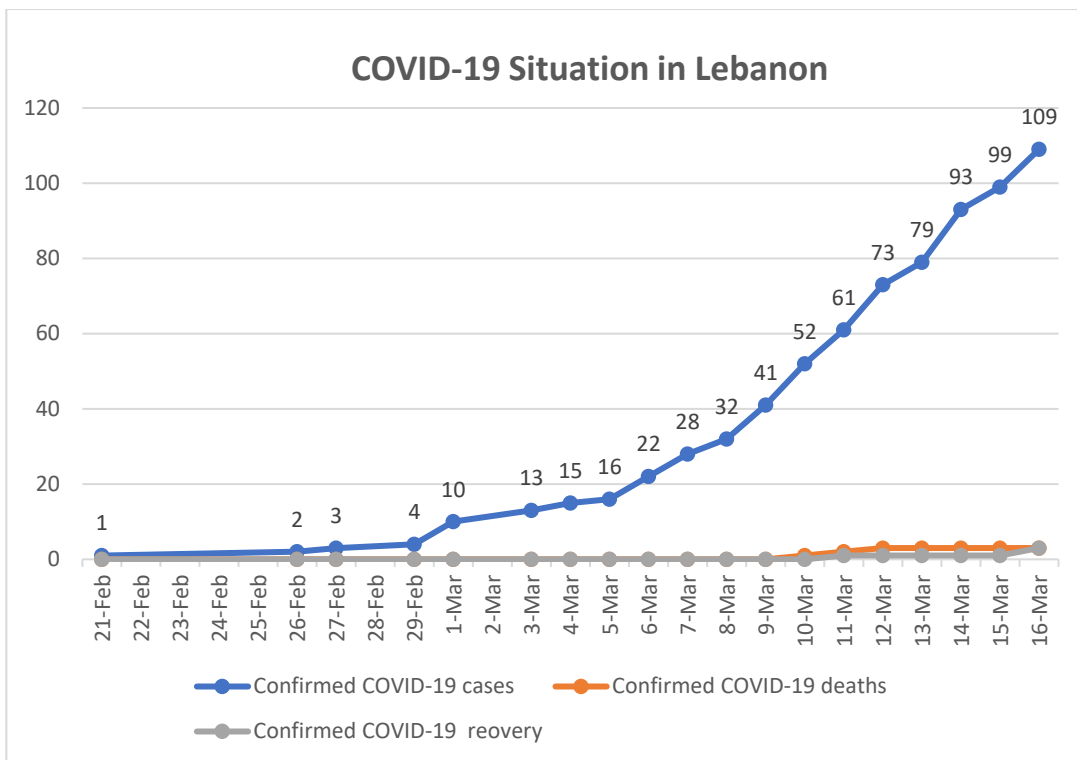


Figure 1 **Daily cumulative/emerged number of confirmed, fatal and recovered cases of Coronavirus Disease 2019 (COVID-19) in Lebanon.** Data source: MoPH, 2020

### Measures Adopted in Lebanon

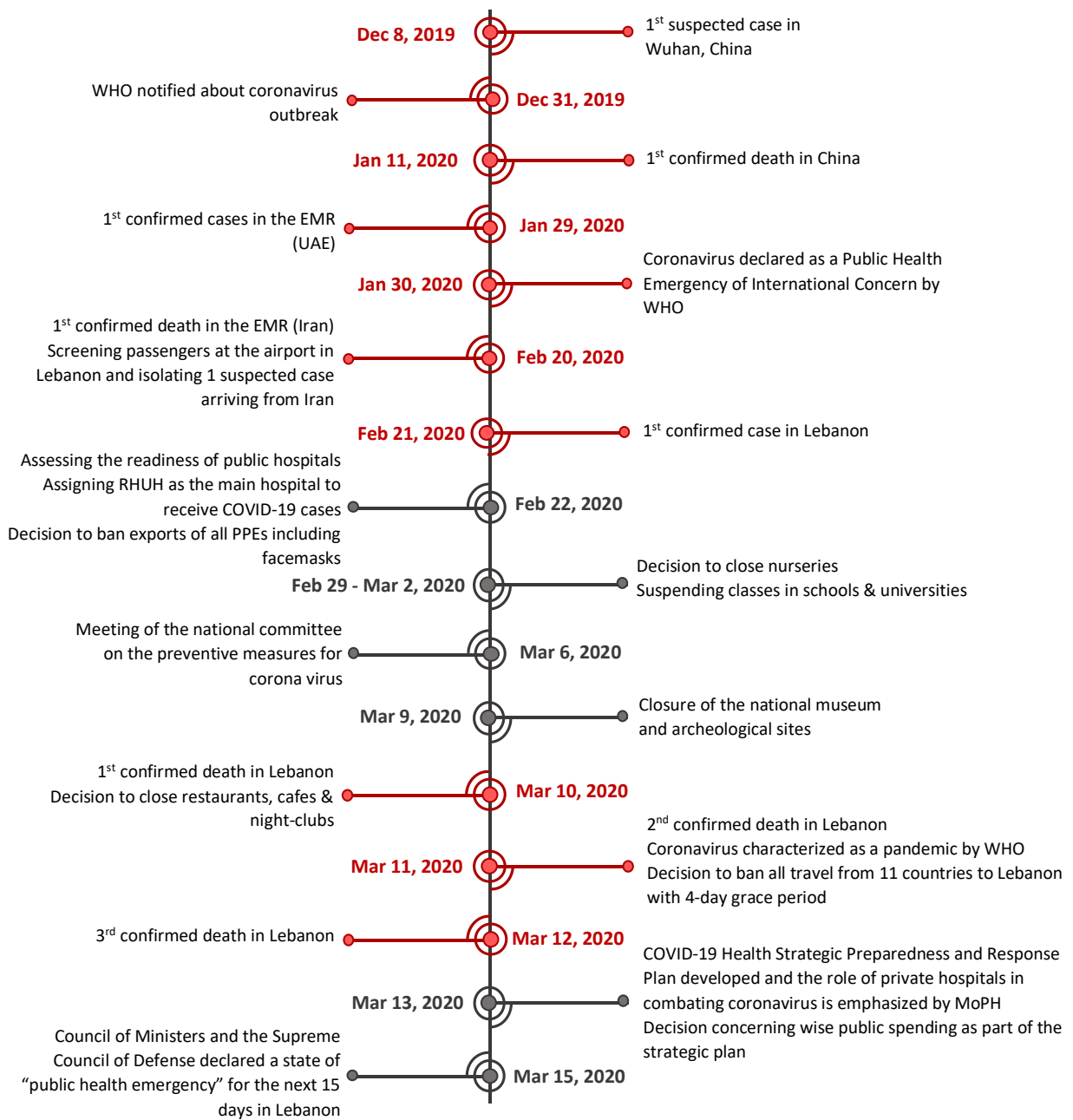
The Lebanese government has enacted a range of measures to control the epidemic, starting with temperature screening at the airport and testing of suspected cases (including contact tracing) before moving to closure of schools, universities and nurseries (February 29 - March 2, 2020); banning of large gatherings, closing restaurants, cafes, and bars (March 10, 2020); and more recently, travel restrictions to and from highly affected areas (March 11, 2020). On March 15 (23 days after the first confirmed case in Lebanon), the government declared a state of health emergency in Lebanon.

Initially, the responsibility of handling all COVID-19 cases in the country has been mostly assumed by one hospital, namely Rafic Hariri University Hospital (RHUH). The hospital has taken the responsibility for delivering all spectrum of care: triage, laboratory testing, quarantine, and medical management of cases of all levels of severity. (MOPHb, 2020). Concomitantly, RHUH employees launched a strike on March 13, 2020 in quest of the implementation of the salary scale, as has been done in other governmental hospitals. On March 13, 2020, MoPH took a decision to allocate a ward for coronavirus patients at each and every one of the government hospitals spread across Lebanon's governorates, as well as engage private sector in the response (MoPH 2020).

Tests for diagnosing of COVID-19 infections were initially conducted exclusively at RHUH, free of charge, for patients with clinical symptoms suggestive of the infection, specifically those who have been coming from endemic countries. Initial indiscriminate use of these conditions has led to the delayed diagnosis of one patient coming from Egypt, and resulted in the transmission of infection to the patient's roommate, a cancer patient, which contributed to the death of both patients. The delay in diagnosis also led to the transmission of infection to a number of the hospital nursing staff who were involved in patient care. With increased demand on the laboratory testing, on March 10, 2020, the MOPH gave permission to four additional laboratory centers in university hospitals to perform the test, provided the cost does not exceed 150,000 L.L per test. These centers are located around Beirut, which might limit access to patients suspected of the disease in rural areas of the country, and thereby result in delayed diagnosis and further spread.

Most recently, the MOPH issued the 'Regional Preparedness and Response Plan for COVID-19'. The strategy aims at scaling up the preparedness and response capacities in Lebanon for prevention, early detection, and rapid response to the disease. Efforts should also be made to translate this plan into specific actions that respond to the current context with clear operational plan for coordination between private and public hospitals including surge capacities. In addition, a more comprehensive plan should be inclusive of other measures beyond the direct health sector such as: stricter and more effective quarantine measures with punitive actions for non-compliance, more aggressive and sustained testing and contact tracing, stricter travel restrictions, and earmarked funding to optimize response. As it is a matter of a county's life or death, there should be no room for political interference or financial constraints. Equally important, actions should be timely, as every day counts in epidemics. Any delay in action will undoubtedly lead to escalating morbidity and mortality.

Still, there is no clear plan in terms of tailoring the pandemic response to vulnerable populations (e.g. refugees, prisoners, elderly), providing financial/social assistance schemes for vulnerable groups and sectors affected by social distancing measures, including providing mental health support for the people in need.



**Figure 2 Key events and interventions in Lebanon concerning the COVID-19 outbreak**

## Need to scale up efforts

Scaling up existing efforts is crucial, given the expected exponential growth in number of cases, and the challenges in the existing health system which may undermine current response.

## Expected Exponential growth in number of cases

To understand the likely impact of government's efforts on containment of the epidemic, it is important to shed light on some of the key characteristics of COVID-19 (Wu et al, 2020; Wilder-Smith et al, 2020; Cascella et al 2020; Anderson et al 2020; Ganyani, et al 2020):

- A considerable number of infections are spread by pre-symptomatic individuals (i.e. people with no symptoms of illness). For reference, SARS epidemic in 2003 was infectious only after the development of clinical signs, which made it relatively easier to control
- Incubation period (i.e. period between exposure to an infection and the appearance of the first symptoms) is around 5-6 days
- Reproduction number (R0) is estimated at 2.5
- Epidemic doubling time is 6.4 days

This means that isolating people only once they start to show clinical signs is less effective than initially hoped. Furthermore, the effectiveness of isolation and contact tracing methods depends on the proportion of transmission that occurs before symptom onset (Wilder-Smith et al, 2020). This also explains the sheer speed of both the geographical expansion and the sudden increase in numbers of cases which can quickly overwhelm health and public health services (Wu & McGoogan, 2020).

Given that the COVID-19 transmission can be massive in a short period of time, with thousands of new patients diagnosed daily around the world (Fisher & Heymann, 2020), minimizing the size of the outbreak or suppressing its peak is critical in Lebanon to provide the already stretched health systems with the opportunity to scale up and respond.

By February 18 2020, case numbers and deaths from COVID-19 already surpassed those of SARS epidemic in 2003 which reported 8098 cases with 774 deaths, and was eventually brought under control by July, 2003, in a matter of 8 months (Wilder-Smith et al, 2020)

Given the asymptomatic transmission and prominence of community spread of COVID-19 where speed could mean the difference between containment and outbreak, the government did not act decisively, quickly and early before and after the first case cases was confirmed in Lebanon:

- Measures were more reactive than proactive. Given the limited resources, the technical measures that have been taken by the Ministry of Public Health (MoPH) are critical and useful to contain and delay transmission. However, that there were some considerations that delayed the swift response including political ones
- Lack of mandatory quarantine for suspected cases (poor monitoring / follow up of self-imposed quarantine)
- Lack of mandatory quarantine for all people coming from highly affected areas regardless of any symptoms. Travel ban came 20 days after the first case was reported in Lebanon. By that time, many asymptomatic carriers would have entered the country, spreading the infection to others
- Poor readiness and preparedness of many of the public and private hospitals (including primary healthcare centers) at the time of crisis
- Limited coordination among other sectors beyond health (including municipalities)
- Limited community awareness (which hindered effectiveness of social distancing measures, especially during early phases)
- Inadequate enforcement mechanisms and punitive measures to ensure implementation and compliance with measures

### **Challenges in existing health system**

While strong health systems are a crucial foundation for national preparedness capabilities, in Lebanon, the healthcare system suffers from various deficiencies which may subsequently undermine Lebanon's response to the coronavirus outbreak.

#### *Inefficient public health sector*

Civil wars, economic downturns and political instability have taken a toll on the public health sector in Lebanon, leading to rapid growth of private institutions and nongovernmental organizations (NGOs) in an unregulated manner (Ammar,

2009). (MoPH 2018). Currently, the health system in Lebanon is pluralistic and curative-oriented with dominance of private sector in provision and financing of care.

Since end of civil war, public sector has not been supported by government due to political and confessional reasons. The public sector remains underfunded, understaffed and ill-equipped; only 1.8% of MoPH budget is invested in public hospitals; in contrast, more than 80% of MoPH budget is invested in private hospitals and pharmaceuticals. Furthermore, only 15% of hospital beds in Lebanon belong to the public sector (while 85% belong to the private sector) (Table1).

Investment in the public sector is hindered by waste and inefficiencies which further drain the health system. For instance, pharmaceutical spending as a proportion of GDP is highest in Lebanon (3.47%) among countries of the Eastern Mediterranean Region (Kanavos et al., 2018). Yet, the pharmaceutical sector is dominated by imported medicines and on patented brand names which constitute more than 80% of the total market. Similarly, only around 5% of MoPH budget is allocated to primary healthcare where 90% of health needs can be met (WHO, 2017; Doherty and Govender 2004).

#### *Weak and fragmented information systems*

A national public health surveillance system plays an important role in ensuring that reliable and timely health information is available to inform operational and strategic decision making at different levels of the health system (Sheikhali et al., 2016). At the beginning of an outbreak, readily available information is important to detect outbreak as early as possible to trace the source of outbreak and prevent massive transmission of the infectious disease (Haron, 2020; Heymann, 2020).

In Lebanon, health information system is fragmented and patchy. The epidemiological surveillance system does not cover laboratories, health facilities in all public and private sector and other relevant points of entry. There is limited capacity to collect, analyze and interpret health data to produce strategic information for effective and efficient decision-making. There are also gaps in real time data for specific geographical areas, and utilization rates of hospitals and response capacity etc. which are critical to guide decisions during such outbreak (MoPH, 2020; Maamari & Chaanine, 2013; Tyler, 2015).

#### *Poor engagement of the private sector in early response*

Up until March 13, 2020, the responsibility of handling all coronavirus cases in the country has been mostly assumed by RHUH which is equipped with 4 isolation rooms and 128 beds dedicated for the management of coronavirus (with additional 64 beds under preparation) (MOPHb, 2020). The diminished role of remaining 27 public hospitals invariably reflects the limited resources and poor preparedness to face such public health challenge. As for the private sector, despite

its predominance, it has not been notably involved in the management of coronavirus cases. This delay is most likely due to high treatment costs, the high need for safety and infection control measures, and mostly the delayed third party payers' remuneration. This further weakened the capacity for rapid testing and tracing of suspected individuals in the earlier phases of the infection trajectory when such measures are most effective (Hellewet et al 2020). On March 13, 2020, the MoPH issued a decree requiring the involvement of private sector in the fight against coronavirus. According to the Syndicate of Hospitals, not more than 20 beds could be allocated for coronavirus patients per involved private hospital. Yet, till now, there is no clear operational plan for the coordination between private and public hospitals including surge capacities

There is lack of clear enforcement of infectious disease Law issued in 1957 with regards to authority, responsibility and coordination of different sectors including reinforcement of mandatory isolation and engagement of private sector, civil society groups and municipalities in the outbreak response including financial coverage. Law 1957 stated government responsibilities with regards to reinforcement of mandatory isolation, contact tracing and coordination with private and civil society in times of outbreak; the law also emphasized the role of health providers in terms of timely reporting of cases to the authorities (The Legal Agenda, 2020).

#### *Limited availability of needed supplies and equipment*

Regarding the availability of care requirements, it is estimated that there exists 500 mechanical ventilators in Lebanon, of which around 20% out of order. Since machine spare parts have not been listed as essential supplies, they were not prioritized in the financial coverage similar to medications and vital supplies (LBCI, 2020). The supply and distribution of mechanical ventilators is of paramount importance in health emergencies; one study conducted in China on 1099 patients diagnosed with COVID-19, 5.0% were admitted to the ICU, and 2.3% underwent invasive mechanical ventilation (Guan et al, 2020). As for facemasks and other personal protective equipment (PPE), and with increased worldwide demand, local supplies were exported, making no considerations to local needs and leaving the market with diminished stocks possibly incapable of outlasting the crisis. In response, the Minister of Commerce issued on February 22, 2020 a decision banning export of all PPE (MOI, 2020). This decision was not made until the first coronavirus case in Lebanon was declared.

Lebanon has a total of 12,555 beds, including 2,026 beds in Intensive Care Units (Annahar, 2020b). Other much-needed data, such as the availability and distribution of health care providers, the availability of infection control programs, referral pathways, hospital disaster preparedness, is not readily available.

The above situation is exacerbated by the worsening economic situation in Lebanon by the end of 2019 and early 2020, with serious impacts on the Lebanese health system especially in terms of shortage of medical supplies right before the spread of COVID-19. Even before this outbreak, medical suppliers in Lebanon were unable to import the products they need due to a shortage of U.S dollars in the Lebanese market (Joles, 2020).

Dealing with a pandemic with limited containment measures, and extrapolating from other countries' experience where numbers of cases exponentially increased in a matter of days, it remains unclear the ability of the available hospitals with their current preparation to respond. The biggest fear would be that the number of seriously ill exceeds local hospitalization and ICU capacities, similar to what happened in China (Li et al, 2020) and Italy (The Atlantic, 2020), leaving healthcare workers faced with drastic decisions.

**Table 1 Overview of Key Health System indicators in Lebanon**

<b>Variables</b>	<b>Value</b>
<b>Current expenditure on health (% of GDP)- (2017)</b>	7.7%
<b>Total MoPH budget for 2018 ('000 LBP)</b>	728, 849, 074
<b>MoPH Itemized budget for 2018 (% of total MoPH budget):</b>	
• Hospitalization in Public and private hospitals	63.8%
• Public hospitals	1.8 %
• Drugs	21.7%
• Contribution to NGOs	3.7%
• Salaries and Other Employees Benefits	5.1%
• Other expenses	3.6%
• Part 2	0.3%
<b>% MOPH budget out of Total Government Budget (with debt)</b>	3.05%
<b>% MOPH budget out of Total Government Budget (without debt)</b>	4.65%
<b>Major financing entity</b>	Private sector (71%)
<b>Number of beds</b>	12, 555
<b>Average hospital occupancy bed</b>	55-70%

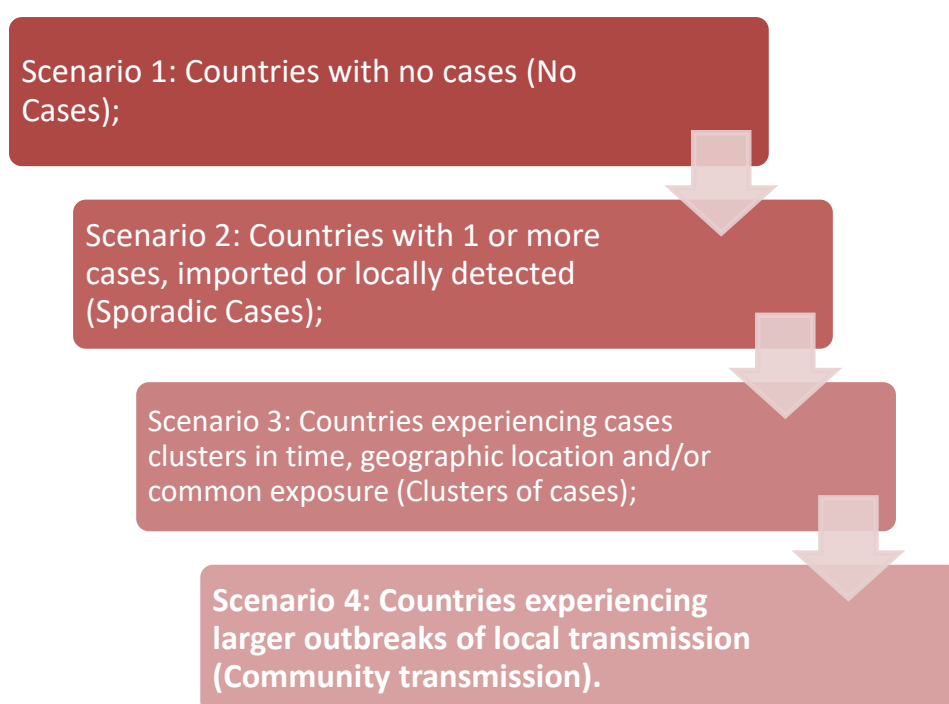


<b>% of beds in public hospitals</b>	Around 15%
<b>Number of ICU beds</b>	2026
<b>Number of ventilators</b>	500 (10% are not operating)

Sources: (LBCI, 2020; MoPH, 2020; Statistical Bulletin, 2018; Lerberghe et al, 2018; MoPH 2017)

## Consequences of delayed response

WHO has defined four transmission scenarios for COVID-19 (WHO, 2019):



In Lebanon, the recently adopted measures may not have come in time to prevent the surge of cases. If the government and the general public do not step up and demonstrate high level of commitments to strict containment measures with strong enforcement mechanisms in place, Scenario 4 is inevitable, if not already there.

In case of an outbreak and based on the current available epidemiological data in Lebanon, the following is estimated (MoPH, 2020): for a population of 6 million, approximately 600 thousand persons (10%) will contract symptomatic infection, over a period of 2-3 months. Of these cases, 90,000 (15%) will seek healthcare, out of which 18,000 (20%) would require hospital admission and 2,700 (3%) would be admitted to the intensive care unit. These numbers exceed

local hospitalization beds (N=12, 555) and ICU capacities (ICU beds (N=2026); ventilators (N=500)) (MoPH, 2018). The death toll is estimated at a maximum of 1,800, 2% of those seeking healthcare (figure 3).

The outcomes of such scenario may vary depending on the readiness of a country. Data from the Chinese Center for Disease Control and Prevention indicate that 13.8% of cases had a severe condition requiring hospitalization, and 4.7% were critically ill requiring Intensive Care Unit (ICU) (Epidemiology Team, 2020). In Italy, the percentage of patients admitted to intensive care units reported daily from March 1 to March 11 2020, was consistently between 9% and 11% of actively infected patients (Remuzzi et al 2020). Countries that are prepared and act swiftly will likely experience a fatality rate of less than 1% (such as in South Korea, Singapore) whereas countries that are overwhelmed will likely suffer from a fatality rate of ~3%-6% (such as in Wuhan and Italy) (Wilder-Smith, Chiew and Lee, 2020; Remuzzi; Liew et al, 2020; Strother, 2020).

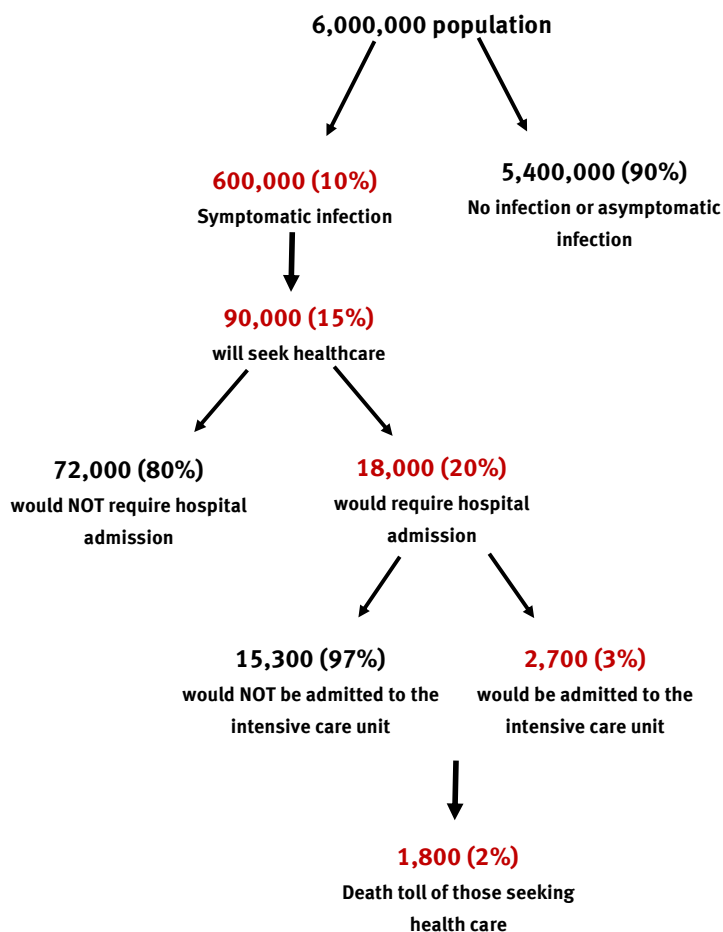


Figure 3: **Application of Scenario 4 to Lebanon**

If the outbreak is not contained in a timely manner, the Lebanese health system will be overwhelmed; patients with coronavirus or other urgent medical conditions will not receive their needed care, and a substantial number of unnecessary deaths will become inevitable (Figure 4) (Fisher & Heymann, 2020). This may also put healthcare providers in serious ethical dilemmas. For instance, in Italy where the system's capacity to respond to changing circumstances has been under enormous pressure, intensive care specialists are already considering denying life-saving care to the sickest when deciding who to provide ventilation to and giving priority to patients most likely to survive (Remuzzi et al 2020).

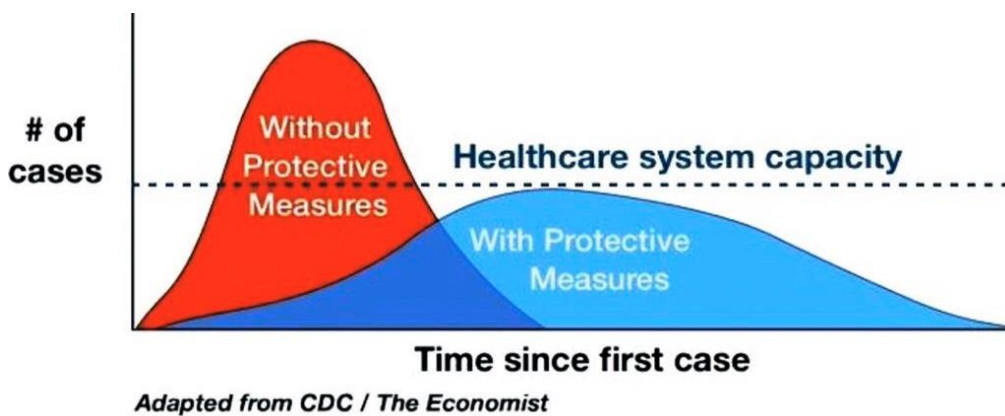


Figure 4 **Healthcare system capacity with and without protective measures** (CDC/The Economist, 2020)

In practice, the health care system cannot sustain an uncontrolled outbreak, and stronger containment measures are now the only realistic option to avoid the total collapse of the health system (Grasselli, Pesenti, & Cecconi, 2020). In the absence of vaccines and specific treatment, significant efforts should be invested in stricter containment of COVID-19 at the moment. The only available public health tools to control person-to-person transmittable diseases are isolation and quarantine, social distancing, and community containment measures (Wilder Smith 2020). In case it is no longer feasible to identify all infectious individuals and their contacts in the attempt to slow the spread of disease, a next step is to apply community-wide containment measures which ranges from encouraging personal responsibility to identifying disease, increasing social distancing among community members and finally implementing community quarantine (Wilder-Smith 2020). To ensure compliance with such measures, there is a critical need for strong enforcement mechanisms with punitive measures for non-compliance (Wang 2020; Wong 2020; Heijmans, 2020).

The adoption of such measures will help in delaying the onset of widespread community transmission, reducing peak incidence and its impact on public services, and decreasing the overall attack rate, slowing down spread until effective vaccines become available.

### **Economic implication**

The world is likely to lose up to US\$ 1.1 trillion as a direct impact of the coronavirus pandemic (Oxford Economics, 2020) while China is expected to lose up to \$62 billion in the first quarter of the year (Ayittey et al., 2020).

Social distancing measures being implemented to contain and mitigate corona spread will have economic downturn on countries: reduction of people's full ability to work, supply chain disruptions, and financial losses associated with closure of businesses. However, failure to contain the epidemic will only exacerbate the situation as it would push governments to take more drastic measures which will further disrupt the economy (Maffioli, 2020). In Lebanon, the spread of the coronavirus has coincided with political turmoil and an economic recession that has worsened since October 2019 (Joles, 2020).

Given the economic implication, governments have a strong prima facie obligation to compensate individuals who suffer non-trivial financial or non-financial losses as a result of being the subjects of targeted public health interventions aimed at controlling the spread of infectious diseases. They also have an obligation to put in place regulation aimed at minimizing such losses (e.g. by protecting the employment of people in isolation, quarantine or complying with social distancing advice) (Holm, 2020). Governments in Singapore, Taiwan and Hong Kong have provided financial/social assistance schemes for vulnerable groups (poor, unemployed, refugees, elderly) and sectors affected by social distancing measures. In Singapore, government provided financial support for people who are isolated: self-employed workers have been offered \$100 per day, and people who are not able to remain isolated at home can stay in a government facility. In Taiwan, Ministry of Labor provided financial assistance to workers furloughed due to COVID-19 ((USD \$630 a month in subsidies) (see Annex I).

## **What Other Countries are doing**

With the number of new reported cases of infection declining or being contained in certain countries (e.g. China, Taiwan, Singapore, Hong Kong, South Korea) but soaring in others (Italy and Iran), it is worth highlighting the experiences and strategies of countries to see what can be learned (Fisher & Heymann, 2020;

Liew et al 2020; Wong et al, 2020; World Economic Forum, 2020; Wang et al, 2020; Lee et al, 2020; Sui 2020; Cowling and Lim, 2020; Carinci F. 2020; Porcheddu et al. 2020; Remuzzi A & Remuzzi G, 2020; Alaei K & Alaei A 2020; Rezaian J. 2020).

Annex I provides a detailed overview of the key measures adopted by the following 7 countries: China, Taiwan, Singapore, Hong Kong, South Korea, Italy and Iran. In countries that seem to have contained the spread, the response has been swift, proactive, transparent, and data driven with seemingly broad societal buy-in while the public health system has managed to cope with a surge in cases. Governments were proactive in recognizing the crisis and have implemented a combination of measures to: a) reduce the importation of new cases into the community (travel restrictions), b) prevent possible transmission between affected individuals and the local population (quarantine) and, c) suppress asymptomatic transmission in the community by reducing contact between individuals (social distancing, self-isolation, heightened hygiene).

Importantly, these countries were better equipped to face an outbreak, given they were exposed to previous SARS outbreak of 2002-3, and have internalized the lessons from that experience. This allowed them to develop testing capacity for new viruses as well as expand hospitals' ability to handle patients with novel respiratory pathogens. At the individual level, the experience has prepared people to voluntarily display a tremendous amount of self-discipline.

Overview of measures adopted by countries with more successful outcomes in controlling the epidemic (see Annex I for details):

- .....> Being alert and proactive in realizing the crisis by initiating screening and testing before actual identification of cases
- .....> Organizing cross-departmental government emergency responses
- .....> Taking quick and decisive actions to impose travel restrictions and protect borders
- .....> Extensive and aggressive contact tracing and mandatory quarantine with punitive measures for non-compliance
- .....> Leveraging big data and technology for case identification and containment
- .....> Practicing high level of openness and transparency early on in relation to infected, suspected, under treatment and deaths (and on a daily basis)
- .....> Educating the public on the risks and necessary precautionary measures, and getting their buy-in and commitment
- .....> Strict social distancing measures (school closures, banning of public gathering, working from home)

- .....➤ Preparedness of healthcare facilities (protocols to follow, availability of supplies and equipment, isolation rooms)
- .....➤ Financial compensation/support for vulnerable groups and sectors affected by social distancing measures (including regulation aimed at minimizing losses)

Overview of measures adopted by countries with less successful outcomes in controlling the epidemic (see Annex I for details):

- .....➤ Delay in acknowledging the magnitude of the disease.
- .....➤ Being reactive instead of proactive as measures weren't taken until after the number of cases increased
- .....➤ Delay in taking appropriate measures such as travel bans, quarantine of infected regions, closure of schools and universities and other crowded spaces such as touristic sites in Italy and religious sites in Iran.
- .....➤ Slow response to the outbreak due to political reasons
- .....➤ Delay in taking precautions at the health facilities levels leading to wide infection among health care workers.
- .....➤ Incautious individual behavior due to the lack of information provided and measures taken by the government

# Roadmap for action

Effective prevention and control of COVID19 relies on implementing a comprehensive and cross-sectoral roadmap for action to COVID-19 that involves public, private sector and civil society sectors. The roadmap has been developed in alignment with the strategy of the Ministry of Public Health, the World Health Organization and International best practices.

Measures are to be implemented according to the following pillars:

## **National-level coordination, planning and monitoring**

- Provide the government with a list of healthcare experts, local leaders and global experts to support the government in addressing COVID-19 in the country (Gates, 2020) including municipalities
- Establish a national COVID-19 management team from multi-sectoral and inter-professional specialists (Patel, Jernigan, & nCo, 2020)
- Gain political support to implement COVID-19 prevention and control measures to adequately contain the virus from transmission (Wilder-Smith, Chiew, & Lee, 2020)
- Assess country readiness and capacity to caring for COVID-19 cases including, number of ICU beds, number of ventilators and availability of medical equipment and personal protective equipment (CDC, 2020a)
- Establish collaborations among facilities (public and private sector) and between facilities and the Ministry of Public Health (CDC, 2020c)
- Designate specific hospitals for COVID-19 care (Huh, Shin, & Peck, 2020)
- Develop a plan to surge the capacity of hospitals especially in terms of increasing the intensive care units (ICU) bed capacity (though transforming general units to ICU) (Arabi, Murthy, & Webb, 2020)-
- Initiate public health emergency response at the level of early detection (including identifying false negative cases), early isolation and early treatment (Fang, Nie, & Penny, 2020)
- Monitor and evaluate the efficacy of interventions to prevent and control COVID-19 (Lee, 2020)

*Recommendations were identified using a systematic search strategy*

*The search strategy yielded 1294 articles of which 67 were relevant to the topic and 32 articles were integrated*

*Reports from WHO, CDC and other health authorities were utilized to inform the development of the recommendations*

## Community-level and organizational-level initiatives

- Implement social distancing measures such as reducing mass gatherings, limiting inter-school interaction (delaying school resumption), considering e-learning methods, consider work-from-home (CDC, 2020b; Kickbusch & Leung, 2020)
- Limit non-essential work travel (CDC, 2020b)
- Develop effective collaboration between clinicians, infectious disease specialists, laboratories, and health authorities to implement COVID-19 control measures at national and sub-national levels including early detection, isolation and care (Bernard Stoecklin et al., 2020; Binnicker, 2020; Mattiuzzi & Lippi, 2020)]
- Decrease human-to-human transmission of virus by implementing social isolation measures and home quarantine for those at mild to high risk of exposure (Bernard Stoecklin et al., 2020)
- Practice extra precaution for personnel in various occupations including workers in retail stores selling health products, domestic workers of confirmed COVID-19 cases, tour guides, jewelry store workers selling tourists, multinational companies with employees that attend international business meetings regularly, taxi drivers and private care drivers, security officers of quarantined people, casino workers and construction site workers (Koh, 2020)

*The measures to prevent and contain COVID19 are multi-sectoral. The delineation and clarity of the role and responsibility of the various sectors is critical to ensure each sector effectively implements the measures to overcome the outbreak (Annex II)*

## Healthcare facility-level initiatives and case management

- Separate COVID-19 triage area from regular emergency department area / develop designated areas for COVID-19 examination and care (Cao et al., 2020)
- Match expansion of healthcare facilities with sufficient staff to provide appropriate quality of care and staff/patient safety (Ling, Joynt, Lipman, Constantin, & Joannes-Boyau, 2020)
- Re-allocate health-human workforce to the emergency room departments and/or COVID-19 management areas from other departments (Cao et al., 2020)
- Staff protection by asking staff to stay home if have respiratory symptoms and conducting COVID-19 tests when needed (Arabi et al., 2020; Klompas, 2020)



- .....> Postpone non-urgent appointment and operations in hospitals (Cao et al., 2020; Pan et al., 2020)
- .....> Provide comprehensive care for critically-ill COVID-19 patients that include antiviral therapy, respiratory support, circulatory support, immunity enhancement (Fang et al., 2020)
- .....> Strengthen primary healthcare systems to utilize the centers as community outreach support (Gates, 2020)
- .....> Set up a core team in hospitals that includes hospital management, infection control team member, infectious diseases expert and intensive care unit and emergency department specialists (The Lancet, 2020)
- .....> Implement strict measures in hospitals, which include developing signage at entrances to direct COVID-19 suspected cases, informing visitors and staff of respiratory and hand hygiene, daily cleaning and disinfection of environment (Wang et al., 2020)
- .....> Implement prioritization of treatment for patient with or at risk of severe illness (WHO, 2020)
- .....> Disseminate self-care guidance for patients with mild diseases to be implemented at home with self-isolation measures (WHO, 2020)
- .....> Identify equipped teams and ambulances to refer and transport patients with COVID-19 (WHO, 2020)
- .....> Implement clear referral channels to hospitals that are treating COVID-19 patients (Assistant Secretary for Preparedness and Response, 2020)
- .....> Implement infection prevention and control standards from the hospital accreditation to reduce COVID-19 transmission within the hospital (patient-to-patient or patient-to-staff or staff-to-patient) or from the hospital to the community, improve staff knowledge on infection prevention and control and support hospitals in responding to the outbreak. Infection prevention and control need to be implemented at administrative and clinical levels (MOPH, 2019)
- .....> Implement infection control measures in primary healthcare centers to prevent transmission of COVID-19 in the centers to other community members and/or healthcare workers (Gates, 2020)
- .....> Develop policies and procedures for outbreak management, a committee or team to support infection prevention and control, a plan to manage and address infection prevention and control and manage the outbreak and a surveillance system for early warning and monitoring in healthcare facilities (MOPH, 2019)

- Train medical and non-medical staff in hospitals, primary healthcare centers and social development centers on a regular basis on most up to date infection control measures including infection prevention and control, PPE measures, perform self-isolation if they were exposed and safe triage measures (Arabi et al., 2020; Xuejiao Chen, Tian, Li, & Li, 2020; Huh et al., 2020; MOPH, 2019; Zhou et al, 2020)
- Proper handling of specimens, mobile healthcare equipment, laundry and waste, safe and effective cleaning and disinfecting, proper hand hygiene (for staff, patients and visitors) and adequate communication of COVID-19 internally and externally on the outbreak (MOPH, 2019).
- Triage:
  - Equip triage area with personal protective equipment (Cao et al., 2020)
  - Implement rapid and safe triage processes
- Isolation precautions:
  - Isolate patients in designated areas preferably in a separate building from other hospital facility, separate patient flow/movement including elevators, CT scans or X-rays, airborne isolation rooms (i.e. negative pressure rooms) (Huh et al., 2020)
  - Patients waiting for their test results should wait in an isolation room until test results are out (Pan, Wang, & Huang, 2020)
  - Implement strict isolation precautions in ICU (Arabi et al., 2020)
- Medical staff should wear protective equipment during the screening process and implement rigorous hand washing (Pan et al., 2020)
- Collect medical waste generated into double-layer infectious waste bag, which should be treated with chlorine-containing preparation for at least 10 min before disposing of as infectious medical waste (Wang et al., 2020)
- Implement adequate infection prevention and control measures for specimen collection and transportation (Huh et al., 2020)
- Implement contact, droplet and airborne precautions when performing aerosol-generating procedures (Arabi et al., 2020)
- Implement infection prevention and control measures from manufacturers to frontline staff for the supply of equipment and medication (Arabi et al., 2020)
- Restrict visitors in healthcare facilities (i.e. 1 visitor per day) to minimize transmission (CDC, 2020b)

- Provide financial and non-financial support of healthcare providers to improve morale and strengthen resilience to healthcare providers to improve morale
- Provide mental health support to people and health workers in need (Xiang et al., 2020):
  - Deliver mental health support to people and health workers through multidisciplinary mental health teams established by health authorities at regional and national levels (including psychiatrists, psychiatric nurses, clinical psychologists, and other mental health workers). Specialized psychiatric treatments and appropriate mental health services and facilities should be provided for patients with comorbid mental disorders.
  - Provide clear communication with regular and accurate updates about the 2019-nCoV outbreak to both health workers and people in order to address their sense of uncertainty and fear. Treatment plans, progress reports, and health status updates should be given to both patients and their families.
  - Set up secure services to provide psychological counselling using electronic devices and applications (such as smartphones and WeChat) for affected patients, as well as their families and members of the public. Using safe communication channels between patients and families, such as smartphone communication and WeChat, should be encouraged to decrease isolation.
  - Ensure suspected and diagnosed patients with 2019-nCoV pneumonia as well as health professionals working in hospitals caring for infected patients receive regular clinical screening for depression, anxiety, and suicidality by mental health workers.

### **Information Sharing**

- Provide transparent and accurate information to the public on number of infected, suspected, under treatment and deaths on a daily basis (Xinguang Chen & Yu, 2020; Sohrabi et al., 2020)
- Provide public education through media outlets, social media, WhatsApp on hand hygiene, cough and sneezing etiquette, voluntary home isolation, proper utilization of facemasks, and social distancing (Huh et al., 2020; Qing et al., 2020)
- Provide accurate knowledge and information to clarify misinformation provided to public (Lai, Shih, Ko, Tang, & Hsueh, 2020)
- Restrict travel to level three and level two areas with high rates of COVID-19 active cases (Patel et al., 2020; Sohrabi et al., 2020)

- ..... Provide platform/system and/or build on two-way channels such as social media and media outlets to identify and respond to concerns and misinformation (WHO, 2020)
- ..... Work with trusted local influencers and networks (religious, healthcare, community influencers and networks) to ensure effective communication (WHO, 2020)

### **Surveillance and case investigation**

- ..... Develop extensive surveillance systems that will support the extraction of updated and timely data to inform decision-making (Bernard Stoecklin et al., 2020)
- ..... Implement COVID-19 confirmed cases contact tracing, surveillance and identification (Bernard Stoecklin et al., 2020; Xinguang Chen & Yu, 2020; Hellewell et al., 2020)
- ..... Assess gaps in the surveillance system and revise the surveillance system accordingly (WHO, 2020)

### **Travel and Entry**

- ..... Couple travel restrictions with reduction of community transmission to increase effectivity of COVID-19 control measures (Chinazzi et al., 2020)
- ..... Combine airport screening for incoming passengers on fever, cough and shortness of breath with detailed contact tracing information and direct isolation when needed (Jernigan & Team, 2020; WHO, 2020). Airport screening alone is estimated to detect only 46% of infected travellers (Quilty et al., 2020).
- ..... Disseminate information on COVID-19 to travelers such as information on protection measures and provide staff with training to manage ill passengers (WHO, 2020)

### **Specimen testing and laboratories**

- ..... Expand testing of COVID-19 to several laboratories to respond to high demands of testing (Bernard Stoecklin et al., 2020)
- ..... Adopt standardized procedures to collect, manage and transport specimens and report test results without breaching patient confidentiality and privacy (WHO, 2020)
- ..... Implement strict infection prevention and control measures in laboratories to prevent transmission of COVID-19 (WHO, 2020)
- ..... Ensure availability of primers, probes, positive controls, and personnel (Reusken et al, 2020)

### **Operational logistics and financing (including financial/social assistance schemes for vulnerable groups and sectors)**

- .....> Identify and leverage on funding to support the response to COVID-19 and support hospital preparedness to respond to COVID-19 (CDC, 2020a)
- .....> Assess available resources and supplies (ventilators, personal protective equipment (Zhou et al, 2020), medication, ambulances, beds, isolation rooms) and develop in-country inventory
- .....> Ensure availability of sufficient medical supplies, which include masks, protective suits and COVID-19 test kits (Fang et al., 2020)
- .....> Allocate funds to preventing and controlling COVID-19 by engage with local and international donors to allocate resources and capacities to implement measures (Pan et al., 2020)
- .....> Encourage scientific research on COVID-19 especially in relation to lessons learned (Pan et al., 2020)
- .....> Regulate the prices of essential supplies and products
- .....> Provide financial/social assistance schemes for vulnerable groups and sectors affected by social distancing measures and put in place regulation aimed at minimizing losses (Holm; 2020; Wong, 2020).

## **Re-imagining Lebanon’s Public Health System and preparedness response**

The world is witnessing the worst public health crisis in recent history, exposing deficiencies in public health systems and pandemic preparedness response.

COVID-19 experience is an opportunity to re-imagine Lebanon’s public health system and preparedness response by reshaping efforts and making the right investment at the public health sector level, broader health system level, country-wide level, and globally.

*At public health sector level:*

National public health capabilities and infrastructures remain at the core of global health security, because they are the first line of defense in infectious

disease emergencies (Smith, 2020). The COVID-19 epidemic revealed the fragility of Lebanon's system and the re-enforced the need to scale-up national public health capabilities and infrastructures, including disease surveillance systems and laboratory networks, as well as human capacity (e.g., training in surveillance, epidemic response, and diagnostic testing).

To ensure a more proactive and swift response facing epidemic, Lebanon must revitalize its public health sector and preparedness by:

- Increased investment in public hospitals and primary healthcare center
- Setting clear plan including rule of engagement with private sector and municipalities to better respond to needs of the population
- Construction of state-of-the-art public health laboratory capacity
- Significant expansion in number of negative-pressure isolation beds throughout public hospital system;
- Designation of areas for quarantine
- Stockpiling of personal protective equipment (PPE) and masks as well as supplies (e.g. respirators)
- Establishment of formal platforms for multi-Ministry and cross-agency coordination;
- Development of a strong capability to perform contact tracing quickly and at scale;
- Building expertise in infectious diseases
- Advancement of data and analytics capabilities

*At broader healthcare system level:*

- Prioritize public health and preventive care: The Lebanese healthcare system is predominantly a curative care system that reacts to people being sick. We must re-orient health system to public health and preventive care that pro-actively keep people well. Preventive and primary care services can cut the global burden of disease by 70%; moreover, 90% of health needs are met by primary care (World Bank).
- Institutionalize evidence and data-informed decision-making and practice: For health systems to serve the population needs in an effective, efficient and equitable manner, the role of data and evidence should be placed at the heart of policymaking processes. Poorly-informed decision-making is one of the reasons why policies and programs fail to meet their intended objectives, why health indicators

are off-track and why countries are unlikely to reach their health targets (Oxman et al, 2009).

- ..... Engage citizen and civil society groups as partners in decision-making: Citizens and civil society participation must be anchored systematically in health systems strengthening efforts to enable more responsive and socially-grounded decisions and services.
- ..... Promote accountability and transparency at all levels of the health system- from interactions at frontline of service delivery to governmental institutions and the unchecked power of corporations and suppliers for more effective, trust-worthy and efficient health system.

#### *At country-wide level:*

Based on the accumulated evidence in the management of epidemics and pandemics and the recent unfavorable global experience of the coronavirus pandemic, accommodating a country-level response to an emerging epidemic becomes a necessity for all country.

The breadth of evidence available on epidemic preparedness and control should direct the details of any epidemic preparedness plan. Extensive evidence, through systematic reviews and single studies, have demonstrated effectiveness of interventions such as travel restriction (Mateus et al, 2014), school closures (Jackson et al, 2014), resource allocation (Timbie et al, 2013), stockpiling (Lugner & Postma, 2009), disease surveillance networks (Wang, Xie, & Fang, 2012), vaccination and quarantine (Pasquini-Descomps, Brender, & Maradan, 2017) in contributing to epidemic control and containment.

The Epidemic Preparedness Index (EPI) was developed to assess a country's capacity to detect and respond to infectious disease events. The EPI which was validated against proxy measures for preparedness in a methodology involving 188 countries, and complements previously designed tools (Oppenheim et al, 2019).

Robust objective and scientific metrics for national-level preparedness are critical for assessing readiness and designing action plans that ensure resilience to epidemic and pandemic outbreaks. Based on the EPI index, the following elements may constitute the cornerstone of such a system (Figure 5).

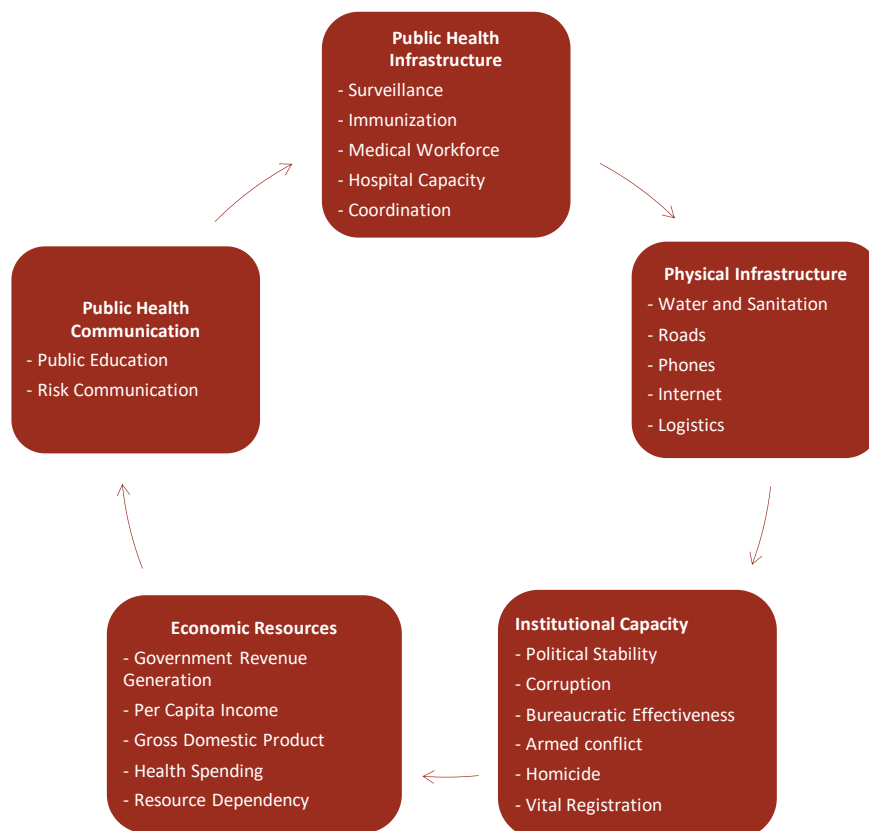


Figure 5 **Framework for National Epidemic Preparedness** (Based on the Epidemic Preparedness Index)

*At global level:*

This pandemic re-enforced the importance of redefining global health and promoting better global leadership to coordinate and enforce efforts across countries. While countries might implement some protectionist strategies at the time of pandemic, there is a need for more cooperation, coordination, solidarity and support between countries to effectively control pandemics.



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# Annexes

# Annexes

## Annex I: Overview of selected country experiences

### Overview of measures adopted by countries with more successful outcomes in controlling the epidemic

<b>China</b> (Fisher & Heymann, 2020; Chen & Yu, 2020; Deng, & Peng, 2020; WHO, 2020; NHCP, 2020; Wu & McGoogan, 2020; Chen, 2020)	
Context	COVID-19 started in China with the report of a first suspected case on December 8, 2019 in Wuhan which is the capital of Central China’s Hubei province. Since 2003, the Chinese government has been improving its epidemic response capacity which was evident in the early response to COVID-19 and in the success of reducing the case fatality ratio within a month of notifying WHO of the outbreak.
Cases Detected	As of 14 <sup>th</sup> of March, a total of 65,573 cases are recovered from COVID-19 in China; 12,062 are currently infected (with 70% mild in mild condition) and 3,189 deaths were reported. As of January 1 <sup>st</sup> , the reported deaths among total cases decreased from 18% to almost 1% in China as a whole.
Key Measures	<p><i>Be alert and proactive in recognizing the crisis:</i></p> <ul style="list-style-type: none"> <li>→ Jan 20: China officially declared the epidemic as an outbreak</li> <li>→ Jan 24: President Xi Jinping held a special meeting at the Central Chinese Government and decided to implement massive national efforts to curb the epidemic.</li> <li>→ An Anti- COVID-19 Group headed by Premier Li Keqiang was established to lead the massive national efforts.</li> <li>→ Vice Premier Sun Chunlan was sent to Hubei and Wuhan to directly lead the local efforts.</li> <li>→ Jan 26: The Chinese Government initiated a level-1 public health response in 30 provinces to control COVID-19 according to the decision deployment and unified command of the State Council.</li> </ul> <p><i>Extensive travel restrictions</i></p> <ul style="list-style-type: none"> <li>→ Chinese authorities extended travel restrictions to 48 million people in hardest-hit Hubei province, banned inter-province buses to Beijing and canceled tour group travel abroad</li> <li>→ Migrant workers were prevented from returning to work after the extended Chinese New Year Holiday.</li> <li>→ All transportation was subsequently restricted at a national level.</li> </ul> <p><i>Extensive contact tracing and quarantine:</i></p>

- Feb 23: Wuhan City and other cities were locked down. Rigorous efforts were devoted to: 1) Identify the infected and bring them to treatment in hospitals for infectious diseases, 2) Locate and quarantine all those who had contact with the infected, 3) Sterilize environmental pathogens, 3) Promote mask use, and 4) Release to the public of number of infected, suspected, under treatment and deaths on a daily basis.
- People in other cities and provinces who either traveled to or out of Wuhan were quarantined, with suspected patients being diagnosed and treated.
- An estimated 40 million to 60 million residents of Wuhan and 15 others surrounding cities within Hubei Province were subjected to community containment measures.

*Hospital preparedness*

- Identified case patients with COVID-19 were immediately isolated in designated wards in existing hospitals, and 2 new hospitals were rapidly built to isolate and care for the increasing numbers of cases in Wuhan and Hubei.
- Comprehensive medical institutions and some specialized hospitals were prepared to accept COVID-19 patients and ensure that severe and critical cases can be differentiated, diagnosed, and effectively treated in time.

*Extensive measures to encourage social distancing*

- Large gatherings were canceled, including all Lunar New Year celebrations
- Commercial and social activities became negligible, with schools, restaurants, other entertainment spots and most shops closed

*Ensure availability of supplies*

- Feb 25: massive number of detection kits were made available to all locations to test all susceptible patients for final diagnosis.
- The Chinese government ensured the sufficient supply of masks, disinfectants, and other protective articles on the market, and standardized the market order

*Public education*

- Public health surveillance and hygiene knowledge publicity was strengthened, and public places and key groups were monitored.
- The health administration departments, public health departments, and medical institutions at all levels, and social organizations worked on epidemic prevention and control and provided guidance for patients and close contact families for disease prevention

*Financial compensation/support*

- The Chinese government, in accordance with the law, took compulsory measures to restrict all kinds of the congregation, and ensured the supply of living resources

*Use big data and technology for case identification and containment*

	<ul style="list-style-type: none"> <li>→ A risk-based prevention and control approach was adopted for different regions of the country and provinces</li> <li>→ New technologies were applied such as the use of big data and artificial intelligence to strengthen contact tracing and the management of priority populations</li> <li>→ Fever observation rooms were set up at stations, airports, ports, and so on to detect the body temperature of passengers entering and leaving the area and observation/registration for the suspicious patients</li> </ul> <p><i>Learn from previous SARS outbreak</i></p> <ul style="list-style-type: none"> <li>→ In the SARS outbreak, 300 cases and 5 deaths already had occurred by the time China reported the outbreak to the WHO, whereas in the COVID-19 outbreak, only 27 cases and zero deaths had occurred when the WHO was notified.</li> <li>→ From the time of WHO notification, 2 months elapsed before SARS-CoV was identified compared with only 1 week from the time of WHO notification until 2019-nCoV was identified.</li> </ul>
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<b>Singapore</b>	
(Liew et al 2020; Wong et al, 2020; World Economic Forum, 2020; McCurry)	
Context	Singapore is an independent city-state with extensive health care infrastructure and a highly centralized government. It has historically had very strong epidemiological surveillance. It is 3400 km (2125 miles) from Wuhan, but as a major air hub, had an average of 330 000 visitor arrivals from China each month in 2019.
Coronavirus cases detected	As of March 13, 2020, Singapore had 187 cases confirmed and no deaths (for a total population of about 5.7 million), while the recoveries are outpacing the rate of infection.
Key Measures	<p><i>Be alert and proactive in recognizing the crisis:</i></p> <ul style="list-style-type: none"> <li>→ Jan 2: Two days after China informed WHO of a novel viral pneumonia, Singapore’s Ministry of Health alerted all physicians to identify any patient with pneumonia and a recent travel history to Wuhan.</li> <li>→ Jan 3: Singapore started temperature screening at its airport of all travelers arriving from Wuhan for further assessment and isolation</li> <li>→ Jan 9-20: Following the identification of a novel coronavirus as the causative agent on January 9, and confirmation of human transmission to health care workers on January 20, Singapore promptly shifted its public health response level to “enhanced preparedness”.</li> </ul> <p><i>Take quick and decisive actions to protect borders:</i></p> <ul style="list-style-type: none"> <li>→ Jan 23: Cancellation of all inbound flights from Wuhan following the identification of the first imported case</li> </ul>

→ Jan 31: Entry restrictions on people who had traveled to China or parts of South Korea in the preceding 14 days

*Extensive contact tracing and quarantine:*

- Aggressive contact tracing and quarantine of close contacts of confirmed cases (namely persons who had spent a prolonged period within 2 meters of a confirmed case) for 14 days from last exposure.
- Travelers coming from affected areas were placed under mandatory quarantine; three university hostels were promptly converted into facilities to host them.
- Punitive measures for those who disobey mandated quarantines, including charging those who falsify information on their travel history and taking away residency status for those who breach their quarantine. Those who do not stay home can expect a fine of up to \$10,000 or up to six months in prison

*Financial compensation/support*

- Government compensated individuals and employers for any workdays lost due to requirements for quarantine
- There is some financial support for people who are isolated: self-employed workers have been offered \$100 per day, and people who are not able to remain isolated at home can stay in a government facility.

*Extensive measures to encourage social distancing*

- Suspension of large gathering
- Schools and workplaces have remained open to minimize social and economic costs; however, students and staff are subjected to daily health checks, including temperature screenings (early implementation of other protective measures made this option possible)

*Standard health care protocols:*

- All healthcare institutions adopted a common strategy of containment, with isolation of all suspected or confirmed cases of COVID-19 in negative-pressure rooms. Most ICU beds were single rooms—this infrastructure was put in place following the outbreak of SARS in 2003.

*Support to frontline providers:*

- Prime minister and the cabinetmaking are making special efforts to visit frontline healthcare workers caring for COVID-19 patients to personally hear the challenges they encounter and to offer support knowing the tremendous stress they are going through.

*Public education:*

	<ul style="list-style-type: none"> <li>→ Utilization of print, broadcast, websites, and social messaging platforms such as WhatsApp, Twitter, Telegram, and Facebook to send out daily briefings on cases updates</li> <li>→ Active engagement of many specific groups ranging from health care professionals to taxi drivers (social media and town hall meetings)</li> </ul> <p><i>Learn from previous outbreaks (SARS)</i></p> <p>Since its experience with the SARS outbreak in 2003 (when 238 people were infected, including several health care professionals, and 33 patients died), Singapore has been systematically strengthening its ability to manage another emerging infectious disease outbreak:</p> <ul style="list-style-type: none"> <li>→ Construction of a new purpose-built National Centre for Infectious Diseases and National Public Health Laboratory;</li> <li>→ Significant expansion in the number of negative-pressure isolation beds throughout the public hospital system;</li> <li>→ Stockpiling of personal protective equipment and masks;</li> <li>→ Establishment of formal platforms for multi-Ministry and cross-agency coordination;</li> <li>→ Development of a strong capability to perform contact tracing quickly and at scale;</li> <li>→ Training of health professionals including in the correct use of PPE;</li> <li>→ Building more biosafety level 3 laboratories.</li> <li>→ Building expertise in infectious diseases</li> </ul>
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	<p><b>Taiwan</b></p> <p>(Wang et al, 2020; Lee et al, 2020; Sui 2020; Cowling and Lim, 2020)</p>
Context	<p>Taiwan is just 81 miles off and a short flight away from mainland China and was expected to have the second highest number of cases of coronavirus disease due to its proximity to and number of flights between China.</p> <p>Taiwan’s health insurance system covers 99% of the population</p>
Cases Detected	<p>As of March, 13 2020, Taiwan has had only had 50 confirmed cases including 1 death (for a total population of about 23.6 million) —the lowest incidence rate per capita — around 1 in every 500,000 people</p>
Key Measures	<p><i>Be alert and proactive in recognizing the crisis:</i></p> <ul style="list-style-type: none"> <li>→ Dec 31: The same day China notified the WHO that it had several cases of an unknown pneumonia, Taiwan’s Centers for Disease Control immediately ordered inspections of passengers arriving on flights from Wuhan for fever and pneumonia symptoms before passengers could deplane.</li> </ul>

- Jan 5: Expansion of notification to include any individual who had traveled to Wuhan in the past 14 days and had a fever or symptoms of upper respiratory tract infection at the point of entry; passengers displaying symptoms of fever and coughing were quarantined at home and assessed whether medical attention at a hospital was necessary. All this happened long before Taiwan confirmed its first case on January 21

*Activate a national command center for concerted efforts:*

- Jan 20: Taiwan's CDC activated the Central Epidemic Command Center (CECC) which allowed it to quickly roll out a series of epidemic control measures.
- CECC coordinated efforts by various ministries, including the ministries of health, transportation, economics, labor, and education and the Environmental Protection Administration, among others, in a comprehensive effort to counteract the emerging public health crisis. The Command center not only investigates confirmed and suspected cases, but also works with ministries and local governments to coordinate the response across Taiwan, including allocating funds, mobilizing personnel and advising on the disinfection of schools and public places.
- CECC coordinated with the Environmental Protection Administration, the Ministry of Education, Ministry of Transportation and Communications, and local environmental protection departments to disinfect public spaces around schools and universities and set cleaning standards for school buses, Taiwan High Speed Rail, Taiwan Railways, tour buses, and taxis

*Take quick and decisive actions to control border from the air and sea*

- Jan 26: Five days after it confirmed its first case, Taiwan banned arrivals from Wuhan, earlier than any other country. Not long after, it did the same for flights from all but a handful of Chinese cities, and only Taiwanese people were allowed to fly in.

*Use big data and technology for case identification and containment*

- Temperature monitors were already set up at airports after the 2003 SARS outbreak to detect anyone with a fever
- Integration of national health insurance database with immigration and customs database to generate real-time alerts during a clinical visit based on travel history and clinical symptoms to aid case identification
- QR code scanning and online reporting of travel history and health symptoms to classify travelers' infectious risks based on flight origin and travel history in past 14 days.
- Mandatory 14-day home quarantine for people coming from highly affected areas, even if they are not reporting symptoms, and tracking them using location sharing on their mobile phone. Tracing of individuals who



confirmed cases had been in contact with, testing them, and putting them in home quarantine.

- To ensure compliance, the government declared that violators of home isolation regulations will be fined up to NT\$300,000 (USD \$10,000); violators of home quarantine regulations will be fined up to NT\$150,000 (USD \$5,000).

#### *Ensure availability of supplies*

- Government invested USD \$6.66 million to purchase equipment and add production lines. Army Reserve troops have aided in mask production across 28 manufacturers
- Government set the price of masks at just 6 cents each
- Banning manufacturers from exporting masks and implementation of a rationing system

#### *Educate the public and get their buy in*

- Government asked television and radio stations to broadcast hourly public service announcements on how the virus is spread how to prevent it and when to wear masks
- Daily press briefings by the minister of health and welfare.
- Practically every office building, school and community sports center check temperatures and prevent anyone with a fever from entering. Apartment buildings also place hand sanitizer inside or outside elevators.
- Organizers of mass events were encouraged to defer or cancel events; some religious institutions suspended services. Elementary schools and high schools would remain closed after the end of the Lunar New Year holidays
- Government announced the spread of fake news on epidemic can be fined up to NT\$3 million (USD \$100,000)

#### *Financial compensation*

- Ministry of Labor to provide financial assistance to workers furloughed due to COVID-19 and receive up to NT\$18,960 a month (USD \$630) in subsidies
- NT\$60 billion (USD \$2 billion) allocated for businesses affected by the epidemic
- Taiwan's health insurance covers tests and medical costs related to coronavirus (including lodging and food cost during isolation period)

#### *Hospital preparedness*

- Introduction of infrared thermal camera scanning at hospital entrances and in the emergency departments to recognize any person (including visitors) with fever at first point of entry.
- Prohibition of individuals having fever and who had a history of traveling to China or Hong Kong/Macau in 14 days prior to symptom onset, or close

	<p>contact with a confirmed COVID-19 case from entering the hospital, instead, directing them to the emergency department for isolation in a negative pressure room or an outdoor quarantine station for evaluation and management</p> <ul style="list-style-type: none"> <li>→ Revising hospital visit policies</li> <li>→ Access control to avoid overcrowding in hospital.</li> <li>→ Timely education and training of hospital staffs including physicians, nurses, laboratory personnel, ambulance paramedics, administrative and other staffs.</li> </ul> <p><i>Learn from previous SARS outbreak</i></p> <ul style="list-style-type: none"> <li>→ Taiwan was able to put the lessons it learned during the SARS outbreak in 2003 was more prepared this time</li> </ul>
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<p><b>South Korea</b></p> <p>(Liew et al 2020; Jeong, 2020; KCDC 2020; Strother 2020)</p>	
Case detected	<p>South Korea, once the largest coronavirus outbreak outside China, has seen its newly recovered patients exceed fresh infections for the first time on March 13, 2020, as it reported its lowest number of new cases for three weeks. Compared to a global case fatality rate of 3-4%, the case fatality rate in South Korea stands at 0.7%</p> <p>For the first time since its outbreak emerged in January, South Korea reported more new recoveries than new infections, a possible start of a downward trend.</p>
Key Measures	<p><i>Proactive response:</i></p> <ul style="list-style-type: none"> <li>→ Early on, government has raised the crisis alerts to the highest level and put the country on "war-like" footing</li> </ul> <p><i>Extensive measures to encourage social distancing</i></p> <ul style="list-style-type: none"> <li>→ Banning of public gatherings in Seoul and complying with social distancing (work from home protocols, extended school and university holidays, and closed schools and universities nationally)</li> </ul> <p><i>Practicing high level of openness and transparency</i></p> <ul style="list-style-type: none"> <li>→ Holding daily press conferences and publishing detailed data on cases, testing and tracking daily (sometimes more frequently).</li> </ul> <p><i>Leveraging big data and technology for tracking cases</i></p>

	<p>→ Government publication of anonymized information about individual confirmed cases in terms of where/when a person was at a given time and sending that via text message to people in the area.</p> <p><i>A very rapid ramp up in testing:</i></p> <p>→ Drive-through testing (including to non-citizens) with text results texted to patients within three days; thermal cameras set up in buildings and public places</p> <p>→ Mandatory self-quarantines for anyone that has come into contact with (defined as 2 meters) of a confirmed carrier. Those who are in self-quarantine are assigned a government case officer who checks in twice a day by phone to track the development of any symptoms, and mobile testing teams are deployed to collect samples if things escalate. The government also rolled out an App that uses GPS to track people in quarantine to make sure they are not breaking their quarantine</p> <p>→ People found positive are placed in self-quarantine and monitored remotely through an app or checked regularly in telephone calls until a hospital bed becomes available. When this occurs, an ambulance picks the person up and takes them to a hospital with air-sealed isolation rooms.</p> <p><i>Hospital measures</i></p> <p>→ Hospitals now take individuals' temperatures at the entrance. They have set up separate screening centers for at-risk patients and have more special wards in place for treating patients with infectious diseases. Doctors check patient databases to see if a patient has visited another medical facility or traveled abroad recently.</p> <p><i>Learning from previous MERS outbreak:</i></p> <p>→ Government took a political beating for a poor response back then and thus was much better prepared including having enhanced legal authorities</p>
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<b>Hong Kong</b>	
(HKSAR Government, 2020; Cheng et al, 2020; Cowling and Lim, 2020)	
Context	Hong Kong shares a border with mainland China, (with an average of 300,000 people crossing the border every day last year. As of March 13, 2020, Hong Kong had 131 confirmed cases including 4 deaths (for a total population of about 7.5 million).
Case detected	As of March 13, 2020, Hong Kong had 131 confirmed cases including 4 deaths (for a total population of about 7.5 million).

<p>Key Measures</p>	<p><i>Be alert and proactive in recognizing the crisis:</i></p> <ul style="list-style-type: none"> <li>→ Jan 3: Very soon after the first declared case in Wuhan, existing temperature-screening stations at ports of entry were expanded, and local clinicians were asked to report to the city’s health authorities any patient with a fever or acute respiratory symptoms and a history of recent travel to Wuhan.</li> </ul> <p><i>Travel restrictions</i></p> <ul style="list-style-type: none"> <li>→ Five days after the first imported case, travel restrictions were placed on visitors from Wuhan and other affected areas and for six of the territory’s 14 border crossings with the mainland to be closed. (Another five crossings were closed later.)</li> </ul> <p><i>Extensive contact tracing and quarantine:</i></p> <ul style="list-style-type: none"> <li>→ Starting Feb 5: anyone coming across the border or arriving from elsewhere who had been in mainland China in the preceding 14 days was required to undergo a mandatory 14-day period of self-quarantine.</li> <li>→ Extensive efforts have been made to track down and quarantine the close contacts of confirmed cases. And in the event transmission might occur before an infected person displayed any symptoms, tracing included all contacts starting two days before the onset of the patient’s illness.</li> <li>→ Of Hong Kong’s 40,000 hospital beds, some 1,000 are negative-pressure beds, allowing confirmed cases to be properly isolated. Holiday camps and newly constructed public-housing units that were still vacant were rapidly repurposed into quarantine facilities.</li> </ul> <p><i>Extensive measures to encourage social distancing</i></p> <ul style="list-style-type: none"> <li>→ Jan 27: Closure of all kindergartens and schools; the decision was extended several times, most recently to at least April 20. Many classes have been conducted online.</li> <li>→ Jan 28: Civil servants were asked to work from home for the following month; large-scale events have been canceled or postponed</li> </ul> <p><i>Public education</i></p> <ul style="list-style-type: none"> <li>→ Government has mounted a public-education campaign to promote hand hygiene and environmental hygiene. Nearly everyone in Hong Kong wears a face mask in public.</li> </ul> <p><i>Financial compensation:</i></p> <ul style="list-style-type: none"> <li>→ Given the huge financial hit by being proactive, the government has agreed to pay out 10,000 HKD to every resident over the age of 18, to ease the economic pain.</li> </ul>
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**Overview of measures adopted by countries with less successful outcomes in controlling the epidemic**

<b>Italy</b>	
(Carinci F. 2020; Porcheddu et al. 2020; Remuzzi A & Remuzzi G, 2020; ECFR 2020; WHO Europe, 2020; O’Leary N. 2020; Belluz J. 2020; Horowitz J. 2020; Parodi E. 2020; Ferraresi M. 2020; Glazer R. 2020)	
Context	Travel-related cases were the main source of COVID-19 in Italy where the first case was detected in 2 Chinese tourists from Wuhan on 30 January, 2020. As of March 13, 2020, the number of COVID-19 confirmed cases in Italy reached 15,113 cases with 1,016 deaths. Italy recorded the highest number of deaths from COVID-19 outside of mainland China. Italy’s fatality rate from COVID-19 (6.7%) is much higher than the global average of 3.4%. Italy reports a 50% increase in confirmed cases on March 1, 2020.
Measures	On March 10, 2020, the Italian government implemented extraordinary measures to limit viral transmission including restricting movement and closing all stores except for pharmacies, groceries and other essential services. The Italian health care system is stretched to its maximum capacity especially in the intensive care that is overloaded. In some instances, doctors are forced to choose which patients to give priority to, following guidelines around life expectancy.
Key weaknesses and gaps in the response	<p><i>Delay in taking stringent measures:</i> Measures did not come in time to prevent the surge of cases that has intensely strained the capacity of a well-regarded health care system. Italy’s experience has underscored the need to act decisively, quickly and early before case numbers reach crisis levels. If drastic measures need to be taken, they are more effective if taken earlier.</p> <p><i>Adopting a reactive instead of a proactive approach:</i> Italy was forced into reaction mode which other countries should avoid. Measures such as closure of schools, universities and crowded sites and travel bans weren’t implemented proactively but as a desperate countermeasure after coronavirus cases spiked.</p> <p><i>Delay in testing suspected cases:</i> There were delays in testing suspected local cases with no previous travel history. Undetected cases contributed to the rise of number of cases and contributed to the infection of health care workers as around 10% of medical workers in Lombardy have</p>

	<p>been infected, and 5% of cases in the country. WHO rapid response team to Italy suggests that hospitals should work on infection prevention and control measures.</p> <p><i>Weak coordination in a decentralized system:</i> There have been communication and coordination problems between the regional and central authorities. The central government has limited access to linked real time data, and there was no formal data flow allowing regions to interconnect the regional and central systems and harmonize preparedness and containment operations.</p> <p><i>Inefficient exchange of data across borders:</i> The Italian experience showed that the accurate and timely information required by health providers, authorities, and researchers to trace contacts and people’s movements, identify high risk cases, and the outbreak’s epidemiological trajectory, was insufficient, even when health information infrastructure is optimal.</p> <p><i>Incautious individuals’ behavior and limited civic responsibilities:</i> Mild measures to enforce social distancing in Italy were widely disregarded by the people who did not take the outbreak as a serious matter.</p> <p><i>Concerns over economic implications:</i> Concern about the economic implications mainly on trade and tourism has contributed to the delay of the government in taking stringent measures.</p> <p><i>Weak preparedness to a surge in demand:</i> The Italian health system was considered as among the best in the world. However, the system had no extra resources to deal with a surge in demand. Italia health care system was working at its maximum capacity.</p>
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<b>Iran</b>	
(De Luce D. 2020; Alaei K & Alaei A 2020; Rezaian J. 2020; Salari E., Dursun A. 2020; Wright R. 2020; BBC 2020)	
Context	The first two cases detected in Iran dated February 19, 2020 after a report of two deaths in Qum. The first victim was an Iranian business man coming back from Wuhan China. As of March 14, 2020, the number of coronavirus confirmed cases in Iran reached 12,729 cases with 611 deaths.
Measures	Iran has one of the best health care systems in the Eastern Mediterranean Region, a decentralized health system with an effective referral system and thousands of medical centers across the country that provide primary, secondary and tertiary care. Yet its failure to take timely measures led to an outbreak of Covid-19 on its territories.
Key weaknesses and gaps in	Slow response: Measures to contain the outbreak such as the closure of religious sites, closure of schools, disinfection of public transportation were taken late. Iran could have reduced

<p>the response</p>	<p>the outbreak if it has quarantined Qum which is a crowded area and was the epicenter of the disease in Iran. The government in Iran was late in acknowledging the magnitude of the crisis. The reason behind this slow response was mainly political (described below).</p> <p>Political considerations As Iran was undergoing elections in February 2020 the authorities might have suppressed the information regarding the coronavirus outbreak in order not to affect the participation in the elections. Politicizing the coronavirus crisis might have undermined the adequate response to address it.</p> <p>Religious considerations Some religious considerations have delayed the response to coronavirus outbreak. Some Iranian officials regarded religious sites as a place to heal diseases and should not be closed.</p> <p>Delay in taking precautions at the health care facilities levels Health care workers including doctors and nurse at the some government hospitals were not alerted to take necessary precautions until the number of cases started to rise sharply.</p> <p>Lack of transparency The Iranian government was accused of distorting the public through not disclosing and sharing information which hampered the public response to the outbreak.</p> <p>Sanctions Some Iranians are blaming the sanctions imposed on Iran in causing shortage in medical supplies and test kits and medical supplies. And due to sanction and poor relations with international community, the Iranian government was reluctant to limit travel from China given its economic and strategic partnership.</p>
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## Annex II: Multi-sectoral role and responsibility to prevent and contain COVID19

ان التصدي الفعال لفيروس الكورونا المستجد لا يتم الا عبر التنسيق الشفاف والتواصل الدائم بين جميع الوزارات والقطاعات وأصحاب المصلحة المعنيين .

وتقع المسؤولية على عاتق كل من :



### وزارة الصحة العامة



- مراقبة وضبط تطبيق خطة الجبوزية
- تدريب العاملين في القطاع الصحي
- التنسيق مع جميع الوزارات المعنية والقطاعات المحلية والدولية
- جمع ومراقبة ومشاركة البيانات
- تقديم القواعد الإرشادية
- دعم القدرة التشغيلية للمؤسسات الصحية العامة

### مجلس الوزراء



تكثيف الجلسات الطارئة لإيجاد الحلول واتخاذ خطوات شاملة

### وزارة الشؤون الاجتماعية



تدريب العاملين في مراكز الشؤون الاجتماعية لوقاية أنفسهم والتصدي للوباء

### وزارة التربية والتعليم العالي



- تفعيل دور المؤسسات التربوية في الوقاية والتوعية
- العمل على نظام إحالة وتصدي فعال

### وزارة الدفاع



- تدريب الجيش للاستعداد الدائم لتنفيذ أي خطة وقائية
- تدريب العاملين في المستشفيات العسكرية
- دعم القدرة التشغيلية للمؤسسات الصحية

### وزارة الاقتصاد وزارة الطاقة والمياه



- منع احتكار السلع الضرورية والأسواق الغذائية
- وقطاع المحروقات

### وزارة الداخلية والبلديات



- حفظ الأمن وضبط الهلع
- تدريب القوى الأمنية للاستعداد الدائم لتنفيذ أي خطة وقائية

### وزارة الاعلام



- تكثيف حملات التوعية لتفادي الهلع
- مراقبة وسائل الاعلام ومكافحة المعلومات الخاطئة
- الحرص على الشفافية في تقديم المعلومات المستجدة

### وزارة النقل



- اتخاذ الإجراءات الوقائية في قطاع النقل العام والمشارك
- العمل على نظام إحالة وتصدي فعال

### وزارة الزراعة



الرصد والتصدي لأي حالات مشتبه بها بين الحيوانات

### الجهات المانحة ووزارة المالية

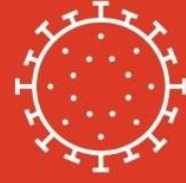


رصد وتأمين الموارد المالية المطلوبة



## ان التصدي الفعال لفيروس الكورونا المستجد لا يتم الا عبر التنسيق الشفاف والتواصل الدائم بين جميع الوزارات والقطاعات وأصحاب المصلحة المعنيين .

وتقع المسؤولية على عاتق كل من :



### الصليب الأحمر



- اتخاذ الإجراءات الوقائية في عملية النقل والاسعاف الأولي وتدريب العاملين
- تفعيل خطة الجهوية والتنسيق مع الجهات المعنية

### القطاع الصحي الخاص



- اتخاذ الإجراءات الوقائية وتدريب العاملين في المؤسسات
- دعم القدرة التشغيلية للمؤسسات
- الحرص على جهوية البنى التحتية وتأمين الموارد المطلوبة

### الجمعيات الدولية



- تقديم الخبرات والموارد المطلوبة
- دعم جهوية القطاع العام

### القطاع الخاص



- اتخاذ الإجراءات الوقائية في أماكن العمل ، وتفادي السفر غير الضروري الى الدول التي تحتوي كورونا
- تقديم تسهيلات للموظفين الذين يحتاجون للعزل الاحترازي
- العمل على نظام إحالة آمن وفعال

### الجمعيات الأهلية



- التنسيق مع مؤسسات الرعاية الصحية
- تفعيل برامج التوعية

### المواطن



- تفادي الهمع
- الالتزام بالارشادات الرسمية والموثوقة لتفادي انتقال الشائعات وانتشار العدوى
- الامتناع عن الوصم والتميز بحق المرضى او المصابين المحتملين
- احترام خصوصية المرضى

### مراكز البحوث والجامعات والمؤسسات المتخصصة



- تقديم الدعم التقني والعلمي للوقاية والكشف والمعالجة على مختلف المستويات
- المشاركة في التنسيق والتشبيك بين مختلف القطاعات

Knowledge to Policy Center draws on an unparalleled breadth of synthesized evidence and context-specific knowledge to impact policy agendas and action. K2P does not restrict itself to research evidence but draws on and integrates multiple types and levels of knowledge to inform policy including grey literature, opinions and expertise of stakeholders.

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