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Adaptive Transformation

COVID-19 Patient Journey

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COVID-19 PATIENT JOURNEY

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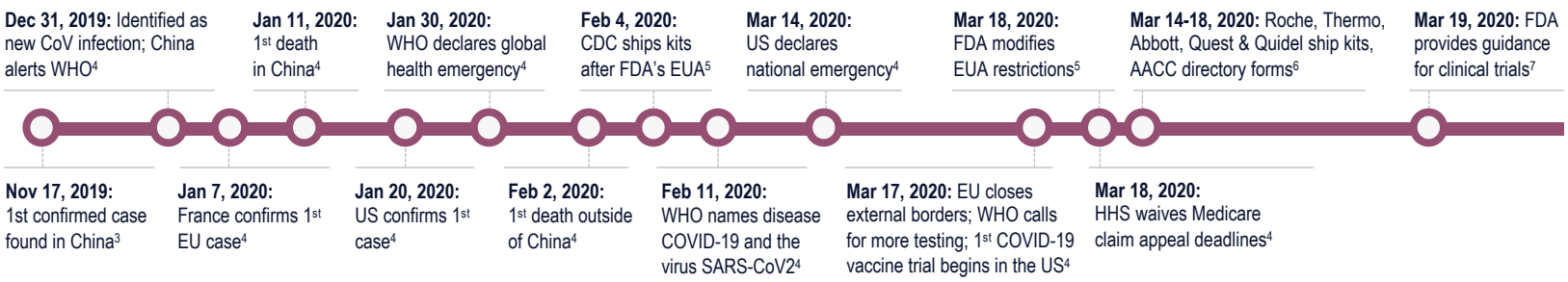
BACKGROUND AND EPIDEMIOLOGY

We developed this patient journey to help us all start to separate the signal from the noise. Coronaviruses (CoVs) are major pathogens that target the human respiratory system.[1] Previous outbreaks of CoVs in the last decade include the severe acute respiratory syndrome (SARS)-CoV and the Middle East respiratory syndrome (MERS)-CoV, previously characterized as agents that are great public health threats.[1]

In late December 2019, a cluster of critically ill patients, epidemiologically linked to a seafood and wet animal wholesale market in Wuhan, Hubei Province, China,[1,2] were admitted to hospitals with an initial diagnosis of pneumonia of unknown cause. The most common symptoms were fever, cough, and fatigue.

The clinical features, e.g. chest scans indicating pneumonia, were similar to infection from other CoVs. Genomic sequence analysis of COVID-19 showed >88% of the same identity as two bat-derived severe acute respiratory syndrome (SARS)-like CoVs.[1] This evidence of bat-origin CoVs indicates that mammals were the link for transmission into humans.[1]

TIMELINE



DIAGNOSIS AND PROGRESSION

Symptoms of COVID-19 disease present after an incubation period of approximately 5 days and are generally mild in young adults.[8] Depending on patients' symptoms and risk factors, they may be triaged to either home monitoring, respiratory screening clinic, or the ER.

Most common symptoms: Fever, cough, and fatigue, which are considered mild.[9]

Emergency warning signs to indicate moderate to severe disease: Difficulty breathing, persistent chest pain or pressure, confusion, or bluish lips.[10]

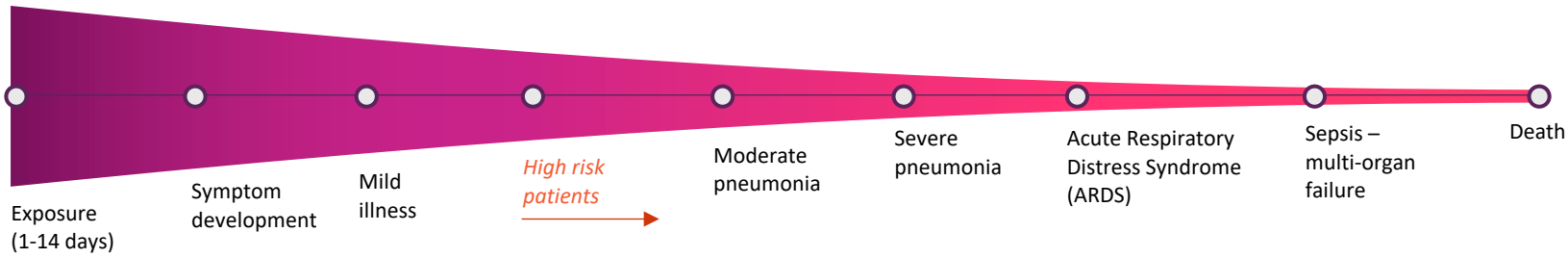
Diagnostic testing: Upper respiratory tract specimens (nasopharyngeal swab) and lower respiratory tract specimens (bronchoalveolar lavage).[11]

Recovery process: More than 80% of the population will experience mild symptoms and can stay home to recover without further testing.[12] People with pre-existing medical conditions (high blood pressure, heart/lung disease, cancer, diabetes) are at risk for developing serious illness. Critically ill patients will develop pneumonia and need to be admitted to the hospital, isolated, and provided antibiotics, antivirals, steroids, and ventilation. Most will recover with proper care.

Complications and mortality rate:

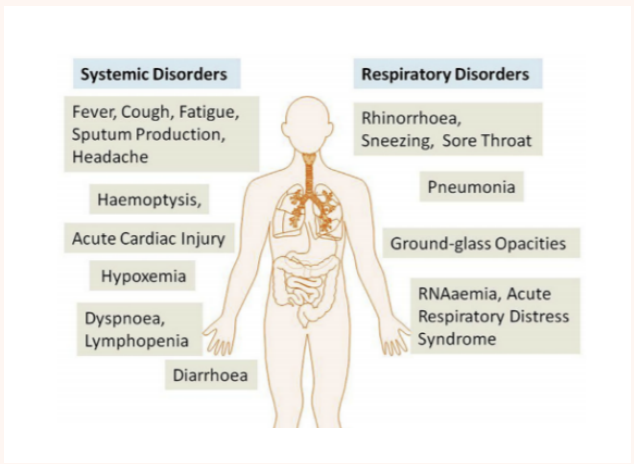
- In Northern Italy less than 0.1% deaths were observed for patients under 50.[13]
- A retrospective study of 191 COVID-19 adult critically-ill patients from Wuhan[2] revealed for high-risk critically ill patients, the period from the onset of COVID-19 symptoms to death had a median of 14 days[14] and was dependent on the age of the patient and status of the patient's immune system. Common complications were respiratory failure/acute respiratory distress syndrome, sepsis/septic shock, and heart failure.[2,11] Half of the non-survivors experienced a secondary infection, and ventilator-associated pneumonia occurred in 31% of the patients.[2]
- Another smaller study on 59 COVID-19 adult patients in China found that kidney dysfunction from the viral infection was common and may contribute to multi-organ failure and death.[15]

SYMPTOM PROGRESSION



DIAGNOSTICS

The FDA recently changed their Emergency Use Authorization (EUA) rules,[17] and currently Roche, Thermo, Abbott, Quest, and Quidel are shipping tests. The American Association of Clinical Chemistry (AACC) also has launched the COVID-19 Testing Directory, a new resource for healthcare professionals seeking access to clinical laboratory testing services for SARS-CoV-2. Molecular diagnostic tests still follow CDC protocols[18] for the real-time RT-polymerase chain reaction (rRT-PCR) detection of the SARS-CoV-2 virus. Rapid diagnostics also are in development for IgM and IgG antibodies, and analysis of secondary predictors are currently underway, e.g. increased C-Reactive Protein (CRP) levels.[18]



Systemic and respiratory disorders for COVID-19

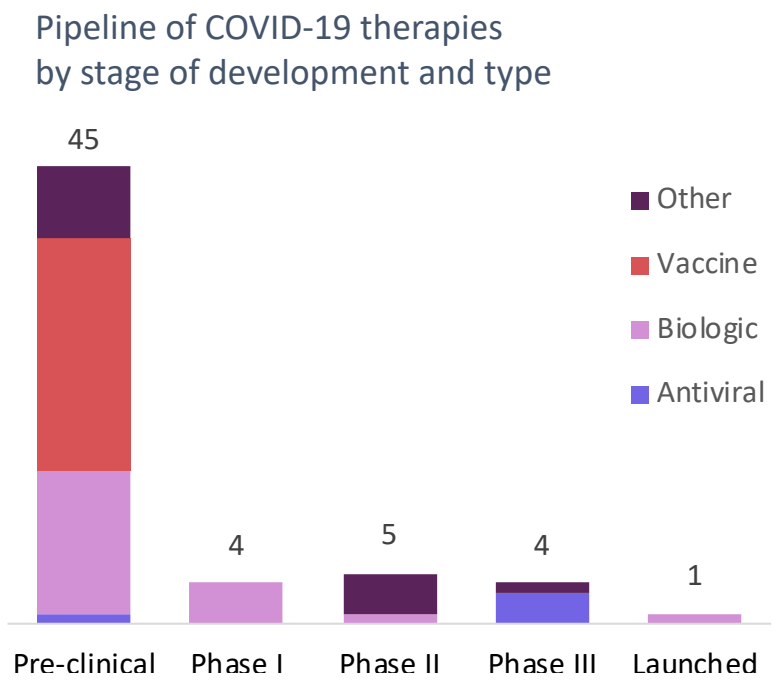
Cell entry of coronaviruses depends on binding of the viral spike (S) proteins to the host's cellular ACE2 receptors and on S protein priming by the host cell serine proteases (TMPRSS2),[16] both druggable targets. Early Type I Interferon (IFN-1) signaling or reduced inflammatory monocyte-macrophages (IMMs) result in mild disease.[9]

TREATMENTS IN DEVELOPMENT

Today at least 60 drugs are in development globally,[19] with one launched (Acentra, China). Most are early-stage (discovery and pre-clinical) and vaccines. Some repurposed drugs (camostat mesylate, chloroquine) suggest the rapid mobilization of global R&D. The high number of therapies in development since the first confirmed case points to an unprecedented urgency for intervention.

IMPACT AND NEXT STEPS

There has been a large, global mobilization to solve the coronavirus pandemic and to maintain a functional healthcare system. Pharmaceutical companies and research groups have come together to share data and work together in diagnosing, screening, and treating patients.



DISCLAIMER: Please check with city and state public health departments to coordinate local response; call your doctor if symptoms appear.

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