5G for Health and Wellbeing

Use case & Visions & Future steps

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bio

- Senior engineer, China Academy of Information and Communications Technology (CAICT)
- Head of WHO Collaborating Centre for Digital Health
- Vice-chair of ITU&WHO Artificial Intelligence for Health focus group(FG-AI4H)
- Co-chair of the Ad-hoc group of the digital technologies on COVID health emergency (AHG-DT4ER)
- WHO digital health expert roster
- WHO Smart Vaccination Certificate (SVC) working group
- Member of the Cybersecurity working group, International Medical Device Regulators Forum (IMDRF)

Digital health, AI for health, 5G for health, COVID and global health

https://www.itu.int/en/ITU-T/academia/kaleidoscope/2019/Pages/Shan-Xu.aspx

Content

Use cases

Take the “Hospital on 5G-based cloud” as a collection of use cases on 5G for health

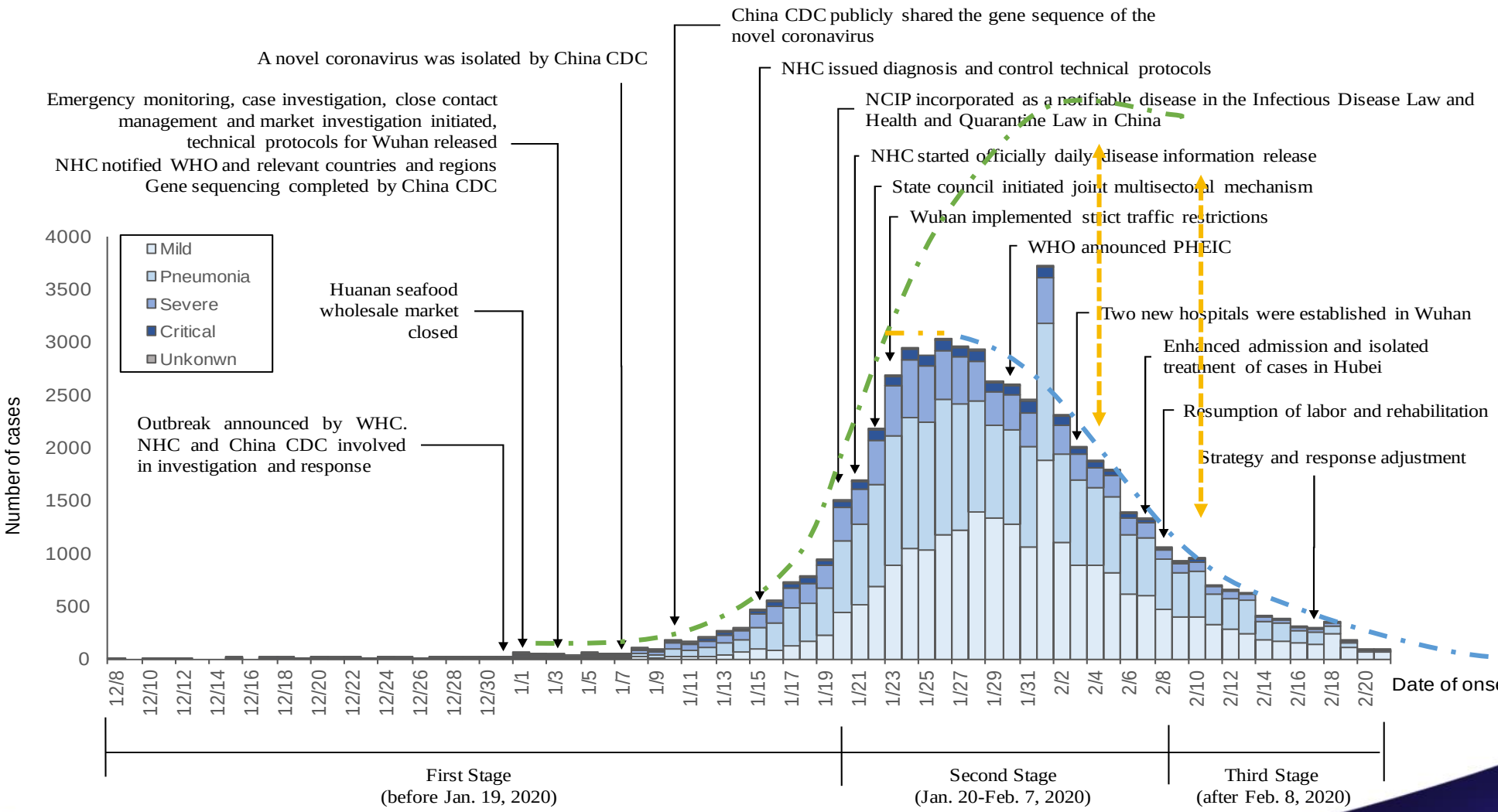
Trends

Six trends at all levels in “5G for health and wellbeing” to provide a vision for the future

Future steps

Three suggestions to support a sustainable development for the future.

5G in combating COVID-19

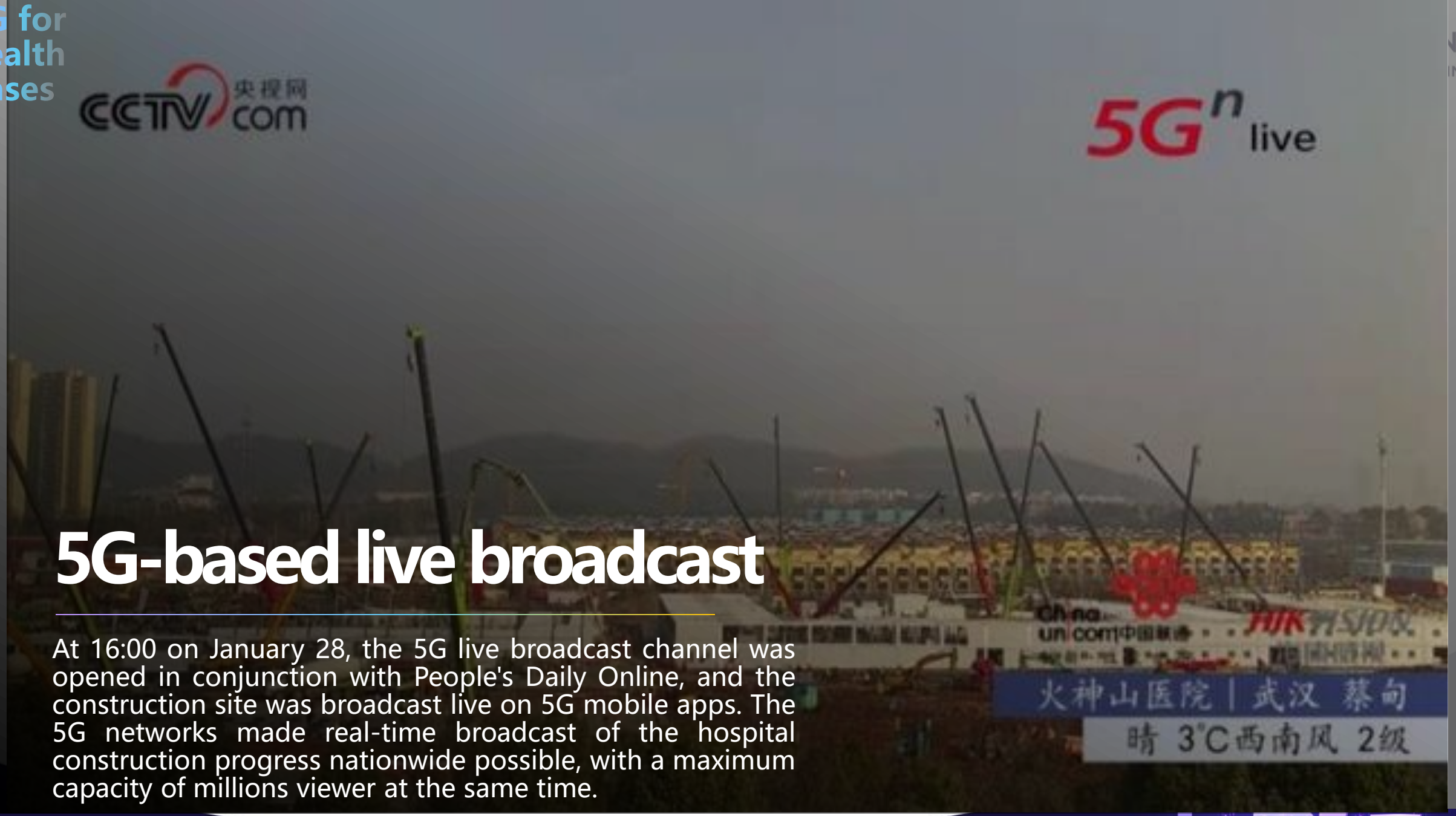


Story behind

Miracles

The construction of the Wuhan Vulcan Mountain Hospital only takes **TEN** days (01.23-02.02) to offer extended capacity to combat the health emergency. The total construction area is 33,900 square meters, with 1,000 beds to treat patients.

Image Source: http://5b0988e595225.cdn.sohucs.com/images/20200303/9c31166587554f34b0c13b894ea66fcb.jpeg



5G-based live broadcast

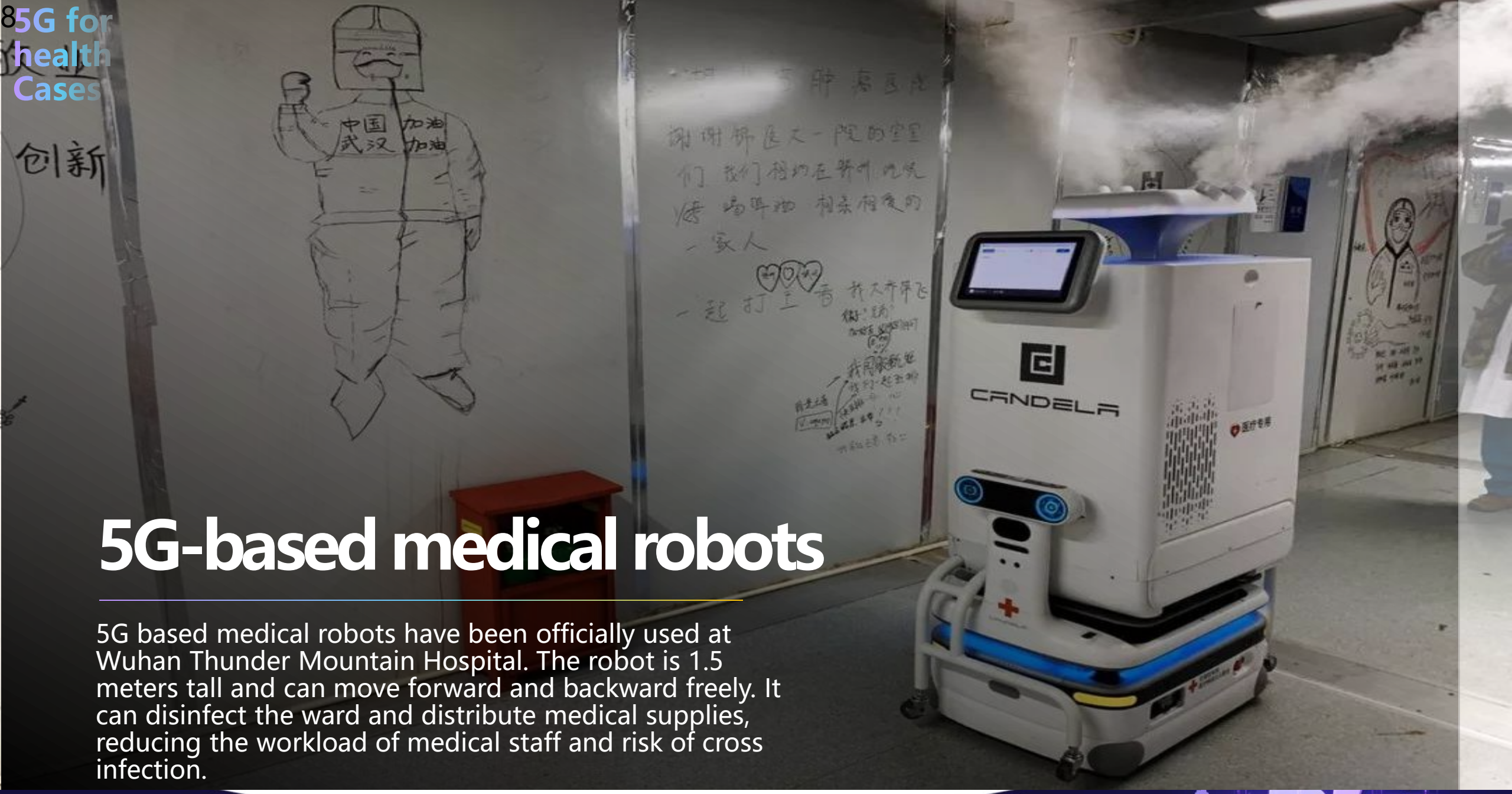
At 16:00 on January 28, the 5G live broadcast channel was opened in conjunction with People's Daily Online, and the construction site was broadcast live on 5G mobile apps. The 5G networks made real-time broadcast of the hospital construction progress nationwide possible, with a maximum capacity of millions viewer at the same time.

Image Source: https://empic.dfcfw.com/5710313381410406 41/art

5G-based consultation

On Feb 9, the PLA General Hospital conducted the first 5G network remote consultation with Vulcan Mountain Hospital. Experts stared at the electronic screen in front of them, and the results of patient medical records and biochemical indicators were uploaded in real time, and clear at a glance.

Image Source: http://www.legaldaily.com.cn/index/content/2020-02/10/content_8114084.htm



5G-based medical robots

5G based medical robots have been officially used at Wuhan Thunder Mountain Hospital. The robot is 1.5 meters tall and can move forward and backward freely. It can disinfect the ward and distribute medical supplies, reducing the workload of medical staff and risk of cross infection.

Image Source: https://www.sohu.com/a/378301359_100256408

5G-based AI diagnosis

AI system only needs seconds to process dozens of high-resolution CT data from a patient, providing great support for rapid early screening and reduce front-line workers. The average sensitivity and specificity have reached the judgment results of a chief physician in hospitals.

Image Source: http://news.nankai.edu.cn/ywsd/system/2020/03/12/030038105.shtml

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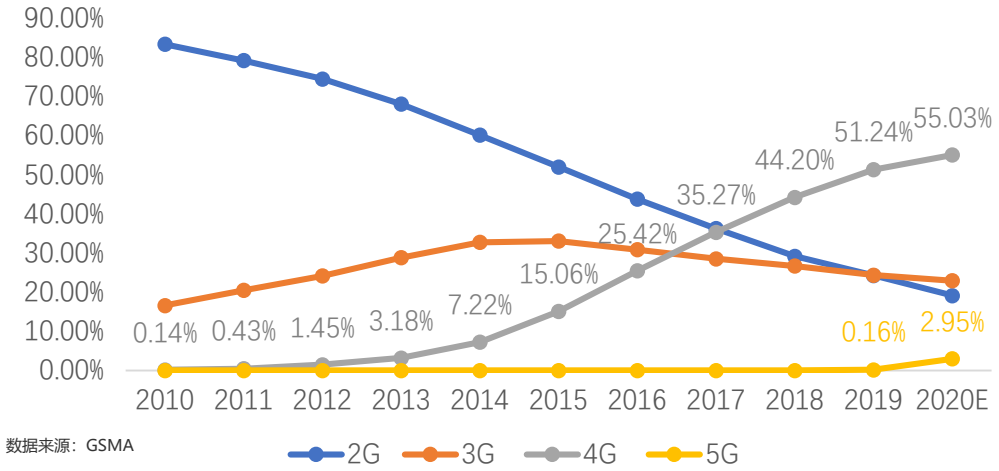
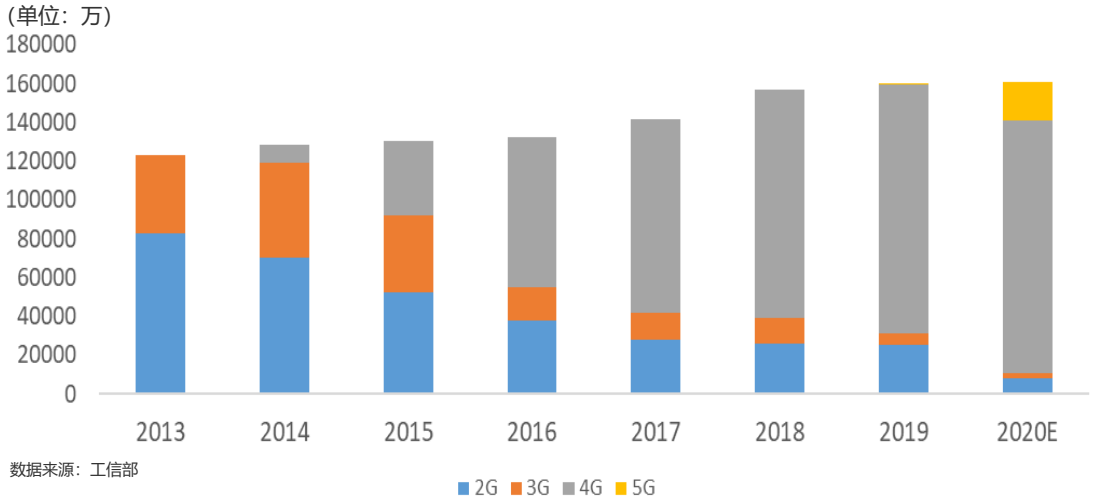
Users: 5G users number increasing rapidly

Global 5G user increasing rapidly



数据来源：GSMA

Chinese 2G/3G/4G/5G users



数据来源：工信部

The number of global mobile users reached **7.98 billion**, the number of 5G users are **growing rapidly to 180 million**, with an estimated growth rate to about 18 times.

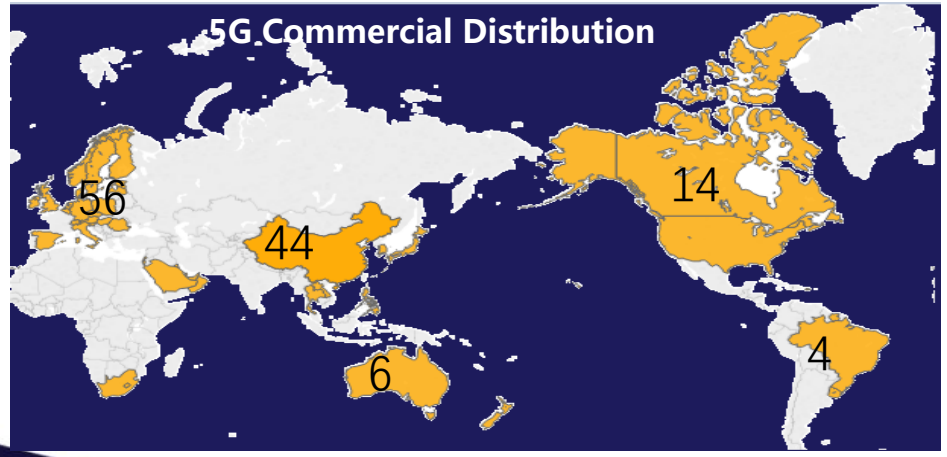
The number of 5G users in China has **exceeded 160 million**, accounting for approximately **89% of the total number of 5G users in the world.**

数据来源：GSMA、工信部
截至2020.10

Network: 5G infrastructure improvement

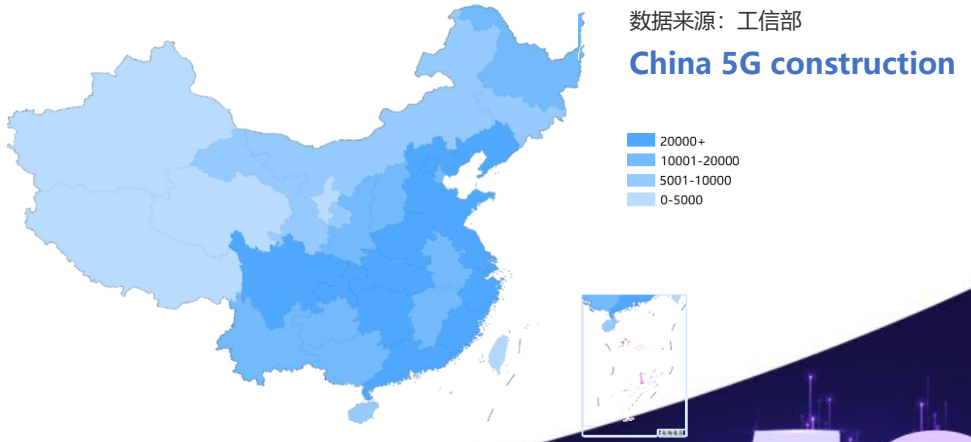
Global construction

- As of the end of October 2020, **124 network operators in 54 countries /regions** have announced to provide 5G services (including fixed wireless and mobile services).
- A total of **55 operators** worldwide are investing 5G standalone(SA) commercial networks, including stages of plan, test, trial, deployment.



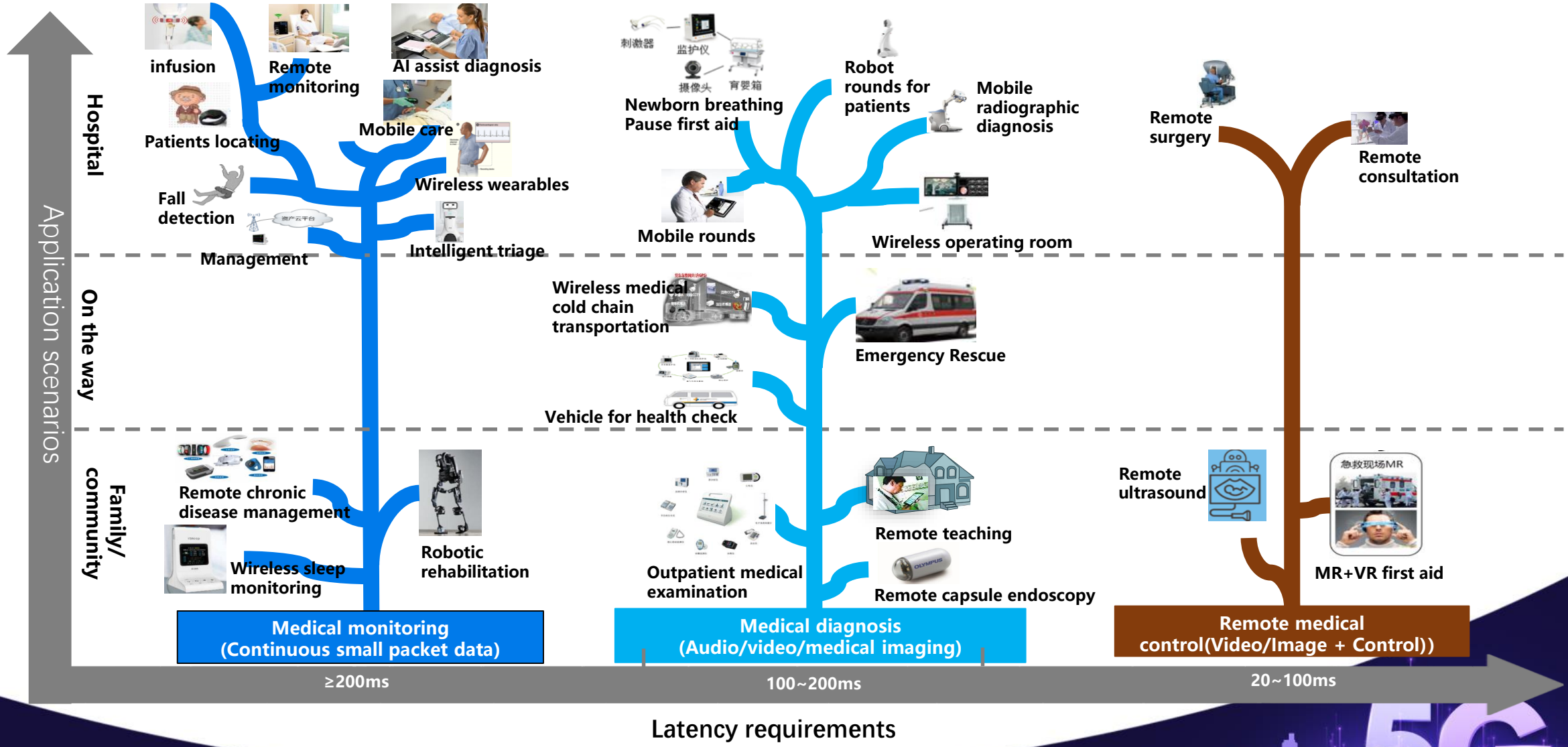
China construction

- As of the end of October 2020, China has opened more than **699,000 5G base stations**, covering all prefecture-level cities.
- China has started **commercial use** of 5G SA network. Shenzhen and Beijing have achieved full coverage of 5G SA networks.



Terminal: mobilization & intelligentization

Application: controllability & wide coverage



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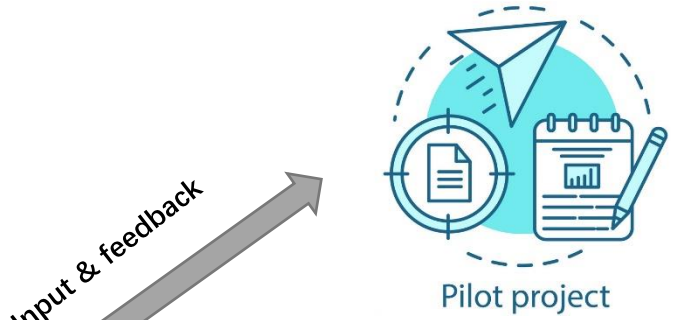


Input & feedback

Input & feedback

Set examples of best practice on 5G for health applications to drive industry

Support each other

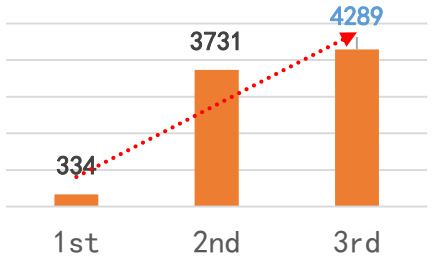
Build a systematic thinking and development on standardization to support the industry norms

Invest more on ecosystem and supportive factors building, esp. testing capacity for standardization.

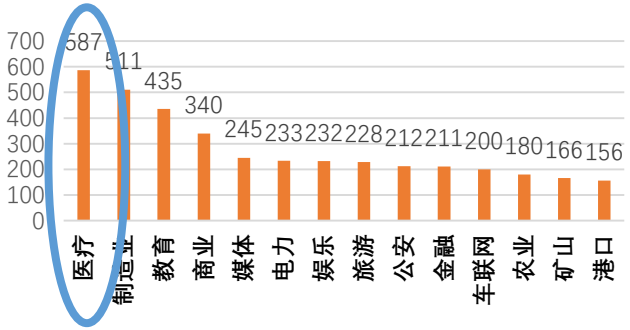
① Pilot applications

5G Application challenge

Sponsored by the MIIT, CAICT and IMT-2020 (5G) promotion group, etc. launched a series of "**Blooming Cup" 5G Application challenge,** 5G for health is one of the track.



The 3rd "Blooming Cup" reached a record high, with 8 regions, 16 tracks covering 30 provinces.

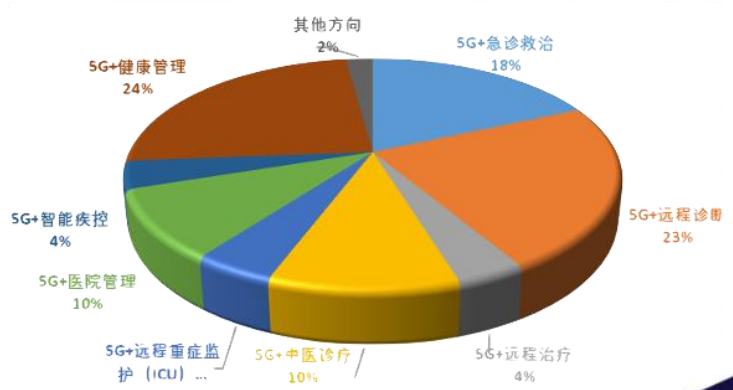


31% of the 3rd participating projects have been commercialized, and expected to reach over 50% in 2021.

5G for health is the application direction with most use cases.

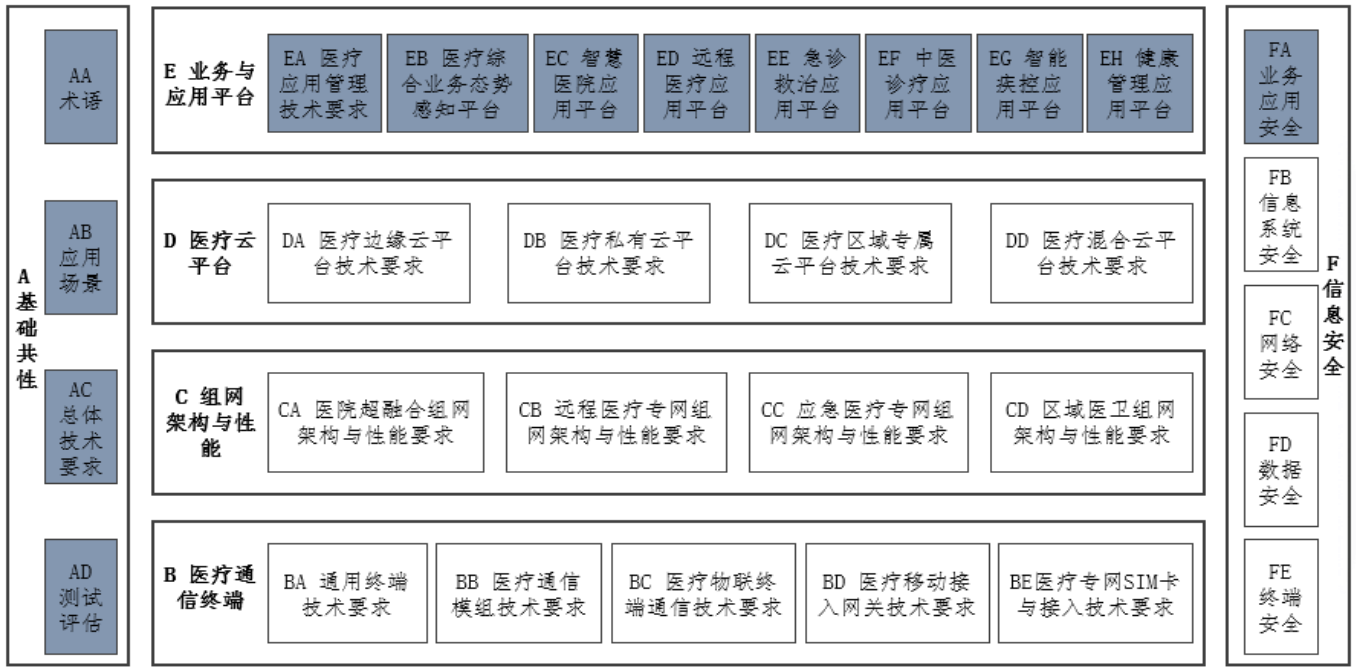
National Pilot project declaration

MIIT and NHC issued the "Notice on Organizing and Carrying out the Application for 5G+ Medical and Health Pilot Projects", with **1,419** leading declaration units, **1,329** formal examinations, **987** shortlisted publicity, covering **9 major directions** in healthcare.



② Systematic Standardization

Under the guidance of MIIT and NHC, CCSA actively promotes the standards development of 5G for medical and health. A sub-working group was established in Sep 2020, with a membership of over 40 units including operators, equipment vendors, hospitals, etc. to jointly develop standards.



Standardization framework of 5G for health

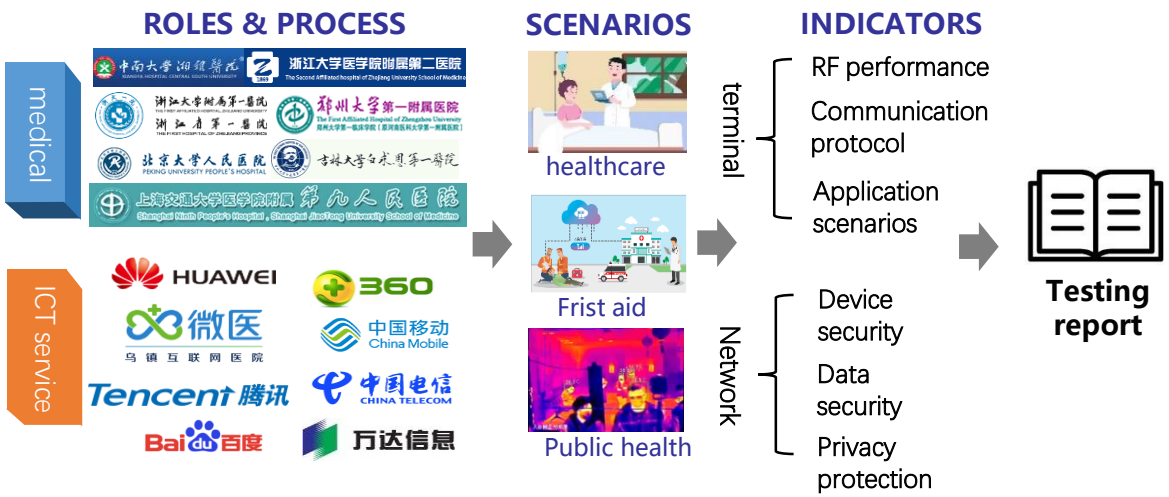
2 work items in the International Telecommunication Union (ITU)

- Requirements and reference framework for emergency rescue systems
- Requirements, reference framework and use cases for telemonitoring systems in rapid deployment hospitals

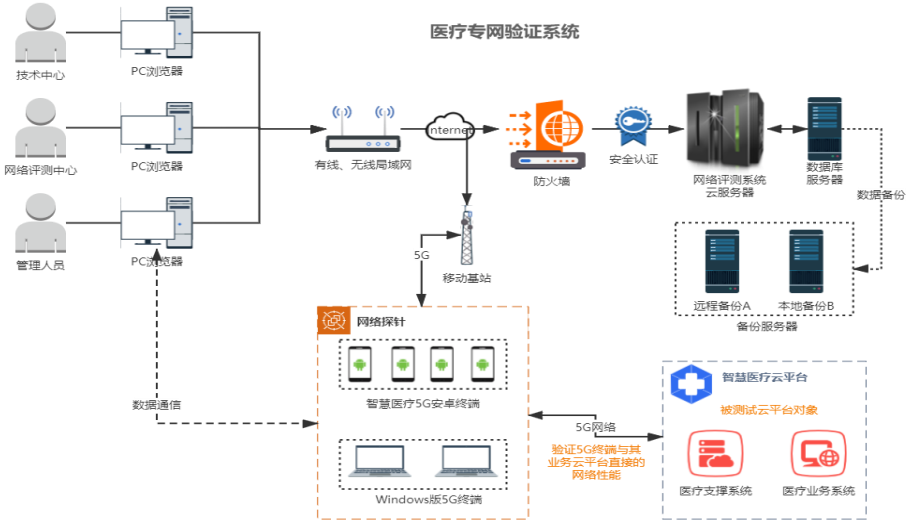
③ Testing capacity building

Ecosystem construction

✓ Cooperate with authoritative medical institutions and IT service providers to simulate the business model, test process and refine key indicators for various scenarios.



Testing capacity building



Verification system for medical private network

- network probes at the terminal
- test data processed by the server
- results visualization on the front-end

Thank you !

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