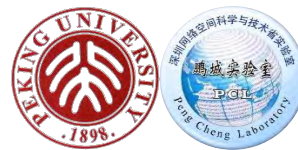


# COVID-19 Research in Shenzhen



- International cooperation for COVID-19 epidemiological study in Shenzhen

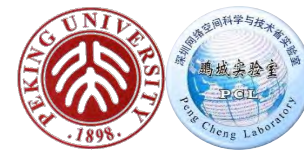
Role: data clean and analysis



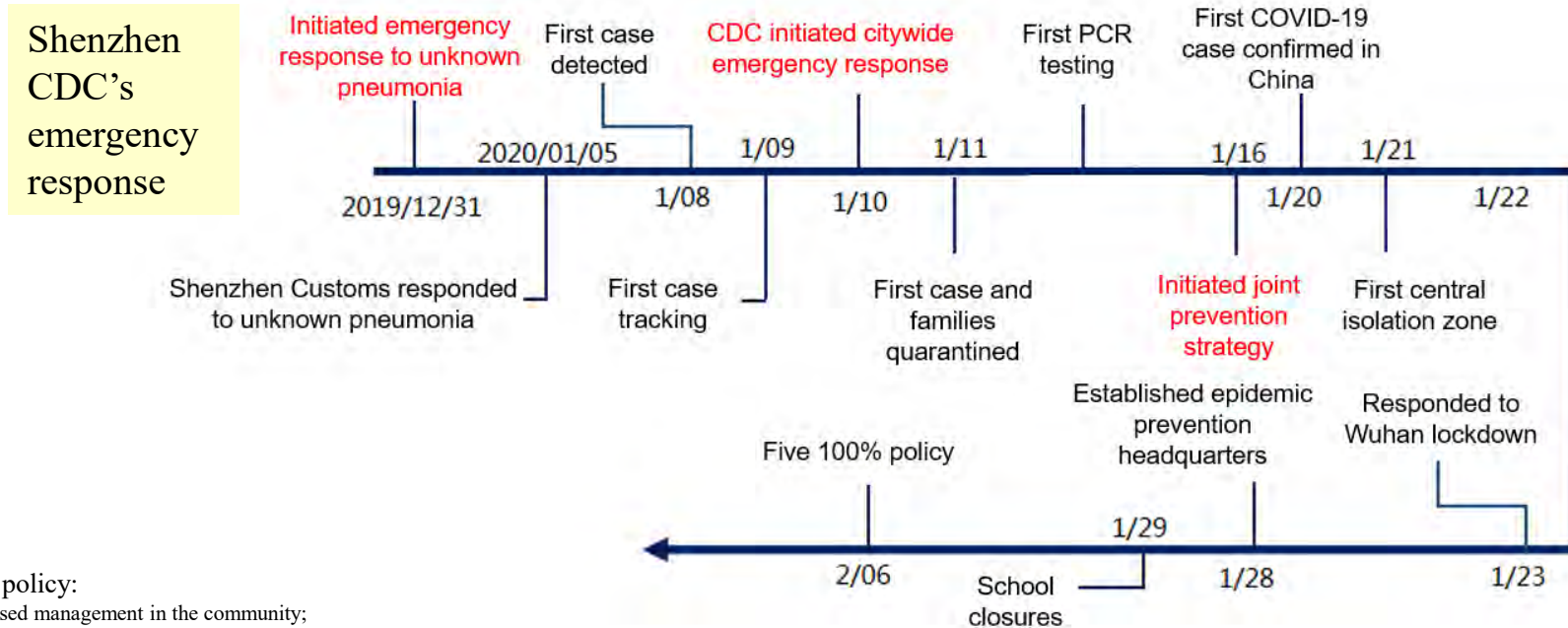
Role: epidemiological guidance

Role: data acquisition

# COVID-19 Research in Shenzhen



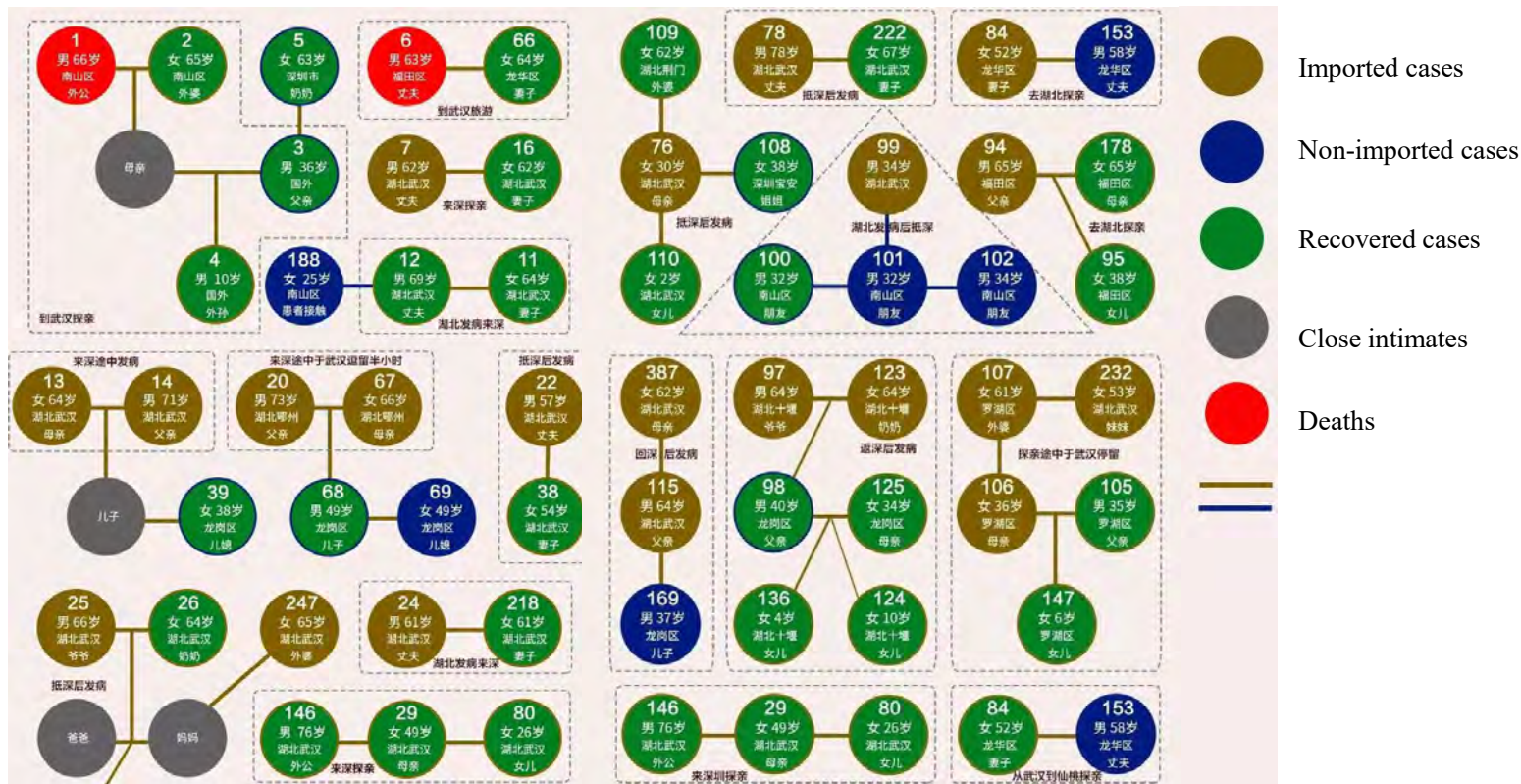
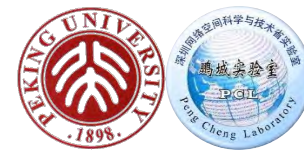
- Rapid spread of SARS-CoV-2 in Wuhan prompted heightened surveillance in Shenzhen.



## Five 100% policy:

1. 100% enclosed management in the community;
2. In the past 14 days, 100% persons who have traveled to the key epidemic areas must be quarantined at home;
3. 100% persons with close contact with the case shall be put under centralized isolation;
4. Bidirectional temperature detection shall be carried out for 100% residents in and out of the community;
5. 100% contacting registration for the landlord and lessee of the rental house.

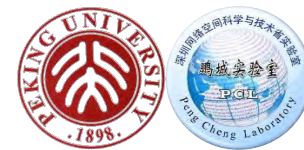
# COVID-19 Research in Shenzhen



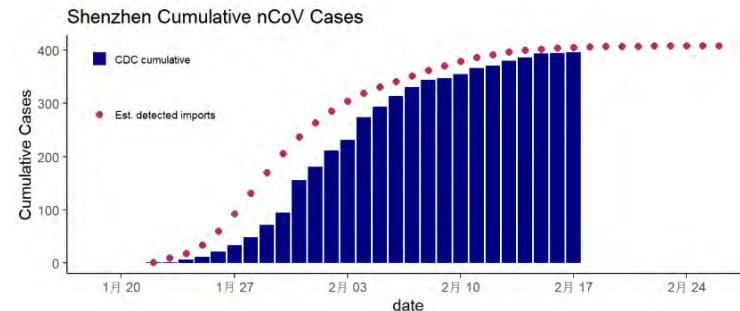
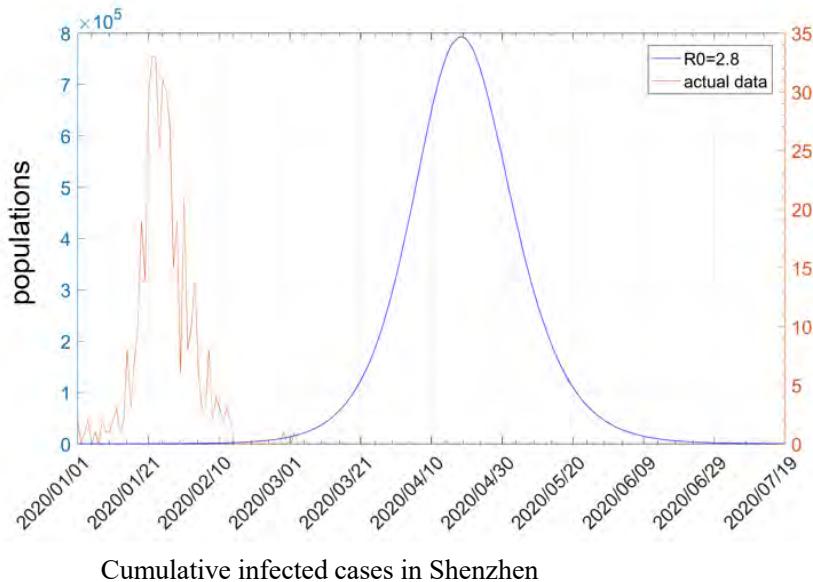
Graph of COVID-19 index cases and close intimates in Shenzhen

Source: Shenzhen municipal health commission

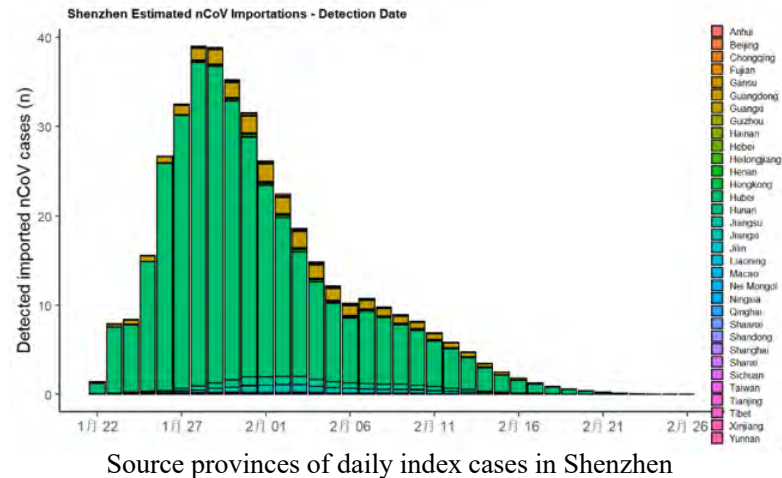
# Modelling Research



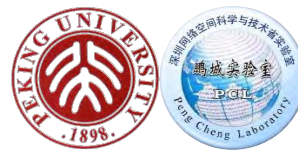
- Importation model of COVID-19 in Shenzhen
  - Transmission modelling (SEIR) in Shenzhen City
  - To estimate **the proportion of detected cases** in Shenzhen imported from other provinces



Estimation of detected imported cases in Shenzhen



# Epidemiological Research



## □ Target population:

- Shenzhen CDC identified 391 SARS-CoV-2 cases and 1286 close contacts from Jan 14 to Feb 12.

## □ Methods:

- Estimation of transmission characteristics for **contact-based** and **symptom-based**, respectively.

## □ Results:

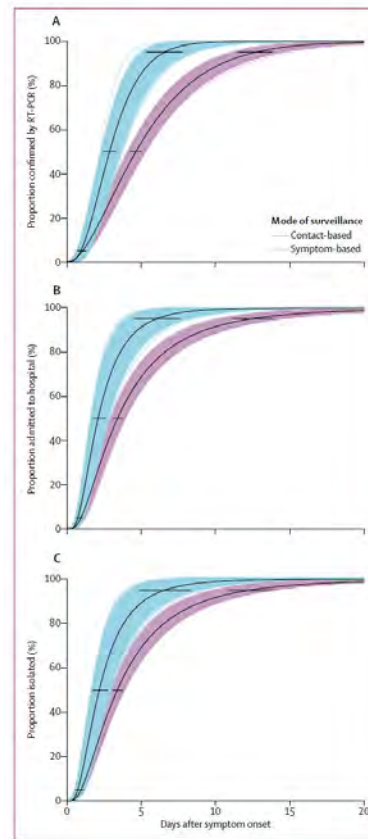
- Cases were isolated on average **4.6 days** after developing symptoms; contact tracing reduced this by **1.9 days**.

## □ Conclusions:

- We provide a key piece of evidence supporting **intensive contact tracing**
- These results paint a positive picture of the impact of heightened surveillance and isolation in Shenzhen.

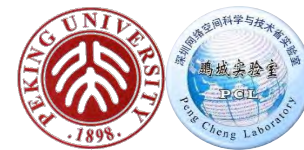
## □ Highlights:

- Scientific evidence of how China **flattened the curve**



*Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: a retrospective cohort study. [The Lancet Infectious Diseases \(2020\).](#)*

# Epidemiological Research



## Epidemiology and Transmission of COVID-19 in Shenzhen China: Analysis of 391 cases and 1,286 of their close contacts

Qifang Bi, Yongsheng Wu, Shujuan Mei, Chenfei Ye, Xuan Zou, Zhen Zhang, Xiaojian Liu, Lan Wei, Shaun A Truelove, Tong Zhang, Wei Gao, Cong Cheng, Xlujuan Tang, Xiaoliang Wu, Yu Wu, Binbin Sun, Suli Huang, Yu Sun, Juncen Zhang, Ting Ma, Justin Lessler, Teijian Feng

doi: <https://doi.org/10.1101/2020.03.03.20028423>

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.

Abstract Info/History Metrics Preview PDF

### ARTICLE INFORMATION

doi <https://doi.org/10.1101/2020.03.03.20028423>

History March 27, 2020.

### ARTICLE VERSIONS

Version 1 (March 4, 2020 - 16:18).

Version 2 (March 18, 2020 - 09:58).

DOI: [10.1101/2020.03.03.20028423](https://doi.org/10.1101/2020.03.03.20028423) | Corpus ID: 215718733

## Epidemiology and Transmission of COVID-19 in Shenzhen China: Analysis of 391 cases and 1,286 of their close contacts

Qifang Bi, Yongsheng Wu, 19 authors, 1 Field | Published in medRxiv 2020 - Medicine

128 Citations  
11 Highly Influential Papers  
42 Cite Background  
7 Cite Results  
3 Cite Methods

Background Rapid spread of SARS-CoV-2 in Wuhan prompted heightened surveillance in Shenzhen and elsewhere in China. The resulting data provide a rare opportunity to measure key metrics of disease course, transmission, and the impact of control. Methods The Shenzhen CDC identified 391 SARS-CoV-2 cases from January 14 to February 12, 2020 and 1286 close contacts. We compare cases identified through asymptomatic surveillance and contact tracing, and estimate the time from symptom onset to... CONTINUE READING

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## THE LANCET Infectious Diseases

ARTICLES | VOLUME 20, ISSUE 6, P669-677, JUNE 01, 2020

## Estimates of the severity of coronavirus disease 2019: a model-based analysis

Our processed data has shared to Dr. Neil M Ferguson and cited by their recent epidemiological modelling work

CCTV NEWS 中文新聞

STUDY OF DATA FROM SHENZHEN, CHINA, PROVIDES KEY COVID-19 INSIGHTS

《柳叶刀》披露深圳抗疫关键密码 全球媒体竞相聚焦深圳经验

ScienceDaily

HEALTH CARE

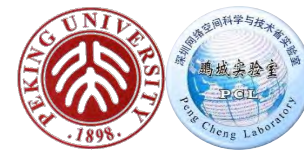
2020年4月27日

患者平均隔离时间 4.6天

推行密切接触者追踪设备后平均时间 2.7天

世界权威医学期刊《柳叶刀》揭秘深圳防控关键

# Genome Research



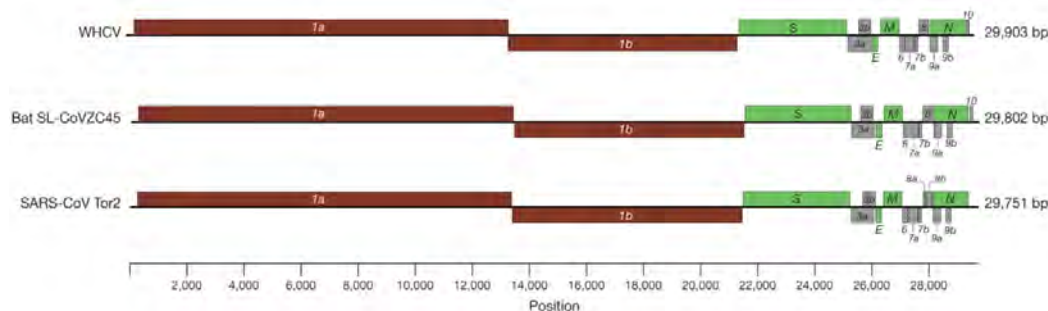
Article | [Open Access](#) | Published: 03 February 2020

## A new coronavirus associated with human respiratory disease in China

Fan Wu, Su Zhao, Bin Yu, Yan-Mei Chen, Wen Wang, Zhi-Gang Song, Yi Hu, Zhao-Wu Tao, Jun-Hua Tian, Yuan-Yuan Pei, Ming-Li Yuan, Yu-Ling Zhang, Fa-Hui Dai, Yi Liu, Qi-Min Wang, Jiao-Jiao Zheng, Lin Xu, Edward C. Holmes & Yong-Zhen Zhang

*Nature* **579**, 265–269(2020) | [Cite this article](#)

**366k** Accesses | **334** Citations | **1312** Altmetric | [Metrics](#)



The organization of genes for WHCV, bat SL-CoVZC45 and SARS-CoV Tor2.

81 different coronavirus gene sequences had been **shared openly via GenBank** and 189 via the China National Genomics Data Centre, which allow scientists to decode the mystery of the virus and hopefully find a treatment or vaccine.

nature > technology features > article

a nature research journal

nature

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TECHNOLOGY FEATURE • 24 APRIL 2020

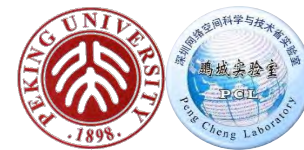
## Open science takes on the coronavirus pandemic

Data sharing, open-source designs for medical equipment, and hobbyists are all being harnessed to combat COVID-19.

Mark Zastrow

Yet it wasn't a given that researchers would embrace openness early in the outbreak: data that are made public can be difficult to publish through conventional channels later. And multiple news reports have suggested that health workers and researchers in China were initially subjected to government limits on what information they could release. But when Chinese researchers uploaded the first genome sequence of the SARS-CoV-2 virus to the online repositories [virological.org](#) and [GenBank](#), they opened the floodgates for more sequences from China and from the rest of the world, Hodcroft says. "I am very grateful for the scientists who took this risk, because I

# Antibody drug Research

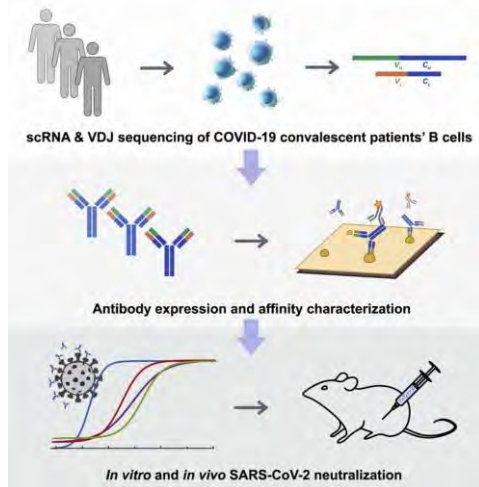


## Highlights:

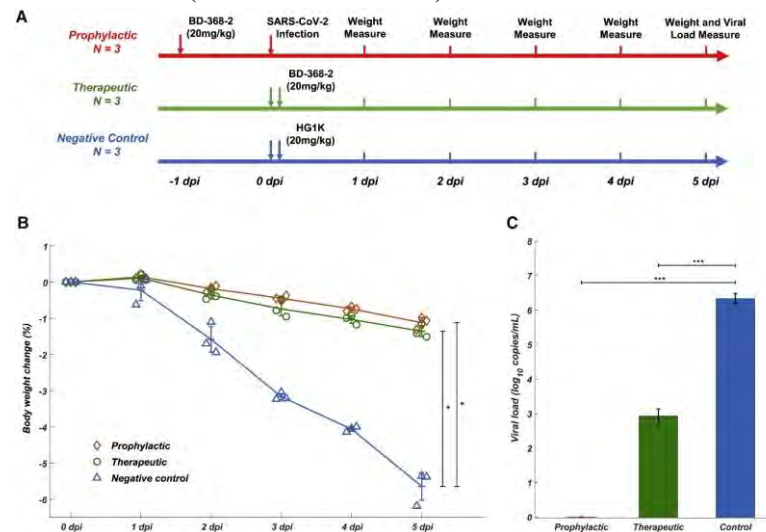
- ❑ 8,558 IgG1+ antigen-binding clonotypes were identified by high-throughput scRNA/VDJ-seq
- ❑ 14 potent SARS-CoV-2 neutralizing antibodies were found from 60 convalescent patients
- ❑ **BD-368-2** showed high therapeutic and prophylactic efficacy in SARS-CoV-2-infected mice

[Yunlong Cao et al. Potent neutralizing antibodies against SARS-CoV-2 identified by high-throughput single-cell sequencing of convalescent patients' B cells. CELL. 2020.](#)

Human antibody sequences are available on the European Genome-Phenome Archive (EGAS00001004412)



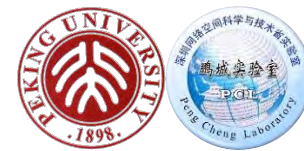
Efficient Neutralizing Antibody Identification through Antigen-Enriched High-Throughput Single-Cell RNA Sequencing



BD-368-2 Showed High Therapeutic and Prophylactic Efficacy in SARS-CoV-2-Infected hACE2 Transgenic Mice



# Vaccination Research

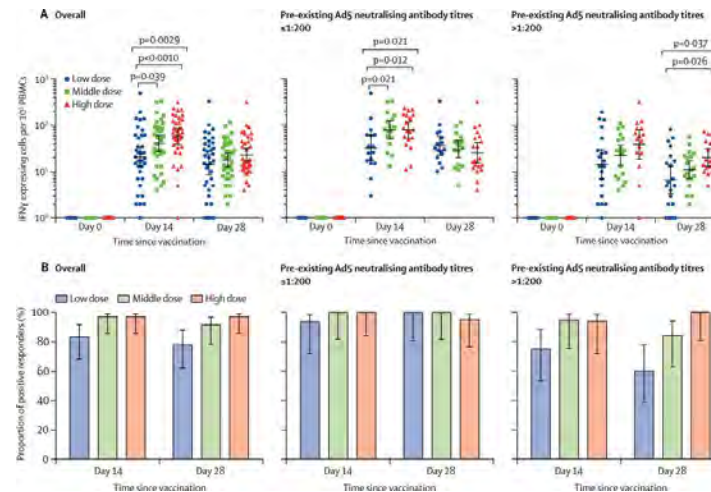


## Highlights:

- ❑ The Ad5 vectored COVID-19 vaccine is **tolerable** and **immunogenic** at 28 days post-vaccination. [FC Zhu, YH Li, XH Guan, et al. Safety, tolerability, and immunogenicity of a recombinant adenovirus type-5 vectored COVID-19 vaccine: a dose-escalation, open-label, non-randomised, first-in-human trial. Lancet. 2020.](#)
  - ❑ Humoral responses against SARS-CoV-2 peaked at day 28 post-vaccination in healthy adults
  - ❑ Rapid specific T-cell responses were noted from day 14 post-vaccination.
- Individual participant data will be available beginning 3 months and ending 1 year after publication

	Low dose group (n=36)	Middle dose group (n=36)	High dose group (n=36)	Total (N=108)
<b>All adverse reactions within 0-7 days</b>				
Any	30 (83%)	30 (83%)	27 (75%)	87 (81%)
Grade 3	2 (6%)	2 (6%)	6 (17%)	10 (9%)
<b>Injection site adverse reactions within 0-7 days</b>				
Pain	17 (47%)	20 (56%)	21 (58%)	58 (54%)
Induration	2 (6%)	1 (3%)	1 (3%)	4 (4%)
Redness	2 (6%)	1 (3%)	1 (3%)	4 (4%)
Swelling	4 (11%)	4 (11%)	0	8 (7%)
Itch	2 (6%)	3 (8%)	0	5 (5%)
Muscular weakness	0	0	1 (3%)	1 (1%)

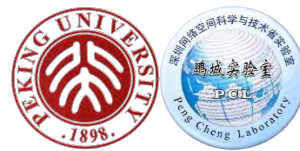
Adverse reactions within 7 days and overall adverse events within 28 days after vaccination



Specific T-cell response measured by ELISpot

# COVID-19 in open science

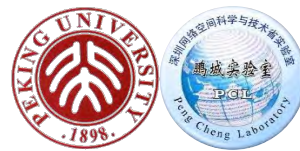
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- Transmission modeling
- Epidemiological
- Genome
- Antibody drug
- Vaccination

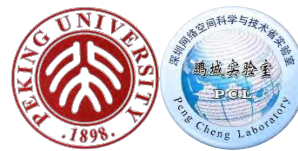
# Content

---



- COVID-19 Happening in China
- COVID-19 Related Open Science in China
- COVID-19 Related Open Resources from China
- Summary

# Public data sets , in Chinese



## [DXY-COVID-19-Data](#): COVID-19 Infection Time Series Data Warehouse

BlankerL / [DXY-COVID-19-Data](#) Sponsor Watch 71 Star 1.6k Fork 591

Code Issues 6 Pull requests 0 Actions Projects 0 Wiki Security 0 Insights

2019新型冠状病毒疫情时间序列数据仓库 | COVID-19/2019-nCoV Infection Time Series Data Warehouse <https://lab.isaacclin.cn/nCoV/>

[2019-ncov](#) [data-warehouse](#)

## [Chinese medical dialogue data set](#)

和鲸社区 **Kesci**

K-Lab

项目

**数据集**

比赛

众包

专区



### COVID-19和其他类型肺炎的中文医学对话数据集

957个中文医学对话，关于COVID-19和其他类型肺炎数据集

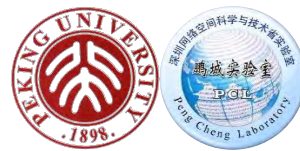


sisis

2020-03-27 16:18

数据集协议: [CC-BY 4.0](#) 转载需署名

# Open source tools



## [DXY-COVID-19-Crawler](#): COVID-19 Realtime Infection Crawler and API

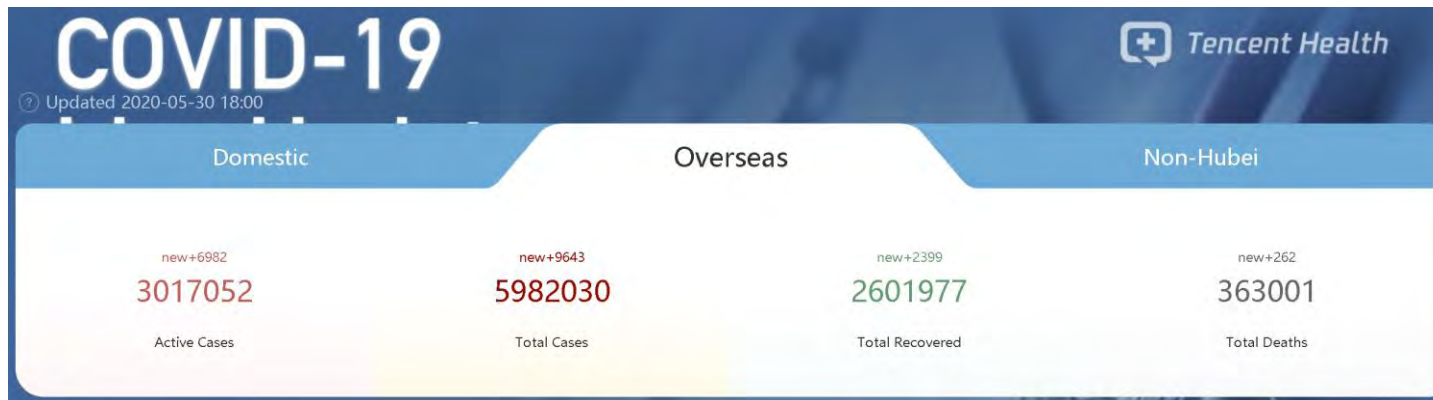
BlankerL / [DXY-COVID-19-Crawler](#) Sponsor Watch 60 Star 1.6k Fork 349

Code Issues 7 Pull requests 0 Actions Projects 0 Wiki Security 0 Insights

2019新型冠状病毒疫情实时爬虫及API | COVID-19/2019-nCoV Realtime Infection Crawler and API <https://lab.isaacclin.cn/nCoV/>

[2019-ncov](#) [crawler](#) [realtime-api](#)

## [TH\\_COVID19\\_International](#): Tracking the live updates of COVID-19



# Open source tools, in Chinese



## Pneumonia-CT-LKM-PP: CT image analysis of pneumonia

Baidu 大脑 | AI Studio

项目 数据集 课程 比赛 考试认证 社区 教育合作 文档 访问飞桨官网

公开项目 > PaddleHub 肺炎CT影像分析

PaddleHub 肺炎CT影像分析 Fork 1.7K

PaddleHub 肺炎CT影像分析

飞桨PaddleHub Notebook 初级 计算机视觉 深度学习 数据分析 公开 9.8K Python3 2020-02-27 18:19:35

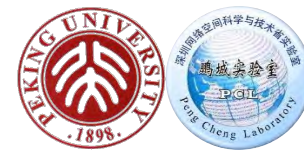
## PaddleHub mask detection

PaddleHub口罩检测助力抗击肺炎 Fork 2.3K

口罩检测

飞桨PaddleHub Notebook 初级 计算机视觉 机器学习 深度学习 数据分析 公开 18.5K Python3 2020-02-11 16:29:14

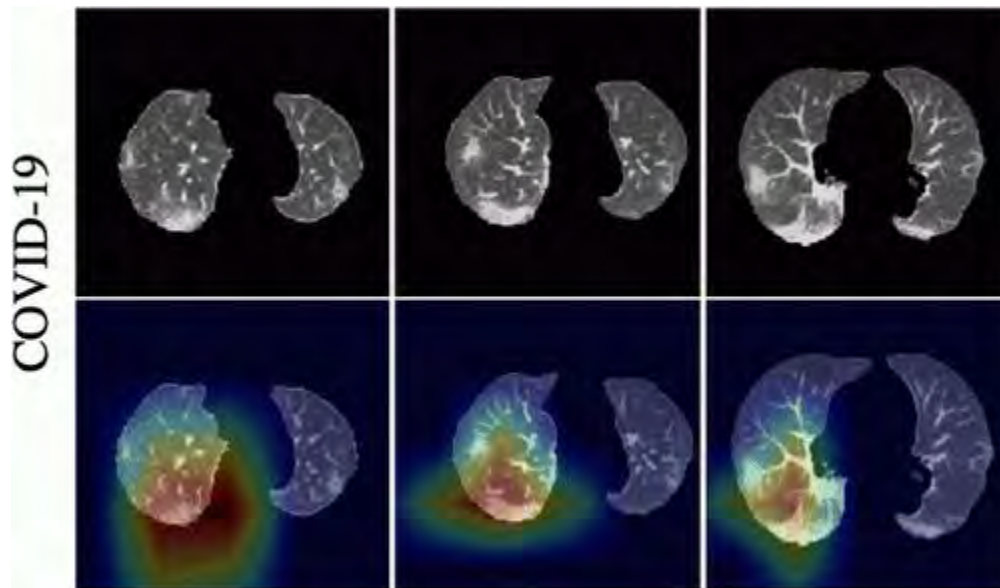
# Open source models



## CT Image Analytics for COVID-19:

## A COVID-19.

- Deep learning model was developed to extract visual features from 3,322 COVID-19 patients (Keya Imaging Ltd)
- CT Image Analytics for COVID-19 suspected cases with 96% accuracy in 20 seconds (Free to apply in AliCloud)
- Already deployed in more than 160 hospitals in China and completed 260,000 clinical cases.



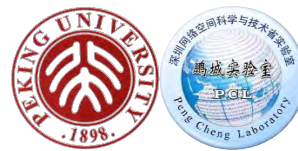
COVID-19

*Li L, Qin L, Xu Z, et al. Artificial Intelligence Distinguishes COVID-19 from Community Acquired Pneumonia on Chest CT. Radiology. 2020;200905.*

Source: AliCloud

# Content

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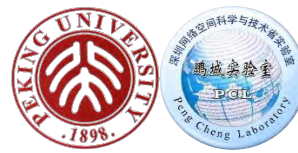


- COVID-19 Happening in China
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- Summary

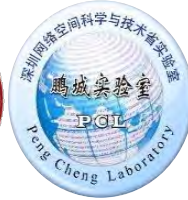


# Summary

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- COVID-19 history in China, 4 stages
  - Stage I: Early outbreak in Wuhan City, slow, pay for unknown
  - Stage II: Central government take action on block COVID-19, very good
  - Stage III: Prevention of community spread and importation, very good
  - Stage IV: Return to work and production, and school reopening, very good
- COVID related open science in China
  - Transmission modeling,
  - Epidemiological
  - Genome
  - Antibody drug
  - Vaccination
- COVID-19 Related Open Resources from China
  - Many related open sourced can be used



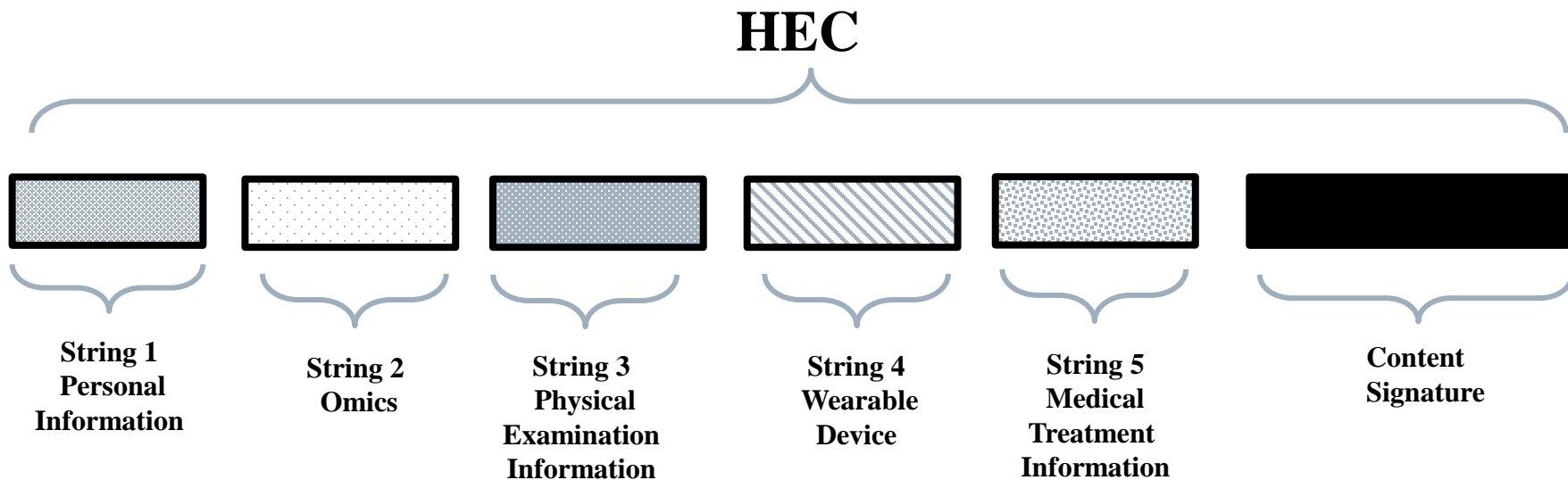
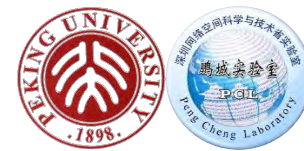
# Thanks for your attention

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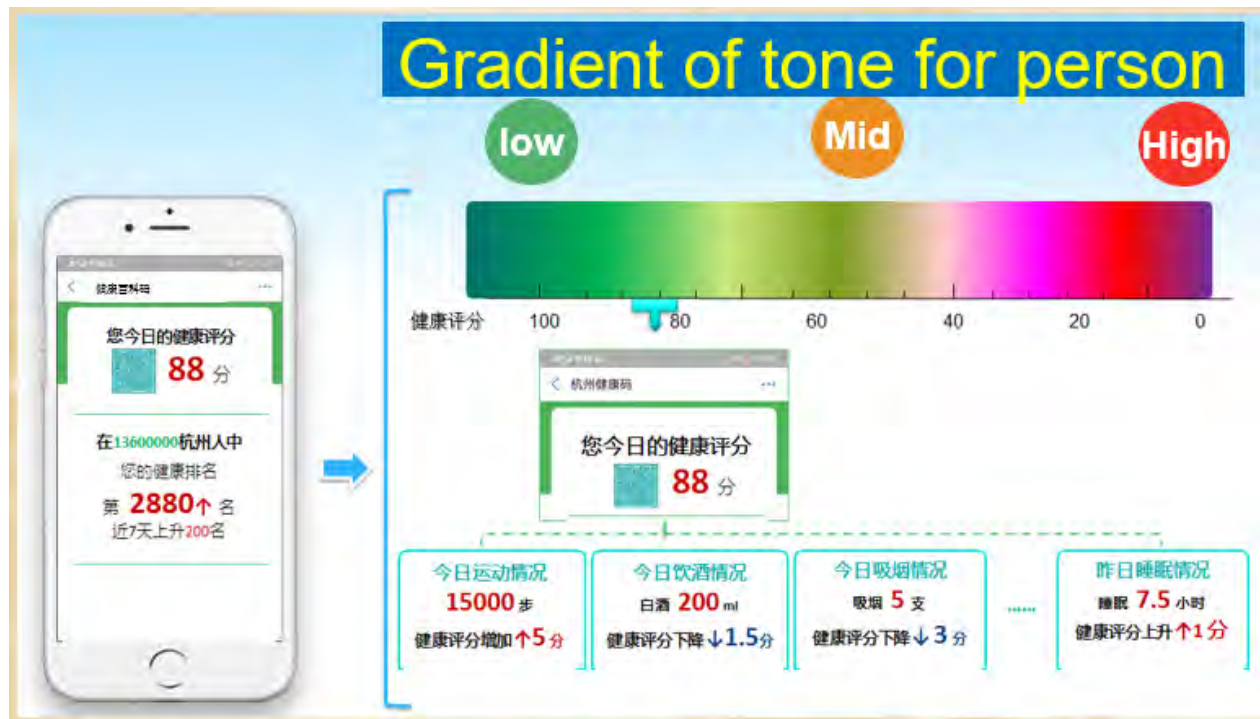
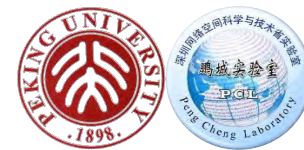
*“At unprecedented speed, scientists are starting experiments, sharing data and revealing the secrets of the pathogen — a race that is made possible by new scientific tools and cultural norms in the face of a public health emergency.”*

—Mark Zastrow

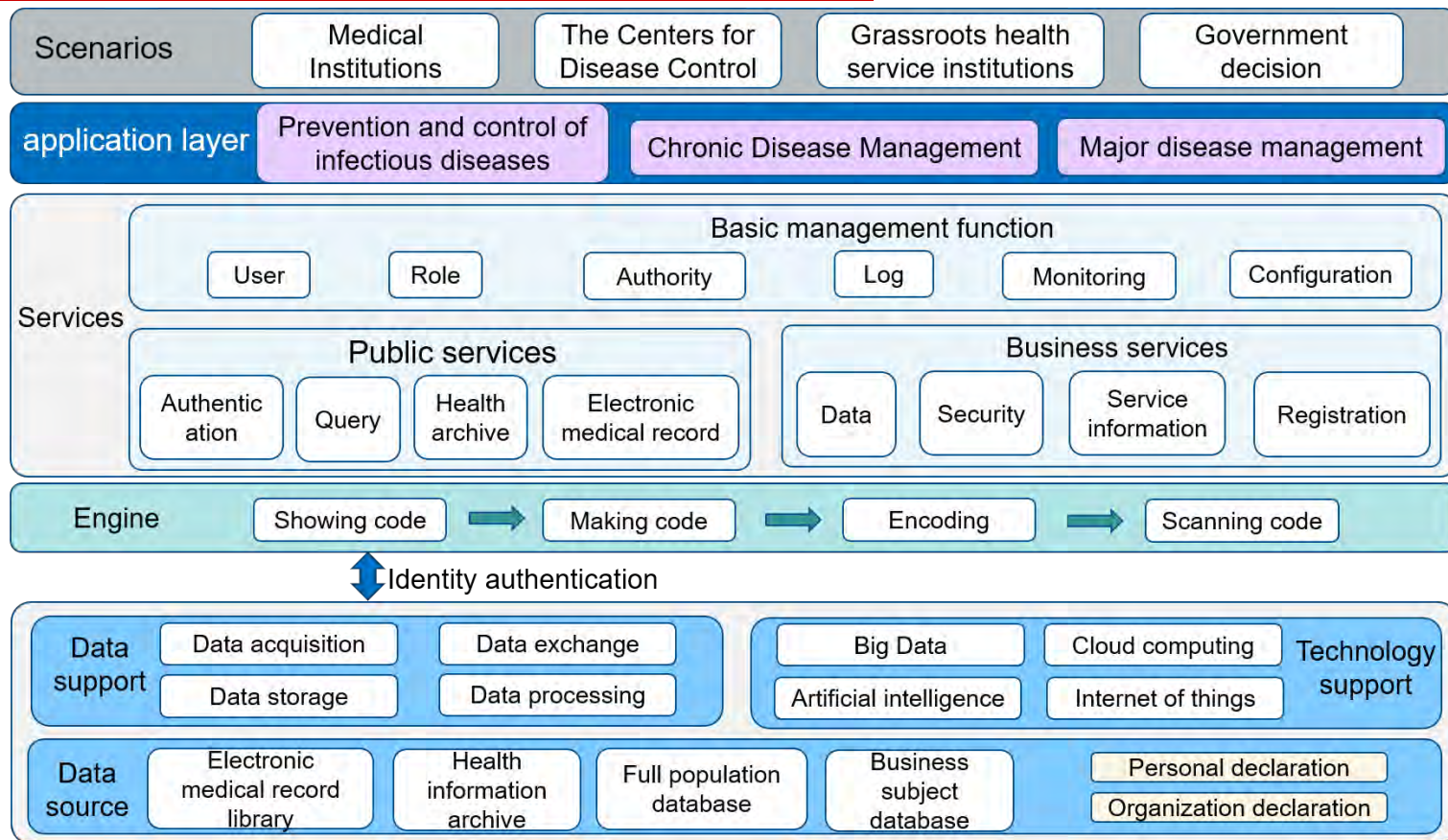
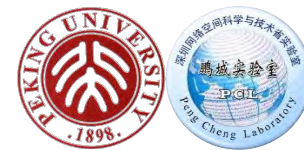
# Health Encyclopedia Code (HEC)



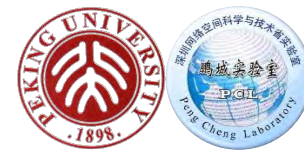
# Application system HEC



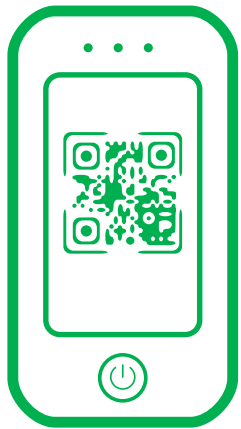
# Application system HEC



# Application scenarios



“One code  
for one life”



## Emergency patients

Doctor gets the patient's core information instantly



## Referral patients

Doctor rely on the patient's HEC for diagnosis, avoiding repeated examination.



## Physical examination people

Continuous and comparable tracking of the key indicators for the detection of disease signs.



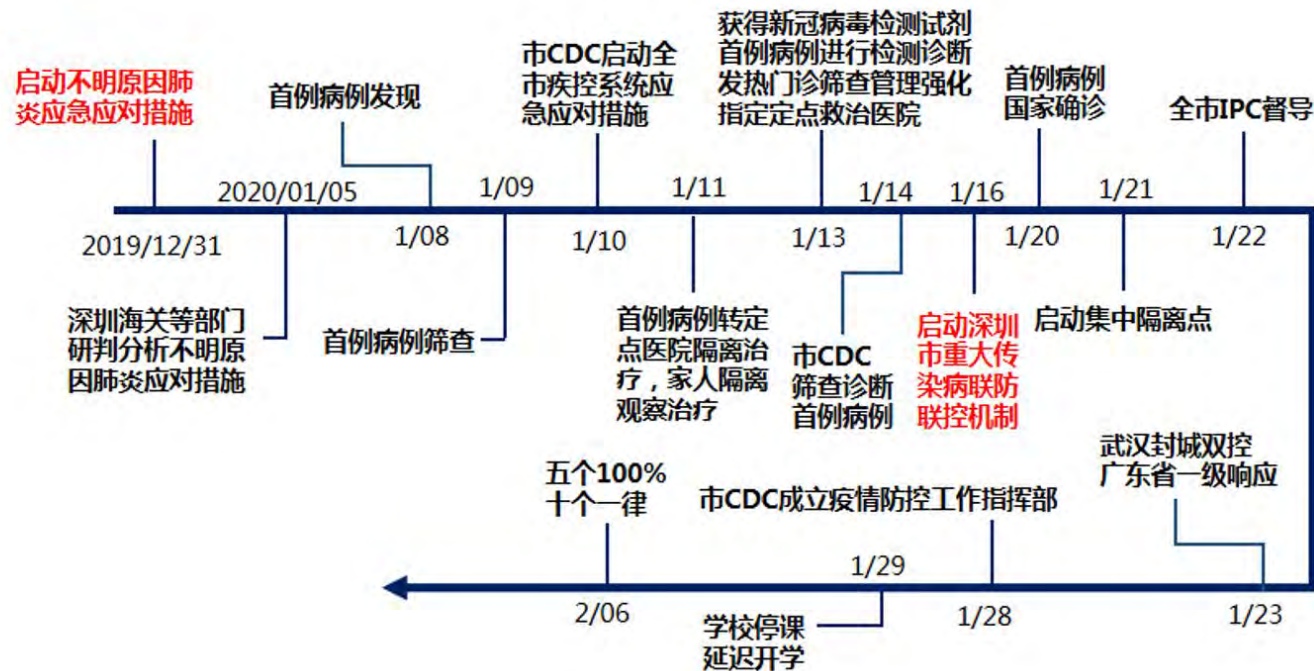
Hospital

One-network query  
One-stop service

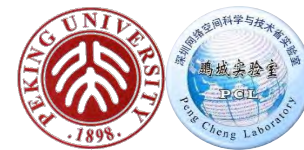
# 备注 (对应第26页的图)



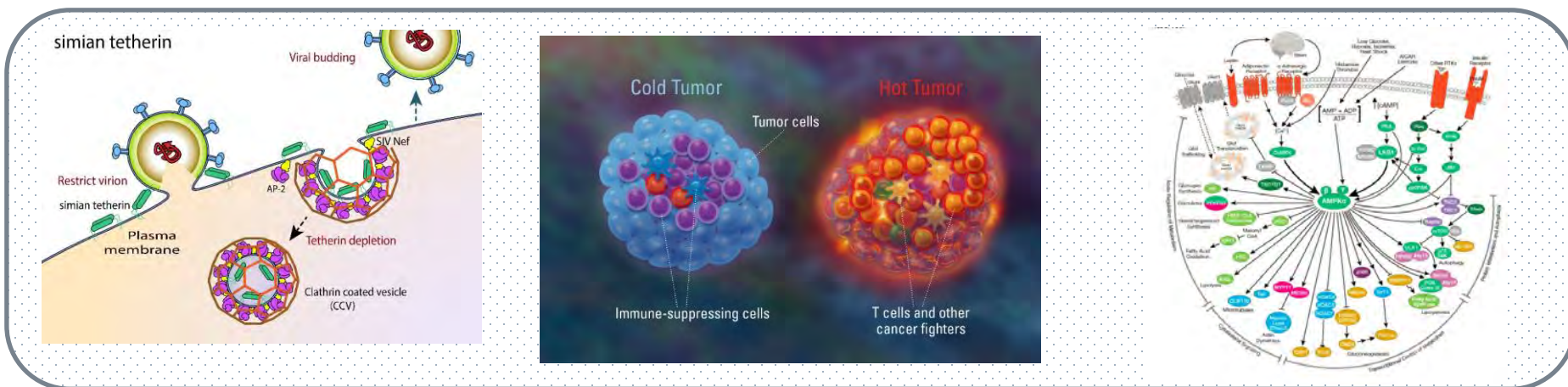
## 深圳CDC应急响应



# Motivation



## Basic diseases



Three categories :

- ❑ basic metabolic disorders,
- ❑ immunodeficiency,
- ❑ serious chronic wasting diseases