PRC Cyber Attack Motivations: Medical Big Data



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The PRC Political System and Military-Civil Fusion (MCF)

U.S. Military-Civil Fusion

- **Voluntary** grants, subsidies, and contracts
- Involves some Industry and Academia
    - Industry is typically made up of defense contractors
- Involves picking winners of contracts- does not involve involuntary data transfer to winners, or picking winners for non-government-related work

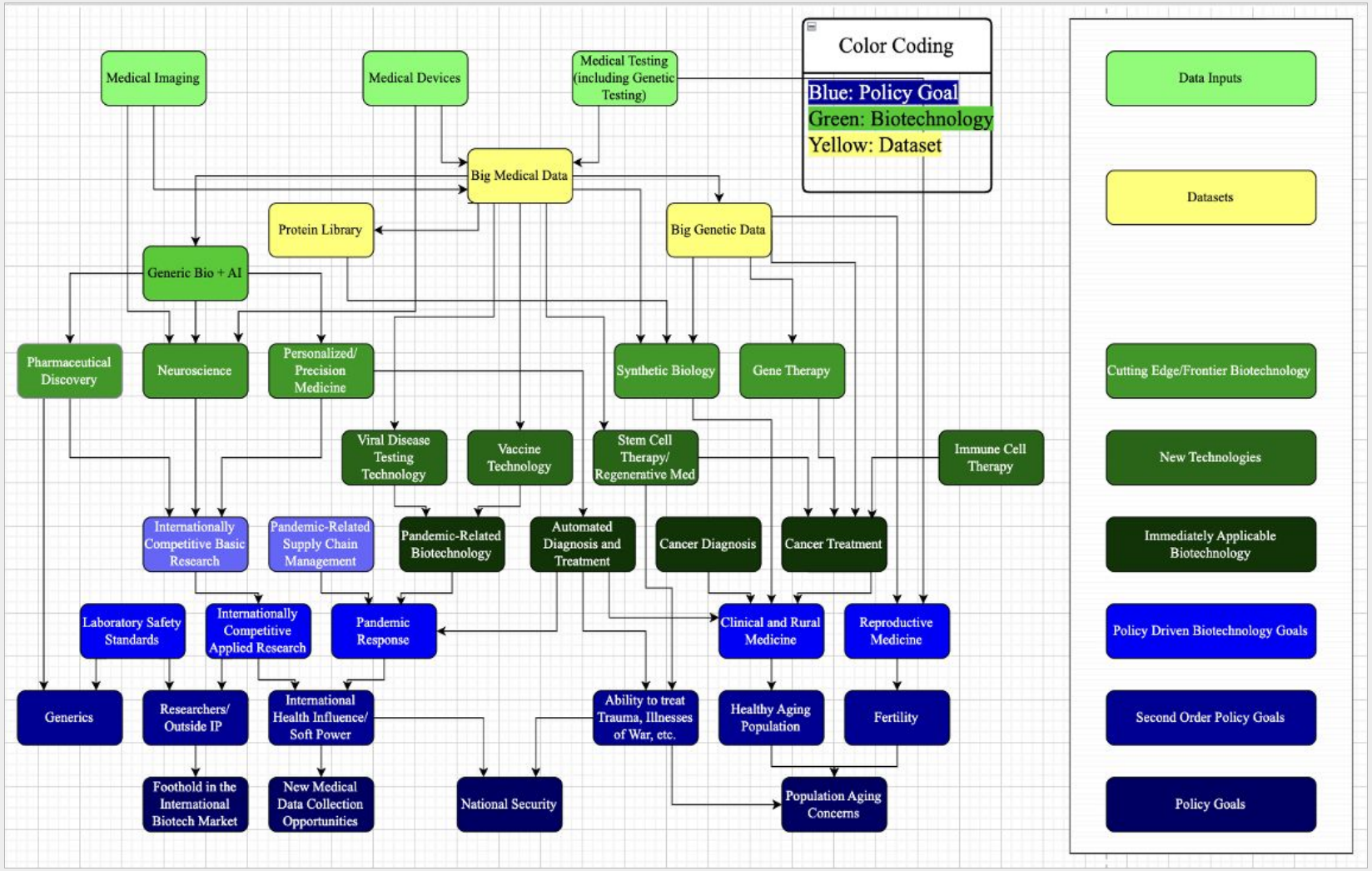
PRC Military-Civil Fusion

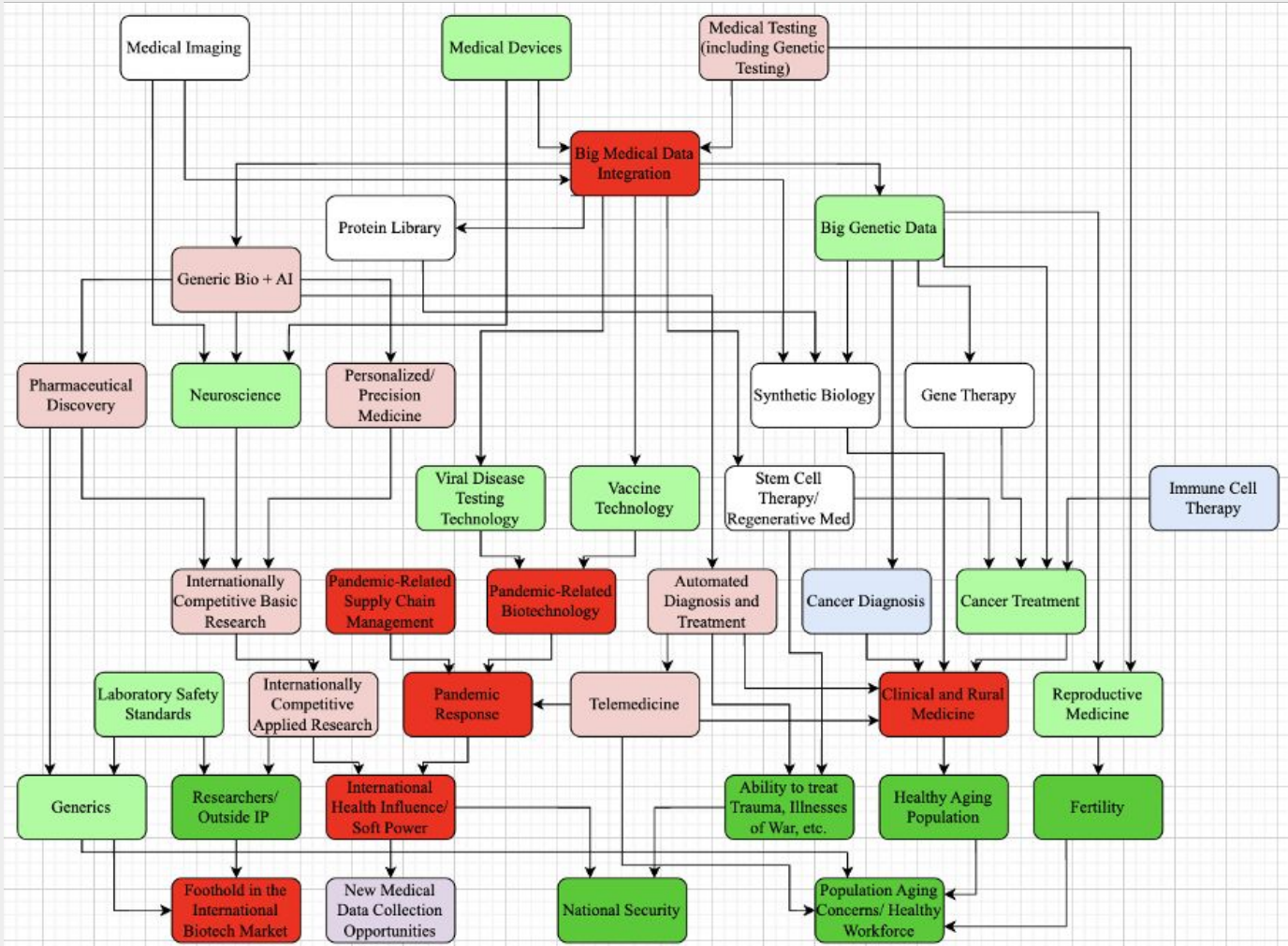
- Based on U.S. MCF
- Involves Industry, Academia and Local Governments
- Comprehensive
- Required. Punishments range from losing business to jail time
- More direct support (such as stealing information to support academics/ IP for commercial entities or attacking rivals)

How important is **bioinformatics** to the CCP?

- Bioinformatics is prominently featured in the 14th Five-Year Plan for the Bioeconomy as a building block for fields which are national security goals.
- Noted applications of Bioinformatics (global public health and vaccine development) are each given their own sections in the 14th Five Year Plan for National Economic and Social Development and Long-Range Objectives for 2035.




Color Coding
Blue: Policy Goal
Green: Biotechnology
Yellow: Dataset
Medical Imaging
Medical Devices
Medical Testing (including Genetic Testing)
Big Medical Data
Protein Library
Big Genetic Data
Generic Bio + AI
Pharmaceutical Discovery
Neuroscience
Personalized/ Precision Medicine
Synthetic Biology
Gene Therapy
Viral Disease Testing Technology
Vaccine Technology
Stem Cell Therapy/ Regenerative Med
Immune Cell Therapy
Internationally Competitive Basic Research
Pandemic-Related Supply Chain Management
Pandemic-Related Biotechnology
Automated Diagnosis and Treatment
Cancer Diagnosis
Cancer Treatment
Laboratory Safety Standards
Internationally Competitive Applied Research
Pandemic Response
Clinical and Rural Medicine
Reproductive Medicine
Generics
Researchers/ Outside IP
International Health Influence/ Soft Power
Ability to treat Trauma, Illnesses of War, etc.
Healthy Aging Population
Fertility
Foothold in the International Biotech Market
New Medical Data Collection Opportunities
National Security
Population Aging Concerns
Data Inputs
Datasets
Cutting Edge/Frontier Biotechnology
New Technologies
Immediately Applicable Biotechnology
Policy Driven Biotechnology Goals
Second Order Policy Goals
Policy Goals



Color Coding

Red: Section Header in the 14th Five Year Plan for the Bioeconomy

Pink: Subsection in the 14th Five Year Plan for the Bioeconomy

Mentioned Prominently in the 14th Five Year Plan for the Bioeconomy

Green: Dedicated section or subsection in the Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035

Light Green: Mentioned in the Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035

Blue: Mentioned in the 14th Five Year Plan for Pharmaceutical Development

Purple: Indicated by External Data

PRC Industrial Policy Playbook: Control the Supply Chain

Stage One: Use a competitive advantage to undercut (or control) the market on a key upstream good.

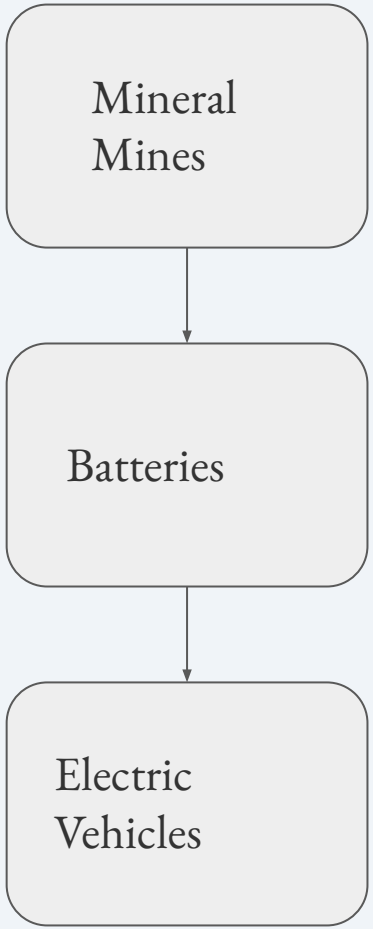
Stage Two: use that control or pricing to induce foreign companies to transfer IP and expertise in the more complex downstream area

Stage Three: use a combination of industrial policy, economic tools, and limited R&D costs to undercut prices in the downstream area.

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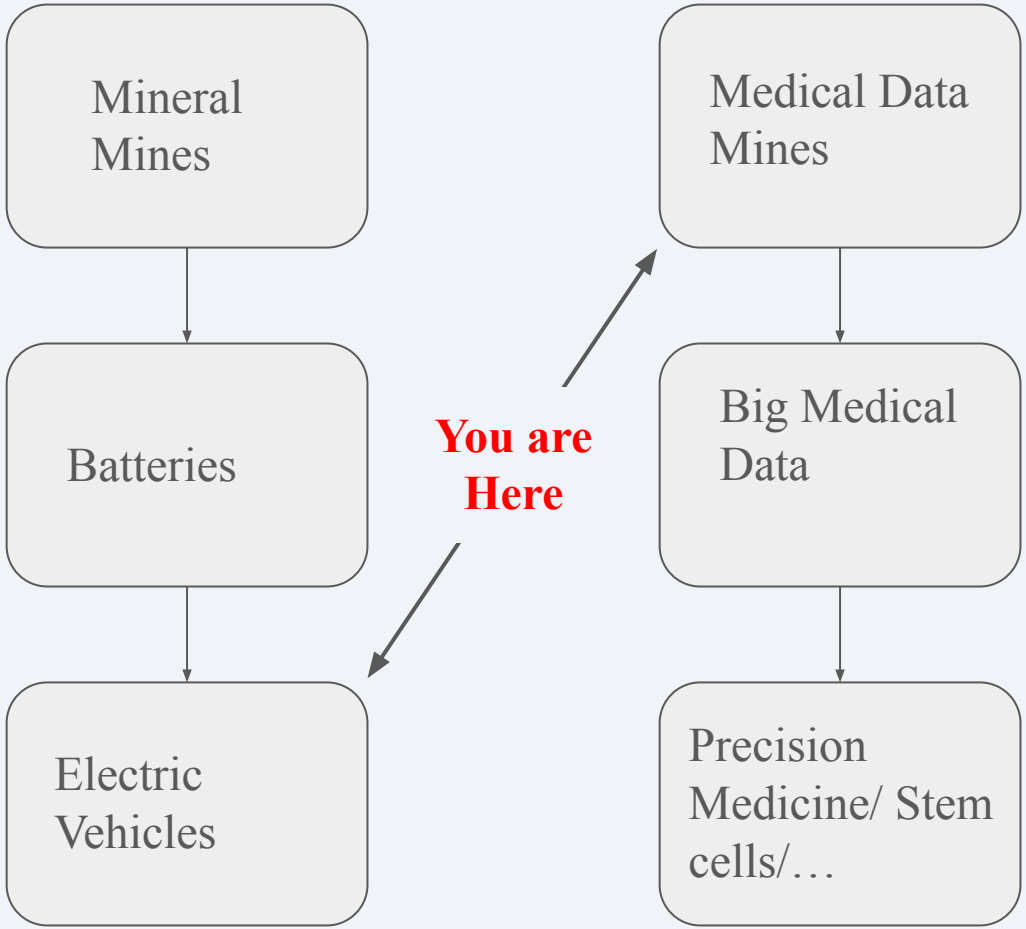
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Competitive Advantages:

	Rare Earth Minerals	**Biomedical Big Data Collection**
Lack of political constraints	• No environmental concerns • No human rights concerns (cheap labor)	• No privacy concerns • Limited IP concerns • **Remote data theft (e.g. cyberattacks)**
Industrial Policy	• Tax breaks • BRI influence	• Tax Breaks • Data sharing requirements
Other	• Nonthreatening to local non-democratic governments	• Cheap PRC Labor

Stage One: Use a competitive advantage to undercut (or control) the market on a key upstream good.

Goal: undercut the battery market

Mineral Mines

Competitive Advantages

- No environmental concerns
- No human rights concerns (cheap labor)
- Relatable to authoritarian governments
- BRI influence
- Industrial policy incentives

Goal: control medical big data

Medical Data Mines

- Genetic Testing
- Medical Devices
- Other?

Competitive Advantages

- No privacy concerns
- Limited IP concerns
- Cheap labor (in manufacturing genetic tests/ medical devices)
- Data sharing requirements
- Industrial policy incentives for manufacturing

Signals that the PRC is using this playbook in big medical data:

- Fields for Going Out
- Data Sharing Laws
- BGI's track record
- Nationally-funded biotechnology research

"Promote the **export** of innovative drugs, **high-end medical devices, genetic testing, pharmaceutical R&D services,** traditional Chinese medicine, **Internet diagnosis and treatment** and other products and services, and encourage bio-enterprises to accelerate their integration into the international market by establishing overseas R&D centers, production bases, sales networks and service systems."

14th Five Year Plan for Development of the Bioeconomy

Fields that contribute to the agglomeration of data are bolded

PRC Data Sharing Laws

> "For any overseas organization or individual whose personal information processing activities damage the personal information rights and interests of citizens of the People's Republic of China, or **endanger the national security or public interests of the People's Republic of China**, the State cyberspace administration may include such overseas organization or individual in the list of restricted or **prohibited provision of personal information**, announce the same, and take measures such as restricting or prohibiting the provision of personal information to such overseas organization or individual."

Article 43, Personal Information Protection Law (2020) since amended

In addition, **all sensitive data relating to over 10,000 people is subject to review by the government** (allowing for data transfer of medical data to PRC companies).



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BGI collecting foreign genetic data

“Shenzhen-based BGI shot to global prominence last year after selling or donating millions of COVID-19 test kits and gene-sequencing labs outside China. U.S. security agencies warned this was part of an effort to **collect large amounts of foreign genetic material**. BGI said this year it has built 80 COVID-19 labs in 30 countries, which it plans to repurpose for reproductive health screening.

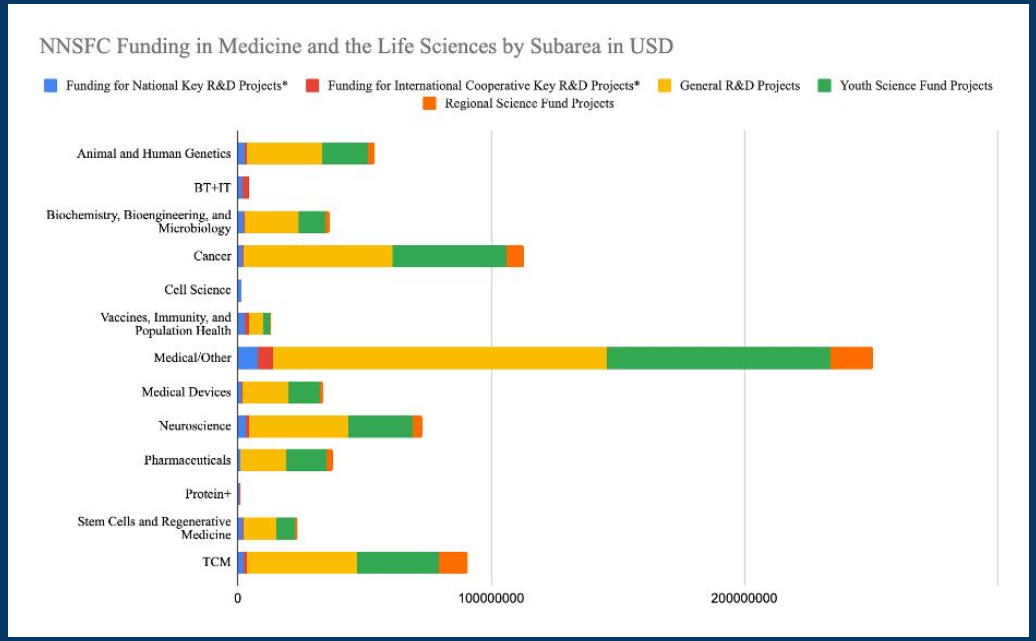
It says its COVID-19 tests do not collect patient DNA.

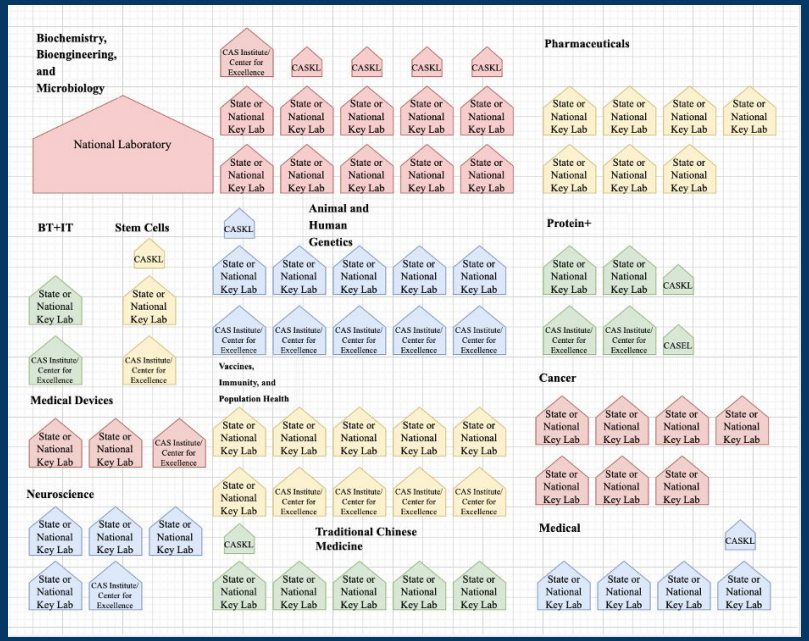
But **its prenatal tests do**.”



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Science Funding Data:





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Medical Data China is Most Interested in:

- Useful for biotechnology big data research
- Contains information that the PRC cannot otherwise access, for example
  - On genetic data of people with ethnic backgrounds outside of the PRC
  - Related to climates unlike those in the PRC
  - Workers in industries not common in the PRC
  - Recipients of medical care unavailable in the PRC
- Is immediately ready for use
- Requires no or limited additional expertise to parse



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A Note:

We can draw conclusions about other US strategic goals from information about PRC cyber attack patterns on US medical infrastructure.



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National Security and Bioinformatics

“Biosafety is related to the life and health of the people, the **long-term stability of the country**, and the sustainable development of the Chinese nation. **It is an important part of the overall national security and an important force that influences and even reshapes the world pattern.**”

All planned research to contribute to biosafety is bioinformatics research:

“Accelerate the construction of national strategic resource platforms such as **bioinformatics, human genetic resource preservation, bacterial (virus) strain preservation, and animal and plant genetic resource preservation.** Focusing on key areas such as population health, inspection and quarantine, and national defense security, adhere to total volume control, layout according to needs, and dynamic adjustment, and coordinate the layout and construction of high-level biosafety laboratories.”

(There are also manufacturing plans)

Plans to go international:

These same documents emphasize plans to go international with vaccines and public health measures and thereby gain the influence necessary to set international biosafety standards and responses to suit PRC wishes.

Oops, we noticed: US Provisions are making the PRC desired data transfer slightly harder

- Export Controls
- Sanctions
- Planned Biosecure Act

This leads to an odd conclusion: seeing an uptick in cyber attacks on bioinformation is good. It means that our plans to limit the transfer of data are working.



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A lack of an uptick in cyber attacks in this sector means that our attempts to stop PRC entities from accessing US medical data are failing.



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Questions



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Back-ups

Just in case

Applications:

Artificial intelligence-assisted diagnosis and treatment. Develop medical image-assisted diagnosis systems. Support the development of applications such as medical image-assisted diagnosis, pathological typing, and physiological signal analysis based on artificial intelligence, carry out research and development of image recognition technology for common injuries and diseases such as brain, lung, eye, bone, cardiovascular and cerebrovascular, and skin, and accelerate the productization and clinical auxiliary application of medical image-assisted diagnosis systems. Develop a multimodal clinical decision support system that comprehensively uses clinical guidelines and clinical standard terminology sets for common diseases, covers common types of diseases, supports the timely addition of new disease types for diagnosis, treatment, and rehabilitation guidelines every year, and uses natural language processing, knowledge graphs and other technical means to achieve intelligent guidance in the collection and identification of medical record information, covering the entire process of physical examination, triage, decision-making, and postoperative review. Explore the development of traditional Chinese medicine Intelligent auxiliary system for syndrome differentiation and treatment.

Applications

Information technology supports the development of new drugs. Use cloud computing, big data, artificial intelligence and other information technologies to supervise the development of new drugs such as therapeutic indications and new target verification, preclinical and clinical trials, product design optimization and industrialization, and realize the precise development and large-scale development of the drug industry. Improve the automation, digitization and intelligence level of pharmaceutical equipment, and develop information-based pharmaceutical equipment such as drug crystallization, supercritical extraction and chromatographic separation, online detection of solid preparation production, continuous culture bioreactors, large-scale protein purification, cold chain storage and transportation based on artificial intelligence.