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Mega Genomics Limited (6667 HK)

Embracing fast growing genetic-based preventive care

■ Co. is the largest player in cancer & consumer genetic testing in China in 2020 per F&S, providing comprehensive testing solutions

■ We expect Co. to maintain its leading position in future and predict 58%/54% CAGR in revenue/adj. NP over 2021-23E

■ Initiate with BUY and TP of HKD23.1 based on 19x 2023 PER

Thriving cancer screening/consumer genetic testing mkts

The cancer screening & consumer genetic testing mkt. are experiencing fast growth thanks to increasing health awareness. Per F&S, the combined Chinese IVD mkt. of colorectal, gastric, lung, breast & cervical cancer screening is expected to grow at a CAGR of 22.3%/20.9% to reach ~RMB26.5bn/68.6bn in 2020-25E/25E-30E; Chinese consumer genetic testing also has significant potentials: F&S estimated it to grow at a CAGR of 45.4%/42.4% to reach ~USD445mn/USD2.6bn in 2020-25E/25E-30E, w/ penetration rate grow from 0.8% in 2020 to 11.6% in 2030E.

A leader in cancer screening & consumer genetic testing

As per F&S, Mega Genomics and its subsidiaries ("the Group") were the largest genetic testing platform for cancer screening in China as measured by the No. of tests administered in FY20. It provided 106.2k genetic-based CRC tests, accounting for 49% mkt. share. In FY21, the Group provided ~312K cancer screening services (~+200% yoy). It was also the largest consumer genetic testing player in China in 2020, accounting for 34.2%/65.8% mkt share by revenue/No. of tests provided. We expect the Group to maintain its leading position in future, due to its 1) strong sales network and marketing synergy w/ Meinian OneHealth (美年大健康), 2) ability to provide comprehensive solutions (91 testing services/products), 3) ability to achieve cost advantage given its greater scale and mkt. share, and to ensure quality controls via automated labs & refined SOPs, and 4) in-house R&D effort to broaden product mix & to reduce IVD product cost.

Sales network expansion & synergy with Meinian

The Group's broad sales network covered 1,497 healthcare institutions (incl. ~600 Meinian checkup centers) in over 340 cities in China, as of YE21. Of note, Meinian as one of the Group's controlling shareholders, accounted for 40% mkt. share of private health checkup centers by consumer traffic in 2020 in China. We think the strong synergic relationship between the Group and Meinian should strengthen its leading position in cancer screening & consumer genetic testing mkt. Meanwhile, we expect the Group to continue to scale its marketing team and to diversify its sales network, incl. tapping into O2O/retail channels.

We initiate with BUY and PE-based TP of HKD23.1

We predict 58% CAGR in revenue and 54% CAGR in adj. NP over 2021-23E, driven by growing penetration and network expansion. We initiate with BUY on Co. with TP of HKD23.1 based on 19x 2023 PER. We think the Group' valuation should align with its listed peers' average, judging from its greater profitability but smaller P&L size. **Investment risk:** contract renewal, regulation risks and, etc.

RMB mn	2019	2020	2021	2022E	2023E
Consolidated revenue	124	203	237	368	595
% yoy change	-37%	64%	17%	55%	62%
Adjusted EBITDA	72	125	137	199	330
% yoy change	64%	74%	9%	46%	66%
Adjusted net profit	46	94	105	161	251
% yoy change	23%	103%	12%	53%	56%

Sources: Company, CMS (HK) estimates; Note*: adj. net profit excluded one-off items

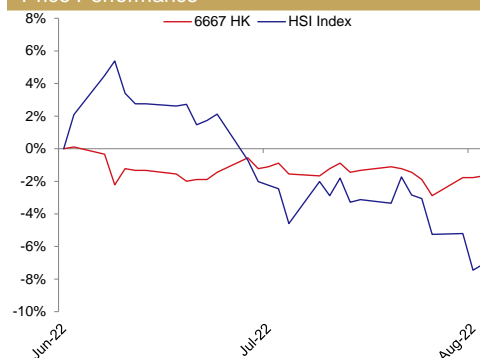
Initiation

BUY

Price (Aug 3, 2022) HKD17.7

12-month Target Price HKD23.1 (+30%)
(Potential up/downside)

Price Performance



Source: Bloomberg

%	1m	6m	12m
6667 HK	(0.1)	n.a.	n.a.
HIS	(9.5)	(17.0)	(25.2)

Sector: Pharmaceutical & Healthcare

Hang Seng Index (Aug 3, 2022)	19,767
HSCEI (Aug 3, 2022)	6,737

Key Data

52-week range (HKD)	16.1-21.0
Market cap (HKD mn)	4,239
Avg. daily traded value (HKD mn)	n.a.
BVPS (HKD)	4.8

Shareholding Structure

Management	16.7%
Meinian Onehealth	15.6%
Other pre-IPO investors	62.7%
Free float	5.0%

Sources: Company, Bloomberg

Thesis summary

The Group (Mega Genomics Limited (the “Company”) and its subsidiaries (collectively referred to as the “Group”)) is headquartered in Beijing, is a leading genetic testing platform within the fast growing 1) cancer screening and 2) consumer genetic testing markets. The Group had broad sales network, covering 1,497 healthcare institutions over 340 cities in China, as of December 31, 2021.

The significant market potential within the **cancer screening market** was due to high disease incidences. China had 4.6mn cancer incidences and 2.7mn cancer-related deaths in 2020. Cancer incidences and number of cancer-related deaths are estimated to reach 5.2mn/3.1mn in 2025E and 5.8mn/3.5mn in 2030E. The cancer screening is experiencing fast growth, thanks to increasing health awareness. According to F&S, the combined Chinese IVD market of colorectal, gastric, lung, breast, and cervical cancer screening at ex-factory level is expected to grow at a CAGR of 22.3%/20.9% to reach RMB26,534.3mn/68,632.1mn in 2020-25E/2025E-30E.

In particular, among the 646.4mn Chinese adult recommended for CRC screening during 2020, 15.1% underwent fecal occult blood testing, 1.3% used colonoscopy, and 0.03% chose genetic testing. Genetic testing is expected to tap into the unscreened population thanks to public’s growing acceptance. Genetic testing is expected to replace the fecal occult blood given higher sensitivity/lower false positive rate, and to attract some colonoscopy population due to its minimally invasive nature.

The Chinese **consumer genetic testing business** also has significant market potentials. As per F&S, China’s consumer genetic testing is estimated to grow at a CAGR of 45.4%/42.4% to reach USD445.1mn/USD2,610.1mn in 2020-25E/2025E-30E with penetration rate grow from 0.8% in 2020 to 11.6% in 2030E.

As per F&S, the Group was the largest provider of genetic testing platform for cancer screening in China as measured by the number of tests administered in 2020. It provided 106.2k genetic-based CRC tests, accounting for 49% market share. During the fiscal year of 2021, the Group provided ~312K cancer screening tests (~+200% yoy). The Group was also the largest consumer genetic testing player in China in 2020, accounting for 34.2%/65.8% market share by revenue/ number of tests provided. We expect the Group to maintain the leading position in the future, due to its 1) strong sales network and marketing synergy with Meinian OneHealth, 2) ability to provide comprehensive solutions (91 testing services/products) towards its institutional customers, 3) ability to achieve cost advantage given its greater scale and mkt share, and ensure quality controls via automated labs and refined SOPs, and 4) in-house R&D effort to further broaden product mix and reduce IVD product cost (ApoE, folate metabolic testing, cancer screenings, etc.).

The Group had broad sales network, covering 1,497 healthcare institutions (incl. ~600 checkup centers under Meinian OneHealth) in over 340 cities in China, as of December 31, 2021. These customers include private health checkup centers, hospitals, and O2O platforms. Of note, Meinian OneHealth, as one of the Group’s controlling shareholders, accounted for 40% market share of private health checkup centers by consumer traffic during 2020 in China. We think the strong synergic relationship between the Group and Meinian OneHealth should strengthen its leading position in cancer screening and consumer genetic testing market. Meanwhile, we expect the Group to continue to scale its marketing team and to diversify its channel, including tapping into O2O/retail channels.

Over 2019-2021, the Group delivered 64%/17% yoy growth in revenue with an adjusted net profit of RMB46mn, RMB94mn and RMB105mn. We predict 58% CAGR in revenue and 54% CAGR in adj. NP over 2021-23E, driven by growing demand of cancer screening testing and expansion of customer base.

We initiate with BUY on Co. with TP of HKD23.1 based on 19x 2023 PER. We think the Group’ valuation should align with its listed peers’ average, judging from its greater profitability but smaller P&L size. **Investment risks** include contract renewal, regulation risks and, etc.

Risks

Contract renewal risk: The Group's sales rely on the continued business partnership with institutional customers by providing consumer genetic testing and cancer screening services. Revenue and profitability could be materially and adversely affected if contract was voided or lapsed.

Regulation risk: All business operational aspects of the Group that involve in 1) specimen collection, 2) testing result reading, 3) testing result analysis, and 4) gene data integrity are heavily regulated.

Malpractice & reputation risk: If the Group's services cause, or are perceived to cause, severe adverse healthcare outcomes, the Group's reputation (i.e. failure to achieve broad market acceptance or maintain good reputation for the Group's IVD products in the future), the business and operating results could be materially and adversely affected.

Accreditation risk: If the Group fails to extend and obtain necessary permits or accreditations for its existing and new services and products, the ability to perform tests may be jeopardized, and the Group may not be able to commercialize new services or products promptly or at all.

Intellectual property (IP) risk: If the Group is unable to obtain and maintain patent protection for its standard operating procedures or technical know-hows or if its IP rights are not sufficiently broad, third parties may compete directly against the Group. If the Group is sued for infringing the IP rights of third parties, such litigation could prevent or delay the operations.

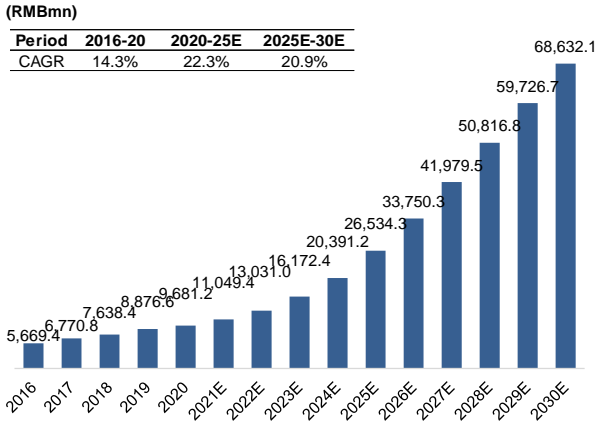
Staff and key management risk: The Group's future success depends on its ability to retain key staff in its business development, R&D, sales and marketing team and executives and to attract, retain and motivate qualified personnel. To retain valuable employees at the Group, it may also significantly increase staff remuneration.

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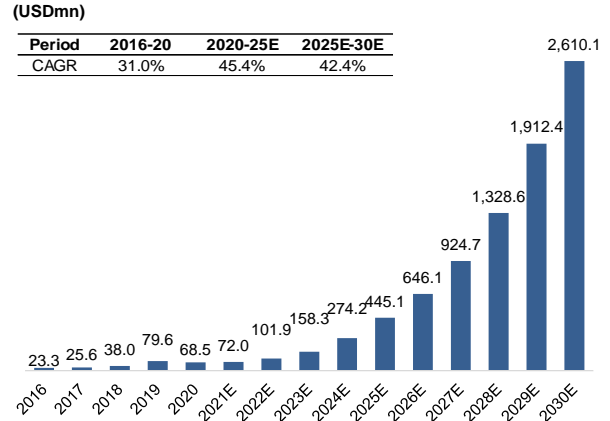
Focus Charts

Figure 1: China's major cancer screening* markets, 2016-2030E



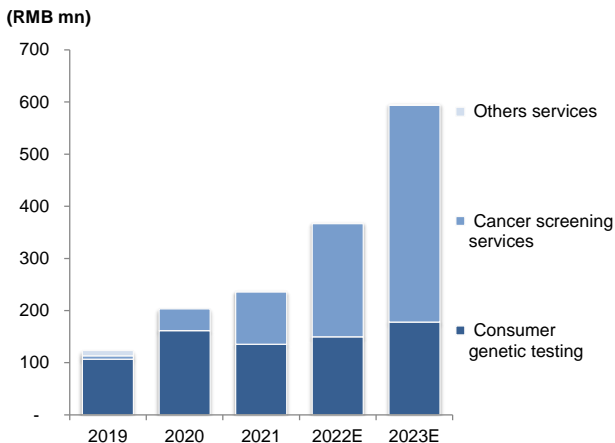
Source: Literature research, expert review and Frost & Sullivan Analysis; Note*: combination of CRC, gastric cancer, lung cancer, breast cancer, and cervical cancer screening mkt include only the revenue of IVD products for cancer screening at ex-factory level.

Figure 2: China's consumer genetic testing market, 2016-2030E



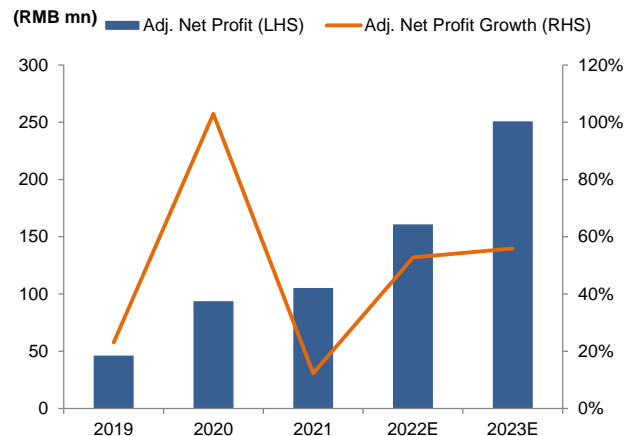
Sources: China's National Bureau of Statistics, expert interview and Frost & Sullivan Analysis

Figure 3: The Group's revenue breakdown by segments



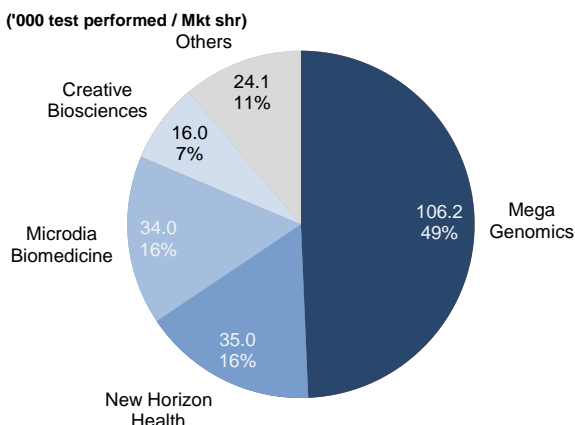
Sources: Company data, CMS (HK) estimates

Figure 4: The Group's adjusted net profit and growth



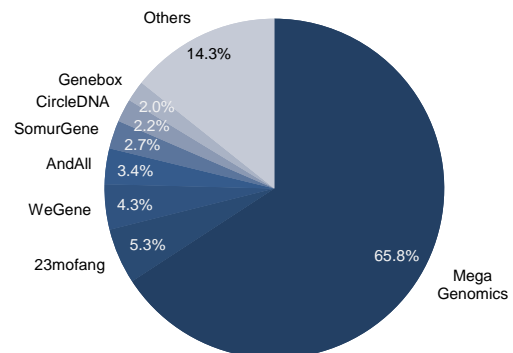
Sources: Company data, CMS (HK) estimates

Figure 5: Group's genetic-based CRC screening mkt share by No. of test performed in China, 2020



Sources: Companies' website, expert interview and Frost & Sullivan Analysis

Figure 6: Group's mkt share of consumer genetic testing by No. of testing performed in China, 2020



Sources: Company data, CMS (HK) estimates

Industry overview

Vast market opportunities for cancer screening business

The significant market potential within the cancer screening market was due to high disease incidences. China had 4.6mn cancer incidences and 2.7mn cancer-related deaths during 2020. Cancer incidences and number of cancer-related deaths are estimated to reach 5.2mn/3.1mn in 2025E and 5.8mn/3.5mn in 2030E.

The cancer screening is experiencing fast growth, thanks to increasing health awareness. According to F&S, the combined Chinese IVD markets of colorectal, gastric, lung, breast, and cervical cancer screening at ex-factory level is expected to grow at a CAGR of 22.3%/20.9% to reach RMB26,534.3mn/68,632.1mn in 2020-25E/2025E-30E.

Cancer screening can lead to early detection and early intervention of diseases. Therefore, significantly prolong patients' survival while the disease burden is low or minimal.

Figure 7: Cancer screening offers significant benefit when tumor burden is low



Source: Exact Science presentation material

Although current penetration rate of cancer screening remains low compared to developed economy, we expected the gap will narrow, due to increasing awareness and medical sources on per capita basis (i.e. colonoscopist/pathologists and more alternative screening methods). Current “gold standard” screenings are usually invasive and heavily reliant on visual recognition of lesions. Genetic based cancer screening has the potential to overcome the above obstacles and to provide ideal solutions for high risk population. Below we summarized market potential and competitive landscape of cancer screenings of five disease areas, including 1) colorectal cancer, 2) gastric cancer, 3) lung cancer, 4) breast cancer, and 5) cervical cancer.

Colorectal cancer screening

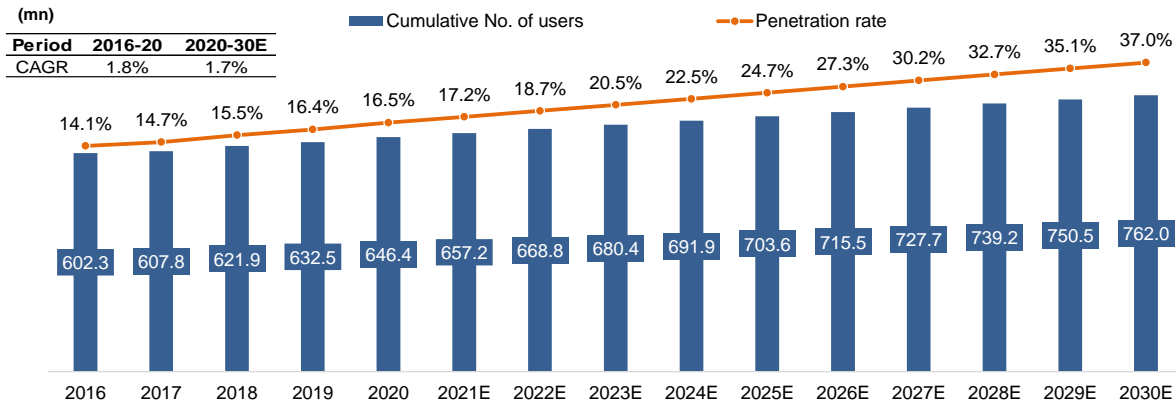
As per F&S, China had 453,400 colorectal cancer (CRC) incidences and 218,200 related deaths in China during 2020. The CRC incidences are on the rise and average age of patient is trending lower during recent years, mainly due to changing life styles (dietary habit changes or lack of physical activities). However CRC is considered highly curable if patients received early detections and medical interventions. This is due to the nature of slow disease progression of CRC in early development stages. According to F&S, in China the 5 year survival rate of CRC is 90.1% if diagnosed and treated during the localized stages. Therefore CRC screening and identification provide unparalleled clinical benefit, particularly to asymptomatic patients.

Per the China Anti-Cancer Association (CACA) recommendation, people between age 40 and 74 are considered high risk population and shall undertake regular CRC screenings. The number of people recommended for regular CRC screening in China increased to 646.4mn people in 2020 from 602.3mn people in 2016 and is expected to further increase to 762.0mn people in 2030. This trend is reflected in Figure 8 on the next page.

In 2019, the penetration rate of CRC screening for the recommended population was 16.4% in China, lower than 60.1% penetration rate in the United States in 2019. The lower penetration rate was mainly due to 1) lower CRC screening awareness, 2) lack of pharmaco-economically effective screening methods, 3) insufficient medical resources (limited colonoscopy capacity per capita) and 4) invasive nature of colonoscopy.

Although the current penetration rate remains low in China, F&S estimated that the penetration rate for CRC screening among the recommended population to reach 24.7% in 2025E and 37.0% in 2030E.

Figure 8: Population recommended for CRC screening and penetration rate in China, 2016-2030E

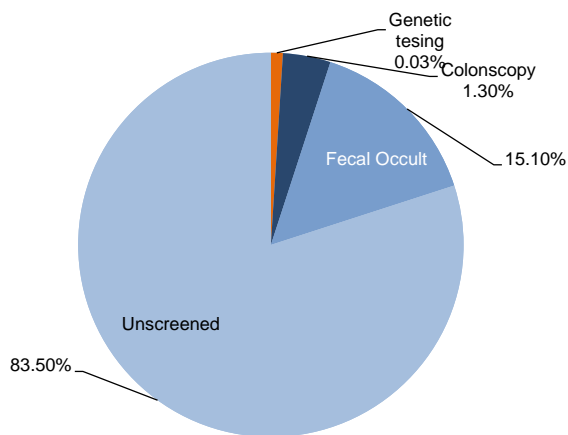


Sources: China's National Bureau of Statistics, Expert Consensus on Screening Strategies for CRC in China, literature research, expert interview and Frost & Sullivan Analysis

Based on above data, it is estimated that 173.8mn/281.9mn people will receive CRC screening in 2025E/2030E. In particular, among the 646.4mn Chinese adult recommended for CRC screening during 2020, 83.5% was unscreened, 15.1% underwent fecal occult blood testing, 1.3% used colonoscopy, and 0.03% chose genetic testing. Genetic testing is expected to tap into the unscreened population thanks to growing acceptance of such method. It is expected to replace the fecal occult blood given its higher sensitivity/lower false positive rate and to attract some colonoscopy population due to its minimally invasive nature.

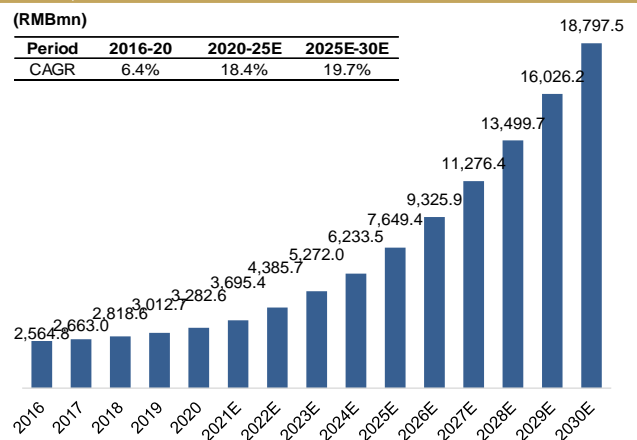
According to F&S, the combined Chinese IVD market of colorectal cancer screening at ex-factory level is expected to grow at a CAGR of 18.4%/19.7% to reach RMB7,649.4mn/18,797.5mn in 2025E/2030E.

Figure 9: CRC screening penetration in China by testing method, 2020



Sources: Companies' websites, expert interview and Frost & Sullivan Analysis

Figure 10: Market size of CRC screening market in China, 2016-2030E



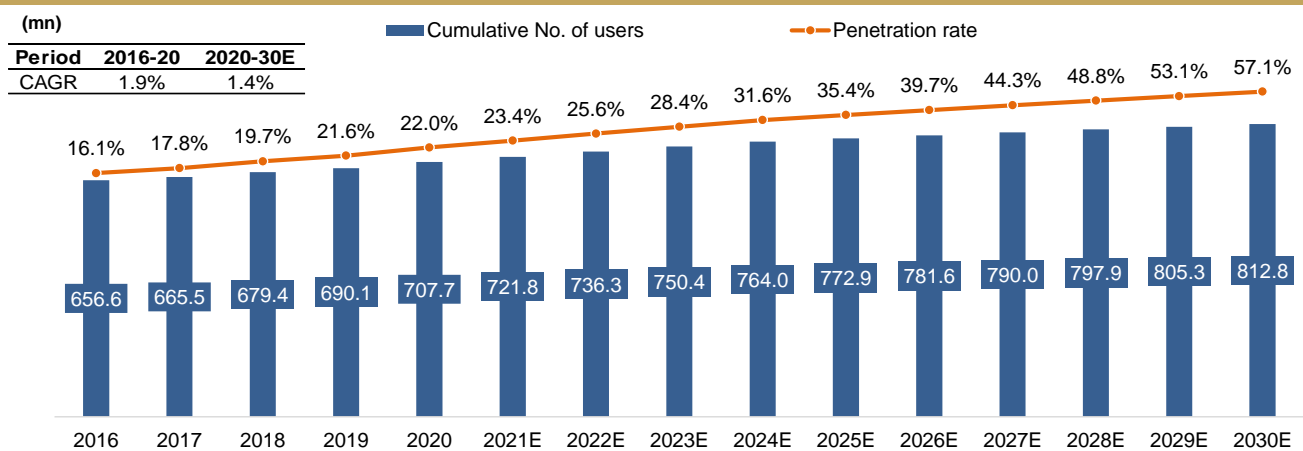
Source: Literature research, expert interviews and Frost & Sullivan Analysis; Note: The calculation of the CRC screening market includes only the revenue of IVD products for cancer screening at ex-factory level.

Gastric cancer screening

As per F&S, China had 469,600 gastric cancer (GC) incidences and 341,200 related deaths in China (accounting for 44.4% of world total GC-related deaths) during 2020. The GC incidences are on the rise, due to changing life styles and environmental factors.

Per the “Expert Consensus on Early Gastric Cancer Screening Process in China (Draft)” published by the China Anti-Cancer Association (CACA) in 2017, people above age 40 are recommended to undertake regular GC screenings. The number of people recommended for regular GC screening in China increased to 707.7mn in 2020 from 656.6mn people in 2016 and is expected to further increase to 772.9mn/812.8mn people in 2025E/2030E. The penetration rate of GC screening is on the rise in recent years and reached 22.0% in 2020 from 16.1% in 2016. It is expected to reach 35.4%/57.1% in 2025E/2030E. Based on the data, it is estimated that 273.6mn/464.1mn people will receive GC screening in 2025E/2030E. This trend is reflected in Figure 11 below.

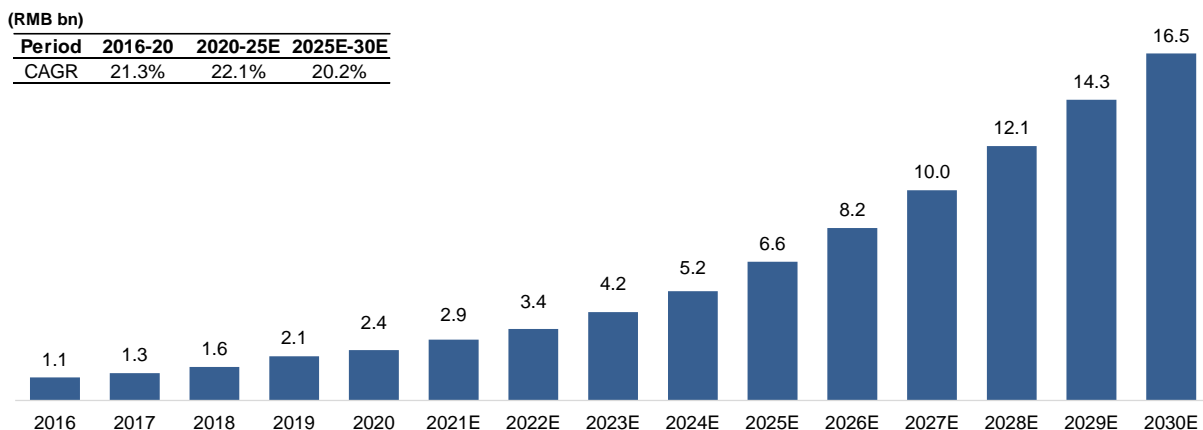
Figure 11: Population recommended for gastric cancer screening and penetration rate in China, 2016-2030E



Sources: China’s National Bureau of Statistics, Expert Consensus on Early Gastric Cancer Screening Process in China (Draft) (2017, Shanghai), literature research, expert interviews, Frost & Sullivan analysis

GC screening market in China can provide substantial opportunities for IVD products companies. As per F&S, China’s IVD market for GC screening grew at a CAGR of 21.3% to RMB2.4bn from RMB1.1bn over 2016-20. F&S estimated the market will continue to grow at a CAGR of 22.1% to reach RMB6.6bn in 2020-25E and 20.2% CAGR to RMB16.5bn in 2025E-30E.

Figure 12: Gastric cancer screening market in China, 2016-2030E



Sources: Literature research, expert interviews and Frost & Sullivan Analysis; Note: The calculation of the gastric cancer screening market includes only the revenue of IVD products for cancer screening at ex-factory level.

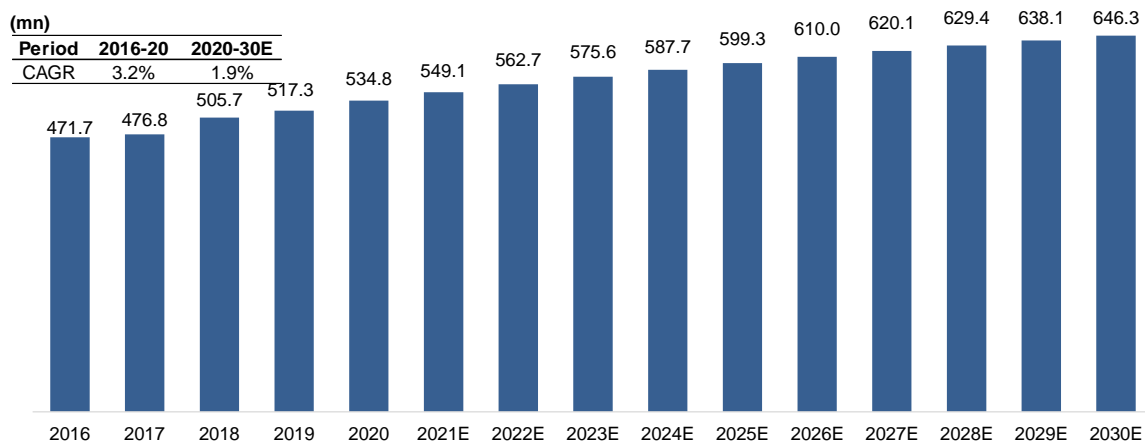
Lung cancer screening

As per F&S, China had 924,100 lung cancer (LC) incidences and 743,600 related deaths in China during 2020. Lung cancer incidences in China are on the rise, due to harmful exposure, oncogenic mutations and other environmental factors. Lung cancer is considered as one of the most deadly malignancies: 1) it is minimally symptomatic during early stage of disease and 2) significantly lower five year survival rate for advanced stage patients.

Given the apparent benefit for early detection and intervention, the percentage of patients diagnosed at localized stage was 8.4% in China in 2020, lower than that of 17.6% in the United States. This is partially due to lack of awareness of lung cancer screening options. However, we expect such situation to improve gradually given continued effort of market education by stakeholders.

According to the Cancer Hospital of Chinese Academy of Medical Sciences, people between age 45 and age 75, and adults with a smoking history of at least 20 pack-years, shall undertake lung cancer screenings. This population in China increased to 534.8mn people in 2020 from 471.7mn people in 2016 and is expected to further increase to 599.3mn/646.3mn people in 2025E/2030E. This trend is shown in Figure 13 below.

Figure 13: Population recommended for lung cancer screening in China, 2016-2030E



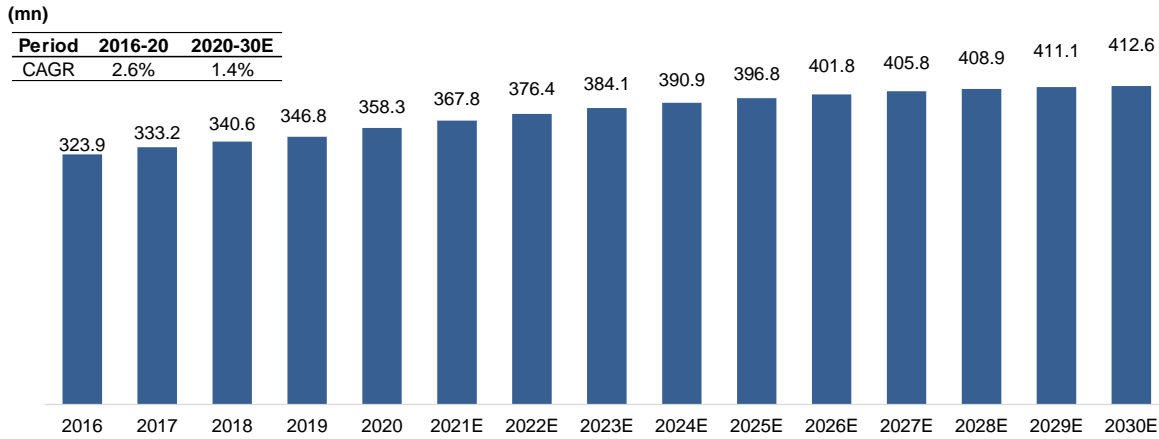
Sources: China's National Bureau of Statistics, Guidelines for Clinical Diagnosis and Treatment of Lung Cancer and Frost & Sullivan Analysis

Breast cancer screening

As per F&S, China had 331,600 breast cancer (BC) incidences and 79,600 related deaths in China during 2020. Due to the relatively high incidence and disease burden, it is recommended for regular breast cancer screening. Digital breast tomosynthesis mammography is considered as the gold standard for BC screening. However, it involves radiation during the imaging process and requires specialists' visual recognition of tumor cells among dense breast tissues. Tumor biomarker screening as an alternative option offers a radiation free solution and can be performed at healthcare/non-healthcare setting. Beside cancer screenings, people may also choose consumer genetic testing such as BRCA1/2 testing kit to assess their hereditary risk of breast or ovarian cancer. These consumers may then take preventive actions (i.e. preventive mastectomy) accordingly.

According to CACA, it is recommended that women above age 40 to undertake regular breast cancer screenings. This population in China increased to 358.3mn people in 2020 from 323.9mn people in 2016 and is expected to further increase to 396.8mn/412.6mn people in 2025E/2030E. The historical and the forecasted population trend are shown in Figure 14 on the next page.

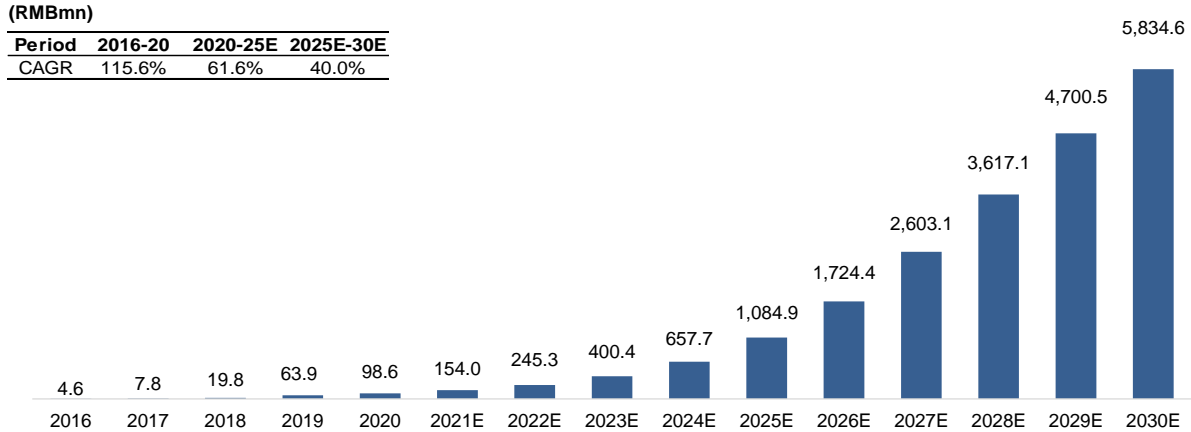
Figure 14: Population recommended for breast cancer screening in China, 2016-2030E



Sources: China's National Bureau of Statistics, Screening Guidelines for Female Breast Cancer in China and Frost & Sullivan Analysis

Breast cancer screening market in China can provide substantial opportunities for IVD products companies. As per F&S, China's IVD market for BC screening grew at a CAGR of 115.6% to RMB98.6mn from RMB4.6mn over 2016-20. F&S estimated the market will continue to grow at a CAGR of 61.6% to reach RMB1,084.9mn in 2020-25E and 40.0% CAGR to RMB5,834.6mn in 2025E-30E.

Figure 15: Breast cancer screening market in China, 2016-2030E

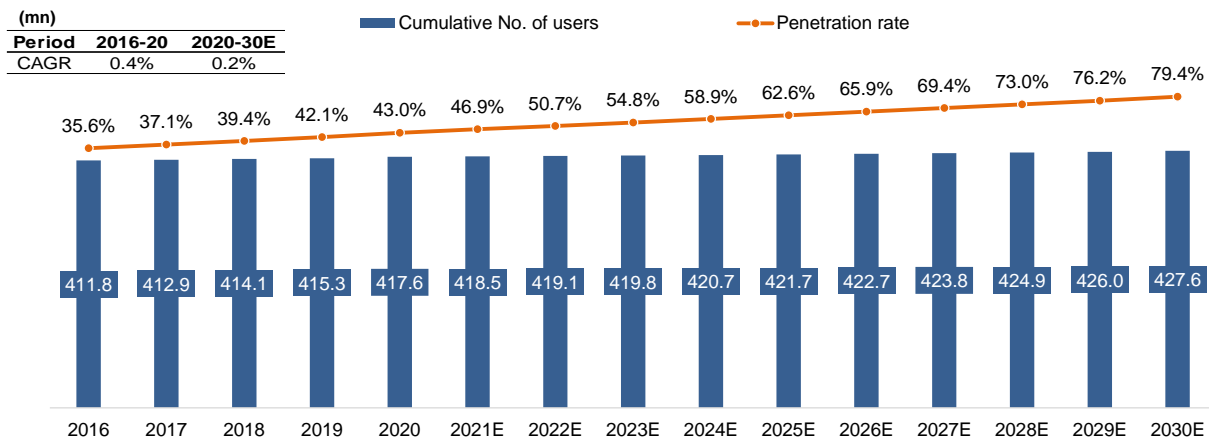


Sources: Literature research, expert interviews and Frost & Sullivan Analysis; Note: The calculation of the breast cancer screening market includes only the revenue of IVD products for cancer screening at ex-factory level.

Cervical cancer screening

According to F&S, China had 118,500 cervical cancer (CC) incidences and 59,100 related deaths in China during 2020. As per the Chinese Preventive Medicine Association (CPMA), women between age 25-65 are recommended to undertake CC screenings. The number of people recommended for CC screening in China increased to 417.6mn in 2020 from 411.8mn people in 2016 and is expected to further increase to 421.7mn/427.6mn people in 2025E/2030E. The penetration rate of CC screening is on the rise in recent years thanks to rising health awareness and updated CC screening guidelines. The penetration rate reached 43.0% in 2020 from 35.6% in 2016. It is expected to reach 62.6% in 2025E and 79.4% in 2030E. Given above data, it is estimated that 264.0mn/339.5mn people will receive CC screening in 2025E/2030E. This trend is reflected in Figure 16 below.

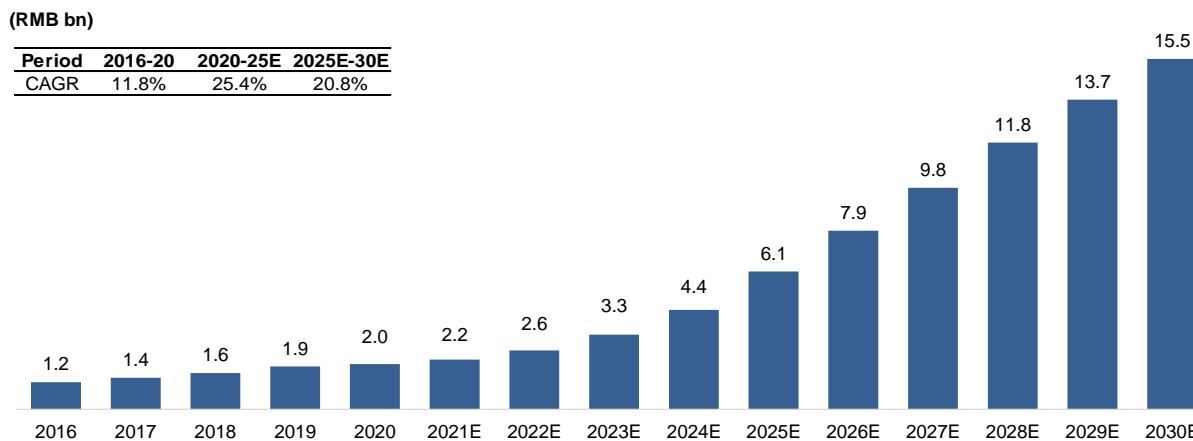
Figure 16: Population recommended for cervical cancer screening and penetration rate in China, 2016-2030E



Source: China's National Bureau of Statistics, Comprehensive Prevention and Control Guidelines for Cervical Cancer in China, literature research, expert interviews, Frost & Sullivan Analysis

The Chinese CC screening market for IVD product companies are expected to experience fast growth. As per F&S, China's IVD market for CC screening grew at a CAGR of 11.8% to RMB2.0bn from RMB1.2bn over 2016-20. F&S estimated the market will continue to grow at a CAGR of 25.4% to reach RMB6.1bn in 2020-25E and 20.8% CAGR to RMB15.5bn in 2025E-30E.

Figure 17: Cervical cancer screening market in China, 2016-2030E

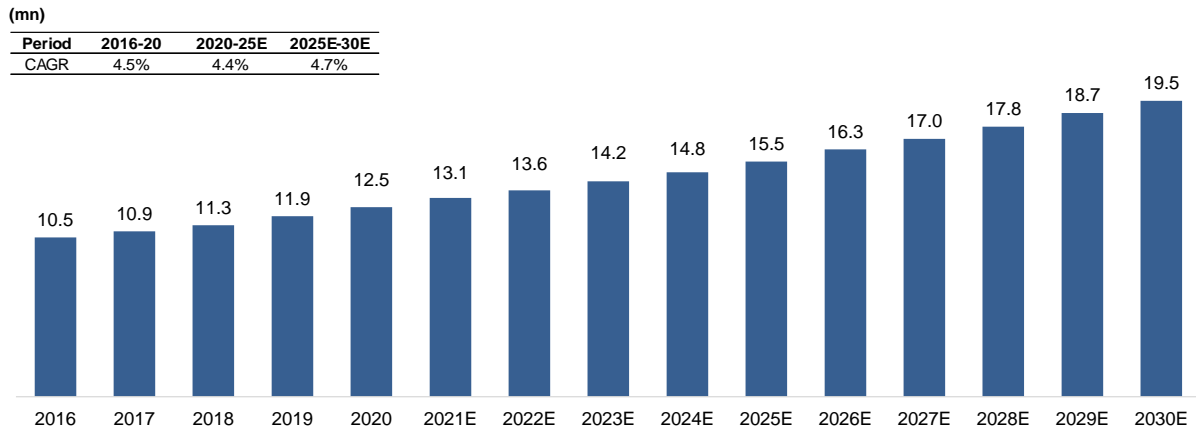


Sources: Literature research, expert interviews and Frost & Sullivan Analysis; Note: The calculation of the cervical cancer screening market includes only the revenue of IVD products for cancer screening at ex-factory level.

Alzheimer’s disease screening (non-cancer)

According to F&S, China had 12.5mn Alzheimer’s disease (AD) prevalence in China by 2020. The AD patient number is gradually rising in China due to longer life expectancies and growing ageing population. F&S estimated the AD prevalence in China will continue to grow at a CAGR of 4.4% to reach 15.5mn in 2020-25E and 4.7% CAGR to 19.5mn in 2025-2030E. The following chart illustrates the historical and forecasted prevalence of Alzheimer’s disease in China between 2016 and 2030.

Figure 18: Prevalence of AD in China, 2016-2030E



Sources: China’s National Bureau of Statistics, literature research and Frost & Sullivan Analysis

There is no sufficiently accurate method for screening of Alzheimer’s disease. Main diagnostic testing includes the combinations of neuro-imaging, cerebrospinal fluid examination, peripheral blood antibody testing and genetic testing. Genetic testing is a less invasive method. It checks AD patients’ expression level of miRNA in plasma exosomes. In addition, ApoE gene testing can be used to assess genetic risk of developing AD. Consumers who carry 4 allele gene (ApoEε4) are identified as higher risk population for AD. ApoEε4 carriers who have enhanced AD pathology, accelerated age-dependent cognitive decline and declining memory shall be advised to adopt prevention strategies, including dietary modification, physical activity and cognitive engagement.

We identify the following factors are key barriers to entry into cancer screening market:

- **Industry relationship and sales channel:** Leading companies have established strong relationships via academic activities with KOLs, research institutes and hospitals to develop and to commercialize their services or products. Late comers may encounter barriers to tap into the market as it requires significant resources and times to establish necessary relationship and channel.
- **Technology and know-how barriers:** Technological barriers remained high to develop new services and products for cancer screenings. It requires multi-disciplinary approach and deep understanding of the market demand to develop commercially viable services or products. The research and development process also requires the understanding of target selections, qPCR probe design, cfDNA methylation capture ability, sample stabilization technology and advanced sequencing technology requiring high throughput and high-precision. New entrants generally lack the technological capabilities and know-hows to perform such activities.
- **Cost control:** Similar to the consumer genetic testing, the ability to control cost effectively is vital for cancer screening business process, involving clinical research, maintenance of sequencing platform, productions of IVD kits (including reagents) and commercialization of prospective IVD products. New entrants typically lack the resources and scale to control such cost effectively.
- **Regulatory approvals:** Securing registration certificates/marketing approvals of medical device from the CMDE of NMPA is the prerequisites to commercialize cancer screening IVD products in China. Marketing approvals typically requires large-scale prospective (enrolling thousands of patients) clinical trials which could take up 2-3 years to complete. New entrants lack the resources to conduct multiple large scales studies and stay solvent during the long process.

In addition, we have identified the following future trend of the cancer screening market:

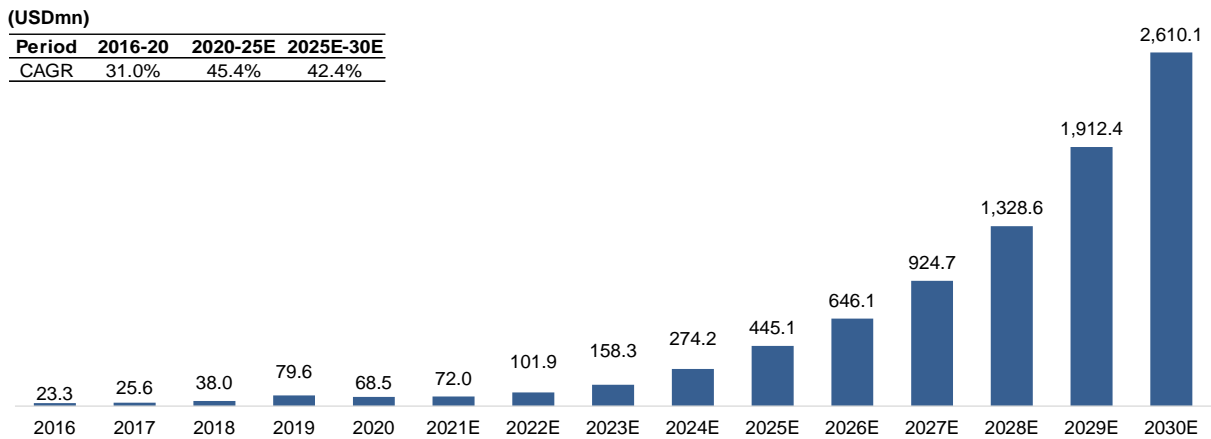
- **Increasing patient adherence via innovation:** Traditional screening paradigms may be replaced gradually due to the development of genetic diagnostics with decreasing sequencing costs and application of genomic data linked to disease pathology. In particular, blood-based methylation testing is convenient to conduct with high patient adherence and low costs, and is expected to drive adoption among the target population more rapidly compared to endoscopy.
- **More players in cancer genetic screening market:** Both the advancement of gene technology and capital inflow into the genetic testing market are expected to promote the emergence of new entrants into the genetic testing industry in China. Competition among market players may further promote technological advancement and the development of the cancer screening industry.
- **Continuous government support:** Government's supportive policies towards cancer screenings are likely to sustain. These supports are expected to accelerate the development and commercialization process of cancer screening products. Supportive policies towards consumer genetic testing and cancer screening market will be introduced in the later pages.

Fast-growing consumer genetic testing market in China

Consumer genetic testing are services that provide consumers with access to their genetic information with or without involvement of healthcare provider. Consumer genetic testing includes a broad array of tests, which include carrier screening, genetic health risk assessment, pharmacogenetic testing, cancer predisposition assessment, low risk general wellness test and ancestry test. Consumer genetic testing services can be ordered from health check-up centers, hospitals, insurance companies or online service providers.

According to F&S, China’s consumer genetic testing market grew at a CAGR of 31.0% to USD68.5mn from USD23.3mn over 2016-20. F&S estimated the market will continue to grow at a CAGR of 45.4% to reach USD445.1mn in 2020-25E and 42.4% CAGR to USD2,610.1mn in 2025E-30E.

Figure 19: Market size of consumer genetic testing market in China, 2016-2030E

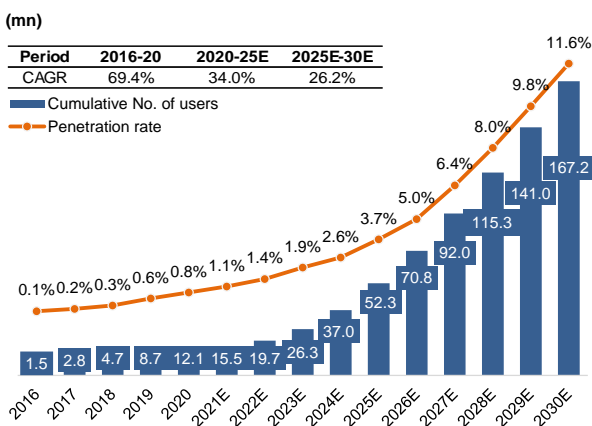


Sources: China’s National Bureau of Statistics, expert interviews and Frost & Sullivan Analysis

In term of cumulative number of users of consumer genetic testing in China, it grew at a CAGR of 69.4% to 12.1mn from 1.5mn over 2016-20. F&S estimated the cumulative number of users to grow at a CAGR of 34.0% to reach 52.3mn in 2020-25E and 26.2% CAGR to 167.2mn in 2025E-30E.

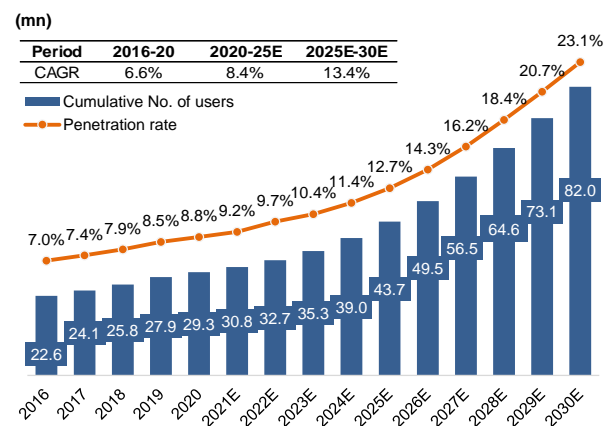
F&S expected consumer genetic testing in China to have high market potential based on multiple perspectives comparing to developed countries such as the U.S, including: 1) market is still in early stage (market established in the year of 2013 vs year of 1991 in the US) and 2) lower penetration rate of consumer genetic testing (0.8% in China, vs 8.8% in the US as of 2020). F&S estimated that the penetration rate in China and the US will reach 3.7%/12.7% in 2025E and 11.6%/23.1% in 2030E.

Figure 20: Consumer genetic testing cumulative number of users in China, 2016-2030E



Sources: China National Bureau of Statistics, expert interviews, Frost & Sullivan analysis

Figure 21: Consumer genetic testing cumulative number of users in the US, 2016-2030E



Sources: Company annual report, US Census Bureau, expert interviews and Frost & Sullivan Analysis

We identify the following factors are key barriers to entry into consumer genetic testing market:

- **Sales channel:** Leading companies have established and developed collaborative relationships with major channel partners throughout years. These channel partners include health checkup centers which located in many geographical locations. Late comers may encounter barriers to tap into sales channel which would result difficulties in commercialization of services and products.
- **Cost control:** The ability to control cost effectively is vital for consumer genetic testing companies. Consumer genetic testing business requires heavy investment in testing platforms and equipment, in order to build adequate testing capacity and low-cost testing process. Beyond investment in technology, the business also requires significant investment in marketing and promotional activities. Late comers may not achieve profitability in the long term, if they cannot control the cost effectively.
- **Brand loyalty:** Leading companies in consumer genetic testing market can enjoy brand loyalties from customers. Healthcare consumers tend to choose reputable brands which have consistent service quality and diversified service portfolio. It is challenging for new entrants to understand the industry practice and to establish creditability in consumer genetic testing in short term, while existing players could leverage on their brand loyalty to succeed.
- **High standard for service quality:** Meeting consumers' expectations requires in-depth understanding of the industry and the need of consumers. In order to do so, it requires companies to establish and comply with industry standards and procedures to ensure testing accuracy and service quality. It is difficult for new entrants to establish sound standardized system within short term and to deliver satisfactory services in short term.
- **Evolving regulations:** Consumer genetic testing service providers need 1) to ensure their constant compliance with industry laws and regulations, and 2) to obtain required permissions from national or local health administrations. New entrants may lack the resources or understanding to maintain compliant with evolving regulations.

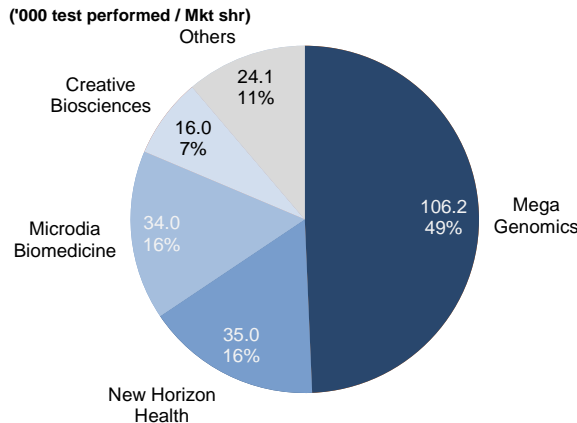
In addition, we have identified the following future trend of the consumer genetic testing market from four aspects:

- **Service and products:** Companies within the consumer genetic testing market are expanding the breadth and depth of their products and services. Consumers expect broader product/services portfolios offered, along with expanded the scope of service (i.e. report interpretation or consulting services by dedicated healthcare professional). Meanwhile, consumers expect the accuracy and effectiveness of tests to improve. We believe consumer genetic testing services providers who can provide diversified and quality portfolio of services or products to satisfy ever-increasing need for individualized preventive care will sustain a competitive edge over peers.
- **Industry:** The consumer genetic testing market is expected to develop alongside with other healthcare businesses (i.e. physical examination and drug development). Since physical examination is a primary offline channel for consumer genetic testing, the growth across different demographic groups within the physical examination business should propel a corresponding growth in consumer genetic tests as well.
- **Consumers:** The penetration rate of consumer genetic testing are expected to increase across different demographic groups. Currently, genetic testing consumers primarily consist of health conscious, well-educated and higher income demographic group. This group is primarily located in tier one cities. The penetration in other regions are lower as of now. It is strategically important for companies to tap into other demographics groups and into non-tier one cities.
- **Regulatory trends:** It is expected that the Chinese government agencies will increase control over product and quality services as well as on consumers' data. Nevertheless, government's supportive policies towards genetic testing are likely sustain. It also expected that more genetic testing services and products will receive green lights to enter the market.

Competitive landscape of colorectal cancer screening market in China

Cancer screening service providers have been focused on 1) developing screening solutions for cancers with high incidence, 2) competing for first-mover advantages in sample accumulation and clinical validations, 3) gaining marketing approval from the CMDE of NMPA, as well as 4) commercializing the products (incl. physicians and patients educations). According to F&S in 2020, the Group was the largest service provider for genetic-based CRC screening in China (by number of tests performed) and was the only profitable company among all leading genetic-based CRC screening players.

Figure 22: The Group's genetic-based CRC screening market share by number of test performed, 2020

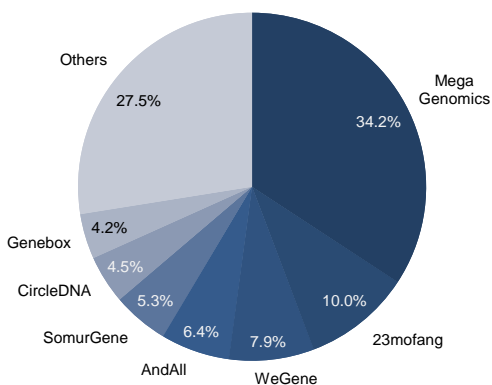


Sources: Companies' website, expert interview and Frost & Sullivan Analysis

Competitive landscape of consumer genetic testing market in China

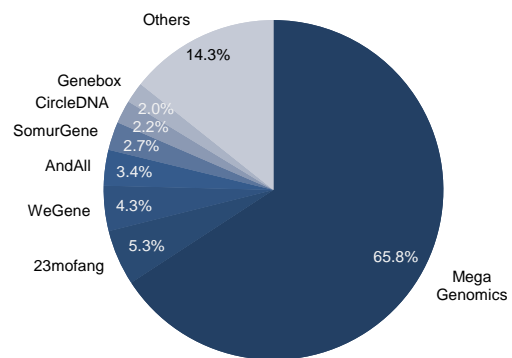
The Chinese consumer genetic testing market is competitive. According to F&S in 2020, the Group was the largest consumer genetic testing company in China (accounting for 34.2% market share by revenue). The 2nd largest companies by revenue had a market share of 10%. The Group's market share by revenue is larger than 2nd to 6th largest companies combined. In addition, the Group is also the largest player as it performed 2.7mn tests, accounted for 65.8% of market share in 2020. The 2nd largest companies by number of tests performed had a market share of 5.3%.

Figure 23: Market share of consumer genetic testing in China, 2020 (by revenue)



Sources: Companies' website, expert interview and Frost & Sullivan Analysis

Figure 24: Market share of consumer genetic testing in China, 2020 (by number of testing performed)



Sources: Companies' website, expert interview and Frost & Sullivan Analysis

The table below shows a multi-dimensional comparison among the leading consumer genetic testing companies in China in 2020. According to F&S, the Group was the only profitable player within the consumer genetic testing field. Thanks to the Group's business model and investment throughout years, the Group has outperformed its peers in multi-dimensions, including 1) number of tests, 2) monthly growth of tests and 3) average production capacity per day in 2020.

Figure 25: Key business metrics of leading consumer genetic testing companies in China, 2020

Company	Cumulative number of users ('000)	Avg. production capacity/day ('000)	Monthly growth of tests ('000)	Profitability
Mega Genomics	7,490	30	223.5	Yes
23mofang	800	3	18.0	No
WeGene	550	3	14.7	No
AndAll	430	<1	11.7	No
SomurGene	300	<1	9.0	No
CircleDNA	220	<1	7.6	No
Genebox	200	<1	6.9	No

Sources: Companies' website, expert interview and Frost & Sullivan Analysis; Note: Monthly growth of tests only include consumer genetic testing

Supportive policies to boost cancer screening and consumer genetic testing businesses

The Chinese government has introduced a series of policies to support the development of cancer screening and consumer genetic testing markets in order to address the unmet preventive care need. We expect the secular policy tailwind to sustain. We summarized policy tailwinds as below:

June 2021 - Medical Devices Regulations (《医疗器械监督管理条例》): This revised regulation was promulgated by the State Council, and became effective since June 2021. The Article 53 of this revised regulation has further confirmed the legality of laboratory developed tests (LDTs).

January 2019 - Action Plan of Further Improving Medical Services (《进一步改善医疗服务行动计划(2018-2020年)》): This action plan was co-published by the NHC (by then NHFPC) and SATCM in January 2019 to improve service quality and convenience within integrated health systems which include promoting the mutual recognitions of diagnostics test results.

October 2017 - Deepening the Reform on the System for Review and Approval to Encourage Innovation of Drugs and Medical Devices (《关于深化审评审批制度改革鼓励药品医疗器械创新的意见》): This document was published by the General Office of the CPC Central Committee and the General Office of the State Council in October 2017, in order to encourage the research and development of innovative medical devices. Innovative medical devices should be given priority review and approval and supported by financial and clinical resources funded by the central government.

August 2015 - Reform of the System of Evaluation, Review and Approval of Drugs and Medical Devices (《国务院关于改革药品医疗器械审评审批制度的意见》): This document was issued by the State Council in August 2015, in order to encourage the R&D and innovations of medical devices, including granting expedited registration status towards products has core technology invention patent and major clinical value.

Laboratory developed tests (LDTs)

Testing services such as cancer screening and consumer genetic testing can be provided as either through **Laboratory developed tests (LDTs)** or **In Vitro Diagnostics (IVDs)**. LDTs are self-developed procedures that are not registered with the NMPA. Therefore LDTs (reagents or testing kits) can only be provided as services instead of being sold as a standalone product or device. IVDs usually refer to NMPA registered products (reagents or testing kits). LDTs are good mean to supplement the unmet demand of cancer screening and consumer genetic testing. Given the brief history of the LDT industry in China, a comprehensive regulatory framework governing the LDT industry has not been established. On June 1, 2021, the revised Regulations on the Supervision and Administration of Medical Devices became effective in China. According to the Article 53 of this regulation, along with relevant administrative rules of NMPA and the NHC, qualified medical institutions may, based on clinical needs, research and develop LDT testing reagents if the same categories of products are not available in the China market. They may also use such LDT testing reagents internally in accordance with a licensed physician's guidance. We think the new policy is a good step forward to confirm the legality of LDTs.

Group profile: a leading player in cancer screening and consumer genetic testing

The Group (Mega Genomics Limited (the “Company”) and its subsidiaries (collectively referred to as the “Group”)), is headquartered in Beijing, is a leading genetic testing platform company within the fast growing 1) cancer screening and 2) consumer genetic testing markets. The Group had broad sales network, covering 1,497 healthcare institutions in over 340 cities in China, as of December 31, 2021.

As per F&S, The Group was the **largest genetic testing platform for cancer screening** in China as measured by the number of tests administered in 2020. It provided 106.2k genetic-based CRC tests, accounting for 49% market share. During the fiscal year of 2021, the Group provided ~312K cancer screening services (~+200% yoy vs 2020). The Group was also the **largest consumer genetic testing** company in China in 2020, accounting for 34.2%/65.8% market share by revenue/number of tests provided. We expect the Group to maintain the leading position in the future based on the following reasons:

- **Sales network expansion and synergy with Meinian OneHealth:** The Group is expanding its sales network, covering the 1,497 healthcare institutions (incl. ~600 Meinian OneHealth checkup centers) in over 340 cities in China, as of December 31, 2021. These customers include private health checkup centers, hospitals, and O2O platforms. The Group will continue expanding the sales and marketing team in order to expand and to diversify its channel customer base. Of note, Meinian OneHealth, as one of the Group’s controlling shareholders, accounted for 40% market share of private health checkup centers by consumer traffic during 2020 in China. We think the strong synergic relationship between the Group and Meinian OneHealth should strengthen its leading position in cancer screening and consumer genetic testing markets.
- **Diversified service portfolio:** The Group has the ability to research, develop and manufacture such testing services or products and to provide to its institutional customers. The Group developed and commercialized 91 types of testing for multi-disease risk assessment and diagnostic services and encompasses from low to high end services to meet consumers’ need of testing. These testing include 80 types of LDTs services and 11 types of outsourced IVD products.
- **Ability to ensure cost advantage and quality controls:** The Group has the ability to achieve cost advantage over peers as it maintains the largest market share position, and ensure quality controls via the Group’s automated labs and refined SOP. In addition, the Group plans to further expand its capacity by establishing additional labs outside of Beijing to meet the fast-growing demand and to reduce cost.
- **In-house R&D initiatives:** the Group’s R&D effort is market demand driven, as it is focusing on 1) ApoE gene testing kits, 2) Folate metabolic capacity assessment kits, 3) BRCA1/BRCA2 gene mutation testing kits, 4) cancer screening (incl. CRC, gastric cancer, lung cancer, breast cancer, and cervical cancer screening) and 5) Alzheimer’s disease screening. The Group now has 5 candidates under clinical development and 3 candidates pre-clinical research respectively with the earliest NMPA approval in 1H23E. Once approved, we think the in-housed developed product can enable the Group 1) to broaden sales mix and 2) to generate cost savings from in-house IVD production.

Broad sales network coverage

The Group’s broad in-house sales network coverage offers scale the brand recognitions among health checkup centers and tiered hospitals. Among the Group’s 1,497 institutional clients, ~600 checkup centers belongs to Meinian OneHealth. Meinian OneHealth, as one of the Group’s controlling shareholders, accounted for 40% market share of private health checkup centers by consumer traffic during 2020 in China. We think the strong synergic relationship between the Group and Meinian OneHealth should strengthen its leading position in cancer screening and consumer genetic testing market.

The Group will also expand the sales and marketing team in order to diversify its channel customer base. These customers include health checkup centers, hospitals, and O2O platforms. In addition, the Group will also utilize its sales and marketing team to enhance its brand awareness among individual consumers.

Figure 26: The Group’s customer coverage as of December 31, 2021



Source: Company data

Diversified service portfolio

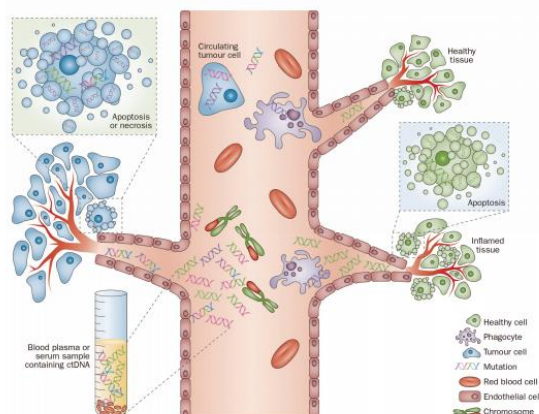
The Group developed and commercialized 91 preventive solutions for multi-disease risk assessment and diagnostic services and encompasses from low to high end services to meet consumers' need of individualized preventive care. These services include 80 and 11 types of services as LDTs and outsourced IVD products respectively. These services are based on Endpoint fluorescent PCR, qPCR, NGS, and whole genome microarray platforms. The diversified service portfolio can help these health checkup centers and tiered hospitals to offer differentiated preventive healthcare services.

The Group's cancer screening service portfolios

The Group's cancer screening services generated revenues of RMB6.9mn, RMB41.5mn, and RMB100.6mn in 2019-2021, respectively. Sales volume of cancer screening services reached ~20,000 tests, ~106,000 tests and ~254,000 tests in 2019-2021, respectively. As per F&S, the Group was the 1) largest provider of genetic testing services for CRC in China in 2020, 2) highest total number of tests and 3) daily average production capacity in 2020. Current cancer screenings are using DNA methylation testing methodology:

- Septin9 colorectal cancer (CRC) screening test:** The Group's Septin9 CRC screening is a DNA methylation detection test (blood sample), which detects the methylation level of the Septin9 gene released by cancer cells into peripheral blood to make a preliminary determination of potentially developed CRC. The test has demonstrated clinical results with a sensitivity of 76.6% and an overall specificity of 95.9%. The service is initially started in 2017. The Group procures the testing kits from an Independent Third Party, whose testing kit is registered with the NMPA as a Class III medical device. This test service is performed on the Group's qPCR platform.
- SDC2 colorectal cancer screening test:** The Group's SDC2 colorectal cancer screening test (stool sample) can detect the DNA of cancer cells shed in the feces. The SDC2 colorectal cancer screening test has demonstrated clinical results of a sensitivity of 84.2% and an overall specificity of 97.9%. The Group procures testing kits for this service from an Independent Third Party, whose testing kit is registered with the NMPA as a Class III medical device. This test service is performed on the Group's qPCR platform. The Group is developing its own testing kits for CRC screening, and expect to receive registration certificates of Class III medical device from NMPA.
- RNF180/Septin9 gastric cancer (GC) screening test:** The Group's RNF180/Septin9 GC screening is a DNA methylation detection test (blood sample). The test could make a preliminary determination of susceptible GC development based on the methylation level of the RNF180 gene and Septin9 gene. The test has demonstrated clinical results with a sensitivity of 61.8% and an overall specificity of 85.1%. The Group launched this testing service in March 2021 and have sold approximately 23,000 tests within three months after launch. The Group procures testing kits for this service from an Independent Third Party, whose testing kit is registered with the NMPA as a Class III medical device. This test service is blood based and is performed on the Group's qPCR platform.

Figure 27: Process of blood-based DNA methylation testing methodology



Source: Nature Reviews Clinical Oncology

The Group's consumer genetic service portfolio

The Group's consumer genetic testing services generated revenues of RMB106.6mn, RMB161.7mn, and RMB135.5mn in 2019-2021, respectively. The Group's consumer genetic service are based on Endpoint fluorescent PCR, qPCR, NGS, or Whole genome microarray technology platform which are either provided through LDT services or outsourced IVD products. Main tests categories provided under the consumer genetic testing service include the following:

- **Cancer risk assessment tests:** Services provided under this categories include P53 tumor suppressor gene testing (male/female), Single cancer risk assessment tests, DNA repair capacity assessment, risk assessment package for most common cancers, full-scale cancer risk assessment package (male/female), and HPV testing.
- **Nutrition status and metabolic diseases risk assessment tests:** Services provided under this categories include folate metabolic capacity assessment (MTHFR gene testing), gout risk assessment, ankylosing spondylitis risk assessment, free radical scavenging capacity assessment, alcohol metabolic capacity assessment package, comprehensive assessment of human immunity, vitamin absorption capacity assessment package, exercise and fitness tests, gastrointestinal disease risk assessment package, and genetic testing package for individualized medication.
- **Cardiovascular disease risk assessment:** This service assesses the risk of developing seven common cardiovascular and cerebrovascular diseases (coronary heart disease, myocardial infarction, diastolic heart failure, hemorrhagic stroke, ischemic stroke, cerebral aneurysm, and abdominal aortic aneurysm) by testing associated susceptibility genes.
- **Central nervous system disease risk assessment:** ApoE gene testing package (genotyping of human ApoE genes 2, 3 and 4) and Parkinson's disease risk assessment.
- **Infectious diseases testing:** Infectious diseases testing mainly include COVID-19 nucleic acid test which test the COVID-19 nucleic acid level in the testing sample with TaqMan probe method. The Group received the clearance from the government authorities to perform the COVID-19 nucleic acid test since May 2020 and has conducted more than 1.7mn tests since then.
- **Hereditary breast cancer/ovarian cancer genetic testing:** This is a NGS-based LDT service, which assesses the risk of developing breast cancer and ovarian cancer by conducting full exon sequencing of BRCA1 and BRCA2 genes.
- **Whole genome testing:** The testing are LDTs services based on the whole genome microarray or NGS technology platform. The Group is offering three types of whole genome tests under the executive testing service, which include: 1) personal whole genome test, 2) whole exome sequencing package for adults, and 3) whole exome sequencing package for children. These services assess the risk of developing multiple types of diseases and provide interpretation for various individual traits and medication advice for certain common diseases by testing ~0.2-0.7mn loci in the human body, etc.

The Group's main technologies and technology platforms

The Group has established leading technologies/technology platforms for its cancer screening and consumer genetic testing services. These services are based on Endpoint fluorescent PCR/qPCR, qPCR, NGS, and whole-genome microarray, etc. which are shown below:

Figure 28: The Group's main technologies/technology platforms

Company's main technologies / technology platforms
<p>Endpoint fluorescent PCR platform</p> <ul style="list-style-type: none"> This platform is suitable for the testing of a relatively small number of gene loci (<10) per sample in batches with high number of samples.
<p>Quantitative PCR (qPCR) platform</p> <ul style="list-style-type: none"> This platform uses a real-time PCR technology, as data is collected throughout the PCR amplification process in real time. Its offers greater sensitivity, enables discrimination of gene numbers across wide range, & time efficient.
<p>Multiplex PCR technology (NGS-based)</p> <ul style="list-style-type: none"> The technology is high throughput, can amplify a dozen to hundreds of gene loci simultaneously in one PCR reaction system and then sequencing multiple DNA molecules in parallel, creating larger data sets that provide more comprehensive insights more quickly.
<p>Whole exome sequencing (WEES) and whole genome sequencing (WGS) (NGS-based)</p> <ul style="list-style-type: none"> WES is used to identify exon genotypes, while WGS is used to identify both exon and intron genotypes, providing an even more comprehensive genetic profile. WES and WGS on the NGS platform can generate comprehensive genetic profile with multiple diagnostic and healthcare applications.
<p>Whole-genome microarray platform</p> <ul style="list-style-type: none"> This technology can be used to identify and quantify thousands of genes from multiple samples simultaneously. The whole-genome microarray technology is a highly scalable and cost-effective tool for genomic screening.
<p>Blood nucleic acid extraction-free technology</p> <ul style="list-style-type: none"> This technology can directly accept blood sample for genetic testing, obviating the preliminary step of extracting nucleic DNA from the nucleus of blood cells and saves at least one hour from genetic tests.

Sources: Company data, CMS (HK)

- Endpoint fluorescent PCR platform:** This platform is suitable for the testing of a relatively small number of gene loci (<10) per sample in batches with high number of samples. This platform is highly automated, as all procedures after the initial sample collection, such as sample preparation (including sample transfer, DNA extraction and purification), and the PCR process itself are automated. As of December 31, 2021, 26 types of the Group's testing services are based on this platform.
- Quantitative PCR (qPCR) platform:** This platform can collect data throughout the PCR amplification process in real time manner. qPCR's use of real-time detection offers greater sensitivity, enables discrimination of gene numbers across a wider dynamic range, and has quicker processing time compared to traditional endpoint fluorescent PCR. As of December 31, 2021, 12 types of the Group's testing services are based on this platform.

- **Next-generation sequencing (NGS):**

NGS is a massively parallel sequencing technology that can sequence millions of fragments simultaneously. NGS offers high throughput, higher sensitivity, and greater discovery power capable of determining the order of nucleotides in entire genomes or targeted regions of DNA or RNA. As of December 31, 2021, 52 types of the Group's testing services are based on NGS platforms (i.e.: Multiplex PCR technology, WES, and WGS).

Multiplex PCR technology (NGS-based): The Group has independently developed the multiplex PCR library preparation method regarding the NGS platform. This method, from primer design and reagent selection to the reaction system, is designed to work together with its automated gene library preparation workstations. The technology is high throughput, capable of amplifying a dozen to hundreds of gene loci simultaneously in one PCR reaction system and then sequencing multiple DNA molecules in parallel, creating larger data sets that provide more comprehensive insights more quickly. The results achieved 99.9% consistency with the Sanger sequencing. This technology also enables gene loci to be added and deleted from multiplex assays with the flexibility to meet testing requirements which can significantly reduce testing cost and personnel time.

NGS-based whole exome sequencing (WES) and whole genome sequencing (WGS): The Group also uses WES and WGS technology regarding the NGS platform. Introns and exons are nucleotide sequences within a gene. Exons are the portion of a gene that contains information required to encode a protein whereas introns are not expressed in the protein. WES is used to identify exon genotypes, while WGS is used to identify both exon and intron genotypes, providing an even more comprehensive genetic profile. The sequencing data is genetically interpreted according to the nature of the mutation (beneficial, neutral or deleterious mutation) and the results of recognized database annotations. Using WES and WGS on the NGS platform can generate comprehensive genetic profile with multiple diagnostic and healthcare applications. The WES and WGS technologies are currently for high-end customized services.

- **Whole-genome microarray platform:** The Group utilizes an Asian screening array whole-genome microarray that contains genome-wide coverage of East Asian population for the Group's testing business and clinical research. This technology can be used to identify and quantify thousands of genes from multiple samples simultaneously. The whole-genome microarray technology is a highly scalable and cost-effective tool for genomic screening. The Group's whole genome test services uses the whole-genome microarray platform technology.
- **Blood nucleic acid extraction-free technology:** the Group's blood nucleic acid extraction-free technology can directly accept blood sample for genetic testing, obviating the preliminary step of extracting nucleic DNA from the nucleus of blood cells, which saves at least one hour during genetic tests. The testing facilities that use testing kits with the blood nucleic acid extraction-free technology can save on the need to invest in nucleic acid extraction equipment.

Ability to achieve cost advantage and ensure quality controls

The Group is continuously refining the provided services and operational management to ensure its cost advantages and quality controls. Based on automated laboratories, high throughput testing, and refined operational management, the Group has a streamlined and efficient clinical services procedure that allows itself to generate reports in a short timeframe with accuracy.

The Group has introduced peripheral blood plasma methylation screening services, which is convenient, accurate and non-invasive. However as per F&S, the cost of providing this type of screening services tends to be relatively higher compared to colonoscopy, gastroscopy, or fecal occult blood or others testing. The Group noticed this shortcoming and have implemented a fully automated production process, which reduced the costs significantly and make this screening technology more accessible. In addition, the Group plans to further expand its capacity by establishing additional labs outside of Beijing to meet the fast growing demand and reduce costs.

Current testing laboratory and future expansion plan

The Group has one testing laboratory (Beijing Mega Lab) located in Beijing, China, with a gross floor area (GFA) of ~880m². The Group plans to further expand its lab capacity, particularly for cancer screening business, by establishing additional laboratories outside of Beijing to meet the fast growing testing demand.

The Group's current testing equipment include automated high-throughput genotyping system, high-throughput pipetting workstation, high-throughput NGS equipment, qPCR equipment and whole-genome microarray equipment. The automated workflow at the laboratory was managed by the Group Laboratory Information Management System (LIMS). The Group' LIMS can ensure smooth operation and integrity of the entire information flow during the testing process.

The Group has a streamlined and efficient clinical services procedure which allows it to generate reports in a short timeframe. The testing/laboratory process includes: 1) sample collection 2) sample transportation, 3) data entry and sorting, 4) sample pretreatment, 5) sample distribution, 6) sample testing and analysis, and 7) issuance of testing report.

The Group's current testing capacity and number of testing performed for both cancer screening and consumer genetic testing business between 2019 and 2021 are listed below:

Figure 29: The testing capacity and number of testing performed by Beijing Mega Lab

		2019	2020	2021
Cancer screening	Testing capacity ('000 tests)	72	180	1,020
	No. of tests performed ('000 tests)	21	106	312
	Utilization rate (%)	29.4	59.1	30.6
Consumer genetic testing	Testing capacity ('000 tests)	7,500	9,000	13,410
	No. of tests performed ('000 tests)	2,691	2,682	2,649
	Utilization rate (%)	35.9	29.8	19.8

Sources: Company data, CMS(HK); Note: Utilization rate is calculated based on the actual number of tests performed for the relevant period divided by the testing capacity for the relevant period, multiplied by 100%.

The Group has obtained all licenses, approvals and permits from government authorities that are mandatory for business operations and are shown below:

Figure 30: Licenses, approvals and permits of the Group's subsidiaries

Holder	License & permit	Grant year	Expiration year
	Practice License of Medical Institution	2018	2022
	Permit to Use Clinical Gene Amplification Testing Technology ¹	2019	n.a.
	Permit to Use Clinical Gene Amplification Testing Technology ²	2020	n.a.
	Permit to Conduct COVID-19 Nucleic Acid Testing	2020	n.a.
Beijing Mega Lab*	External Quality Assessment Certificate ³	2020	n.a.
	External Quality Assessment Certificate ⁴	2020	n.a.
	External Quality Assessment Certificate ⁵	2021	n.a.
	Notice of Filing in Beijing for Pathogenic Microbe Laboratory and Laboratory Activities	2020	n.a.
	Registration Certificate for the Use of Special Equipment (fixed pressure vessel)	2020	n.a.
Mega Genomics Beijing**/ Beijing Mega Lab*	Certificate of Registration for Quality Management Systems (for genetic testing technology services)	2019	2022
	Filing Certificate for Information System Security Protection Level (Mega Integrated Management System Level III)	2021	n.a.
Mega Genomics Beijing**	Registration Certificate for the Use of Special Equipment (vertical pressure steam sterilizer)	2017	n.a.
Beijing Mega Medical Devices Co., Ltd.***	Business License for Medical Devices	2021	2026
	Filing Certificate for Class II Medical Devices Business	2021	n.a.

Sources: Company data, CMS(HK); Note: 1. For Septin9 gene methylation testing, CYP2C19 gene polymorphism detection and ApoE genotyping, 2. For MTHFR (C677T) gene testing and human papillomavirus genotyping, 3. For HPV 16/HPV 18 testing and genotyping, folate metabolism gene (MTHFR) polymorphism detection and clopidogrel metabolism gene (CYP2C19) polymorphism detection in the 2020 National External Quality Assessment, 4. For COVID-19 nucleic acid testing in the 2020 National External Quality Assessment, 5. For HLA-B27 genetic testing, Septin9 gene methylation testing and ApoE genotyping in the 2020 External Quality Assessment Plan; Note*: Beijing Mega Medical Test Laboratory Co., Ltd. (北京美因医学检验实验室有限公司) (formerly known as Beijing Mega Inspection Institution Co., Ltd. (北京美因医学检验有限公司)), a limited liability company incorporated in the PRC on February 22, 2016, a wholly-owned subsidiary of Mega Genomics Beijing; Note**: Mega Genomics (Beijing) Co., Ltd. (美因健康科技(北京)有限公司), a limited liability company incorporated in the PRC on January 5, 2016 and one of the Group's PRC Consolidated Entities; Note***: a fully-owned subsidiary of Mega Genomics Beijing

Demand driven in-house R&D capabilities

The Group’s R&D effort is market demand driven. The Group understands the demand of preventive healthcare service market given its broad sales network. It also has the R&D capability and technology platforms to continuously introducing diversified testing solutions to meet emerging needs from the market. In addition to providing diversified LDT-based solutions, the Group is also developing its own testing kits for cancer screening and Alzheimer’s disease screening, and expects to receive registration certificates of Class III medical device from NMPA starting from 1H23E. There are 5 and 3 assets under clinical development and pre-clinical research respectively. The Group plans to accelerate preliminary studies, clinical trials, registration and other research and development processes for these pipeline products. Beyond in-house R&D, the Group may consider acquiring/investing in target companies offer synergy. The chart below listed all pipeline assets in development stage:

Figure 31: The Group’s IVD product pipeline summary

Product	Sample Type	Use	Technology	Early-stage development ¹	Biomarker selection ²	Later-stage Development ³	IVD registration filing ⁴	Expected to obtain IVD Registration Approval
ApoE gene testing kits⁵	Blood	Alzheimer’s disease screening	Blood direct amplification, qPCR					1H23E
Folate metabolic capacity gene testing kits⁵	Blood	Hyperhomocysteinemia	Blood direct amplification, qPCR					1H23E
Colorectal cancer screening kits⁷	Blood	Colorectal cancer screening	NGS, qPCR					1H24E
Gastric cancer screening kits⁷	Blood	Gastric cancer screening	NGS, qPCR					1H24E
Alzheimer’s disease screening kits⁷	Blood	Alzheimer’s disease screening	NGS, qPCR					2H24E
BRCA1/BRCA2 gene mutation diagnostic kits⁷	Blood	Breast cancer screening	NGS					2H24E
Cervical cancer screening kits⁷	Cervical exfoliated cells	Cervical cancer screening	NGS, qPCR					2H24E
Lung nodule (benign or malignant) auxiliary diagnostic kits⁷	Blood, CT scan	Lung cancer screening	NGS, qPCR, CT image AI analysis					2H25E

Source: Company data, CMS (HK); Note: 1. Early-Stage development encompasses feasibility study, method development, etc; 2. Biomarker selection includes biomarker candidate identification, clinical validation, etc; 3. Later-Stage development involves product optimization and finalization, efficacy and safety evaluation, etc; 4. IVD registration filing refers to pilot scale manufacturing, type testing, clinical evaluation, NMPA review, etc; 5. Self-developed kits; 6. ApoE gene testing kits, Folate metabolic capacity gene testing kits, and BRCA1/BRCA2 gene mutation diagnostic kits do not have development phase for biomarker selection; 7. Collaboration mode (with third parties).

Future development strategy and expansion plans

Enhancing platform capability: The Group aims to improve operating efficiency and customer experience by continuous enhancement of its platform capabilities with the plans in the following areas:

- **Research and development:** The Group plans to accelerate preliminary studies, clinical trials, registration and other research and development processes. The Group will further enhance its ability to conduct pre-clinical research and large scale prospective studies by working closely with KOLs and leading hospitals.
- **Automation and digitalization of business processes:** The Group has a strategic focus on operating cost reduction and quality control. In order to achieve these goals, the Group will further automate and digitalize its business processes by leveraging on cutting edge gene and information technology.
- **Geographical expansion:** The Group plan to further expand its lab capacity by establishing additional laboratories outside of Beijing to meet the fast growing testing demand. Potential candidate cities include Shanghai, Wuhan, Guangzhou, Chengdu and Shenyang and, etc. The potential expansion will further improve the group's local service capability throughout time and cost reduction.
- **Pursue potential acquisition and investment opportunities:** The Group may consider acquiring or investing in target companies that have synergistic businesses. The Group expects these efforts would further diversify its product and service portfolio.

Expanding staff scale: As of December 31, 2021, the Group had 332 full-time employees in China. The Group plans to hire more R&D staff who have strong scientific background and rich industry experience in order to expand the depth and breadth of the Group's product/service portfolio. The Group will also expand the sales and marketing team in order to diversify its channel customer base. These customers include health checkup centers, hospitals, and O2O platforms. In addition, the Group will also utilize its sales and marketing team to enhance its brand awareness among individual consumers. The Group expects these efforts should allow it to maintain its leading market position in the cancer screening and consumer genetic testing markets. The following table sets forth the number of the Group's employees by function:

Figure 32: The Group's employees by job functions, as of December 31, 2021

Function	No. of employees	Percentage (%)	Duties and responsibilities
Sales and marketing	201	60.6	<ul style="list-style-type: none"> Responsible for the Group's marketing activities such as expanding institutional customer base and service exiting ones
Testing and operations	77	23.2	
Research and development	22	6.6	<ul style="list-style-type: none"> Responsible for developing in-house 1) technology platform, 2) new gene testing services, and 3) IVD testing kits as well as collaborating with 3rd parties, including prominent experts and companies
Information technology	11	3.3	
Others	21	6.3	
Total	332	100.0	

Sources: Company data, CMS (HK)

Visionary and experienced leadership and management team

Person	Position	Biography
Dr. Yu, Rong (俞榕)	Honorary co-chairperson, Executive Director	Aged 49, joined the Group in 2016 and was appointed in current positions since 2021. She is responsible for overall strategic and business planning of the Group. Dr. Yu founded Meinian OneHealth in 2004 and has served as its director since then. Dr. Yu has served in multiple executive director/director roles within public and private companies.
Ms. Guo, Meiling (郭美玲)	Honorary co-chairperson, non-Executive Director	Aged 52, joined the Group and was appointed in current positions since 2021. She is responsible for overall strategic and business planning of the Group. Ms. Guo has served as the vice chairperson of Meinian OneHealth since 2015 and the chairperson of Shenyang Dajiankang Management since 2008. Ms. Guo has also served in director roles within multiple companies.
Ms. Lin, Lin (林琳)	Chairperson, Executive Director	Aged 46, started to oversee the business of Mega Genomics Beijing since 2018. Ms. Lin joined the Group in 2020 and was appointed in current positions in 2021. She is responsible for the Group's overall strategic planning and investor relations as well as leading the Group's overall operation and management. Ms. Lin has served as the senior vice president and Chief Operating Officer and Meinian OneHealth since 2013.
Mr. Huang, Yufeng (黄宇峰)	CEO, Executive Director	Aged 40, is one of the founder of the Group. He joined the Group in 2017 and was appointed as the CEO of Mega Genomics Beijing in 2021. Mr. Huang is responsible for Group's overall business strategic planning and overall marketing operation management. He served at Bayer and Beijing Joy Orient Translational Medicine Research Center (北京德易东方转化医学研究中心) between 2008 and 2016.
Ms. Jiang, Jing (姜晶)	CFO, Executive Director	Aged 41, joined the Group and was appointed in current position since 2020. She is responsible for the Group's overall financial management and investor relations activities. Ms. Jiang served at Zhongrui Yuehua Accounting Firm (中瑞岳华会计师事务所) Li Ning (China) (李宁(中国)) and Beijing Xinwu Liebo E-Commerce (北京心物裂帛电子商务), and other companies, between 2003 and 2020.
Ms. Li, Yan (李艳)	Head of Human Resources	Aged 36, joined the Group and was appointed in current position since 2017. She is responsible for developing and executing human resources strategy. Ms. Li served at Office Depot Network Technology (欧迪办公网络技术) and Beijing Changkehui Network Information Technology (北京常客汇网络信息技术) between 2008 and 2017.
Dr. Yi, Xiang (易翔)	Head of Research and Development	Aged 41, joined the Group and was appointed in current position since 2019. He is responsible for the Group's product strategy, technology research and development and regulatory review and approval. Dr. Yi served at Biosino Bio-Technology and Science (中生北控生物科技) and Beijing Sacred Valley Tongchuang Technology Development. (北京圣谷同创科技发展) between 2008 and 2019.
Dr. An, Xia (安霞)	Head of Operation	Aged 38, joined the Group and was appointed in current position since 2017. She is responsible for the operation and overall planning and management of Group's operation platform. Dr. An served at Beijing Jinguanfeng Biotechnology (北京金冠丰生物技术) and China Golden Marker (Beijing) Biotech (中五金标记(北京)生物技术) between 2013 and 2017.
Dr. Gong, Xiani (宫夏霓)	Head of Branding	Aged 35, joined the Group and was appointed in current position since 2017. She is responsible for managing the Group's branding and marketing department. Dr. Gong has participated in the development of a number of gene testing products and led the market promotion plan of a number of products.
Mr. Li, Cong (李琮)	Head of Information Technology	Aged 37, joined the Group and was appointed in current position since 2017. He is responsible for the strategic development and management of technology platform and IT operations. He served at VancelInfo Technologies (文思创新软件技术), Beyondsoft (博彦信息科技), GEONG Business Networks (北京新智互连云技术), and Office Depot Network Technology (欧迪办公网络技术) between 2006 and 2017.

Sources: Company data, CMS (HK)

Valuation summary

Peer comparison valuation approach

We initiate with BUY on Co. with TP of HKD23.1 based on 19x 2023 PER. We think the Group' valuation should align with its listed peers' average, judging from its greater profitability but smaller P&L size. We also provided DCF valuation as sanity check in later page. Our preferred valuation approach is based on peer valuation comparison, with sensitivities based on various scenarios of the Group's FY23E earnings forecast. Below is a comparison table of the major cancer screening and genetic testing providers listed in Mainland China, Hong Kong SAR and the U.S. markets. Among the major testing providers in China, we think the following Chinese companies are comparable ones in terms of business types. These comparable companies are trading at c.19x 23E PER.

Figure 33: Comp table of listed major genetic testing and cancer screening providers

Ticker	Name	中文名	List curr	Last Price	Mkt Cap (USD mn)	P/E Ratio			P/B Ratio			P/S Ratio		
						21A	22E	23E	21A	22E	23E	21A	22E	23E
China testing service providers														
603882 CH	GUANGZHOU KING-A	金城医学	CNY	70.1	4,835	23.2	12.6	13.4	8.2	3.8	3.0	4.3	2.3	2.3
300676 CH	BGI GENOMICS CO	华大基因	CNY	61.9	3,791	24.6	24.8	22.8	3.9	2.5	2.2	5.3	4.4	4.1
300685 CH	AMOY DIAGNOSTI-A	艾德生物	CNY	27.5	1,623	69.3	35.5	28.1	12.2	6.7	5.6	18.1	9.8	7.7
6606 HK	NEW HORIZON HEAL	诺辉健康	HKD	22.3	1,218	N.A.	N.A.	N.A.	3.6	3.9	4.5	32.0	16.0	8.9
BNR US	BURNING ROCK-ADR	燃石医学	USD	3.2	336	N.A.	N.A.	N.A.	3.4	1.8	2.7	12.4	3.7	2.9
9960 HK	KINDSTAR GLOBALG	康圣环球	HKD	2.3	296	N.A.	23.1	19.5	1.5	0.7	0.6	2.5	1.9	1.7
China genetic testing and cancer screening providers average					1,750	32.6	18.5	18.7	6.3	3.4	3.1	7.8	4.5	3.6
US testing service providers average														
ILMN US	ILLUMINA INC	illumina公司	USD	216.7	34,040	N.A.	52.6	41.7	5.6	2.9	2.7	12.6	6.6	5.7
EXAS US	EXACT SCIENCES	Exact科学公司	USD	45.1	7,935	N.A.	N.A.	N.A.	4.0	2.7	3.0	7.5	3.9	3.4
NTRA US	NATERA INC	Natera股份有限公司	USD	47.0	4,527	N.A.	N.A.	N.A.	13.6	16.1	N.A.	13.5	5.6	4.5
Genetic testing and cancer screening providers average					26,713	N.A.	52.6	41.7	6.1	4.2	2.7	11.8	6.0	5.2

Sources: Bloomberg, all data were updated to the closing prices on August 1, 2022; Note: we excluded Di'an Diagnostics in our Comp table given ~50% of its revenue came from lower margin distribution business

Below is the financial and operation metrics (historical and forecasted) of major genetic testing and cancer screening providers in China.

Figure 34: Financial and operation metrics of major genetic testing and cancer screening providers

Company	Revenue (RMB mn)				Adj. attributable net profit* (RMB mn)				Gross profit margin (%)				Operating profit margin (%)			
	20A	21A	22E	23E	20A	21A	22E	23E	20A	21A	22E	23E	20A	21A	22E	23E
Mega Genomics	203	237	368	595	94	105	161	251	72	70	71	71	52	51	51	48
Kingmed (603882 CH)	8,244	11,943	13,387	14,075	1,457	2,189	n.a.	n.a.	47	47	46	45	23	23	21	21
BGI (300676 CH)	8,397	6,766	5,422	5,340	2,049	1,358	1,158	1,064	60	58	54	54	31	26	26	24
Di'an** (300244 CH)	5,082	6,620	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	49	49	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Adicon	2,742	3,380	n.a.	n.a.	289	384	n.a.	n.a.	41	43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Labway (301060 CH)	1,238	1,778	n.a.	n.a.	106	224	n.a.	n.a.	32	38	n.a.	n.a.	14	18	n.a.	n.a.
Yunkang (2325 HK)	1,200	1,697	n.a.	n.a.	267	414	n.a.	n.a.	55	53	n.a.	n.a.	28	27	n.a.	n.a.
Berry (000710 CH)	1,540	1,422	n.a.	n.a.	115	(130)	n.a.	n.a.	53	45	n.a.	n.a.	14	(3.2)	n.a.	n.a.
Amoy (300685 CH)	728	917	1,164	1,478	147	216	312	403	87	84	84	84	29	28	29	29
Kindstar (9960 HK)	891	931	1,036	1,213	92	81	n.a.	n.a.	52	52	54	54	10	7	5	6
Gentron (GTH US)	424	532	618	803	(216)	(442)	n.a.	n.a.	61	64	63	65	n.a.	n.a.	n.a.	n.a.
Burning Rock (BNR US)	430	508	620	841	(234)	(514)	n.a.	n.a.	73	72	70	70	n.a.	n.a.	n.a.	n.a.
NH Health (6606 HK)	71	213	499	894	(168)	(286)	n.a.	n.a.	53	73	76	78	n.a.	n.a.	n.a.	n.a.

Sources: Company data, Bloomberg, CMS (HK) estimates, Note*: adj. NP excluded one-off items, ** We only recorded Di'an testing service revenue, which accounted for ~50% of its total revenue over FY20-21

Valuation sensitivity analysis

We conducted a two-step sensitivity analysis and focused on changes of the Group's 2023E adj. earnings in relation to the three key factors, namely: 1) Number of cancer screening service performed per institution, 2) Number of total serviced institutions; 3) Avg. rev per institution in FY2023E. We expect the ASP of cancer screening to remain largely stable in the future as the Group has already offered very competitive pricing for clients over its rivals, thanks to its cost advantages.

In our first sensitivity analysis, we tested growth of number of cancer screening service performed per institution to examine the potential changes in Avg. rev per institution in FY2023E. Our results showed that a 5ppt yoy growth change in the number of cancer screening service performed per institution in FY2023E will lead to a c.2.5ppt change in our FY2023E Avg. rev per institution on overall business.

Figure 35: Sensitivity analysis on avg. rev per institution in FY2023E

# of cancer screening service performed per institutions in FY23E ('000 tests)		Avg. rev per institution (RMB mn)	
			Δ (vs. base case)
	436 (35% yoy)	0.26	-5.0%
	452 (40% yoy)	0.26	-2.5%
	468 (45% yoy)	0.27	Base Case
	485 (50% yoy)	0.28	2.5%
	501 (55% yoy)	0.28	5.0%

Sources: CMS (HK) estimates

Based on the GPM sensitivity results, we then ran our sensitivity analysis on FY2023E adj. earnings in relation to all three selected factors. And the results showed that our FY2023E adj. earnings fluctuate within a range of RMB221mn to RMB283mn.

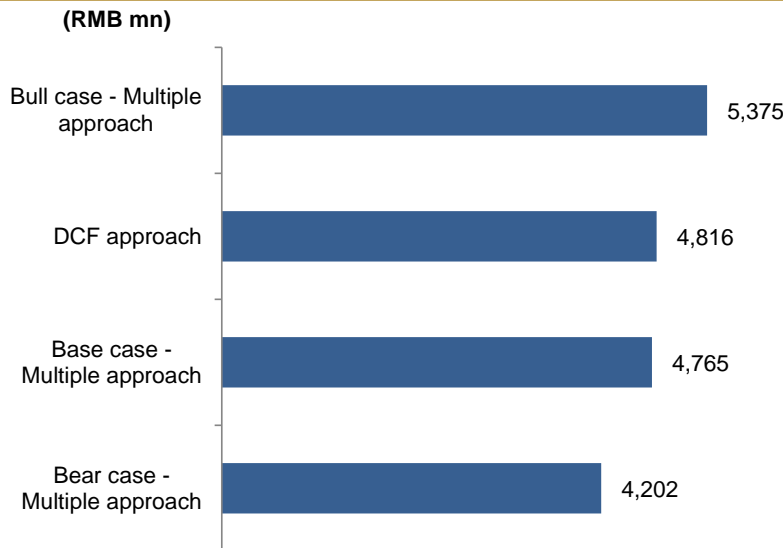
Figure 36: Sensitivity analysis on Adj. earnings in FY2023E (RMB mn)

# of cancer screening service performed per institutions in FY23E ('000 tests)	# of serviced institutions in in FY2023E					Avg. rev per institution in FY2023E (RMB mn)
	2,194	2,316	2,438	2,559	2,681	
436	221	227	233	238	244	0.26
452	230	236	242	248	254	0.26
468	238	244	251	257	263	0.27
485	247	253	260	267	273	0.28
501	255	262	269	276	283	0.28

Sources: CMS (HK) estimates

Our preferred valuation approach is based on peer valuation comparison. Our base case multiple approach corresponds to a target price of HKD23.1. We also provided DCF valuation as sanity check below.

Figure 37: Valuation range



Sources: CMS (HK) estimates

The implied PER and EV/EBITDA multiples ranges based on our base-case earnings estimates are presented in the below table:

Figure 38: The implied PER and EV/EBITDA multiples of the valuation range

	PER			EV/EBITDA		
	2021A	2022E	2023E	2021A	2022E	2023E
Low end – multiples approach	39.9	26.1	16.8	35.0	24.0	14.5
Base case – multiples approach	45.2	29.6	19.0	39.2	26.8	16.2
Base case - DCF approach	45.7	29.9	19.2	39.5	27.1	16.4
High end – multiples approach	51.0	33.4	21.4	43.6	29.9	18.1

Source: CMS (HK) estimates

DCF valuation approach

The DCF approach arrived at an equity value of RMB5,393mn, based on 11.5% WACC and 3% terminal growth.

Figure 39: DCF summary results

DCF summary results	
Enterprise value (RMB mn)	4,232
Net cash (RMB mn) in FY22E	584
Minority interest (RMB mn) in FY22E	-
Equity value (RMB mn)	4,816

Source: CMS (HK) estimates

Figure 40: DCF details (RMB mn)

High Growth Phase	2022	2023	2024	2025	2026
EBIT Adjusted	189	297	428	514	591
% YoY	46%	66%	45%	20%	15%
NOPAT (EBIT*(1-t))	157	247	355	426	490
Add: Depreciation and amortization	10	33	50	59	68
Less: Capital Expenditures	(100)	(100)	(50)	(50)	(50)
Less: Net Working Capital Change	(40)	(52)	(100)	(120)	(138)
FCFF	28	128	255	316	371
% YoY	0%	362%	99%	24%	17%
PV	28	115	205	228	240
Transitional Growth Phase	2027	2028	2029	2030	2031
FCFF	432	488	534	566	580
% YoY Growth	17%	13%	10%	6%	3%
PV	251	254	250	237	218
Stable Growth Phase	2032				
FCFF in terminal year =	580				
Price at the end of growth phase =	6,624				
Present Value of FCFE in high growth phase	787				
Present Value of FCFE in transition phase	1,210				
Present Value of Terminal Price	2,234				
Intrinsic Enterprise Value	4,232				

Source: CMS (HK) estimates

Figure 41: WACC assumption

Cost of equity (%)	
Risk free rate (%)	3.2
Beta	0.9
Equity risk premium (%)	9.2
CAPM unleveraged discount rate	11.5
Cost of debt (%)	
Average spread over risk-free rate (%)	3.0
Pre-tax cost of debt (%)	6.2
Average corporate tax rate for the Group (%)	17.0
Post-tax cost of debt (%)	5.1
Estimated target gearing (net debt/EV) (%)	-
WACC (%)	11.5

Sources: CMS (HK) estimates

Financial summary

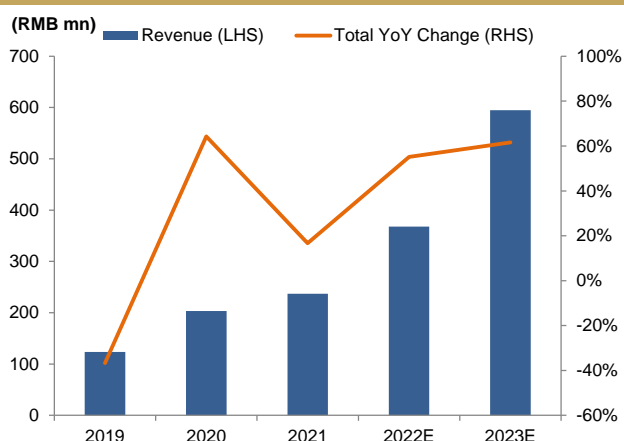
Revenue

Revenue grew from RMB124mn to RMB237mn in 2019-2021, representing a 38% CAGR over the period. The fast growth was mainly driven by the cancer screening services and COVID-19 testing. We expect the consolidated revenue to grow 55%/62% over 2021-23E, reflecting strong revenue growth in cancer screening services offsetting the decline sales of COVID-19 testing.

In cancer screening services, we expect the segment revenue to grow at c.103% CAGR to RMB416mn in 2023E from RMB101mn in 2021, supported by sales network expansion into new checkup centers, hospitals, and O2O platforms as well as higher client penetration thanks to growing health awareness (i.e. CRC screenings).

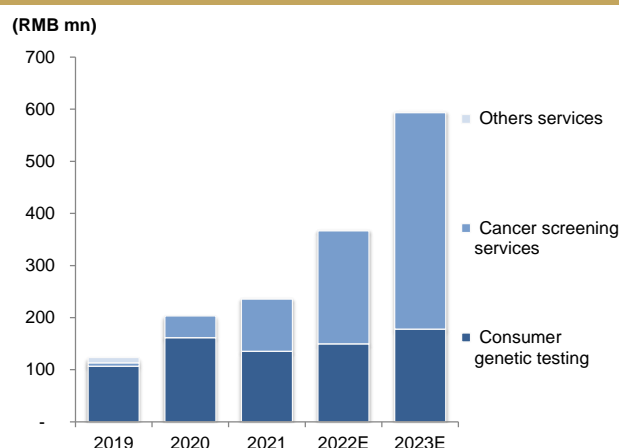
For consumer genetic testing services, we expect the segment revenue to grow at moderate c.15% CAGR to RMB178mn in 2023E from RMB135mn in 2021, reflecting sales recovery in non-COVID testing (35% CAGR over 2021-23E) and waning sales in COVID testing (down 59% CAGR over 2021-23E).

Figure 42: Total revenue and growth



Sources: Company, CMS (HK) estimates

Figure 43: Revenue breakdown by segments



Sources: Company, CMS (HK) estimates

Figure 44: Revenue breakdown (RMB mn)

Revenue breakdown	2019	2020	2021	2022E	2023E
Consumer genetic testing services	107	162	135	149	178
Cancer screening services	7	42	101	217	416
Other services	10	-	1	1	1
Total	124	203	237	368	595
YoY growth (%)					
Consumer genetic testing services	-25%	52%	-16%	10%	19%
Cancer screening services	35%	504%	142%	116%	91%
Other services	-78%	n.a.	n.a.	0%	0%
Total	-37%	64%	17%	55%	62%
As % of total					
Consumer genetic testing services	86%	80%	57%	41%	30%
Cancer screening services	6%	20%	42%	59%	70%
Other services	8%	n.a.	n.a.	n.a.	n.a.
Total	100%	100%	100%	100%	100%

Sources: Company, CMS (HK) estimates

COGS

The Group's COGS mainly consists of raw materials, testing services, staff costs, depreciation & amortization charges, printing & delivery costs and others, whose composition shifted over 2019-2021, mainly due to the discontinuation of other service segment. The c.7-8ppts improvement in COGS ratio over 2019-2021 is mainly due to sales mix changes. Looking forward, we expect the overall COGS ratio to continue to stabilize at ~29% over 2022E-23E as a result of relatively stable sales mix.

Figure 45: COGS breakdown in 2019-2024E

(RMB mn)	2019	2020	2021	2022E	2023E
Raw materials	18	20	37	53	85
% of COGS	40%	35%	52%	50%	50%
Testing services	9	21	12	16	26
% of COGS	20%	37%	16%	15%	15%
Staff costs	6	4	10	16	25
% of COGS	13%	7%	15%	15%	15%
Depreciation and amortization charges	6	6	5	8	13
% of COGS	12%	10%	8%	8%	8%
Printing and delivery costs	4	3	3	4	6
% of COGS	8%	5%	4%	4%	4%
Others	3	3	4	9	15
% of COGS	7%	5%	5%	9%	9%
Total COGS	45	57	71	106	170
% of Revenue	37%	28%	30%	29%	29%

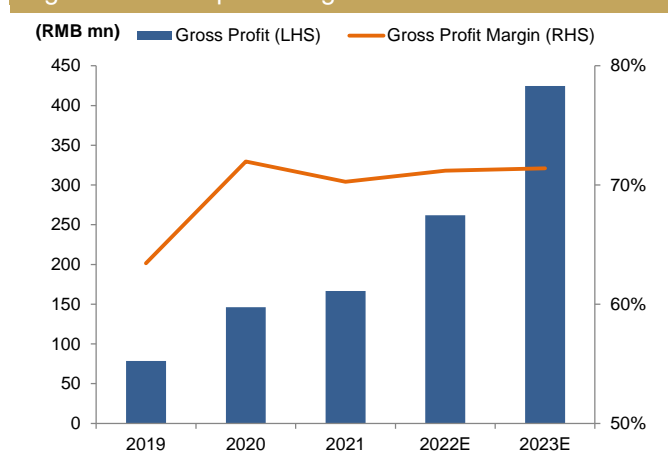
Sources: Company, CMS (HK) estimates

Gross profit margin (GPM)

The Group's gross profit margin improved from ~63% to ~70% over 2019-21, reflecting the change in revenue mix due to: 1) overall improvement of GPM of cancer screening business over 2019-21 (61%/80%/76%) as it scales and 2) overall stable GPM of consumer genetic testing business over 2019-21 (68%/70%/66%).

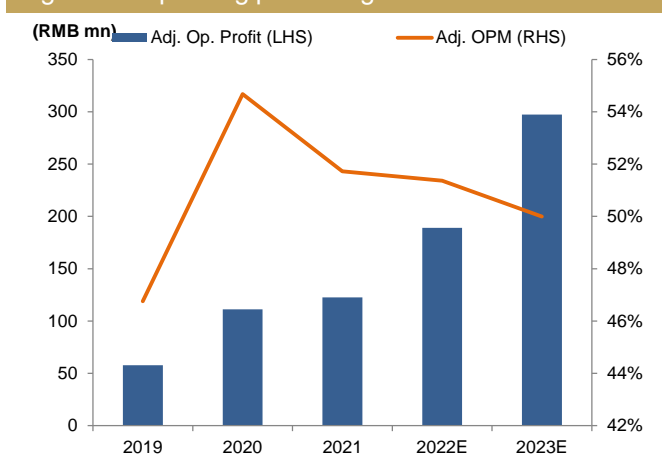
Given the expected relatively stable sales mix in 2022E-2023E, we forecast gross profit margin to stabilize at ~71%. In the long run, we expect a steady improvement in overall gross profit margin thanks to positive operating leverage as the Group scales.

Figure 46: Gross profit margin trend



Sources: Company, CMS (HK) estimates

Figure 47: Operating profit margin trend



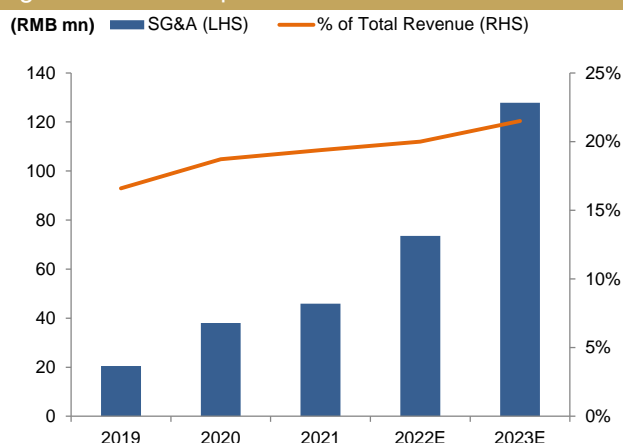
Sources: Company, CMS (HK) estimates

Selling, general and admin (SG&A) expenses:

The Group's SG&A from expense-to-revenue increased over the period of 2019-21 (from 16.6% to 19.4%) mainly due to 1) in-house marketing and development staff grew significantly (staff cost increased from RMB~35mn to RMB160mn and 2) overall increase of administrative expenses (from ~RMB156mn to ~RMB230mn).

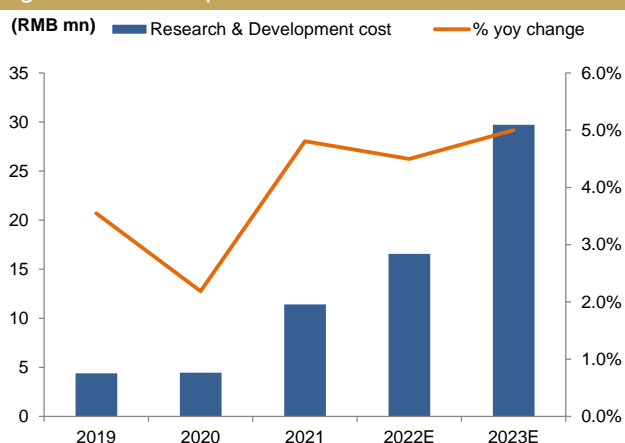
We forecast a significant gradual increase in SG&A (incl. R&D) expense-to-revenue ratio of c.20-22% over 2022E-23E comparing to c.17-19% in 2019-2021, mainly reflecting that the Group will continue to expand its sales coverage beyond Meinian OneHealth. Meanwhile, we predict a c.5% R&D expense-to-revenue ratio as the Group stated to continuously invest in enhancing its service platforms and developing IVD products.

Figure 48: SG&A expense and trend



Sources: Company, CMS (HK) estimates

Figure 49: R&D expense and trend



Sources: Company, CMS (HK) estimates

Figure 50: Operating expenses breakdown

RMB mn	2019	2020	2021	2022E	2023E
SG&A expense	(21)	(38)	(46)	(74)	(128)
Cost-to-revenue ratio %	16.6%	18.7%	19.4%	20.0%	21.5%
Administrative expenses (incl. R&D expense)	(11)	(14)	(12)	(13)	(21)
% yoy change	-46.6%	26.0%	-18.0%	11.4%	61.6%
Cost-to-revenue ratio %	9.0%	6.9%	4.9%	3.5%	3.5%
Selling and distribution costs	(5)	(19)	(23)	(44)	(77)
% yoy change	-80.5%	293.9%	18.0%	92.2%	75.1%
Cost-to-revenue ratio %	4.0%	9.6%	9.7%	12.0%	13.0%
R&D expense	(4)	(4)	(11)	(17)	(30)
% yoy change	-35.0%	1.3%	156.6%	45.1%	79.6%
Cost-to-revenue ratio %	3.5%	2.2%	4.8%	4.5%	5.0%
Adjusted EBIT	58	111	123	189	297
% yoy change	87.6%	92.1%	10.4%	54.0%	57.3%
% margin	46.8%	54.7%	51.7%	51.4%	50.0%
Adjusted EBITDA	72	125	137	199	330
% yoy change	64.1%	74.1%	9.1%	45.9%	65.6%
% margin	58.1%	61.6%	57.6%	54.2%	55.5%

Sources: Company, CMS (HK) estimates

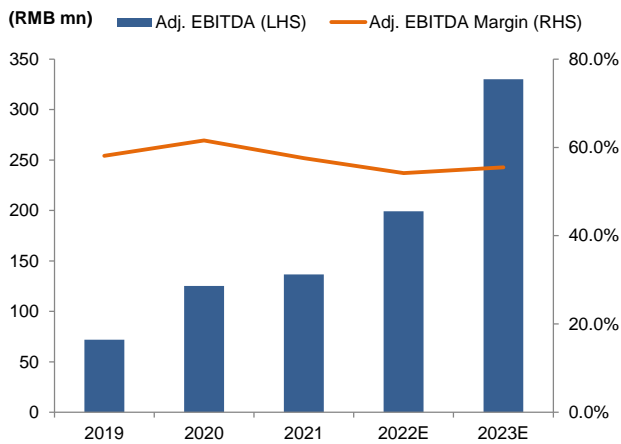
Adjusted EBITDA

We projected that the adjusted EBITDA should grow ~46%/66% yoy to RMB199mn/330mn in 2022E-23E. Our adjusted EBITDA excludes one-off items like the recapitalization expenses and the SBC expenses.

Adjusted net profit

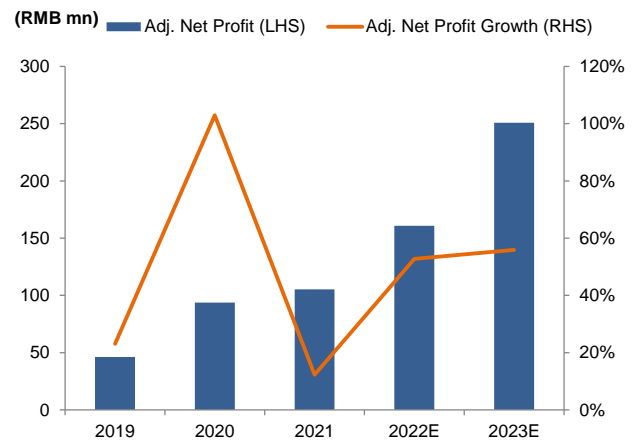
Our adjusted net profit excludes the SBC expenses, fair value changes to financial assets, and recapitalization expenses. The Group reported net profit of RMB30mn/79mn/79mn in 2019-2021. We expect the adjusted net profit to be RMB161mn/251mn in 2022E-23E, representing yoy growth of 53%/56% during the periods.

Figure 51: Adjusted EBITDA and margin



Sources: Company, CMS (HK) estimates

Figure 52: Adjusted net profit and margin



Sources: Company, CMS (HK) estimates

Tax rate

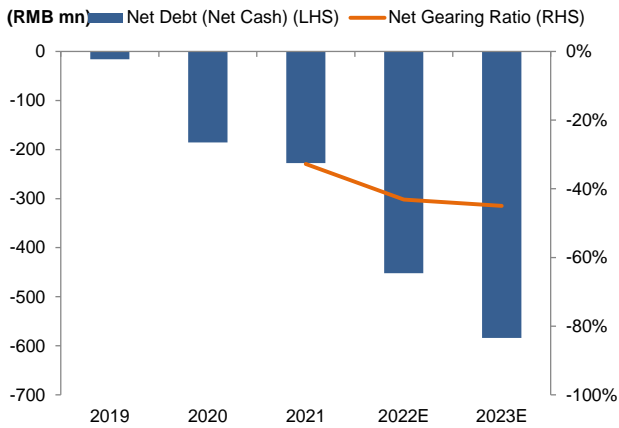
The effective tax rate was 22.5%/16.7%/17.6% during 2019-2021. For 2019, the higher effective tax rate was attributable to higher preferential tax rates enacted by local authority.

We estimate a stable c.16-17% effective tax rate in 2022E-23E mainly owing to the qualification of certain of the Group's subsidiaries in the PRC as high and new technology enterprises, which are thus subject to a preferential income tax of 15% under the relevant tax rules and regulations of the PRC. Going forward, we expect the effective tax rate to stabilize at ~16%.

Balance sheet & cash flow statement

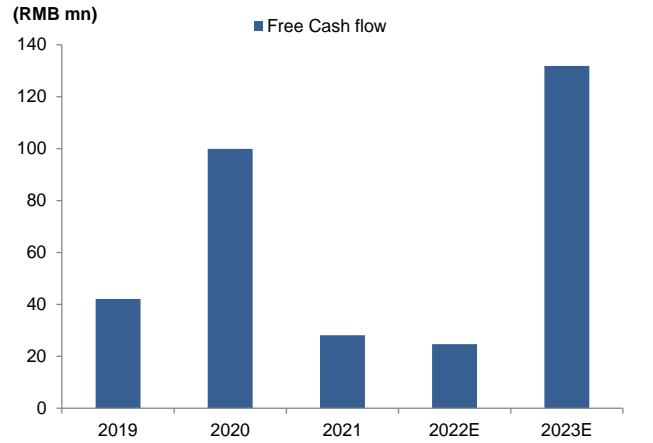
We expect the net cash to reach RMB452mn/584mn in 2022E-23E, with free cash flow at RMB25mn/132mn in the respective periods. The significant increase in net cash during 2022E is mainly attributable to financing activities.

Figure 53: Net debt (Net Cash) and net gearing ratio



Sources: Company, CMS (HK) estimates

Figure 54: Free cash flow

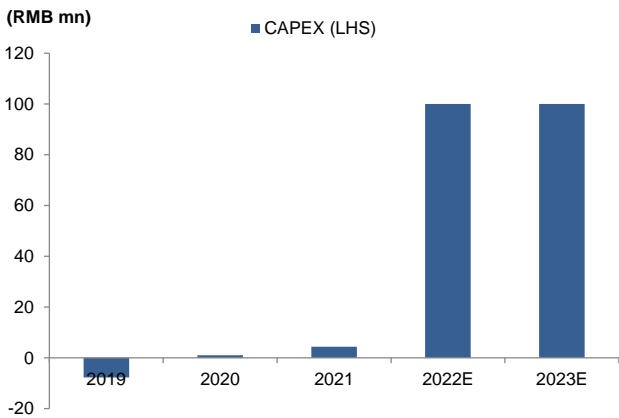


Sources: Company, CMS (HK) estimates

Capital expenditure

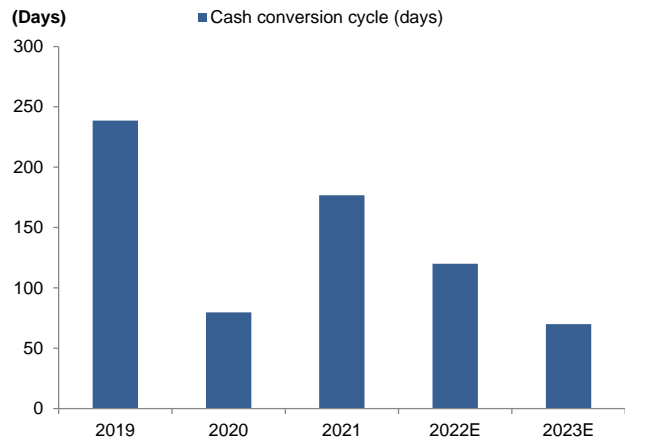
The Group plans to further expand its capacity by establishing additional labs outside of Beijing to meet the fast growing demand. Besides, on top of the CAPEX to the perspective labs, we project a stable maintenance CAPEX of RMB30mn from 2024E onwards as the Group adopted an asset-light expansion approach.

Figure 55: CAPEX and forecast (RMB mn)



Sources: Company, CMS (HK) estimates

Figure 56: Cash conversion cycles (days)



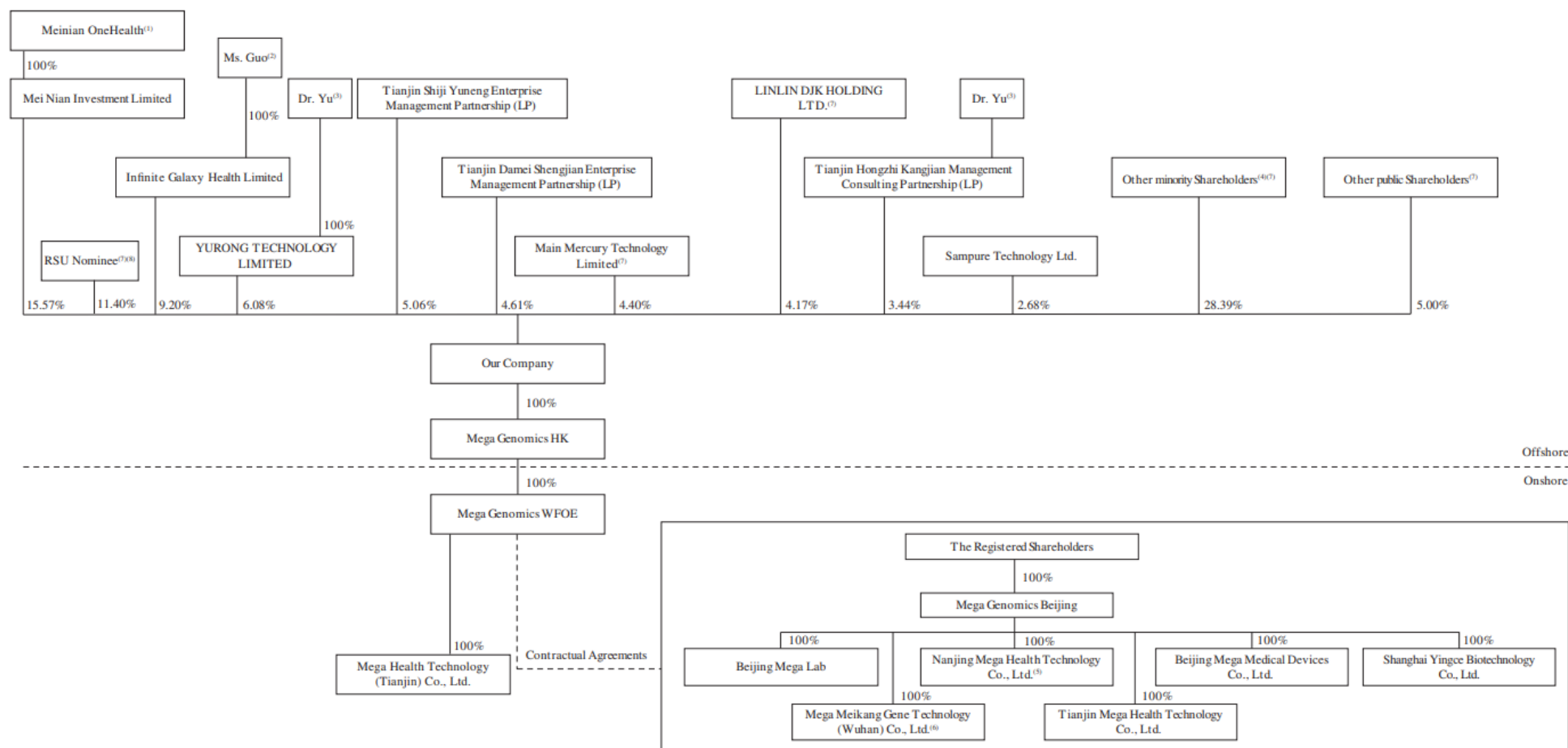
Sources: Company, CMS (HK) estimates

Cash conversion cycles

Cash conversion cycles increased to 177 days in 2021 from 80 days in 2020, mainly due to 1) longer account receivable days (up 78 days to 309 days in 2021 from 231 days in 2020) and 2) shorter account payable days (down 21 days to 149 days in 2021 from 170 days in 2020). We understand the rise in A/R days in 2021 is due to a tighter liquidity situation among customers amid ongoing COVID-19 pandemic. Going forward, we expect stable A/R days and A/P days in starting in 2023E and onward and cash conversion cycle consequently to be stable at 70 days in 2023E and onward.

Appendix - Shareholding structure

Figure 57: Shareholding structure of the Group



Sources: Company data, CMS (HK)

Financials

Balance Sheet

RMB mn	2019	2020	2021	2022E	2023E
Non-current assets	79	95	87	177	244
PP&E	55	47	41	131	198
Intangible assets	1	1	1	1	1
Right-of-use assets	21	15	10	10	10
Financial assets - FVTPL	-	30	30	30	30
Others	3	2	3	3	3
Current assets	184	358	685	965	1,175
Inventories	2	3	3	6	9
Trade receivables	108	130	204	256	330
Prepay./other receiva.	21	16	239	239	239
Amt. due from rela. parties	-	-	-	-	-
Assets held for sale	-	-	-	-	-
Total cash & cash equival.	53	208	239	464	596
Total assets	264	454	772	1,141	1,418
Current liabilities	53	262	70	85	111
Trade and bills payables	12	27	29	44	71
Other payables	30	28	33	33	33
Due to a related party	-	-	-	-	-
Income tax payable	-	0	7	7	7
ST bank debt	10	3	-	-	-
Non-current liabilities	213	15	8	8	8
Deferred tax liabilities	-	-	-	-	-
Others	21	15	8	8	8
LT bank loans	3	-	-	-	-
Shareholders' funds	(3)	176	694	1,048	1,299
Minorities	-	-	-	-	-
Total liability and equity	264	454	772	1,141	1,418

Cashflow

RMB mn	2019	2020	2021	2022E	2023E
Operating cash flow	34	101	30	123	230
Pretax profit	38	95	96	183	300
OP before WC changes	78	124	120	192	330
NWC change	(38)	(9)	(79)	(40)	(52)
Income tax paid	(3)	(13)	(11)	(29)	(49)
Interest paid	(3)	(2)	(1)	-	-
Investing cash flow	18	(31)	(2)	(99)	(98)
Purchase of PPE	8	(1)	(4)	(100)	(100)
Purchase of intan. assets	(0)	-	(0)	-	-
Pur./dis. of JV & Asso.	-	-	-	-	-
Amt. due to/from third party	-	-	-	-	-
Purchases of ST inve., net	-	(30)	3	-	-
Interest received	-	-	-	1	2
Others	20	-	-	-	-
Financing cash flow	(17)	86	3	200	-
Finance activities	-	-	-	200	-
Issuance of equity shares	-	100	15	-	-
Dividends	-	-	-	-	-
Bank borrowings, net	(10)	(10)	(3)	-	-
Others	-	-	-	-	-
Beginning cash	18	53	208	239	464
Net change in cash	35	156	32	225	132
End cash	53	208	239	464	596

Profit & Loss Statement

RMB mn	2019	2020	2021	2022E	2023E
Consolidated revenue	124	203	237	368	595
COGS	(45)	(57)	(71)	(106)	(170)
Gross profit	78	146	167	262	424
(-) Total SG&A exp.	(21)	(38)	(46)	(74)	(128)
Admin expenses	(11)	(14)	(12)	(13)	(21)
Selling & distribution	(5)	(19)	(23)	(44)	(77)
(-) R&D cost	(4)	(4)	(11)	(17)	(30)
(+/-) Other income, net	(0)	3	2	1	1
(+/-) Profit of JV&Asso.	-	-	-	-	-
Adj. EBITDA	72	125	137	199	330
Total Depre. & amort.	(14)	(14)	(14)	(10)	(33)
Stock-based comp	-	-	-	-	-
Adj. EBIT	58	111	123	189	297
(+/-) Finance exp. - net	(3)	(2)	(1)	1	2
(+/-) Other gains/losses	(17)	(15)	(26)	(7)	-
Profit before tax	38	95	96	183	300
(-) Tax	(9)	(16)	(17)	(29)	(49)
Net Profit	30	79	79	154	251
(+/-) Minority interest	-	-	-	-	-
Net profit attri. to shrhld	30	79	79	154	251
Adjusted net profit	46	94	105	161	251

Financial Ratios

	2019	2020	2021	2022E	2023E
Growth (%)					
Consolidated revenue	-37%	64%	17%	55%	62%
Gross profit	-59%	26%	24%	50%	61%
Adjusted net profit	23%	103%	12%	53%	56%
Profitability (%)					
Gross margin (%)	63%	72%	70%	71%	71%
Adj. net profit margin (%)	37%	46%	44%	44%	42%
ROE	n.a.	91%	18%	18%	21%
ROA	n.a.	22%	13%	16%	20%
Efficiency					
Inventory days	19	19	17	20	20
Accounts receivable days	315	231	309	250	200
Accounts payable days	96	170	149	150	150
Cash cycle days	239	80	177	120	70
Liquidity					
FCF (RMB mn)	42	100	26	23	130
Net gearing (%)	584	(105)	(33)	(43)	(45)

Sources: Company data, CMS (HK) estimates

Investment Ratings

Industry Rating	Definition
OVERWEIGHT	Expect sector to outperform the market over the next 12 months
NEUTRAL	Expect sector to perform in-line with the market over the next 12 months
UNDERWEIGHT	Expect sector to underperform the market over the next 12 months

Company Rating	Definition
BUY	Expect stock to generate 10%+ return over the next 12 months
HOLD	Expect stock to generate +10% to -10% over the next 12 months
SELL	Expect stock to generate loss of 10%+ over the next 12 months

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