Expectation of China's contribution to world vaccine development and supplies: Status, strategy and international approach

Li Shi
Shanghai Zerun Biotechnology

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Expectation for China‘s Contribution to World Vaccine Development and Supplies: Status, Strategy and International Approach

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Li Shi, Ph.D.
Shanghai Zerun Biotechnology Co., Ltd.
A Member of Wison Group
Presentation Outline

- World’s expectation for China vaccine market
- China’s readiness for contributing to world market with low-cost life saving vaccine supplies
- Bridging world-China vaccines markets
Presentation Outline

• World’s expectation for China vaccine market

• China’s readiness for contributing to world market with low-cost life saving vaccine supplies

• Bridging world-China vaccines markets
2012 VACCINE VENDOR SURVEY
US / EU play key roles in vaccines innovation, development, production, and supply
US and EU dominate World Vaccine Market

Vaccine Business Operation Locations
now and future

At present

<table>
<thead>
<tr>
<th>Location</th>
<th>USA</th>
<th>EU</th>
<th>ASIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Latin America</td>
<td>15</td>
<td>10</td>
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</tr>
<tr>
<td>Europe</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Asia</td>
<td>5</td>
<td>5</td>
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</tr>
<tr>
<td>Middle East</td>
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<td>Africa</td>
<td>1</td>
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</tr>
<tr>
<td>Australasia</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

In future

<table>
<thead>
<tr>
<th>Location</th>
<th>USA</th>
<th>EU</th>
<th>ASIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>30</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Latin America</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Europe</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Asia</td>
<td>5</td>
<td>5</td>
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</tr>
<tr>
<td>Middle East</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Africa</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Australasia</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Major Revenue Locations

Now and Future

At present

USA: 40%
EU: 23.0%
ASIA: 13.1%

In future

USA: 26.5%
ASIA: 28.6%
EU: 16.3%
Which countries or regions would you like to review as a potential new market for your organisation?

Emerging Market Opportunities

- Brazil
- Mexico
- Argentina
- Russia
- India
- China
- Singapore
- Taiwan
- Africa

2012 VACCINE VENDOR SURVEY
Historical Path of China Immunization Programs

- **In 1930s**: Basically no immunization activities. Smallpox, diphtheria, pertussis, measles and polio infectious diseases caused annual incidence of more than 10 million.

- **1950s to 1980s**: Vaccination with smallpox, BCG, diphtheria, polio, measles, PDT and tetanus vaccines resulted in significantly decrease in incidence rate.

- **In 1980s**: Started the implementation of national immunization program, and involved in WHO EPI. The vaccination rate of BCG, polio, measles and DPT vaccines for infant reached 85%.

- **In 1990s**: Achieved the eradication of polio and neonatal tetanus, and implemented comprehensive child immunization services.

- **2008**: Hepatitis A, meningitis, encephalitis B and MMR etc vaccination had been included into national immunization programs (EPI). Up 2010, the programs cover 14 kinds of vaccines that prevent up to 15 different infectious diseases.
### China Vaccination Rate (97.4~99.4%)
1 year old children data from 2000 to 2008

Vaccination rate (%) of 1 year old children in China from 2000 to 2008

<table>
<thead>
<tr>
<th>年份</th>
<th>卡介苗 (BCG)</th>
<th>百白破 (DPT)</th>
<th>骨髓灰质炎疫苗 (OPV)</th>
<th>麻疹疫苗 (MV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>97.8</td>
<td>97.9</td>
<td>98.0</td>
<td>97.4</td>
</tr>
<tr>
<td>2001</td>
<td>97.6</td>
<td>98.3</td>
<td>98.3</td>
<td>97.7</td>
</tr>
<tr>
<td>2002</td>
<td>98.0</td>
<td>98.2</td>
<td>98.4</td>
<td>97.9</td>
</tr>
<tr>
<td>2003</td>
<td>98.0</td>
<td>98.2</td>
<td>98.1</td>
<td>97.9</td>
</tr>
<tr>
<td>2004</td>
<td>98.8</td>
<td>98.9</td>
<td>98.9</td>
<td>98.5</td>
</tr>
<tr>
<td>2006</td>
<td>99.2</td>
<td>99.0</td>
<td>99.0</td>
<td>98.6</td>
</tr>
<tr>
<td>2007</td>
<td>99.0</td>
<td>99.0</td>
<td>99.1</td>
<td>98.6</td>
</tr>
<tr>
<td>2008</td>
<td>99.4</td>
<td>99.3</td>
<td>99.1</td>
<td>98.6</td>
</tr>
</tbody>
</table>

Source: China SFDA
Current Landscape of Vaccines Market and Supplies in China

• China is currently the biggest vaccine producer and consumer\(^1,2\)
  – 43 vaccine supply companies\(^1\)
  – \(~1,000\) mm doses of 49 vaccines delivered every year\(^3\)
  – 1.341 billion people\(^4\) (up to 2011)
  – \(~20\)\(^{1.5}\) million babies born every year

• China's vaccine sector is growing fast
  – \(~20\) (15\(^6\)-25\(^7\)) percent growth annually
  – \(~$1.2-1.4\) billion market size up to 2012\(^6,7,8\)

Sources:
4. Xinhua Beijing, 2011
8. business.ezinemark.com 2011

20% of total world vaccines supplies
2000-2010 China Population Growth
A Sustain Growth of Vaccines Market

20% of World Population

Source: China vaccine market analysis report 2011 (version in Chinese)
Public market adoption (EPI) in China is expected to grow at 4x the rate of that in India

China EPI Program Projections
Estimated full immunization cost per child

India EPI Program Projections
Estimated full immunization cost per child

1.2009 Tender information, Hainan, Shanxi and Hunan Province for existing vaccines; 2/3 current PAHO pricing assumed for new vaccines
2.2009 UNICEF pricing for existing vaccines; Penta, Rota, and PCV based off of GAVI investment case
Source: EPI adoption timing based on market interviews

Bill Gates Foundation 2010 Report on Key Public Markets for Vaccines
Presentation Outline

• World’s expectation for China vaccine market
• China’s readiness for contributing to world market with low-cost life saving vaccine supplies
• Bridging world-China vaccines markets
“China’s vaccine industry is well-developed”

<table>
<thead>
<tr>
<th>Category</th>
<th>State – Owned Companies</th>
<th>Private/Public Companies</th>
<th>MNC Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide mainly</td>
<td>8</td>
<td>30+</td>
<td>5</td>
</tr>
<tr>
<td>Category 1 vaccines</td>
<td>(EPI: paid by government)</td>
<td>(Non-EPI: paid by individual)</td>
<td></td>
</tr>
</tbody>
</table>

Chinese vaccine producers have marketed 49 vaccines and produced 800 million vaccine doses annually to fight 26 infectious diseases.

Bill Gates Foundation 2010 Report on Key Public Markets for Vaccines
### China Vaccine Supplies Status

<table>
<thead>
<tr>
<th>Vaccine Supplies in China</th>
<th>Category 1 vaccines</th>
<th>Category 2 vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPI (paid by Government)</td>
<td>(paid by individual)</td>
</tr>
<tr>
<td>Total shared doses (%)</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Total shared revenue (%)</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Sale growth rate</td>
<td>15%</td>
<td>28%</td>
</tr>
<tr>
<td>Profit margin</td>
<td>Small (fixed, low price)</td>
<td>Large (high price)</td>
</tr>
<tr>
<td># of diseases covered</td>
<td>15</td>
<td>rest diseases</td>
</tr>
<tr>
<td># of vaccine kinds</td>
<td>14</td>
<td>rest vaccines</td>
</tr>
<tr>
<td>Total supplies needed</td>
<td>large and stable</td>
<td>varies</td>
</tr>
<tr>
<td>Dominated Enterprises</td>
<td>China National Biotech Group (CNBG)'s 6 companies</td>
<td>5 MNCs and 30+ local companies</td>
</tr>
</tbody>
</table>

In fact, the compulsory and free EPI vaccines are dominant in inoculation vaccines in China on account of relatively low economic level and comparatively lower awareness of epidemic precaution. Taking human vaccine market for example, the release of EPI human vaccines reached 648.4261 million person doses in 2009, accounting for 80.4% of the total; while the extra EPI vaccine was only 158.512 million person doses, with a share of 19.6%. Yet, the sum of EPI vaccine only occupied 38.9% of the total being restricted by governmental procurement price, while the extra EPI vaccine covered 61.1%.

Source: Annals, ResearchInChina
## Europe and China Vaccines Suppliers

<table>
<thead>
<tr>
<th></th>
<th>Manufacturing</th>
<th>R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Belgium</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Germany</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hungary</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ireland</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>U.K.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

**China**

43+  

The vast majority of vaccine doses are manufactured in Europe.

- Total production: 4,281,304,000 doses
- China production: ~1,000,000,000 doses (~20% but almost no export)

Europe: 89.4%
North America: 8.7%
Rest of World: 2.0%

> 40 companies

Source: EVM survey
Bill Gates Foundation 2010 Report on Key Public Markets for Vaccines:

Key Countries

1. India – emerging domestic market, strong export capability
2. China – strong domestic market, limited role in exporting vaccines
3. Brazil – strong domestic market, limited role in exporting vaccines

Purchasing Channels (WHO prequalification required)

1. GAVI – income based inclusion of poorest countries, UNICEF procurement.
2. PAHO – regional purchasing through revolving fund
It may take some time

“China's vaccine makers are gearing up over the next few years to push exports, which should lower costs of life saving immunizations for the world's poor, and provide major new competition for the big Western companies.”

“However, it may take some time before some parts of the world are ready to embrace Chinese vaccine products when safety is as sensitive an issue as it is with vaccines — especially given the food, drug and other scandals the country has seen.”
Chinese vaccines industry entering world market

It may take time to achieve the goal with full confidence
China’s Long March to Innovation Success

• “China’s journey from a seriously poor, autarkic, economy to the ‘shop floor of the world’, took a bit more than two decades.”

• “Today, less than a decade later, it appears poised to evolve into becoming a leading global innovator; but can China actually make this next great leap forward?”

China Economy Growth in Next Two Decades

Source: IMF, Xinhua, Standard Charter & Time
China Economic Growth

10 years after joining WTO

World Top 1 or 2

Internet Users
420 mm
TOP 1

Air flight passengers
290 mm
TOP 2

Cell phone users
860 mm
TOP 2

High way
74000km
TOP 2

Cars
18 mm
TOP 1

Rail road
18358 km
TOP 1

www.bioway-pku.com
China’s Economic Growth in Western’s Eyes in 2005

- “China medicine market today is about $8 billion (2005) and projected to grow to $24 billion by 2010”
- “China is No. 10 worldwide now, already quite something, and could be the 3rd one.”
- “It grows currently at 20%, faster than the average market growth.”
- “….. is good in chemistry and so forth, but I believe this place (China) probably has more potential.”

Daniel Vasella, Chairman and CEO, Novartis 2005
China will soon become the second world largest medicine market

Source: China pharmaceutical market analysis report 2010
World Pharmaceutical Market by 2020

**2007**
1. US
2. Japan
3. France
4. Germany
5. UK
6. Italy
7. Spain
8. Canada
9. China
10. Brazil

**2009**
1. US
2. Japan
3. France
4. Germany
5. China
6. Italy
7. Spain
8. UK
9. Brazil
10. Canada

**2011**
1. US
2. China
3. Japan
4. Germany
5. France
6. Italy
7. Spain
8. Brazil
9. US
10. Canada

**2020**
1. China
2. US
3. Japan
4. Germany
5. France
6. Italy
7. Spain
8. Brazil
9. US
10. Canada

Source: IMS Health & ChinaBio 2011
World and China Pharma Market Growth

Data Source: IMS, bioway-pku, and some media reports

~$110 billion (>20% growth)
China is leading the expansion of higher education

The rise of doctorates

Major expansion of higher education has boosted PhD output in many countries, shown here as average annual growth of doctoral degrees across all disciplines, 1998–2006.

Nature 472, 276-279 (2011)

SOURCE: OECD/CHINESE MINISTRY OF EDUCATION
Patterns of PhD production
Trends in annual PhD graduation across all disciplines.
All figures given in thousands of PhDs.

**CHINA**

By some counts, China has overtaken the United States to become the world’s biggest producer of PhDs.

**UNITED KINGDOM**

Growth has been fuelled by overseas doctoral students; recent cost-cutting has slowed growth.

---

Nature 472, 276-279 (2011)
Chinese Oversea Returnees Changing the Way Business is Done in China

A total of 430,000 oversea returnees in last 5 years including 150,000 in life science

Source: ChinaBio 2011
China Lead in Global Life Sciences Supply Chain

70% of the surveyed companies have suppliers in China

Wynn Bailey, Contract Pharma Jan-Feb 2011
Research Records in a Highly Critical Field

Number of publications in the highly critical field of nanotechnology for top 20 countries during Jan-Sept 2004

RN Kostoff, The Scientist, 18(18) 2004
From the point of view of Intellectual Properties

Patents: Japan, U.S.A., China, Korea and Europe, 1995-2009

Source: World Intellectual Property Organization

Number of Patents

China
Over 49 Vaccines on China market
(in-complete list)

<table>
<thead>
<tr>
<th>Viral vaccines</th>
<th>Bacterial vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick- borne Encephalitis</td>
<td>BCG</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>Vi Polysaccharide typhoid</td>
</tr>
<tr>
<td>JE(inactivated)</td>
<td>Tetanus Vaccine, Adsorbed</td>
</tr>
<tr>
<td>JE(attenuated, live)</td>
<td>Diphtheria Vaccine, Adsorbed</td>
</tr>
<tr>
<td>Haemorrhagic fever</td>
<td>DT</td>
</tr>
<tr>
<td>Rabies</td>
<td>DTaP</td>
</tr>
<tr>
<td>rHBV</td>
<td>DTwP</td>
</tr>
<tr>
<td>HAV(live)</td>
<td>Brucellosis, Percutaneous Scarification</td>
</tr>
<tr>
<td>HAV(inactivated)</td>
<td>Plague, Percutaneous Scarification</td>
</tr>
<tr>
<td>HAV+HBV</td>
<td>Anthrax, Percutaneous Scarification</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>Meningococcal Polysaccharide A</td>
</tr>
<tr>
<td>Influenza vaccine (whole virion)</td>
<td>Meningococcal Polysaccharide A+C</td>
</tr>
<tr>
<td>Split-virus flu vaccine</td>
<td>Meningococcal Polysaccharide A+C+Y+W</td>
</tr>
<tr>
<td>OPV</td>
<td>Leptospira Vaccine</td>
</tr>
<tr>
<td>Varicella</td>
<td>Hib</td>
</tr>
<tr>
<td>Measles</td>
<td>Pneumonia (23)</td>
</tr>
<tr>
<td>Rubella</td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td></td>
</tr>
<tr>
<td>Measles+Mumps</td>
<td></td>
</tr>
<tr>
<td>Measles+Rubella</td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td></td>
</tr>
</tbody>
</table>
Structure of China Vaccine Technologies
Accumulated with 60 years of vaccine experience

- New Vaccines
  - Therapeutic HB
  - Nasal spray & Human-bird flu
  - Recombinant flu
  - Purified DPaT vaccines

- Improved Vaccines
  - Men AC Conjugate, Combination
  - HIB Conjugate, MenACW135Y vaccines

- Main Traditional Vaccines
  - Hepatitis B, JE, Rabies, Flu, Acellular Pertussis vaccines
Traditional Vaccine Products Dominated China Vaccine Supplies

Innovated Vaccines

Young in discovery research

Traditional Vaccines

Good in development
Vaccine Market Growth Driven by Innovation

- Traditional vaccine’s growth: ~11% per year
- Novel vaccine’s growth: ~58% per year

Source: Global Trends and Drivers of Biopharmaeutical Manufacturing, Frost & Sullivan, Asia Biomanufacturing Summit 28 October 2009
A total of 28 different types of vaccines

Source of Data: China SFDA web
218 Vaccine Clinical Trials Approved by SFDA (2004 – 2012)

Out of total approval

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Products</td>
<td>115</td>
<td>53%</td>
</tr>
<tr>
<td>Imported Products</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Additionally Required Trials</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Existing Products</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

Source of Data: China SFDA web
Examples of novel and bio-similar vaccines under development in China
(in-complete list)

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>Phase II</td>
</tr>
<tr>
<td>H1N1 Flu</td>
<td>approved</td>
</tr>
<tr>
<td>HEV</td>
<td>approved</td>
</tr>
<tr>
<td>H. Pylori</td>
<td>Phase III</td>
</tr>
<tr>
<td>EV71</td>
<td>Phase I I, III</td>
</tr>
<tr>
<td>Cancer vaccines</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>HPV</td>
<td>Phase I, II</td>
</tr>
<tr>
<td>Pneum C.</td>
<td>Phase I</td>
</tr>
<tr>
<td>IPV</td>
<td>Phase II</td>
</tr>
<tr>
<td>Rota Virus</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

Source of Data: China SFDA web
2011 publications: “China prepares to enter world vaccine market: lower costs, increased competition expected”

“The world should get ready for a new Made in China product — vaccines”.
The Associated Press, 29 Nov 2011 by GILLIAN WONG

“Could your vaccines soon be ‘Made in China’?”
The Associated Press, 29 Nov, 2011 by Liz Klimas

“Rapid growth of the global vaccine market has great potential in China market for vaccines”
Tweet, 1 Jan, 2011 by Gaga

Related publishers’ web sites:
www.timeslive.co.za
www.azcentral.com
www.usatoday.com
www.boston.com
news.yahoo.com/china
http://vaccine.ezinemark.com
New Progresses of SFDA and WHO in China

- Concluded the qualification of SFDA quality monitoring system for vaccines on March 1, 2011

- Started “New GMP” (2010V) Implementation to meet international quality standard on March 1, 2011, with a deadline of Dec 31, 2013
## WHO Assessment on SFDA Quality Monitoring Systems through 52 indicators

**China 13 - 17 Dec 2010**

<table>
<thead>
<tr>
<th>NRA Function</th>
<th>Indicator Estimated</th>
<th>Indicator implemented</th>
<th>%Sub-indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. National Regulatory System</strong></td>
<td>7</td>
<td>7</td>
<td>95.45%</td>
</tr>
<tr>
<td><strong>Function 1: Marketing Authorization and Licensing activities</strong></td>
<td>9</td>
<td>9</td>
<td>96.30%</td>
</tr>
<tr>
<td><strong>Function 2: Post-marketing activities including surveillance of Adverse Events Following Immunization (AEFI)</strong></td>
<td>8</td>
<td>8</td>
<td>96.00%</td>
</tr>
<tr>
<td><strong>Function 3: NRA Lot release</strong></td>
<td>6</td>
<td>6</td>
<td>100.00%</td>
</tr>
<tr>
<td><strong>Function 4: Laboratory access</strong></td>
<td>10</td>
<td>10</td>
<td>100.00%</td>
</tr>
<tr>
<td><strong>Function 5: Regulatory inspections</strong></td>
<td>6</td>
<td>5</td>
<td>89.58%</td>
</tr>
<tr>
<td><strong>Function 6: Regulatory oversight of clinical trials</strong></td>
<td>6</td>
<td>6</td>
<td>95.00%</td>
</tr>
</tbody>
</table>

Total of 52 indicators

Source: SFDA public presentation 2011
Chinese national regulatory authority meets international standards

A WHO-led team concluded today, at the end of a comprehensive review, that the national regulatory authority of China, the State Food and Drug Administration (SFDA), and affiliated institutions, meet WHO published indicators for a functional vaccine regulatory system.

http://www.who.int/immunization/en/
Status of Implementation of New GMP quality system in China

- 4900 Pharma and Biopharma/Biotech Companies making 19336 medicine products
- 517 (11%) have passed new GMP required qualification inspections
- 43 vaccine companies making 172 vaccine products
- 8 (19%) have passed new GMP required qualification inspections
  - Changchun Institute of Biological Products Co., Ltd.
  - Shenzhen Sanofi Pasteur Biologcal Products Co., Ltd.
  - Chengdu Institute of Biological Products Co., Ltd.
  - Hualan Biotechnology Company
  - Wuhan Institute of Biological
  - Shenzhen Kangtai Biological Products Co., Ltd.
  - Zhejiang Tianyuan Bio-Pharmaceutical Co., Ltd. (a Novartis company)
  - Beijing Xiangrui Biological Products Co., Ltd.
  - Zhejiang Pukang Biotechnology Co., Ltd.

- All remaining companies have to pass new GMP inspections and receive SFDA certificate by the end of 2013.
Presentation Outline

• World’s expectation for China vaccine market

• China’s readiness for contributing to world market with low-cost life saving vaccine supplies

• Bridging world-China vaccines markets
China Vaccine Industry Faces New Changes & Challenges

1. New GMP
2. WHO PQ
3. MNC’s competitions
China Vaccine Manufacturing Remains Extra Capacity

Source: China vaccine market analysis report 2011 (version in Chinese)
China Vaccine Companies in World Vaccine Supply Chain

At present

China vaccine Companies

World dominated vaccine suppliers

R&D and Manufacturing Technologies

Manufacturing Batch Scale
China Vaccine Companies in World Vaccine Supply Chain

R&D and Manufacturing Technologies

In future

China vaccine Companies

World dominated vaccine suppliers

Manufacturing Batch Scale
Consolidation Results in Complementary Strength Enhancement

- Capability of taking current market (currently product on market)
- Capability of taking future market (R&D innovation and novel product pipeline)
- Government Relationship (Capability of influencing on SFDA approval speed)
- Future Leader of Chinese Vaccine Industry & Market
- Capability of effective international collaboration, exchange, & communication
- Strong marketing and Sale Force (Capability of market penetration)
“Vaccine Market Access in China – M&A Paves the Way for Foreign Companies”

• “China is the largest vaccine consumer in the world. It is a closed market with a strong local vaccine industry, access to which is challenging for Western players.”

• “In order to penetrate the China market, partnerships with local vaccine companies are crucial for Western vaccine manufacturers.”

• “New GMP implementation will further increase M&A opportunities for multinationals.”

Source: Corporate License, 7 November 2011, Datamonitor
GSK, Sanofi-Pasteur, and Novartis have already acquired or set up local vaccine production companies in China. Sanofi-Pasteur, and Novartis have started vaccine R&D centers in China as well.
“In China, Speeding Toward the Future”

“Historically, most important vaccines have originated in Europe and the United States. Now, countries like Brazil, India and China are providing lower-cost versions of some of them. …… because countries like China have experience in making low-cost vaccines, they could be better at designing new ones in ways that make them low in cost from the very beginning.”

“……… I was impressed at how quickly the (Chinese vaccine) industry is moving ahead. They really understand low-cost manufacturing, and they're getting their quality up to world standards. Over the next five to ten years, they have the potential to create many breakthrough vaccines, as well as to help get current vaccines to the world’s poorest people, ………“

Bill Gates Travel Note, 2010
Building the Bridge

Innovation, Quality,
WHO and Collaboration

China

World Market

Thank You!
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