Elimination of Schistosomiasis japonica in China: the last mile towards 2025

Guojing Yang
Outlines

- Burden of the disease
- Stages of control efforts
- Experiences & Lessons
- The way forward
Outlines

• Burden of the disease
• Stages of control efforts
• Experiences & Lessons
• The way forward
• Schistosomiasis japonica has been endemic in P.R. China for more than 2100 years

• Estimated 11.6 million people were infected in 1950s
Schistosomiasis japonica

- None endemic area
- Transmission interrupted
- Transmission controlled
- Endemic area

Graph:
- No. infected
- No. acute
- Units (万人)
- Units (人)
- Year: 2002 to 2010
- Values: 1114, 84.30, 32.58, 42
Schistosomiasis japonica progression in human beings

<table>
<thead>
<tr>
<th>Disease</th>
<th>Progression</th>
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<tbody>
<tr>
<td><strong>Acute schistosomiasis</strong></td>
<td>Cercarial dermatitis, Katayama fever, Bloody diarrhea, Abdominal pain, Portal hypertension, Liver cirrhosis</td>
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<tr>
<td><strong>Chronic schistosomiasis</strong></td>
<td>No symptoms or Intermittent abdominal pain, Diarrhea, Rectal bleeding</td>
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<tr>
<td><strong>Advanced schistosomiasis</strong></td>
<td>Splenomegaly, Ascites, Colonic tumoroid proliferation, Growth retardation</td>
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More severe morbidity than other schistosomiasis
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Stages of control efforts

Preparation stage:
1. setting up control infrastructure;
2. understanding the epidemiology

Mass campaign stage:
1. understanding endemic status
2. strengthening control agencies
3. mass campaign with focus on snail control

Morbidity control stage:
1. Morbidity control and pilot studies

Transmission control and interruption stage:
1. Formulation of comprehensive strategy;
2. National control programme

Elimination/post-elimination stage:

Investigation and re-exam / re-treatment

Snail control

Mass chemotherapy; selective chemotherapy

Integrated control strategy focus on infectious sources

Surveillance & Response

1950-1955
1956-1985
1986-2003
2004 - 2015 - present
Reduction of schistosome-endemic areas

Transmission Controlled
Guangxi 1972
Guangdong 1974
Shanghai 1975
Fujiang 1975
Zhejiang 1987

Transmission interrupted
Guangdong 1985
Shanghai 1985
Fujiang 1987
Guangxi 1989
Zhejiang 1995

Non-endemic
Transmission interrupted
Transmission ongoing
Milestones (By end of 2014)

- The number of cases was decreased from 843,000 cases in 2004 to 115,000 in 2014, with its 86.4% of reduction rate;
- The infection rate of animals is reduced from 4.49% in 2004 to the 0.25% in 2015, with its reduction rate of 94.4%;
- In the 5 provinces zero cases has yet been found during last 20 years;
- Among 454 endemic counties, 98.9% of endemic counties has achieved the goal of transmission control or transmission interruption.
By the end of 2015:

1. zero report on acute schistosomiasis

2. all counties achieve the criteria for **elimination** as public health problem (Prevalence < 1%, at village level)
Outlines

• Burden of the disease
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Experiences and lessons

- Strong political will and government commitment
- Scientific control strategies keep the pace with the times
- Vertical control program and sufficient workforce
- Epidemiological survey and surveillance
In 1955, Chairman Mao Zedong issued a slogan: “Schistosomiasis has to be eliminated”

FAREWELL TO THE GOD OF PLAGUE
--- two poems, July 1, 1958

When I read in the Renmin Ribao of June 30, 1958 that schistosomiasis had been wiped out in Yukiang County, thoughts thronged my mind and I could not sleep. In the warm morning breeze next day, as sunlight falls on my window, I look towards the distant southern sky and in my happiness pen the following lines.

I
So many green streams and blue hills, but to what avail?
This tiny creature left even Hua To powerless!
Hundreds of villages choked with weeds, men wasted away;
Thousands of homes deserted, ghosts chanted mournfully.
Motionless, by earth I travel eighty thousand li a day,
Surveying the sky I see a myriad Milky Ways from afar.
Should the Cowherd ask tidings of the God of Plague,
Say the same griefs flow down the stream of time.

II
The spring wind blows amid profuse willow wands,
Six hundred million in this land all equal Yao and Shun.
Crimson rain swirls in waves under our will,
Green mountains turn to bridges at our wish.
Gleaming mattocks fall on the Five Ridges heaven-high;
Mighty arms move to rock the earth round the Triple
We ask the God of Plague: “Where are you bound ?“
Paper barges aflame and candle-light illuminate the sky.

In 1989, President Jiang Zemin, ordered to “take necessary steps to control schistosomiasis”
Surveillance system at different endemicity areas/ecosystems

Beijing Plans Health Care For Everyone
The Wall Street Journal is reporting on China’s ambitious plan to provide universal health care to all 1.3 billion Chinese citizens by 2020, covering 90 percent of the population within the next two years. Critics of the plan say it does not give detailed information on funding and implementation.

China has unveiled an agenda to achieve universal health care. The plan, released for public debate last year, is part of broad strokes plans to introduce greater health-care funding and reduce the gap in the current system leaves out much of the population and forces the residents to meet out-of-pocket expenses.

The proposal was crafted in a year-long series of consultations with groups such as the World Health Organization, the World Bank, management consultancy McKinsey & Co. and a few Chinese university-based public health experts.

Chinese Primary Health Care
“Healthy China 2020”

High priority in government agenda

BBC News: China Healthcare Under Spotlight
Experiences and lessons

• Strong political will and multi-sectoral collaboration
• Scientific control strategies keep the pace with the times
• Vertical control program and sufficient workforce
• Epidemiological survey and surveillance
The control strategies were developed and adapted over time to remain aligned with **epidemiological insights, technological advances and the political environment**.
**Criteria of schistosomiasis control and elimination**

**Morbidity Control**: lowered incidence/prevalence of disease (both overt or subtle)

1. Among surveillance population, infection rate <5%

**Transmission Control**: significantly reduced prevalence of disease, possibly with low level transmission

1. Among surveillance population, infection rate <1%

**Transmission interruption**: zero incidence of infection in a defined geographical area

1. No human schistosomiasis case with local infection should be found for 5 successive years;
2. No schistosomiasis case in domestic animal with local infection should be found for 5 successive years;
3. No infected Oncomelania snails should be found after careful surveys for two successive years;
4. The effective, sensitive surveillance system should be available.

**National Criteria for Control and Elimination of Schistosomiasis**

Criteria for schistosomiasis control and elimination were formulated and modified 6 times.
Experiences and lessons

- Strong political will and multi-sectoral collaboration
- Scientific control strategies keep the pace with the times
- Vertical control program and sufficient workforce
- Epidemiological survey and surveillance
By 2011, 365 agencies for schistosomiasis control existed in 7 provinces.
Experiences and lessons

- Strong political will and multi-sectoral collaboration
- Scientific control strategies keep the pace with the times
- Vertical control program and sufficient workforce
- Epidemiological survey and surveillance
Number of people infected with *S. japonicum* in PR China

Data extracted from surveillance sites

(1) Repetitive cross-sectional sampling survey, ie, national surveys;

(2) Longitudinal monitoring of fixed sentinel surveillance, ie, surveillance on sentinel sites:

- First survey: 1.6 in 8 provinces
- Second survey: 1.0 in 8 provinces
- Third survey: 0.4 in 11 provinces

- Official, country-wide: Date from 3 Nation-wide survey
- Province or county-le: Date from National surveillance sites

Year

- 1989
- 1991
- 1993
- 1995
- 1997
- 1999
- 2001
- 2003
- 2005
- 2007
- 2014

- 458 in 13 provinces
- 21 in 8 provinces
- 14 in 8 provinces
- 81 in 11 provinces
Role of the Surveillance in Schistosomiasis Elimination

**WEB GIS**

- **Case Detection System**
  - With Ref Lab Network
- **Case Reporting System**
  - With data analysis
- **Forecast and Risk Assessment System**
  - Implemented at national level
- **Response System**
  - Implemented at county level

**Sensitive and Effective S&R System**
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Challenges

- **Extensive and complicated snail habitats**: 3.6-3.8 billion m²; >96% marshland and lake regions;
- **Management of different sources of infection**: migrate population, >40 mammals bovine/goat/rodents…;
- **Unbalanced implementation of integrated strategy**: large funds are not available in poor areas (centrally planned, locally implemented);
- **Unavailability of sensitive diagnostic tools**: under-estimated the real infection rate using traditional way;
- **Weak surveillance and response system**: simple monitored contents, insensitive indicators, obsolete technologies…

**The way forward**
• Chinese government top agenda
• One of 6 most important diseases targeted for control or elimination for the next decade.

Strategic Working Plan (new milestones)

All counties will achieve the criteria of the transmission interruption by 2020
All counties will achieve the certification of schistosomiasis elimination by 2025
Opportunities

**Monitoring and Evaluation (M&E)**

**New Diagnostics**: Products and equipment for parasite detection both in human & animals (incl. snail) sensitive enough and standardized

Modeling, to provide evidence to the decision makers

**New Drugs/vaccine**: Anti-schistosome targets and biology of parasitism

**Elimination of infectious sources**

**Better management Tools**: Surveillance and Forecasting, mobile case management etc.

**Platform**: building information platform with various databases
Preface

Elimination of Schistosomiasis Japonica in The People’s Republic of China: The Last Leg

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Towards the Elimination of Schistosomiasis japonica through Control of the Disease in Domestic Animals in The People’s Republic of China: A Tale of over 60 Years


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Evolution of the National Schistosomiasis Control Programmes in The People’s Republic of China


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