Economic evaluation of screen-and-treat strategies for asymptomatic Helicobacter pylori infection in China

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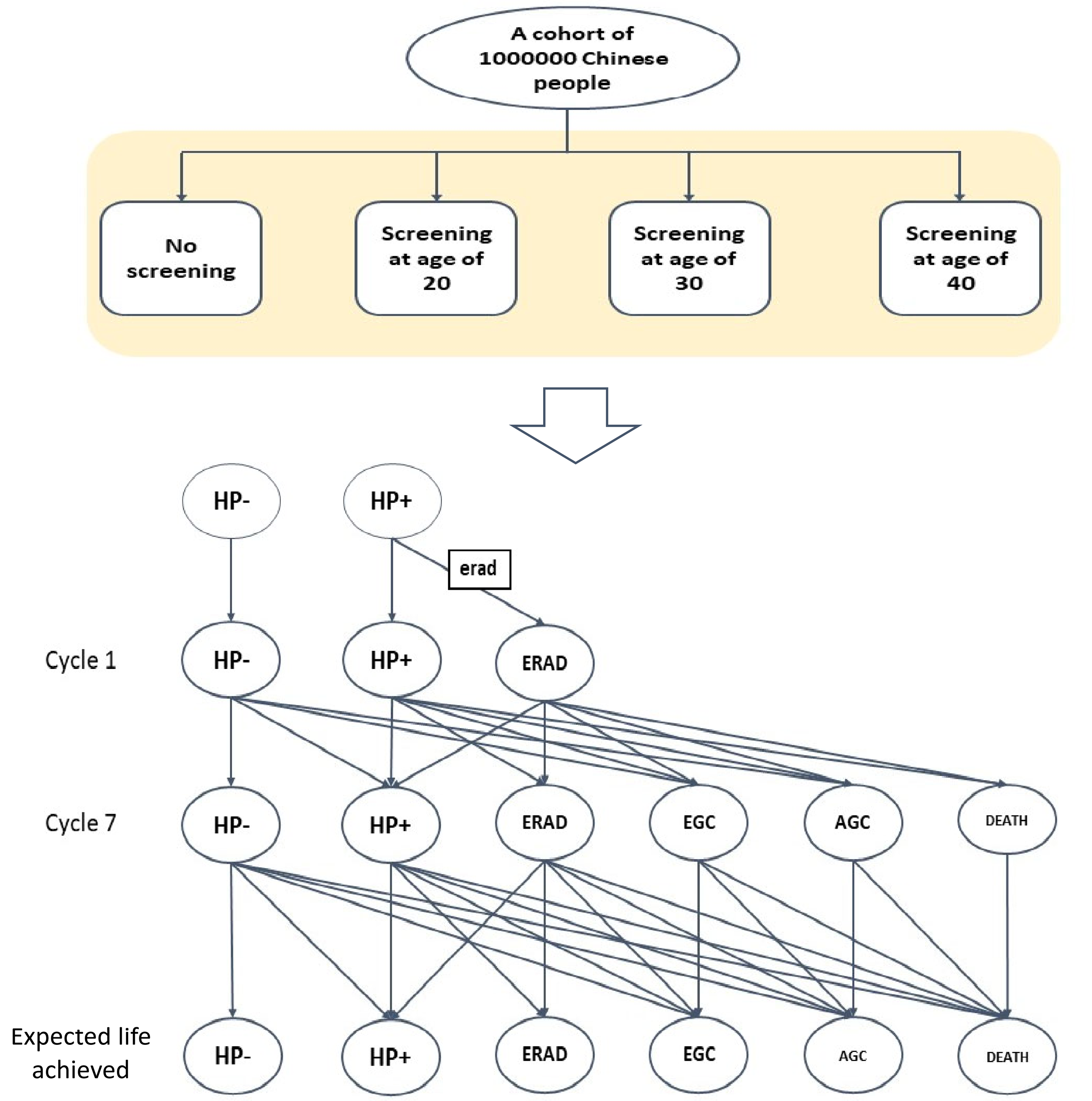
Objective

To determine the most cost-effective strategy in screening and eradicating Helicobacter pylori(H. pylori) infection from Chinese healthcare system perspective.

Methods

- A Markov model was developed to examine the cost-effectiveness of four H.pylori screen-and-treat strategies, using one-year cycle. Incremental cost-effectiveness ratios (ICERs) were calculated for each treatment therapies relative to no screening therapy (*Figure 1*).
  1. No screening(NO-screen);
  2. screening at the age of **20** years and treat H.pylori;
  3. screening at the age of **30** years and treat H.pylori;
  4. screening at the age of **40** years and treat H.pylori.
- Primary outcomes: Quality-adjusted life years (QALYs), costs, incremental cost-effectiveness ratios (￥per QALY);
- Secondary outcomes: Gastric cancer incidence reduction, number of cause-specific deaths avoided.
- Sensitivity analysis: Scenario analysis, one-way sensitivity analysis, probabilistic sensitivity analysis



HP-: H.pylori negative; HP+: H.pylori positive; Erad: Eradication; EGC: early gastric cancer; AGC: advanced gastric cancer

Figure 1 Simplified model schematic

Table 1. Base case results for four strategies

strategy	gastric cancers avoided [1]	death of gastric cancer avoided [2]	QALYs per capita	Cost per capita(￥)	ICERs
NO-screen	-	-	**16.88**	**2224.62**	
screening at the age of 20	**19000.36**	**18975.64**	**17.66**	**2157.97**	**-86.43**
screening at the age of 30	**14030.48**	**14006.25**	**17.24**	**2390.65**	**467.10**
screening at the age of 40	**10135.71**	**10110.82**	**16.99**	**2479.98**	**2429.29**

[1,2]Compared with NO-screen strategy.

Figure 2 The cost-effectiveness acceptability curve

Results

- Compared with no screening, strategies of screening at 20, 30, and 40 years of age were all cost-effective, with ICERs of ￥-86.43, ￥467.10, and ￥2429.29 per QALY, respectively (*Table 1*).
- Screening at 20 years was highly cost-effective, compared with other screening strategies. Each screen strategy prevented **19,000.36**, **14,030.48,** and **10,135.71** gastric cancer cases compared with no screening (*Table 1*).
- Deterministic sensitivity analysis was performed to test the robustness of the results. Changes in the discount rate and utility of H. pylori positive patients have more influence on ICERs than other factors, still, neither of them affects the cost-effectiveness of the screen-and-treat strategy over the no-screen strategy.
- The cost-effectiveness acceptability curve (CEAC) shows that when the willingness-to-pay (WTP) threshold was 0, the probability of being cost-effective of NO-screen and screening at age 20 is **31.3%** and **68.7%**, respectively. When the WTP was 1-3 times GDP per capita, the probabilities of being cost-effective of screening at age at 20 were 100% (*Figure 2*).

Conclusion

- Compared with no screening, all screen-and-treat strategies are cost-effective and reduce the economic burden of gastric cancer.
- Screening **at the age of 20 years** for H. pylori infection was less costly and more effective for preventing gastric cancer in the Chinese population.

Disclosure

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