

EE112. A POPULATION-LEVEL MACROECONOMIC MODEL OF THE POTENTIAL SOCIETAL IMPACT OF USING TISSUE VS. MECHANICAL SURGICAL AORTIC VALVES IN MAINLAND CHINA

Wang B,¹ Rassloff D,² Moore M,² Bridger P,² Wu E,¹ Garrison LP,³
¹ Real Chemistry Consulting, NY, USA, ² Edwards Lifesciences, CA, USA, ³ University of Washington, WA, USA

Objective

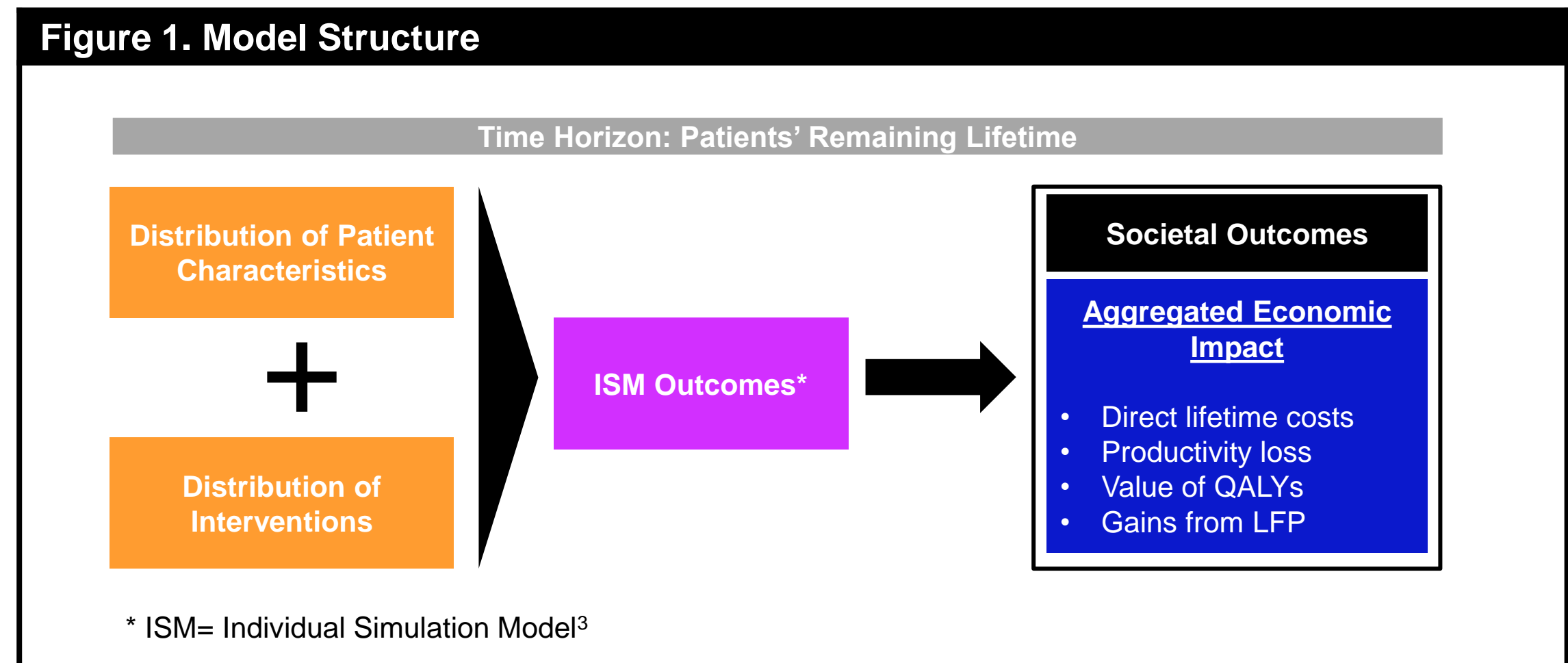
Economic evaluations of new technologies often assess the cost-effectiveness for a typical patient or budget impact for payers. This analysis projects potential costs, health gains, and productivity gains at a national population-level based on more patients receive a surgical tissue valve vs. mechanical valve replacement.

Methods

- Model type:** a national-level simulation from a societal perspective (Figure 1)
- Patient:** eight distinct HVD candidate subgroups based on: (a) years of age—40-49 vs. 50-59; (b) location—urban vs. rural; and (c) occupation—primary/secondary (manual laborers) vs. tertiary (office workers)
- Valve utilization:** base case (96% for HVD patients aged 40-49 yrs. and 88% for aged 50-59 yrs.) vs. tissue valves) and alternative scenario (equal use in each age subgroup) (Table 1)
- Epidemiological and population inputs:** prevalence of Heart Valve Disease (HVD) (Table 1)
- Population inputs:** China Statistical Yearbook (Table 1)
- Economic inputs:** economic outcomes from the individual-level simulation model the total lifetime economic gain was \$315,215 and \$262,622 for tissue and mech patients, respectively. The net economic gain was USD52,593 (representing 20.0% more than for mechanical valve patients) (Table 2)
- Model outcomes:** HVD patients by subgroups (Figure 3 a-c) and total lifetime economic impact (Figure 4)

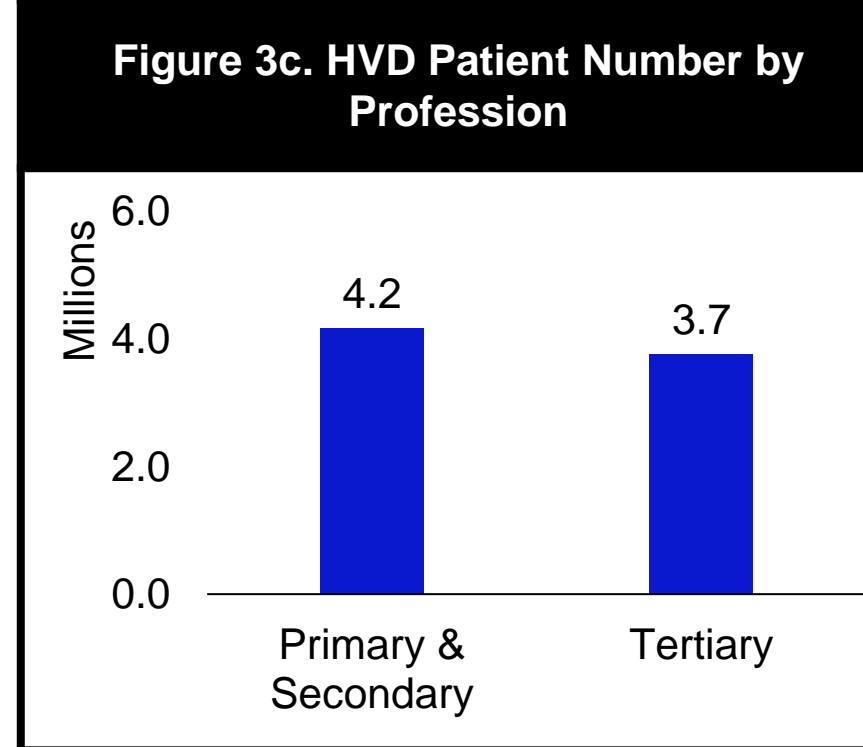
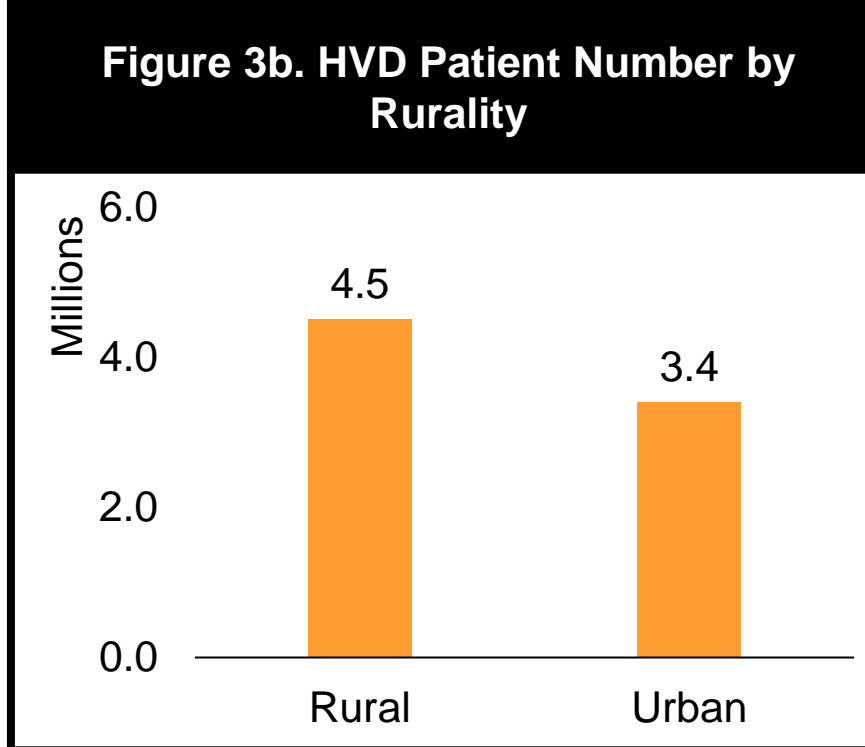
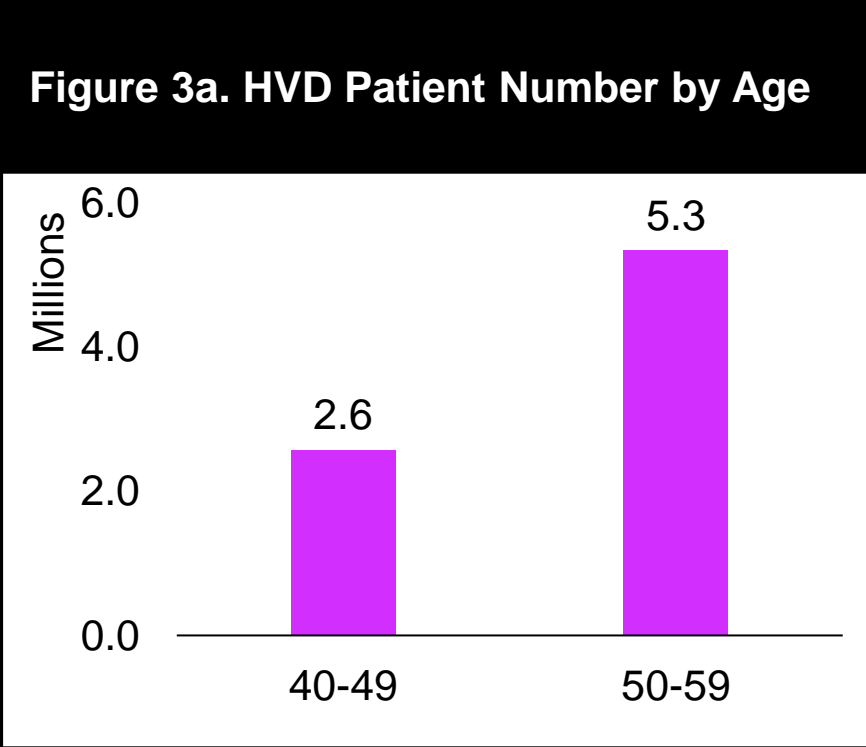
Parameters	Value
40-49 yrs.	
Tissue valves	4%
Mech valves	96%
50-59 yrs.	
Tissue valves	12%
Mech valves	88%
Prevalence of HVD	
40-49 yrs.	2.1%
50-59 yrs.	4.5%
Rural residents	4.5%
Urban residents	3.4%

	Mech	Tissue
Direct Lifetime Costs	\$40,816	\$37,327
Productivity Loss due to ACM	\$4,683	\$0
Value of QALY Gains	\$302,448	\$331,026
Economic Gains from LFP	\$5,674	\$21,516
Total Impact (Gains – Costs)	\$262,622	\$315,215
Difference (in dollars)	\$52,593	
Difference (in %)	20%	



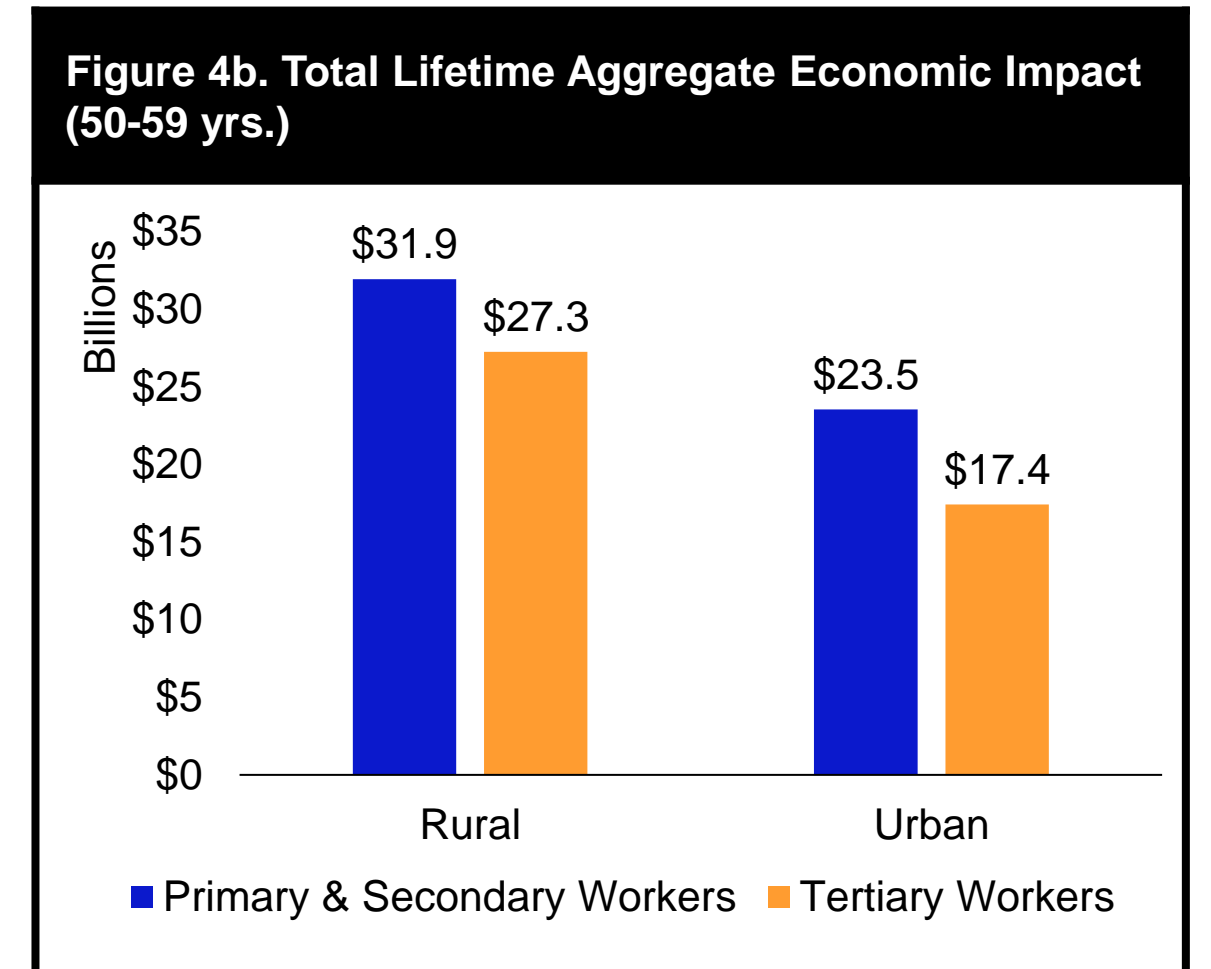
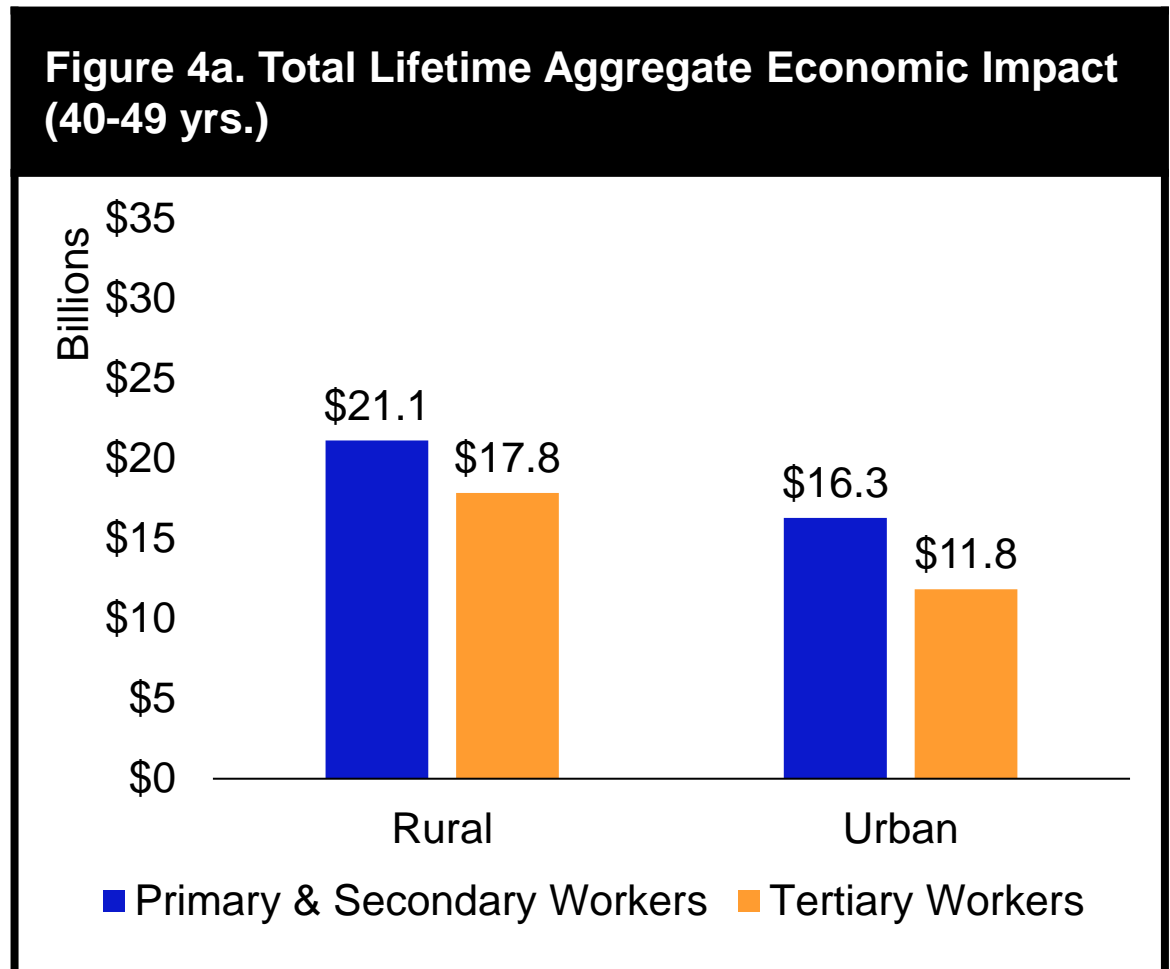
Parameters	Value
Chinese Labor Force by Rurality	
Rural	332,240,000
Urban	442,470,000
Proportion of Labor Force by Profession	
Primary*	25.1%
Secondary*	27.5%
Tertiary*	47.4%
Proportion of Labor Force by Age	
40-49 yrs.	15.8%
50-59 yrs.	15.3%

*Primary : cultivation and acquiring raw materials; Secondary: manufacturing and assembly process. Tertiary: support the production and distribution of goods



Results

- The model projects that there are 7.9 million HVD patients in China who would be eligible for SAVR.
- More HVD patients in the 50-59 yrs. group (Figure 3a), in rural China (Figure 3b), among primary & secondary workers (Figure 3c)
- Increasing the utilization of tissue valves to 50% among the eligible HVD patients would provide aggregate long-term economic gains of USD167 billion during their remaining lifetime (Figure 4a & Figure 4b).
- Limitations:**
 - The model assumes all eligible HVD eventually receive SAVR during their remaining lifetime.
 - The model relies on expert judgment on labor force participation due to limited data available.



Conclusion

A population-level macroeconomic simulation model projects substantial potential aggregate long-term economic gain—of as much as USD\$167 billion—for the entire prevalent HVD patient population in China in 2019 if 50% of that treated population were to receive a tissue (rather than mechanical) valve during their remaining lifetime till death.

References

- Internal Analysis.
- Yang et al. BMC Cardiovasc Disord (2021) 21:339. 2021
- Wu et al. ISPOR US Congress. Poster session 5. Abstract 116737
- China Statistical Yearbook 2020.

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