

# Improving Hepatocellular Carcinoma Screening Outcomes in Patients With Cirrhosis Who Have Been Successfully Treated for Hepatitis C: A Markov Chain Model

## Authors:

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**Background:** Chronic hepatitis C infection (HCV) is now the third leading cause of hepatocellular carcinoma (HCC) in Victoria, Australia. Few studies have looked at the impact of frequency of HCC surveillance after sustained viral response to hepatitis C therapy on patient survival. We aim to quantify the impact of improving liver ultrasound screening surveillance attendance on patient survival.

**Methods:** We used a discrete Markov Chain to model HCC progression, screening, and diagnosis after cirrhosis. Baseline adherence to ultrasound screening was measured at a liver clinic in a tertiary setting and compared to the recommended 6-monthly frequency. We classified adherence levels as non-adherent (0-10% attendance), partial adherence (10-80%), or complete adherence (>80%). Four public health intervention scenarios were modelled: *Realistic Adherence Improvements* (5-10% improvement in adherence relative to baseline), *Optimistic Adherence Improvements* (10-20% improvement in adherence), *Diagnosis Sensitivity improvements* (increasing ultrasound sensitivity for Barcelona Clinic Liver Cancer (BCLC) stages A and B), and *Treatment Improvements* (12 and 6 month improvements to survival when treated for stage A and B).

**Results:** In the tertiary hospital liver clinic, 31.5% of the population was non-adherent, 44.4% were partially adherent, and 24.1% were completely adherent to the biannual screening recommendations. Of those who were partially adherent, they attended 45.2% of appointments on average. Realistic adherence improvements resulted in additional 11.8 life years per cohort of 100 over 10 years, compared to 21.0 life years in the optimistic adherence improvements. 6.3 and 8.9 life years per cohort of 100 over 10 years were gained from diagnosis sensitivity improvements and treatment improvements respectively.

**Conclusion:** Current adherence to screening could be improved substantially, and even modest improvements in adherence can substantially improve life expectancy at a population level relative to improvements in ultrasound sensitivity and treatment. Implementing programs to increase adherence to liver ultrasounds should be a priority.

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