

COST-EFFECTIVENESS OF DIRECT-ACTING ANTIVIRALS FOR THE TREATMENT OF HEPATITIS C VIRUS IN RUSSIA

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BACKGROUND

WHO estimates that more than 71 million persons are living with chronic hepatitis C virus (HCV) infection worldwide and 399 000 died from cirrhosis or hepatocellular carcinoma (HCC) caused by HCV infection in 2015¹. The main goal of antiviral therapy for HCV is to prevent morbidity and mortality from the long-term effects of hepatitis and related substantial resource implications for the healthcare system. People with HCV genotype 1, the most common subtypes in Russia, usually require longer duration of treatment, tend to have worse prognosis and need treatment with direct-acting antivirals (DAA). Calculation of incremental cost-effectiveness ratio (ICER) was officially mentioned in the Russian rules for inclusion of drugs in Vital and Essential Drug (VED) List for the first time previous year, but the willingness-to-pay threshold in each case is determined individually. A lot of new anti-HCV drugs have received market authorization in Russia and, according to the recently approved rules, they can enter the reimbursement list only if their ICER is lower than for the drugs already included into the VED list for the same clinical situation.

OBJECTIVE

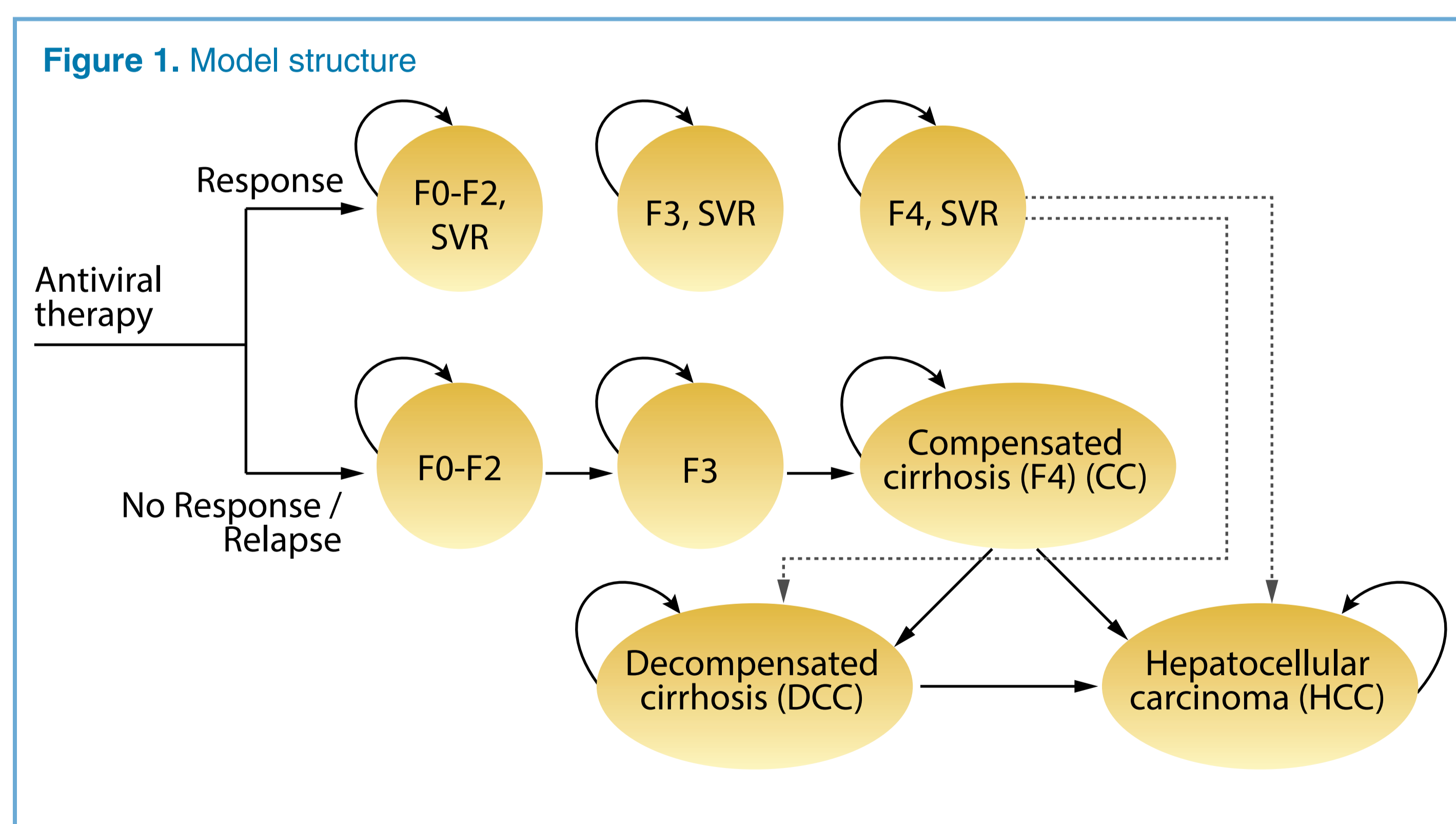
Our objective was to set the willingness-to-pay threshold for HCV genotype 1 in treatment-naïve and treatment-experienced patients with and without cirrhosis through the cost-effectiveness assessment of DAA in comparison with historically used combination of pegylated interferon with ribavirin (PR).

METHODS

We estimated lifetime costs and outcomes in previously developed decision tree followed by a Markov model² for the treatment-naïve and treatment-experienced patients with HCV genotype 1 with and without cirrhosis. Thus, the target model population included the following groups of patients:

- Treatment-naïve without cirrhosis
- Treatment-naïve with cirrhosis
- Treatment-experienced without cirrhosis
- Treatment-experienced with cirrhosis

The model structure is depicted in Figure 1.



The rates of sustained virological response and transition probabilities were based on the published data of the international studies. Costs of DAA and PR therapy were assessed using the relevant tariffs for the HCV antiviral treatment in the Russian public health insurance system. Costs of liver disease progression events (decompensated cirrhosis and HCC) were derived from the published Russian research³. The main costs inputs, including weighted average costs of antiviral therapy in various regimens, as well as the

costs of treatment for the long-term progression of HCV-related liver disease, such as cirrhosis and HCC, used in the model, are presented in Table 1.

Table 1. Key costs inputs used in the model

Cost inputs	Value (€)
Drug costs (antivirals), per course	
DAA regimens	16 193
PR regimens	14 297
Treatment costs for long-term HCV-related liver diseases, per year	
Compensated cirrhosis (CC)	1 950
Decompensated cirrhosis (DCC)	3 788
Hepatocellular carcinoma (HCC)	4 555

Costs and outcomes were discounted at 5%. The ICER per life year gained (LYG) was calculated for each patient group. All costs were converted into EURO using the average-weighted exchange rate for 2018 (1 EURO = 73.9546 RUR).

RESULTS

For treatment-experienced patients with and without cirrhosis DAA are characterized by more LYGs - 1.11 and 1.10, and costs higher by 251 and 270 EURO respectively. DAA regimens compared to PR also were associated with additional LYGs - 0.69 and 0.97 at additional cost - 868 and 451 EURO for treatment-naïve patients with and without cirrhosis respectively (Table 2).

Table 2. Cost-effectiveness analysis results

Patient population	DAA regimens		PR regimens		Incremental LYGs	Incremental costs (€)	ICER
	Total costs (€)	Total LYGs	Total costs (€)	Total LYGs			
Treatment-naïve without cirrhosis	16 728	15.69	15 860	15.00	0.69	868	1 251
Treatment-naïve with cirrhosis	16 689	15.72	16 238	14.74	0.97	451	463
Treatment-experienced without cirrhosis	16 709	15.70	16 438	14.61	1.10	270	247
Treatment-experienced with cirrhosis	16 689	15.72	16 438	14.61	1.11	251	226

The lowest ICER was for treatment-experienced patients with cirrhosis – 226 EURO per LYG. For treatment-experienced patients without cirrhosis ICER was 247 EURO per LYG. For treatment-naïve patients ICER was higher: 463 EURO per LYG for patients with cirrhosis and 1,251 EURO per LYG in the absence of cirrhosis respectively.

CONCLUSIONS

DAA is highly cost-effective option for treatment of HCV genotype 1 in comparison with PR irrespective of treatment experience or cirrhosis state, thus setting in Russia a difficult to pass willingness-to pay threshold for any new treatment for this condition.

REFERENCES

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3. Pyadushkina E., Avxentyeva M., Omelyanovsky V.V., et al. Clinical and economic analysis of alternative schemes of antiviral therapy of chronic hepatitis C genotype 1 patients who failed to respond to previous therapy, in the Russian Federation. *Experimental and clinical gastroenterology*. 2015. number 3 (115). p. 55-65.