

INTRODUCTION

As of 2019, the United States (US) was not on track to achieve the WHO targets for hepatitis C virus (HCV) elimination, due to increasing incidence and barriers to treatment.¹ Additionally, according to the CDC's 2019 National Progress Report, as of 2020, the US was only on track to achieve three of the five national HCV-related targets by the year 2025.²

In 2020, the COVID-19 pandemic disrupted HCV services globally, with the US experiencing multiple waves of infections and restrictions. There have been more than 33 million cases of COVID-19 in the US, with more than 590,000 deaths.³ However, new cases are declining, as more than 63% of adults have received at least one dose of vaccine.³

As COVID-19 vaccinations become commonplace and healthcare services normalize, there is an urgent need to reassess the country's progress toward HCV elimination and evaluate scenarios for recovery.

AIM

The objective of this analysis was to evaluate best and worst case scenarios in the years following the COVID-19 pandemic.

METHOD

We updated a previously validated Markov model to estimate HCV-related morbidity and mortality in the US.^{4,5}

HCV epidemiological data were based on published data, with annual treatment data from industry reports through 2020. Key inputs and sources are included in Table 1.

Three scenarios were developed to bookend possible outcomes for HCV recovery in the wake of the pandemic:

- 1) Long-term treatment disruptions
- 2) Return to original (pre-COVID-19) treatment forecasts
- 3) Increase momentum and achieve WHO targets

Table 1. Model inputs and sources

Input	Year	Value (Range)	Source
Prevalence (HCV-RNA+), 18+	2013-2016	2.4 (2.0 – 2.8) million	Hofmeister 2018 et al. ⁶
Prevalence by age and sex	2006	Varies	Denniston 2014 et al. ⁷
Previously diagnosed	2010	45-50%	Volk 2009 et al. ⁸
Annual diagnosed	2010-2018	110,000 (2018)	Ryerson 2020 et al. ⁹
Treated	2004-2020	Varies, see figure	Medicines sales data

RESULTS

- From 2014-2019, ~1.2 million patients were treated for HCV, leading to >50% reduction in hepatocellular carcinoma (HCC) cases and >65% reduction in HCV liver-related deaths (LRDs) in 2019 relative to 2014.
- In 2020, 25% fewer patients were initiated on treatment than in 2019. In the modeled scenarios, between 780,000 and 2.3 million patients (cumulative) would be initiated on treatment from 2021-2030.
- WHO Targets (scenario 3) could be achieved in the US by treating at least 240,000 patients per year and increasing access to harm reduction programs. Compared to scenario 1, scenarios 2 and 3 could avert 19,400 LRDs and 9,500 HCC cases and 33,200 LRDs and 24,900 HCC cases, respectively.

Figure. Annual treated patients, viremic infections, liver related deaths and hepatocellular carcinoma cases under three scenarios, United States, 2015-2030

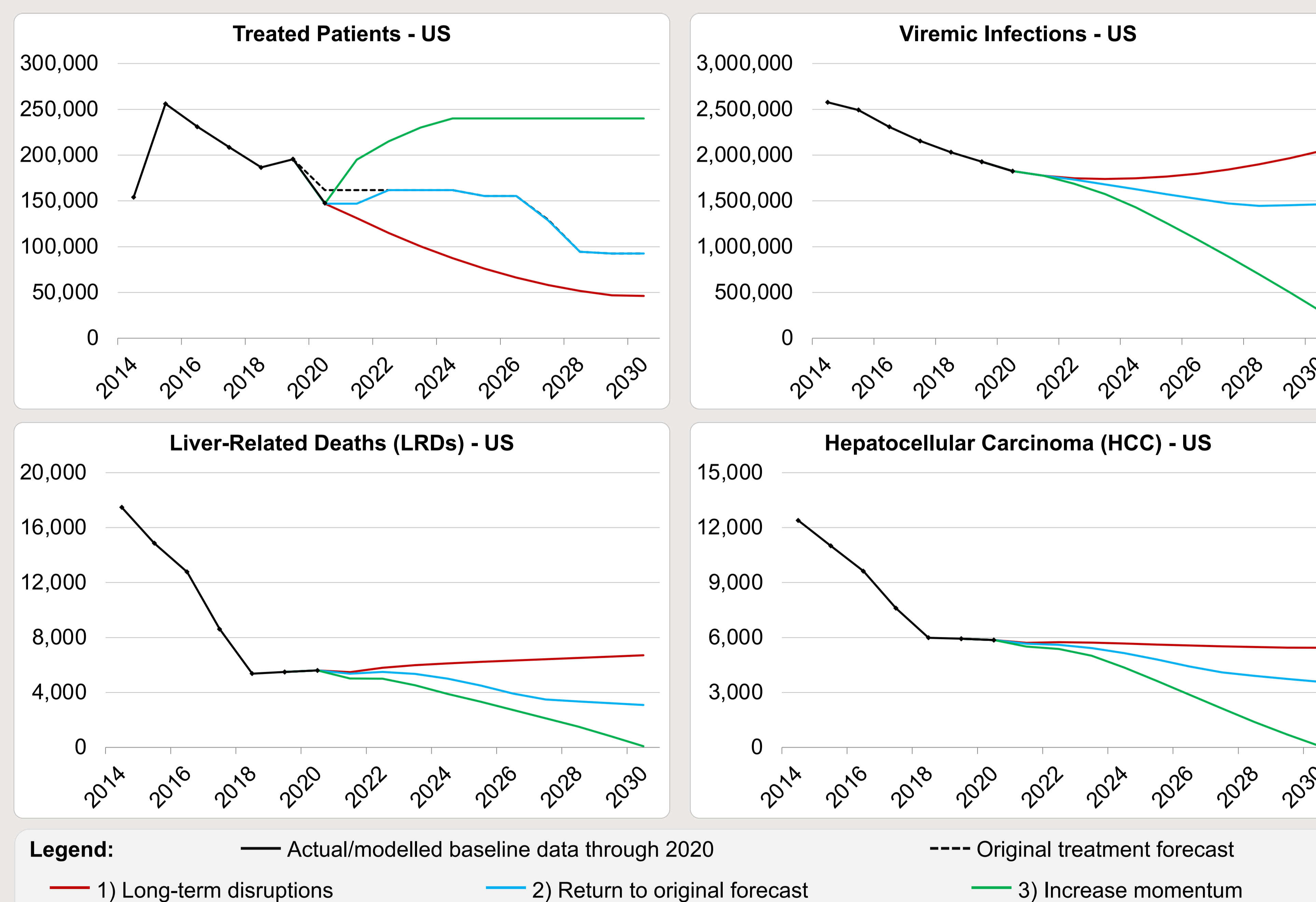


Table 2. Model outcomes under three scenarios, United States, 2021-2030

Scenario Outcomes	Total Treated (2021-2030)	HCC Averted (2021-2030)	LRDs Averted (2021-2030)	Viremic Cases (2030)
1) Long-term disruptions	800,000	-	-	2.0 million
2) Return to original forecast	1.4 million	9,500	19,400	1.5 million
3) Increase momentum	2.3 million	24,900	33,200	300,000

CONCLUSIONS

- The US has made strides toward HCV elimination, but these gains could easily be lost in the wake of the pandemic if we become complacent.
- There is time to regain momentum and avert more than 33,000 deaths while reducing the viral pool to prevent new infections. This requires a swift and coordinated effort from the entire HCV community – including government, industry, patient groups and providers.
- Political will for HCV elimination is increasing (demonstrated through the endorsement by AASLD, US CDC and USPTF of a one-time universal screening for all adults).
- However, to prevent further morbidity and mortality, all new or previously diagnosed patients should be immediately linked to treatment, without restriction (EASL, AASLD and IDSA).

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REFERENCES

- ¹ CDA Foundation. Polaris Observatory 2020 [updated April 17, 2020. Available from: <https://cdfound.org/polaris/>.
- ² Centers for Disease Control and Prevention (CDC). 2020 National Viral Hepatitis Progress Report. 2021.
- ³ Centers for Disease Control and Prevention (CDC). COVID Data Tracker 2021 [updated 3 June 2021. Available from: https://covid.cdc.gov/covid-data-tracker/#trends_dailytrendscases.
- ⁴ Razavi H, Elkhoury AC, Elbasha E, Estes C, Pasini K, Poynard T, et al. Chronic hepatitis C virus (HCV) disease burden and cost in the United States. *Hepatology*. 2013;57(6):2164-70.
- ⁵ Blach S, Zeuzem S, Manns M, Altraif I, Duberg A-S, Muljono DH, et al. Global prevalence and genotype distribution of hepatitis C virus infection in 2015: a modelling study. *The Lancet Gastroenterology & Hepatology*. 2016;2(3):161-76.
- ⁶ Hofmeister MG, Rosenthal EM, Barker LK, Rosenberg ES, Barranco MA, Hall EW, et al. Estimating Prevalence of Hepatitis C Virus Infection in the United States, 2013-2016. *Hepatology*. 2019;69(3):1020-31.
- ⁷ Denniston MM, Jiles RB, Drobeniuc J, Klevens RM, Ward JW, McQuillan GM, et al. Chronic hepatitis C virus infection in the United States, National Health and Nutrition Examination Survey 2003 to 2010. *Ann Intern Med*. 2014;160(5):293-300.
- ⁸ Volk ML, Tocco R, Saini S, Lok AS. Public health impact of antiviral therapy for hepatitis C in the United States. *Hepatology*. 2009;50(6):1750-5.
- ⁹ Ryerson AB, Schillie S, Barker LK, Kupronis BA, Wester C. Vital Signs: Newly Reported Acute and Chronic Hepatitis C Cases - United States, 2009-2018. *MMWR Morb Mortal Wkly Rep*. 2020;69(14):399-404.

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