

# Eliminating Hepatitis C in Portugal: Treatment and Diagnosis Requirements for Two Timelines

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## Introduction

- An estimated 45,000 Portuguese are chronically infected with hepatitis C virus (HCV) (1,2)
- Most new infections in the past 25 years have been in people who inject drugs (PWID) (expert input) with an estimated 390 new infections occurring each year
- New direct-acting antivirals (DAA) achieve high sustained viral response (SVR) rates, paving the way toward disease elimination
- Epidemiological data and modeling techniques can be leveraged to estimate the impact of various disease control strategies

## Methods

- The current and future disease progression of the HCV infected population were forecast using an Excel-based Markov model of HCV disease progression designed and maintained by the Center for Disease Analysis Foundation
- Portuguese-specific epidemiologic data, including prevalence, age, gender and genotype distribution, diagnosis, liver transplants and mortality risk factors were identified via literature review, discussed with local experts then used to calibrate the model
- The impact of intervention strategies (including prevention, treatment and screening) on the projected disease burden was measured by creating three scenarios (Figure 1):

The Base scenario – assume no change to HCV treatment policies

WHO Targets – achieve WHO Targets for HCV elimination by 2030

Accelerated WHO Targets – achieve WHO targets for HCV elimination by 2024

- All scenarios assumed an SVR of 97% and no treatment restrictions on the basis of fibrosis stage

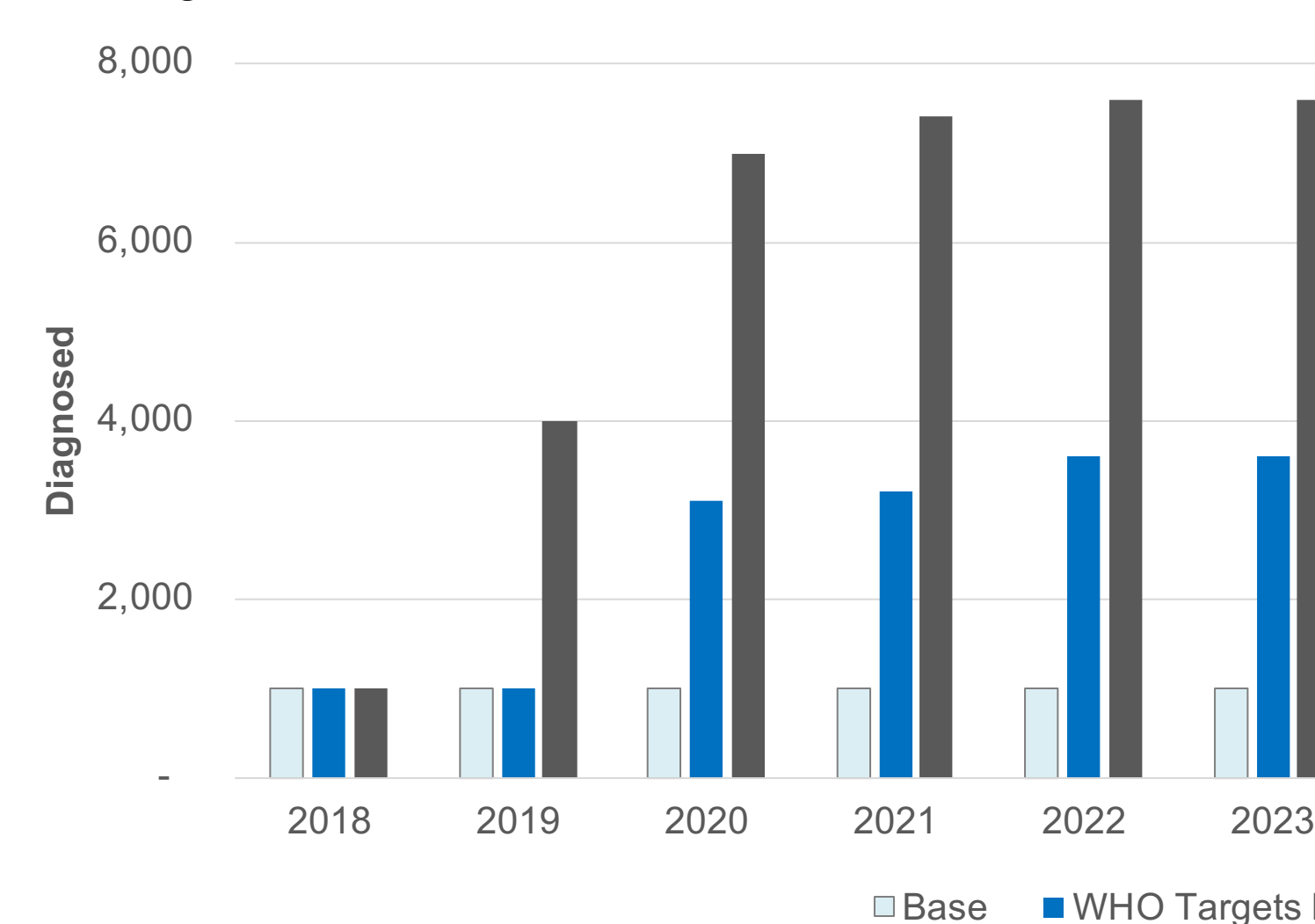
- The Base scenario assumed that patients aged 15-79 years were eligible for treatment. WHO Target scenarios assumed that in 2020, treatment eligibility was expanded to include ages 85+

- Two screening strategies were assessed for the WHO Target scenarios; universal screening (all ages), and targeted screening of adults born between 1950-1975

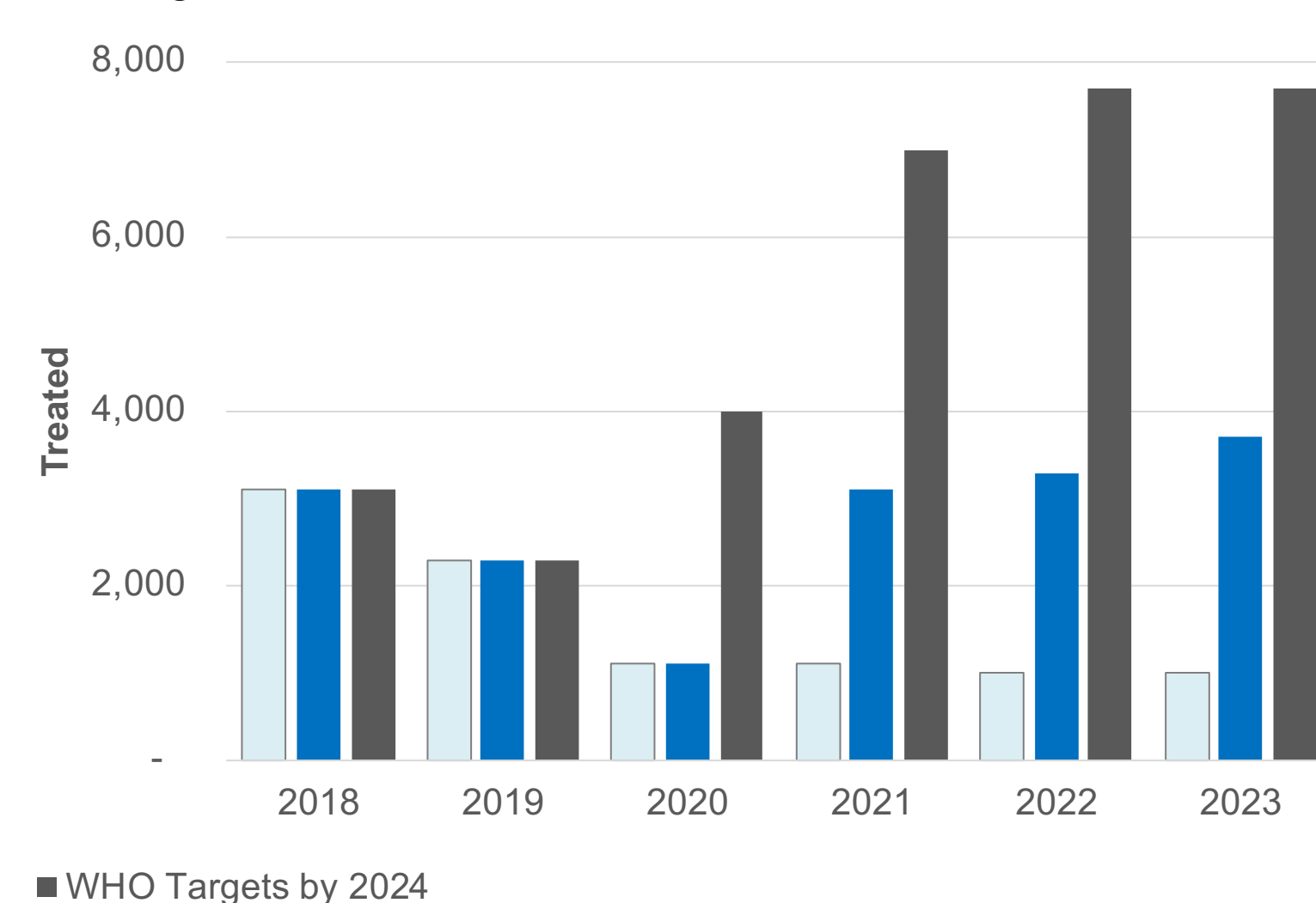
### WHO Targets for HCV Elimination

- DIAGNOSE 90% of the infected population
- TREAT 80% of diagnosed and eligible
- 80% REDUCTION in new infections
- 65% REDUCTION in liver-related deaths

**Figure 1a.** Annual cases diagnosed by scenario, Portugal, 2018-2023



**Figure 1b.** Annual cases treated by scenario, Portugal, 2018-2023



## Results

In 2019, the following HCV disease burden was estimated:

- Of the estimated 45,000 viremic cases, 3,390 were diagnosed (~8%), with 2,390 people initiated on treatment and 2,240 achieving SVR
- An estimated 130,000 people were screened to newly diagnose 1,000 viremic infections

By 2030 the following outcomes were estimated for each scenario:

### Base

- The total number of viremic infections would decline 41% from 53,410 to 31,260 (Figure 2)
- Liver-related deaths, hepatocellular carcinoma (HCC) and decompensated cirrhosis will increase by 80%, 130% and 160%, respectively, as the infected population ages (Figure 2)

### WHO Targets

- Achieving the WHO Targets by 2030 would save 720 lives while preventing 850 new infections and averting 620 cases of decompensated cirrhosis and 790 cases of HCC
- Viremic infections would decline 41% to 9,720 total infections (Figure 2)
- Liver-related deaths would decrease by 65% and decompensated cirrhosis and HCC would decline by 50% (Figure 2)
- Screening would need to increase to >400,000 people annually by 2020 (Table 1a)

## Results, continued

### Accelerated WHO Targets

- Achieving the WHO Targets by 2024 would save 1,330 lives and prevent 2,310 new infections, 1,200 cases of decompensated cirrhosis and 1,540 cases of HCC
- Viremic infections, liver-related deaths, HCC and decompensated cirrhosis would drop by >99% (Figure 2)
- Screening would need to increase to >1 million people annually by 2020 (Table 1b)

**Table 1.** Annual number screened to achieve WHO Targets by 2030 or 2024 (in millions), Portugal, 2018-2023

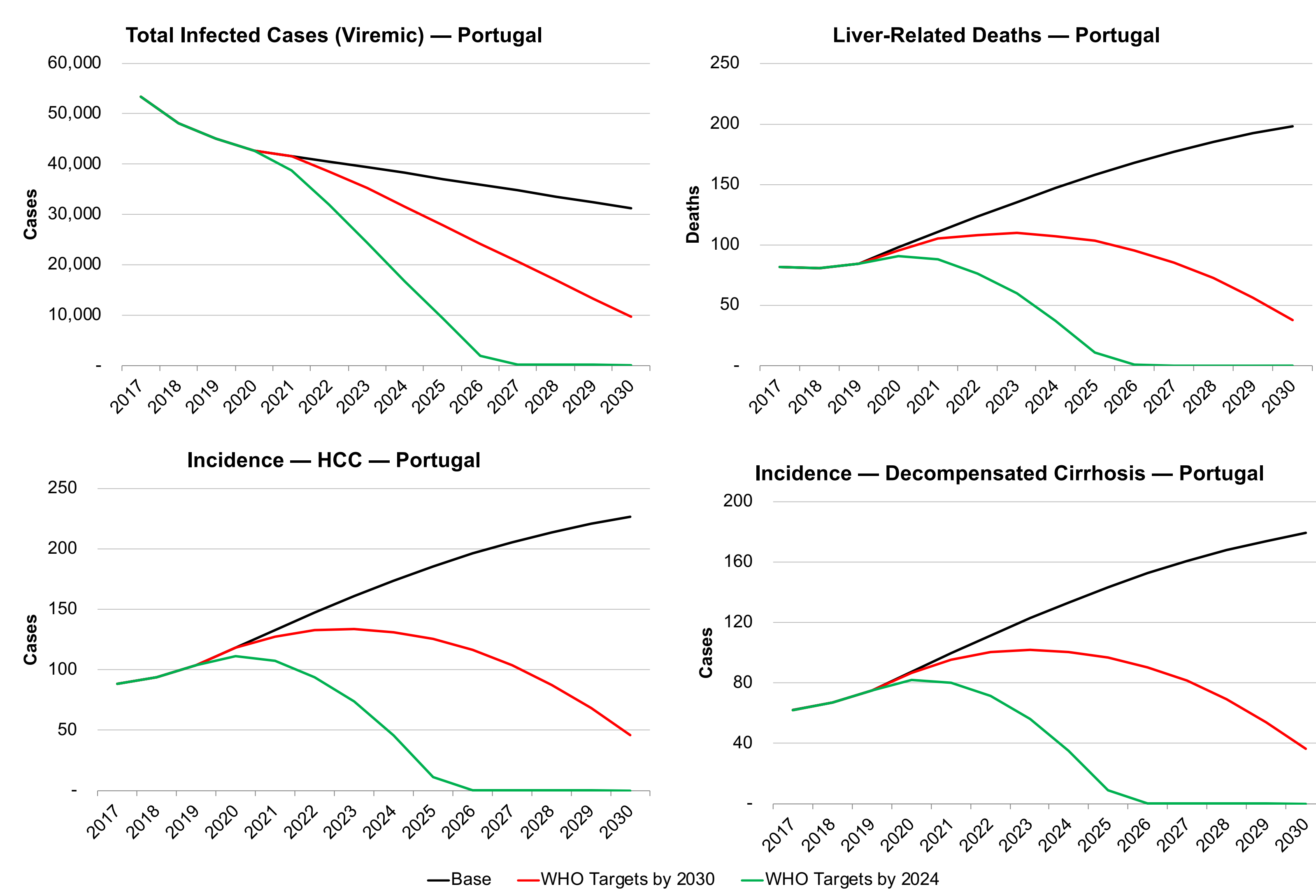
#### 1a. WHO Targets by 2030 (in millions)

Screening Scenario	2018	2019	2020	2021	2022	2023
Screen adults born 1950-1975	0.1	0.1	0.4	0.5	0.6	0.7
Universal screening of all ages	0.2	0.2	0.7	0.8	1.0	1.1

#### 1b. Accelerated WHO Targets by 2024 (in millions)

Screening Scenario	2018	2019	2020	2021	2022	2023
Screen adults born 1950-1975	0.1	0.6	1.1	1.5	2.0	3.1
Universal screening of all ages	0.2	0.9	1.7	2.2	3.0	4.3

**Figure 2.** HCV-related morbidity and mortality, Portugal, 2018-2030



## Conclusions

- Efficiencies can be achieved in screening programs by targeting specific birth cohorts, however, the impact may be limited by depletion of patients to diagnose and treat within a given cohort
- Portugal has already demonstrated the capacity to treat the volume of patients necessary to achieve the WHO Targets and has a high treatment rate for those that are diagnosed. However, the low levels of screening and linkage to care is a major barrier to maintaining high treatment levels
- A large increase in the number of treated patients over the last four years, coinciding with the introduction of direct-acting antivirals in 2015, has reduced the disease burden in Portugal. However, the number of patients treated has decreased annually since 2015, and without a national screening program to identify more patients, treatment rates will continue to decline in the future

## References

1. Carvalhana, S. C., et al. (2016). "Hepatitis B and C prevalence in Portugal: disparity between the general population and high-risk groups." *Eur J Gastroenterol Hepatol* 28(6): 640-644.
2. Oliveira, A., et al. (2018). "Hepatitis c virus infection: An insular reality." *United European Gastroenterology Journal* 6(8): A559.

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