Epidemiology and Infection

chronic hepatitis C virus (HCV) Burden in Rhode Island: Modelling treatment scale-up and Elimination

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Supplementary Material

**Supplementary Figure S1**: HCV Disease Progression Schematic



Adapted from Razavi et al., 2013 [1].

**Supplementary Table S1:** Age- and gender-specific fibrosis disease stage progression probabilities

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age Cohorts** | **0-4** | **5-9** | **10-14** | **15-19** | **20-24** | **25-29** | **30-34** | **35-39** | **40-44** | **45-49** | **50-54** | **55-59** | **60-64** | **65-69** | **70-74** | **75-79** | **80-84** | **85+** |
| Progression rates – males, % | | | | | | | | | | | | | | | | | | |
| F0 to F1 | 5.3 | 5.3 | 6.4 | 6.4 | 5.2 | 5.2 | 3.8 | 3.8 | 13.9 | 13.9 | 17.1 | 17.1 | 19.4 | 19.4 | 21.8 | 21.8 | 17.9 | 17.9 |
| F1 to F2 | 3.8 | 3.8 | 4.7 | 4.7 | 3.8 | 3.8 | 2.7 | 2.7 | 10.1 | 10.1 | 12.4 | 12.4 | 14.1 | 14.1 | 15.8 | 15.8 | 13.0 | 13.0 |
| F2 to F3 | 5.4 | 5.4 | 6.6 | 6.6 | 5.3 | 5.3 | 3.9 | 3.9 | 14.3 | 14.3 | 17.5 | 17.5 | 19.9 | 19.9 | 22.4 | 22.4 | 18.3 | 18.3 |
| F3 to Cirrhosis | 0.0 | 0.0 | 0.8 | 0.8 | 2.5 | 2.5 | 5.7 | 5.7 | 8.8 | 8.8 | 4.8 | 4.8 | 9.9 | 9.9 | 19.1 | 19.1 | 19.1 | 19.1 |
| F3 to HCC | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 |
| Cirrhosis to HCC | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.9 | 0.9 | 1.4 | 1.4 | 2.4 | 2.4 | 3.9 | 3.9 | 3.9 | 3.9 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Progression rates – females, % | | | | | | | | | | | | | | | | | | |
| F0 to F1 | 4.4 | 4.4 | 5.4 | 5.4 | 4.3 | 4.3 | 3.1 | 3.1 | 11.6 | 11.6 | 14.3 | 14.3 | 16.2 | 16.2 | 18.2 | 18.2 | 14.9 | 14.9 |
| F1 to F2 | 3.2 | 3.2 | 3.9 | 3.9 | 3.1 | 3.1 | 2.3 | 2.3 | 8.4 | 8.4 | 10.4 | 10.4 | 11.7 | 11.7 | 13.2 | 13.2 | 10.8 | 10.8 |
| F2 to F3 | 4.5 | 4.5 | 5.5 | 5.5 | 4.4 | 4.4 | 3.2 | 3.2 | 11.9 | 11.9 | 14.6 | 14.6 | 16.6 | 16.6 | 18.6 | 18.6 | 15.3 | 15.3 |
| F3 to Cirrhosis | 0.0 | 0.0 | 0.6 | 0.6 | 2.1 | 2.1 | 4.7 | 4.7 | 7.4 | 7.4 | 4.0 | 4.0 | 8.3 | 8.3 | 15.9 | 15.9 | 15.9 | 15.9 |
| F3 to HCC | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 |
| Cirrhosis to HCC | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.7 | 0.7 | 1.2 | 1.2 | 2.0 | 2.0 | 3.3 | 3.3 | 3.3 | 3.3 |

HCC = hepatocellular carcinoma  
Re-produced from Razavi et al., 2014 [2].  
Rates were estimated from previous studies [3-5], and were based on data from the US Surveillance, Epidemiology, and End Results (SEER) database. We assumed that 90% of all liver cancers were HCC [6], and 40% of HCC cases were due to HCV [7, 8].

**Supplementary Table S2**: HCV disease progression probabilities

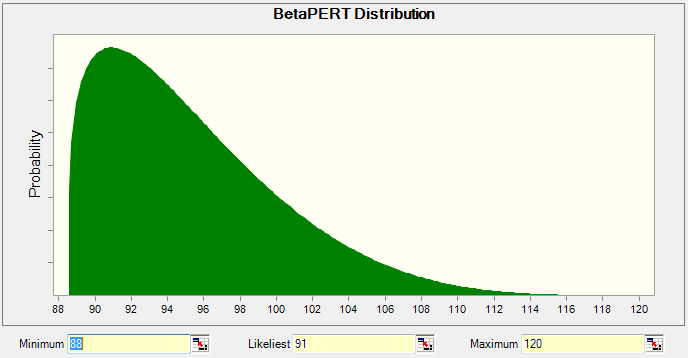
|  |  |  |  |
| --- | --- | --- | --- |
| **Progression…** | **Base** | **Range** | **Source** |
| from Acute (Incidence) |  |  |  |
| % Progress to Chronic HCV | 82.00% | (0.85 - 0.55) | [9-11] |
| from Cirrhosis |  |  |  |
| ….Diuretic Sensitive Ascites | 2.50% | (0.018 - 0.032) | [4, 5] |
| .…Variceal Hemorrhage | 1.10% | (0.006 - 0.016) | [4, 5] |
| …Hepatic Encephalopathy | 0.40% | (0.001 - 0.007) | [4, 5] |
| …HCC | See Table S1 | |  |
| from Diuretic Sensitive Ascites |  |  |  |
| ….Diuretic Refractory Ascites | 6.70% | (0.04 - 0.094 ) | [4, 5] |
| ….Liver Transplant | See below |  |  |
| ….Liver Related Death | 11.00% | (0.077 - 0.143) | [4, 5] |
| from Variceal Hemorrhage |  |  |  |
| ….Liver Transplant (1st Year) | See below |  |  |
| ….Liver Related Death (1st Year) | 40.00% | (0.334 - 0.466) | [4, 5] |
| ….Liver Related Death (Sub Yrs) | 13.00% | (0.085 - 0.175) | [4, 5] |
| from Hepatic Encephalopathy |  |  |  |
| ….Liver Transplant (1st Year) | See below |  |  |
| ….Liver Related Death (1st Year) | 68.00% | (0.659 - 0.701) | [4, 5] |
| ….Liver Related Death (Sub Yrs) | 40.00% | (0.378 - 0.422) | [4, 5] |
| from Diuretic Refractory Ascites |  |  |  |
| ….Liver Transplant | See below |  |  |
| ….Liver Related Death | 33.00% | (0.28 - 0.38) | [4, 5] |
| from HCC |  |  |  |
| ….Liver Related Death (1st Year) | 70.70% | (0.43 - 0.77) | [4, 5, 12] |
| ….Liver Related Death (Sub Yrs) | 16.20% | (0.11 - 0.23) | [4, 5, 12] |
|  |  |  |  |
| Liver Transplant (1950-1970) | 0% | Transplant rates were negligible | |
| Liver Transplant (1971-1987) | 5.3% | (0.031 - 0.0542) | [4], Trended Data |
| Liver Transplant (1988-2010) | Actual Data | 33% attributed to HCV | [13] |
| Liver Transplant (2011-2030) | 1.7% | (0.0169 - 0.045) | Trended Data |

HCC = hepatocellular carcinoma

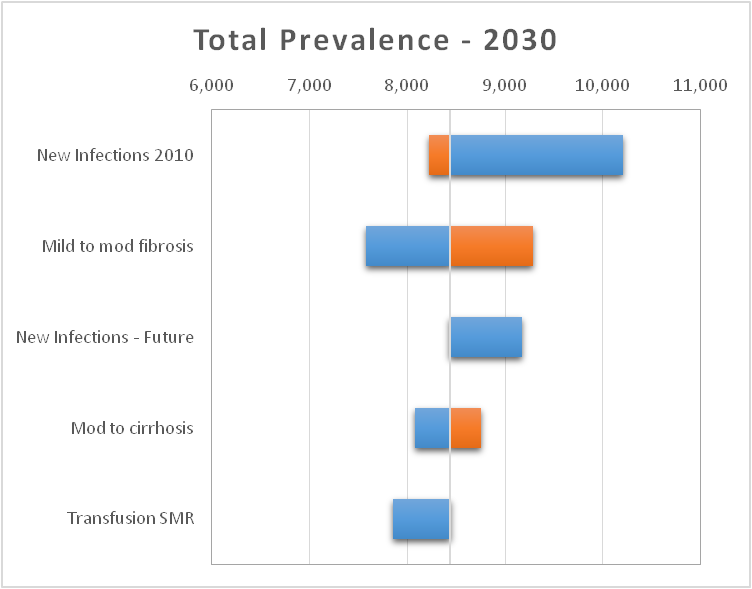
**Supplementary Figure S2:** Estimated HCV incidence, Rhode Island (1950-2030)

Note: CDC surveillance estimates (orange) reflect the total number of estimated cases using methods to account for under-ascertainment of reported cases [14]. The estimated number of acute HCV infections in Rhode Island was derived by multiplying the national values reported by the CDC by the proportion of the US population residing in Rhode Island in each year (based on US census data).

**Supplementary Figure S3:** Example beta-PERT distribution used in the Monte Carlo sensitivity analyses, with minimum, likeliest value 91, and maximum value 120.



**Supplementary Figure S4:** Tornado diagram summarizing the results of one-way sensitivity analyses, selected variables.

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Note: each bar represents the minimum and maximum denoted by the lower and upper range shown in Table 1 or Table S2.

**Supplementary Material References**

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(4) **Siebert U, Sroczynski G.** Effectiveness and cost-effectiveness of initial combination therapy with interferon/peginterferon plus ribavirin in patients with chronic hepatitis C in germany: A health technology assessment commissioned by the german federal ministry of health and social security. *International journal of technology assessment in health care* 2005; **21**: 55-65.

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(14) Centers for Disease and Control Prevention (CDC). Viral hepatitis surveillance: United States, 2011. In: Division of Viral Hepatitis, ed. Atlanta, GA: National Center for HIV/AIDS, Viral Hepatitis, STD, & TB Prevention, 2011.