



Burden of Hepatitis B and C in Iran and the region

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Hepatitis B Virus Infection Epidemiology



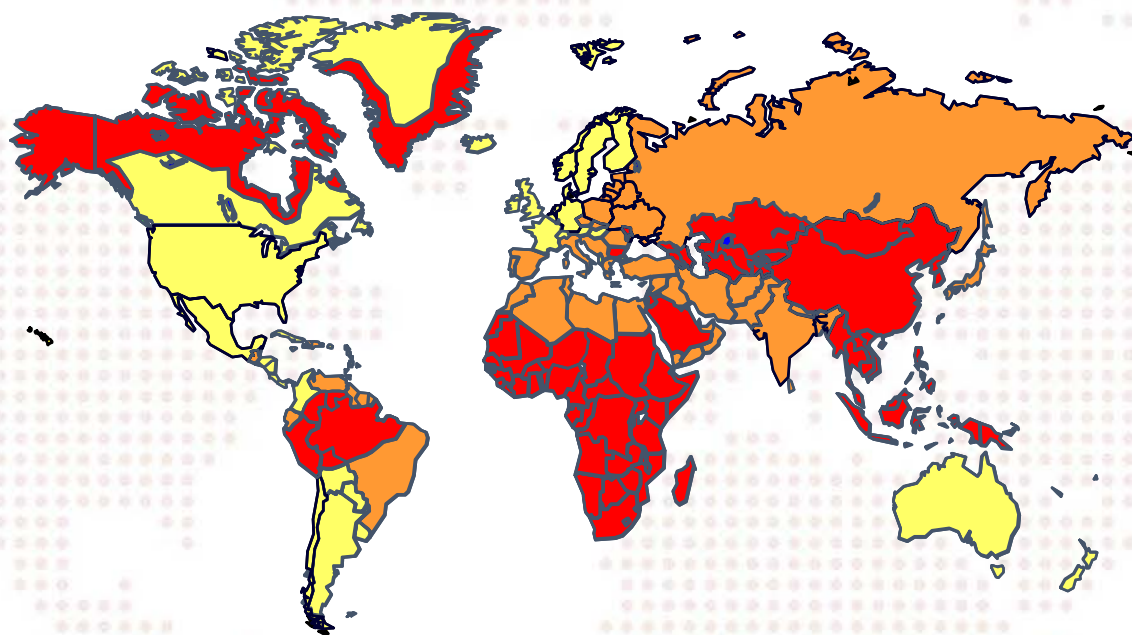
Viral Hepatitis

Type of Hepatitis




	A	B	C	D	E
Source of virus	Feces	Blood/ body fluids	Blood/ body fluids	Blood/ body fluids	Feces
Route of transmission	Fecal-oral	Childbirth, needles, sex, transfusion	Needles, transfusion, (sex, childbirth)	Needles, sex, transfusion (requires HBV co-infection)	Fecal-oral
Chronic infection	No	Yes	Yes	Yes	No
Prevention	Vaccine, immune globulin	Vaccine, immune globulin,	Blood donor screening, risk management, education	HBV vaccine	Ensure safe drinking water



Geographic Distribution of Chronic HBV Infection



- Many of the data relating to the global distribution of HBV are over 10 years old
- More recent data suggest that this is an over-simplification
- **There is an increasing trend towards HBeAg-negative HBV in many areas**
- Global distribution of HBV is being affected by population movements from high prevalence areas

Chronic infection prevalence	Past infection prevalence	Predominant age at infection
 ≥ 8% - High	40- 90%	Perinatal and early childhood
 2-7% - Intermediate	16- 55%	Early childhood
 < 2% - Low	4- 15%	



Risk factors in chronic hepatitis B-Iran

- More Age, male sex, history of contact with hepatitis B infected subject, HBs Ag positivity in mother and family, extramarital sexual activity, injection drug use, hospital admission, major surgery, experimental dentist visit and some jobs (**police, barber, and driver**) were found to be independent risk factors.



Hepatitis B in general Population In Iran

- Using survey data analysis method the HBV infection prevalence in I.R. Iran estimated **2.14 percent** (95%CI: 1.92-2.35).
- The HBV infection prevalence in Iranian men and women estimated 2.55 percent (95%CI 2.25-2.85) and 2.03 percent (95%CI 1.6-2.46 percent) respectively.



Hepatitis B in general Population In Iran

- The distribution of HBV infection prevalence in the country showed that there are significant differences between provinces in HBV infection rates and the highest prevalence rates was in Golestan province (**6.3 percent**) and Sistan-Baluchestan province around (**3.5 percent**).



Seroepidemiology of HBV Infection in South-East of Iran; A Population Based Study

M Salehi¹, SM Alavian^{2*}, SV Tabatabaei³, Sh Izadi⁴, E Sanei Moghaddam⁵, S Amini Kafi-abad⁶, A Gharehbaghian⁶, S Khosravi⁶, H Abolghasemi⁶

The prevalence of HBs Ag and HBc Ab in Sistan and Baluchistan was 3.38% and 23.58% respectively.

Predictors of HBs Ag or HBc Ab in multivariate analysis were **age, marital status** and **addiction**.

Conclusion: The rate of HBV infection in Sistan and Baluchistan was higher than other parts of Iran. Approximately 25% of general population in this province had previous exposure to HBV and 3% were HBs Ag carriers. **Intrafamilial and addiction** were major routes of HBV transmission in this province.



Seroprevalence of HBV Infection and Its Risk Factors in the West of Iran: A Population-based study

Seyed Moayed Alavian, Seyed Vahid Tabatabaei¹, Teyyeb Ghadimi², Farzam Beedrapour², Sedigheh Amini Kafi-abad³, Ahmad Gharehbaghian³, Hassan Abolghasemi³

- The prevalence of HBs Ag and HBe Ab in Kurdistan 0.80% was and 5.02% , respectively. Predictors of HBs Ag or HBe Ab in multivariate analysis were: older age and marriage.
- Conclusion: Our population based study suggests that **Intra-familial HBV transmission** plays a major role in HBV transmission in Kurdistan province.



Jundishapur J Microbiol. 2012;5(4):564-569. DOI: 10.5812/jjm.4156



Jundishapur Journal of
Microbiology

www.jjmicrobiol.com



Seroepidemiology of HBV Infection in Kermanshah- West of Iran; A Population Based Study

Seyed Moayed Alavian^{1*}, Seyed Vahid Tabatabaei², Samad Nourizad³, Feyzollah Mansouri³, Nahid Khademi³, Sedigheh Amini Kafi-abad⁴, Ahmad Gharehbaghian⁴, Hassan Abolghasemi⁴

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- The prevalence of HBsAg and HbC Ab in Kermanshah was 0.75% and 8.28% , respectively. Predictors of HBsAg or HbC Ab in multivariate analysis were: old age, being male, history of tattooing and history of dental procedure.
- **Conclusions: Age, sex and history of tattoo and dental procedures are major risk factors of HBV sero-positivity in this province.**



Hepat Mon. 2011;11(5):346-350

HEPATITIS MONTHLY

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The prevalence of hepatitis B antigen-positivity in the general population of Mashhad, Iran

Farhad Fathimoghaddam¹, Mohammad Reza Hedayati-Moghaddam^{1*}, Hamid Reza Bidkhor¹, Sanaz Ahmadi¹, Hamid Reza Sima^{1, 2}

- The overall prevalence of HBs Ag positivity was 1.39% ; 2.0% and 0.89% among men and women, respectively.
- Infection was more prevalent in older ($p = 0.019$) and married persons ($p = 0.001$), Afghanis ($p = 0.046$), and those with a history of traditional cupping ($p = 0.005$).
- Conclusion: It seems that the prevalence of HBV infection in Mashhad is slightly lower than that of the nation.



Hepat Mon. 2012;12(2):112-117. DOI: 10.5812/hepatmon.822



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Distribution and Risk Factors of Hepatitis B Virus Infection in the General Population of Central Iran

Mohammad Reza Ghadir ¹, Mojtaba Belbasi ², Akram Heidari ³, Mahboobeh Jandagh ⁴, Iman Ahmadi ⁴, Hosseinali Habibinejad ⁵, Alireza Kabiri ², Amir Hossein Ghanooni ⁴, Abolfazl Iranikhah ⁶, Seyed Moayed Alavian ⁷

- A total of 3690 samples were collected from 7 rural clusters and 116 urban clusters. The prevalence rate of hepatitis B infection in Qom Province was 1.3%. The mean age of the patients with hepatitis B was 44.17 years. The prevalence of hepatitis B was 1.6% in men and 1.1% in women.
- Moreover, the prevalence of hepatitis B correlated positively with age, tattooing, and literacy level.



REVIEWS

The Changing Epidemiology of Viral Hepatitis B in Iran

Seyed Moayed Alavian¹, Farahmaz Fallahian¹, Kamran Bagheri Lankarani²

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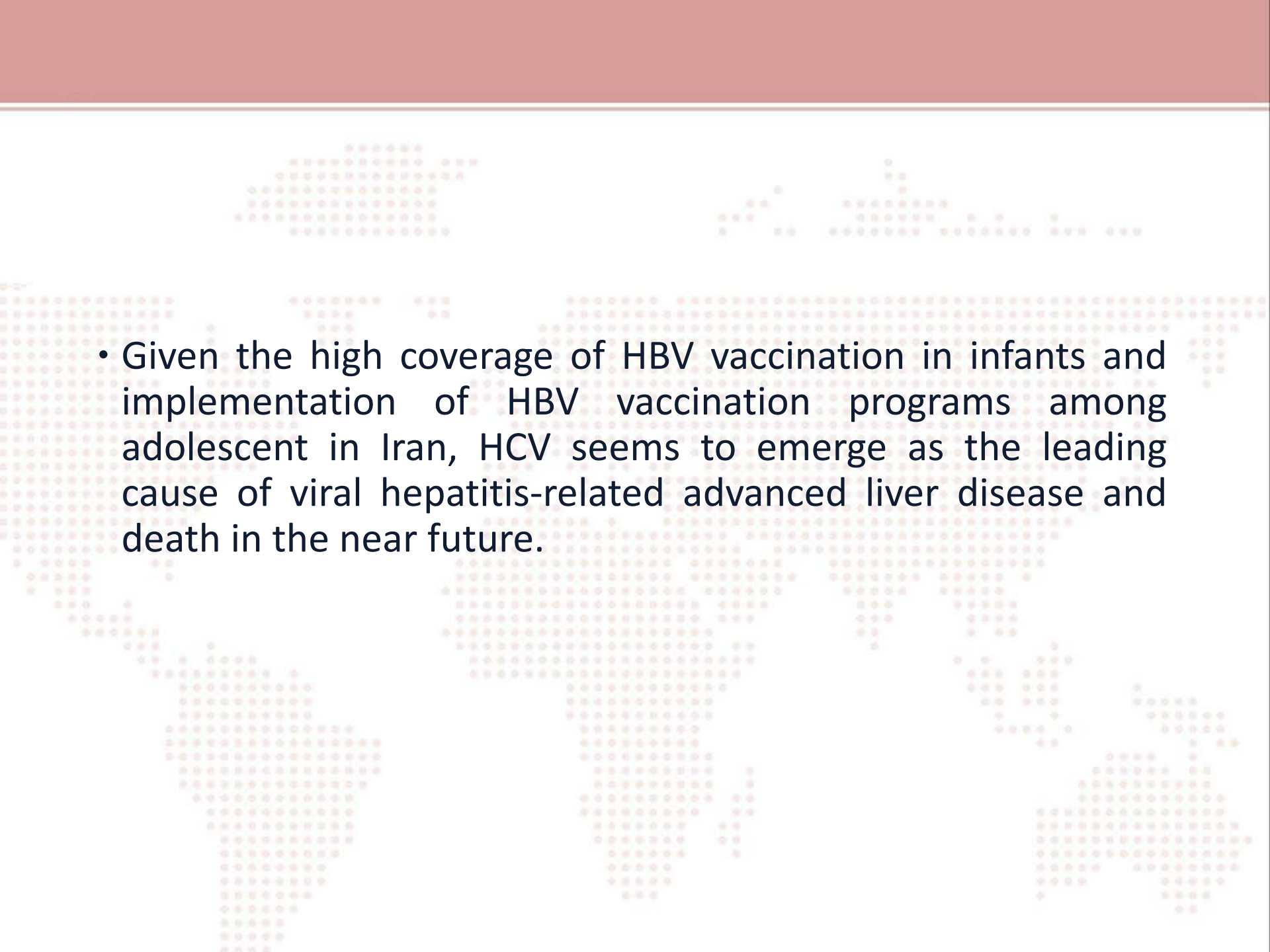
Abstract

Hepatitis B virus (HBV) prevalence has decreased dramatically in Iranian population during the last decade, and now it is classified as having low endemicity for hepatitis B infection. Improvement of the people's knowledge about HBV risk factors, national vaccination program since 1993 for all neonates, and vaccination of high risk groups could

from chronic HBV infection. Of these, 75% are Asians (1,2). Hepatitis B infection is the 10th leading cause of death worldwide, and results in 500,000 to 1.2 million deaths per year caused by chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). HCC accounts for 320 000 deaths per year (3). The prevalence of HBV infection varies widely, with rates ranging from 0.1% to 20% in different parts of the world (3). Overall, 45% of the world population



Hepatitis C Virus Infection Epidemiology

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- Given the high coverage of HBV vaccination in infants and implementation of HBV vaccination programs among adolescent in Iran, HCV seems to emerge as the leading cause of viral hepatitis-related advanced liver disease and death in the near future.



Risk Factors Associated With Acquiring HCV Infection

- Transfusion, transplant from infectious donor (1992)
- Injecting drug use and Incarceration
- Occupational blood exposure (needle sticks)
- Birth to an infected mother
- Infected sex partner
- Multiple heterosexual partners
- Tattooing
- Health-care related transmission:

Epidemiology of Hepatitis C

- First report in Iran is related to Rezvan et al in 1994 in IBTO: 0.3% of blood donors in Tehran.

Table 3 Logistic regression analysis of risk factors

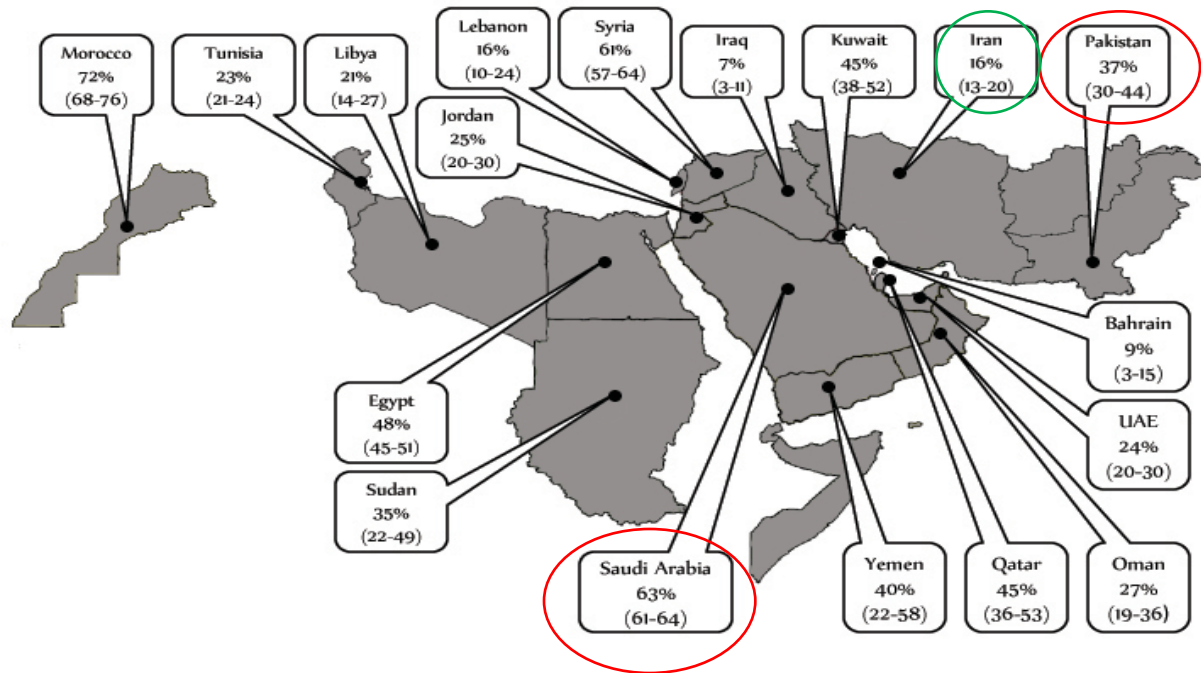
Risk factor	Odds ratio	95% CI
Extramarital sexual activities	42.2*	5.3–335.7
Being wounded at war	5.2*	1.2–21.9
History of undergoing endoscopy	4.0*	1.3–12.5
i.v. drug abuse	52.8*	6.8–412.0
Needle-stick	8.9	0.8–93.9
Non-i.v. drug abuse	34.4*	4.2–278.2
Transfusion history	17.0*	7.0–41.0

*Odds ratio is statistically significant. CI, confidence interval; i.v., intravenous.

In a study in three prisons in three central provinces of Iran (Isfahan, Lorestan, Chaharmahal va Bakhtiari) in 2003 in male prisoners who were arrested because of their addiction

- 3.5% were HBs Ag positive and 35.8% were HCV antibody.
- According the age, the infection with HBV and HCV were more common in younger than 30 yrs. old.
- Isfahan , Lorestan and Chaharmahal va Bakhtiari: Addicted arrested respectively, 28.5%, 50% , 53.% HCV infected
- IUDs, Tattooing history, In jail more than 5 years were important
- **In Conclusion:** Potentiating of harm reduction program ,Education for dangerous behavior,

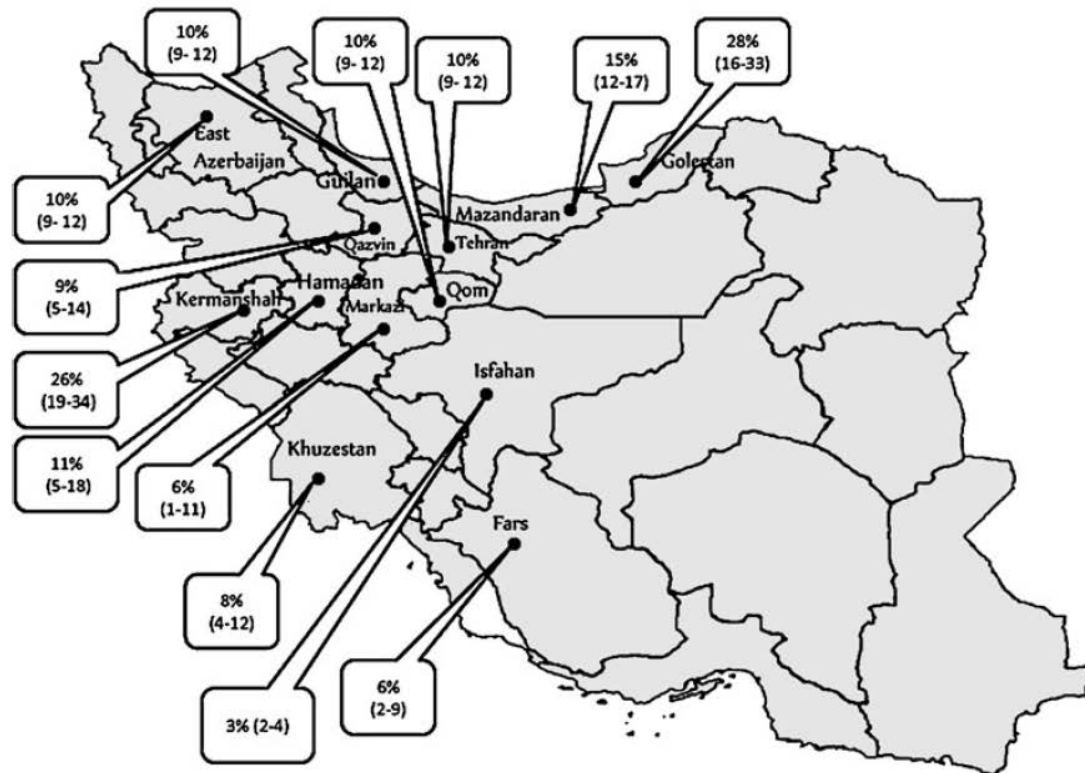
Hemodialysis Patients



Alavian SM, et al. Epidemiology and risk factors of HCV infection among hemodialysis patients in countries of the Eastern Mediterranean Regional Office of WHO (EMRO): a quantitative review of literature. J Public Health (Oxf). 2011.

Hemodialysis Patients

Fig. 2 Geographical distribution of HCV infection in hemodialysis patients in Iran



Alavian SM, et al. Epidemiology and risk factors of HCV infection among hemodialysis patients in countries of the Eastern Mediterranean Regional Office of WHO (EMRO): a quantitative review of literature. *J Public Health (Oxf)*. 2011.

Hepatitis B and C in dialysis units in Iran: Changing the epidemiology

Seyed Moayed ALAVIAN,¹ Kamran BAGHERI-LANKARANI,² Mitra MAHDAVI-MAZDEH,^{3,4}
Shahram NOUROZI⁴

- Prevalence of positive HBS Ag and HCV Abs in patients on hemodialysis decreased from 3.8% and 14.4% in 1999 to 2.6% and 4.5% in 2006, respectively.

Lack of Knowledge About Hepatitis C Infection Rates Among Patients With Inherited Coagulation Disorders in Countries Under the Eastern Mediterranean Region Office of WHO (EMRO): A Meta-Analysis

Seyed Moayed Alavian ¹, Seyed Hossein Aalaei-Andabili ^{1*}

- The estimate of HCV infection among patients with inherited coagulation disorders was 48.07% in Iran, 36.03% in Pakistan, and 48.27% in all the EMRO countries taken together.
- It was interesting that no data was available from Egypt with 4141 hemophilia patients.
- No any relevant study in our search from Bahrain, Kuwait, Jordan, Lebanon, Libya, Oman, Qatar, Emirates, Yemen, Sudan, Djibouti, Syria, Morocco, Somali and Afghanistan concerning HCV prevalence in their hemophilia patients.

CLINICAL STUDIES

Peginterferon α -2a and ribavirin treatment of patients with haemophilia and hepatitis C virus infection: a single-centre study of 367 cases

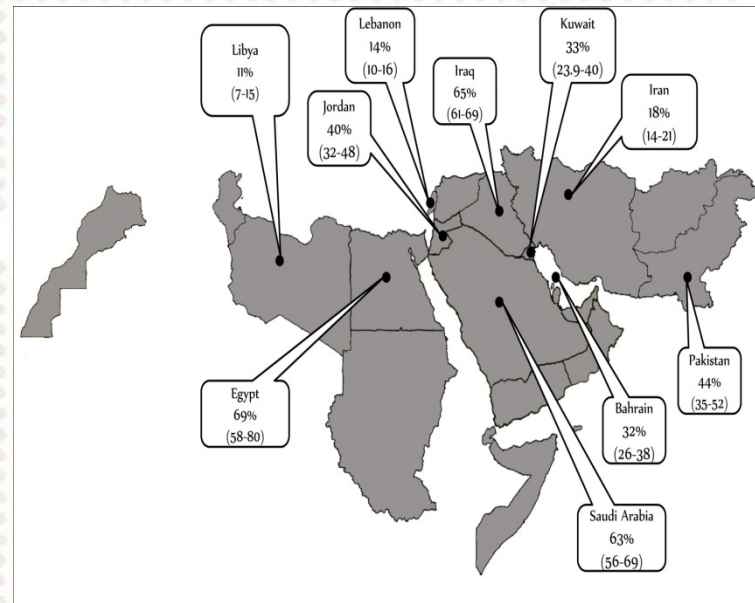
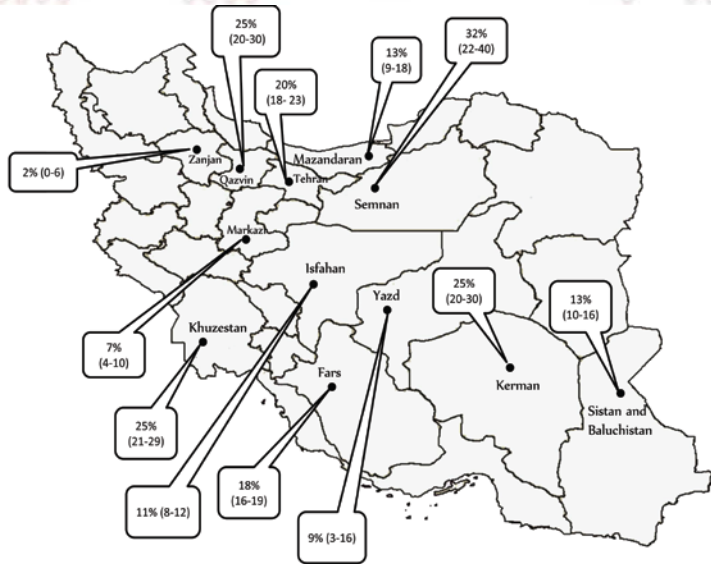
Seyed-Moayed Alavian¹, Seyed Vahid Tabatabaei¹, Maryam Keshvari², Bitā Behnava¹, Seyed Mohammad Miri¹, Pegah Karimi Elizee² and Kamran Bagheri Lankarani³

Two hundred and twenty-five subjects (**61%**) achieved SVR, 66 patients relapsed and 30 subjects did not respond and nine patients developed breakthrough during treatment.

In a multivariate logistic regression model, **age<24** odds ratio (OR) = 1.8, **genotype non-1** OR= 1.8, **BMI<25** OR= 2.1 and **HCV RNA<600 000 IU/ml** OR= 1.7 were independent predictors of SVR.

Epidemiology of HCV Infection among Thalassemia Patients in Eastern Mediterranean Countries: a Quantitative Review of Literature

SM Alavian^{1*}, SV Tabatabaei¹, KB Lankarani²



Treatment of chronic hepatitis C in polytransfused thalassaemic patients: a meta-analysis

S.-M. Alavian and S.-V. Tabatabaei *Baqiyatallah University of Medical Sciences, Research Center for Gastroenterology and Liver Disease, Tehran, Iran*

- In a meta-analysis determined that addition of ribavirin to conventional IFN increases SVR rates by twofold, from 30% to 61%, similar to non-thalassaemic patients.
- We also determined that Genotype 1-infected patients significantly benefit from the addition of ribavirin to IFN monotherapy.

Low Dose Ribavirin for Treatment of Hepatitis C Virus Infected Thalassemia Major Patients; New Indications for Combination Therapy

Seyed Vahid Tabatabaei¹, Seyed Moayed Alavian^{1*}, Maryam Keshvari², Bitā Behnava¹, Seyyed Mohammad Miri¹, Pegah Karimi Elizee², Farhad Zamani³, Sedigheh Amini Kafiabad², Ahmad Gharehbaghian², Bashir Hajibeigy², Kamran Bagheri Lankarani⁴

- Treatment of HCV infected patients is important strategy for control of HCV infection in thalassemia group.
- Sustained virological response (SVR) was significantly higher in patients who received ribavirin (**51 %** vs. 38 % P = 0.02). In multivariate regression, OR of ribavirin for prediction of SVR was 2.2 (95 % CI 1.24-3.91)

Hepatitis C Infection in the General Population of Iran: A Systematic Review

Seyed Moayed Alavian ^{1*}, Masoud Ahmadzad-Asl ², Kamran Bagheri Lankarani ³,
Mohammad Ali Shahbabafe ², Amir Bahrami Ahmadi ², Ali Kabir ²

- Eight eligible studies reported a prevalence of HCV infection in the general population in Iran.
- They were from six (out of 30) provinces, in which about 43 percent of the country's population lives. We calculated that the HCV infection prevalence rate in Iran is 0.16%.
- Conclusions: In comparison with similar studies, the prevalence of HCV infection in Iran is low.



	Iran	Pakistan	Saudi Arabia
Country's Population (000)	71 000	167 000	19 300
Year	2006	2008	2011
HCV Antibody Positive (000)			
Total Cases	275 (189 - 360)	8010 (5792 - 9920)	143 (116 - 368)
Prevalence	0.4% (0.3% - 0.5%)	4.8% (3.5% - 5.9%)	0.7% (0.6% - 1.9%)
Year of Estimate	2006	2008	2011
Viremic Infections (000)			
Total Viremic Cases	170 (117 - 223)	7001 (5062 - 8670)	100 (81 - 257)
Viremic Prevalence	0.2% (0.2% - 0.3%)	4.2% (3.0% - 5.2%)	0.5% (0.4% - 1.3%)
Viremic Rate (%)	62%	87%	70%
Year of Estimate	2006	2008	2011
Genotypes (%)			
1a	40%	5%	13%
1b	12%	1%	26%
1 Other	1%	1%	-
2	53%	7%	39%
3	1%	4%	4%
4	28%	79%	5%
5	1%	2%	53%
6	-	0%	-
Other	-	0%	-
Year of Estimate	2004	1996 - 2011	2003
Diagnosed (Viremic)			
Total Cases	60 000	1 050 000	20 100
Annual Newly Diagnosed	6000	100 000	2000
Year of Estimate	2013	2010	2013
Treated			
Annual Number Treated	4500	85 000	1900
Year of Estimate	2011	2011	2009
Liver Transplants			
Total Liver Transplants	590	300	146
HCV Liver Transplants	94	225	72
% due to HCV	16%	75%	49%
Year of Estimate	2013	2012	2012

Liakina V, Hamid S, Tanaka J, Olafsson S, Sharara AI, Alavian SM, et al. Historical epidemiology of hepatitis C virus (HCV) in select countries. J Viral Hepat. 2015

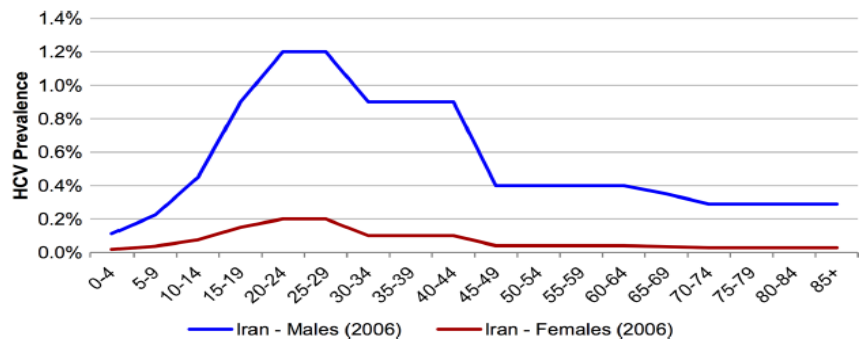
The present and future disease burden of hepatitis C virus infections with today's treatment paradigm

	Iran
Viremic HCV Infections (000)	
2014 Est.	186
2030 Est.	213
Percent Change	14%
HCC Cases	
2014 Est.	110
2030 Est.	330
Percent Change	195%
Liver Related Mortality	
2014 Est.	140
2030 Est.	430
Percent Change	215%
Decompensated Cirrhosis	
2014 Est.	150
2030 Est.	660
Percent Change	350%
Compensated Cirrhosis	
2014 Est.	3500
2030 Est.	10 800
Percent Change	210%

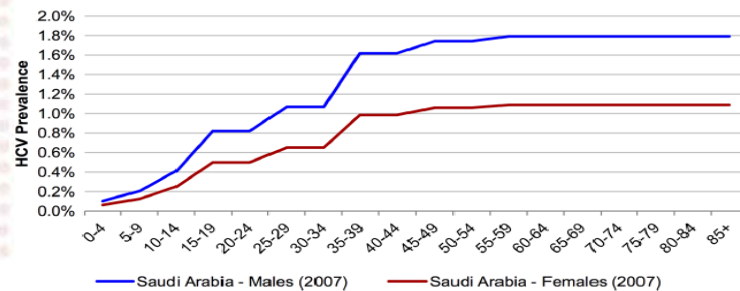
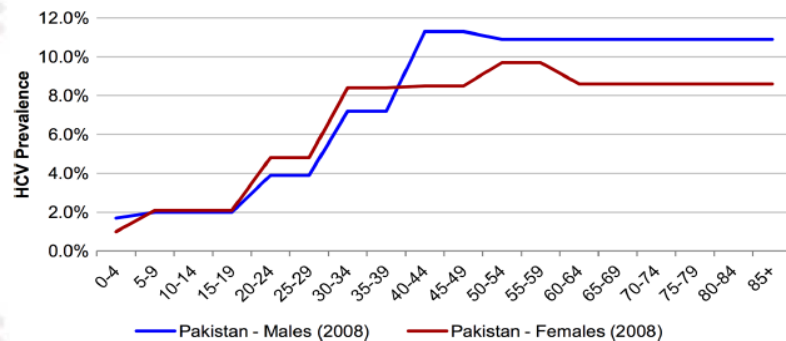
In 2007, it was estimated that 75% of the infected population in Iran had been infected by IDU. Based on expert opinion, 4% of all HCV cases were infected via transfusion procedures. The majority of new cases are due to IDU, which is reflected in the young age distribution.

In 2014, there were an estimated 186 000 (123 000–250 000) viraemic individuals in Iran, increasing 14% to 213 000 individuals in 2030.

Younger HCV infected patients in Iran



Iran has one of the lowest rates of HCV prevalence in the Middle East. Under the current treatment paradigm, HCV infections will increase in Iran.

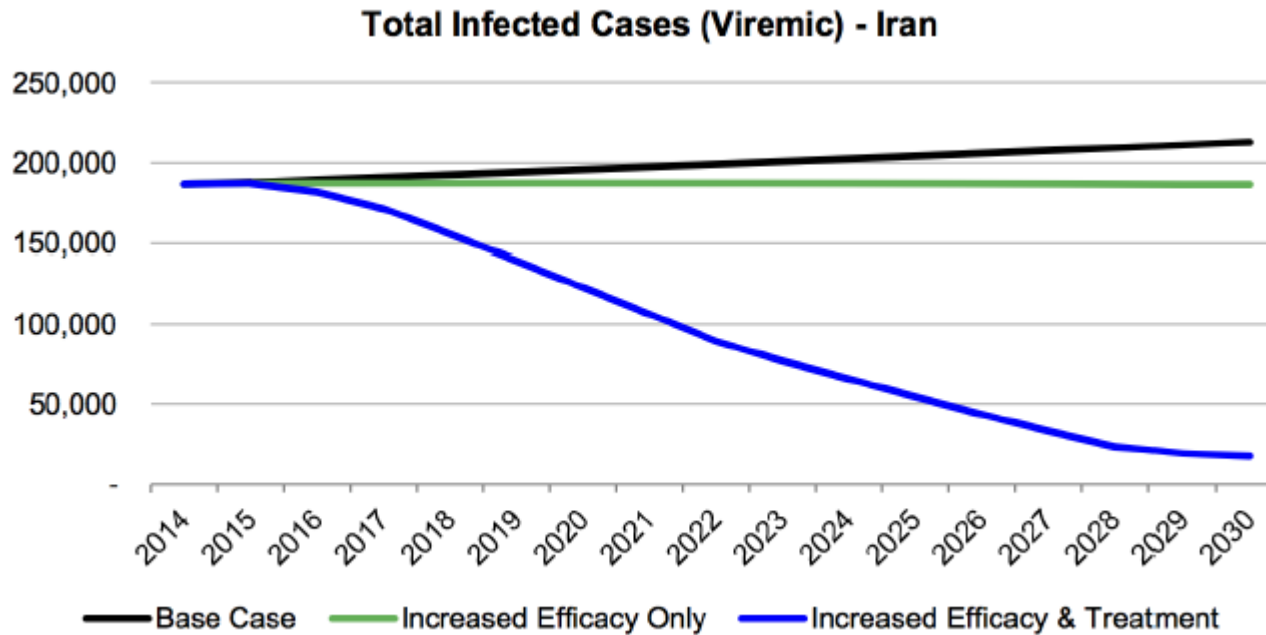


Strategies to manage hepatitis C virus infection disease burden 2014-2030 in Iran

- Iran is low prevalence for HCV infection in the region.
- The future number of treated patients was capped by (i) number diagnosed, (ii) number eligible and (iii) unrestricted cases. The latter related to implicit (defined by physician's practice) and/or explicit (defined by treatment guidelines) restrictions.
- Patients with decompensated cirrhosis, irrespective of genotype, were considered ineligible for any treatment that involved Peg-IFN.
- According to the literature, approximately 40–60% of HCV patients are eligible for Peg-IFN/RBV treatment.

Strategies to manage hepatitis C virus infection disease burden 2014-2030 in Iran

- We have three strategy:
- The **base strategy** was defined as the case when all assumptions (number of treated patients, percent of patients eligible for treatment, and... the average SVR) remained the same as today. **It is not accepted now.**
- In the **second strategy**, the impact of increasing the SVR of therapies was considered.
- The **third scenario** included an increase in both SVR and treatment uptake.

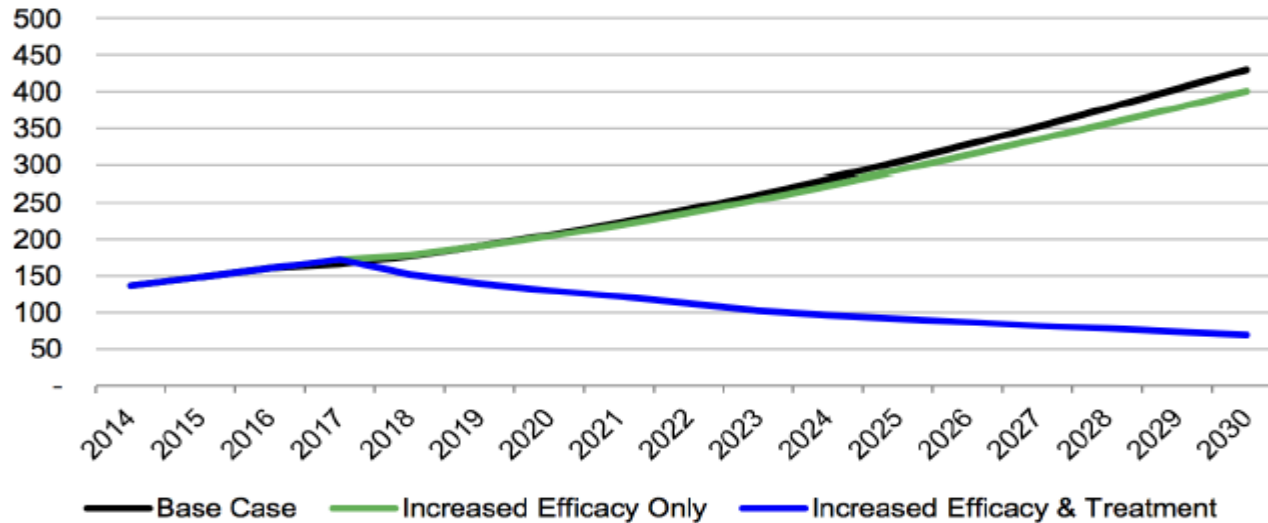


Increased efficacy only

There would be 26 700 fewer viremic individuals in 2030, a 13% reduction as compared to the base case.

Increased efficacy & treatment uptake 90% reduction in the total numbers of viremic individuals, representing 196 000 fewer viremic individuals in 2030, relative to the base case.

Liver-related Deaths - Iran



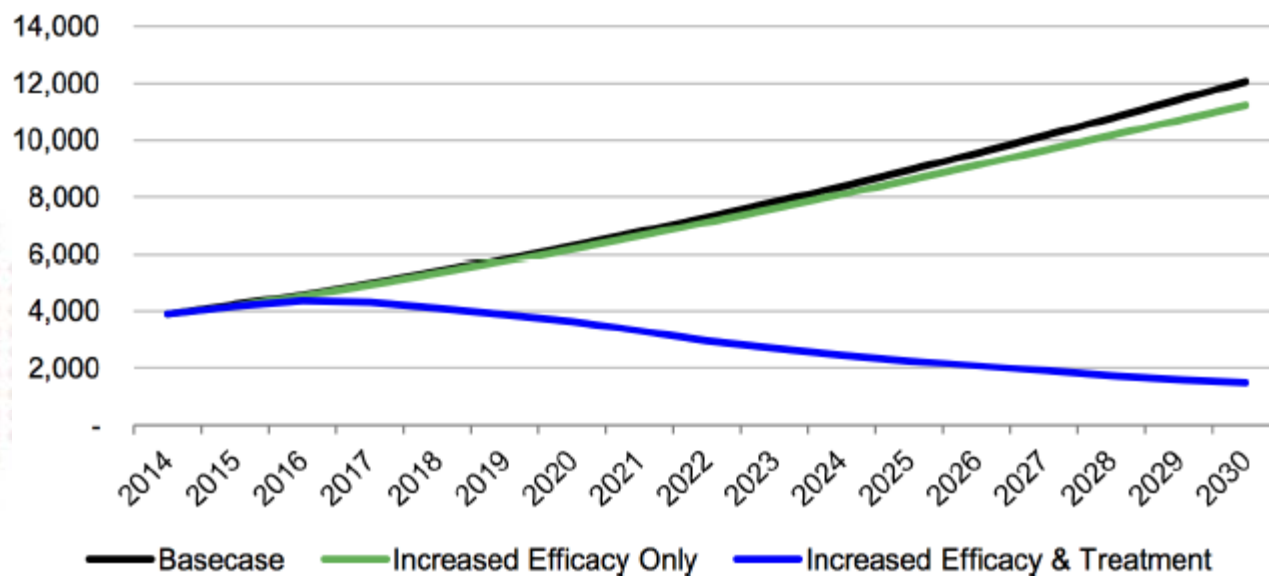
Increased efficacy only

The number of liver-related deaths would decrease by 7% from the base, with 400 deaths in 2030.

Increased efficacy & treatment uptake

The number of liver-related deaths would decrease by 85% from the base, with 70 deaths in 2030.

All Cirrhosis - Iran



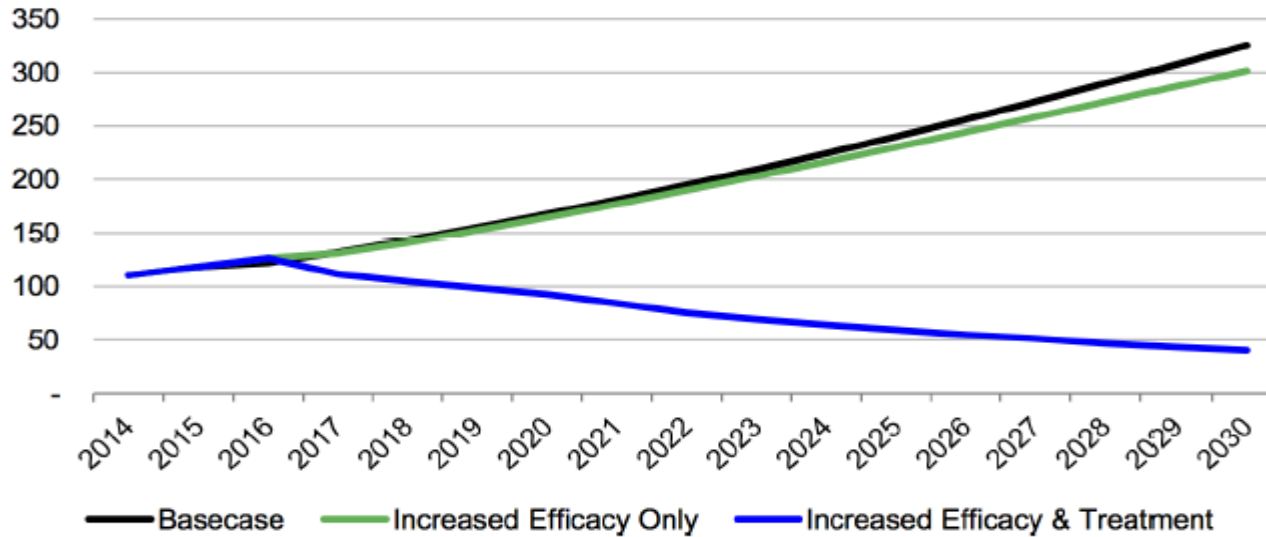
Increased efficacy only

Decompensated and compensated cirrhosis would decrease by 10% and 7% from the base, with 590 and 10 100 cases in 2030.

Increased efficacy & treatment uptake

Decompensated and compensated cirrhosis would decrease by 80% and 90% from the base, with 140 and 1300 cases in 2030.

Total HCC Cases - Iran

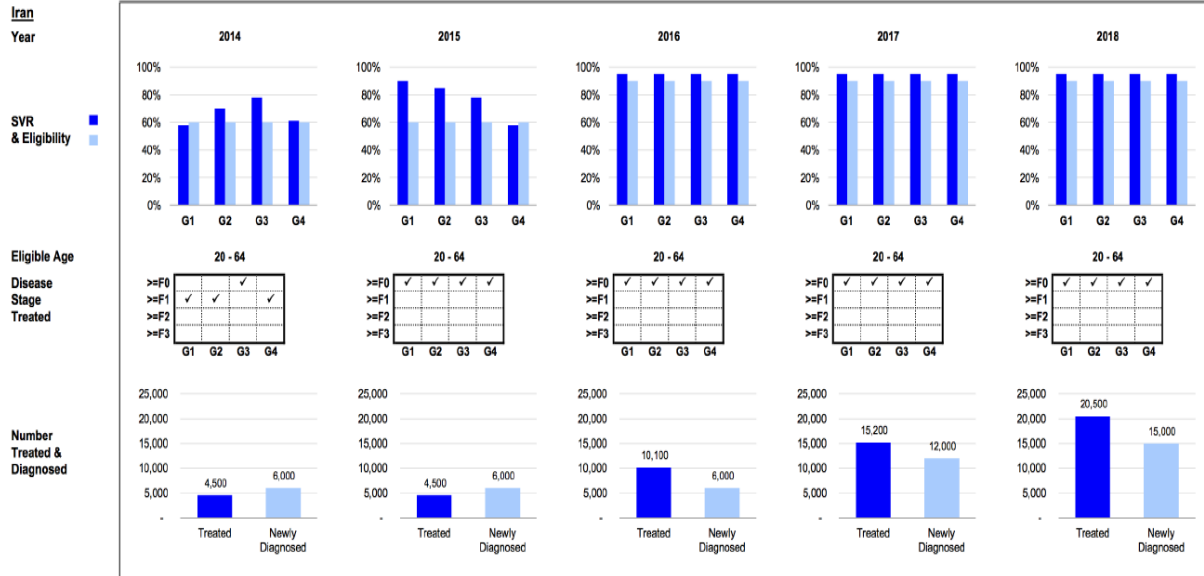


Increased efficacy only

The number of HCC cases in 2030 was estimated at 300 cases, a 7% decrease from the base case.

Increased efficacy & treatment uptake

The number of HCC cases in 2030 was estimated at 40 cases, a 90% decrease from the base case.



While increasing efficacy has moderate declines in all HCV-related indicators, an aggressive treatment strategy would eliminate HCV in Iran, bringing the viremic prevalence to approximately 0.02% by 2030.

Increase treatment by 5000 individuals every year starting in 2016 until reaching a maximum treatment of 20 500 in 2018. By treating over 20 000 individuals annually for 5 years, the treatment could then decrease to below current levels by 2030.

Due to the large numbers of individuals being treated, there would need to be an increase in diagnosis rate to keep pace with the treatment rate. Utilizing a birth cohort with the young infected population could make diagnosis, treatment and thus **elimination, a real possibility in Iran.**



هر کدام سبب منحصراً استیجی جا هر بود
 در این مورد دانسته که هر دو سبب استیجی هستند
 امکان تمام بوی بیخ و جنون در یک فرد
 نادر نیست.
 استیج را با استیجاء مختلف استیج بود
 در حیوانات نامیده و استیجاء سبب هر دو در این
 استیج منحصراً پیدا می شود و هر یک در یک
 خود می تواند در استیج بیخ پیدا شود
 سیستم مغز استیج (دستگاه دفاعی داخلی بدن)
 در سراسر بدن استیج است و دانده بر اساس استیج است
 S.L.R. is distributed strategically
 through out body cells.

عوامل مغز و استیج در حجاب با عین الی در برابر عفونتها
 این عوامل عبارتند از سن، عوامل ژنتیکی، کمبود آنتی بادی در برابر
 عفونت باکتری، قهقهه، و دفع روانی بیمار و محیط او
 اول سن - کمبود آنتی بادی هم دارای قدرت ایمنی است
 میخانه در برابر امراض نظر سرخه و سیفلیس و کولریبا و غیره
 آنتی ژن نشان دهنده تمام ایمنیها در اینها از همه در این
 ساخته می شود و دفع عفونتها هم کامل نیست و درجه این اعمال در صدها
 اعده و مغز استیج و در این مثال در جنین دوازده هفتگی استیج
 فقط در این محیط وجود دارد و در وقت همین کامل بودن عوامل دفاعی است
 که عفونت در این محیط خول گسترده و در آن شایعتر شده و در وقت
 موی عفونت می شود و در وقت خود اهد بود (در حجاب عوامل در این محیط
 و استیج) و در وقت تولد از تولد به بعد قابل ملاحظه در این محیط
 در حقیقت ناقص بوده و در حجاب استیج خاص می شود
 در نوزاد در حجاب استیج این بوی نورطری همیشه ناگانی است. از مادر
 به یک ماهه در این بوی نورطری همیشه با بدن انتقال می یابد و در وقت در برابر
 از عفونتها و در یک روز استیج که ایمنی آنها مربوط به آنتی بویها هر چه شده با
 ناگانی است موقتاً ایمنی پیدا می کند و چون مادر به یک ماهه در حجاب استیج
 انتقال می یابد به جهت نوزاد در برابر عفونتها ایمنی در برابر آنها مربوط به
 آنتی بویها هر چه با AM است (عفونتها می شود) ایمنی در این محیط است
 در این بوی نورطری به عفونتها می شود دفعی روشن می سازد.