ABSTRACTS

STRIVING TOWARDS THE ELIMINATION OF HCV INFECTION

BERLIN, GERMANY
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Scientific Organising Committee
Prof. Alessio Aghemo, Italy
Prof. Jason Grebely, Australia
Prof. Francesco Negro, Switzerland

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P05-04 YI Challenges in eligibility assessment for direct-acting antiviral therapy in patients with chronic hepatitis C

P05-05 YI Working towards eliminating HCV among men who have sex with men in Amsterdam using an innovative and multilevel approach: the MC free project

P05-06 YI Patient-led policy monitoring of viral hepatitis: the HEP-core study's contribution to meeting who elimination goals in Europe

P06-01 The feasibility of treating HCV in low resource setting the MSF projects in Mozambique and Myanmar

P06-02 (Re)- Diagnosing and (re)-engaging older patients with chronic HCV in a central London emergency department - interim findings from the vira+emic project

P06-03 YI Loss-to-follow-up is an important problem in the diagnosis and follow-up of hepatitis C

P06-04 Chronic hepatitis C in children of the Russian Federation

P06-05 YI Treating HCV in people who inject drugs with elbasvir/grazoprevir

P06-06 PH8 A french national study of completion rate of HCV treatment in prison

P07-01 Exploring HCV eradication through diagnosis and treatment strategies

P07-02 HCV-FIS (hepatitis C virus fingerprick study): HCV RNA point-of-care testing by genexpert in the setting of DAA therapy

P07-03 Comparative effectiveness analysis of patient-centered care and health care delivery: systematic review

P07-04 Recurrence and occurrence of hepatocellular carcinoma following ledipasvir and sofosbuvir treatment for chronic hepatitis C in patients with advanced liver disease: Turkish multi-centre early access program

P07-05 YI Is macro-elimination of HCV infection the right approach for Canada?

P07-06 YI Chronic hepatitis B and C infections in the Netherlands: estimated prevalence in risk groups and the general population

P08-01 YI Comparison of resistance profiles among DAA-naive and DAA-failed patients infected with HCV non-1 genotype in Italy

P08-02 YI Decrease in liver stiffness due to HCV treatment using LDV/SOF measured by transient elastography in Mongolian population

P08-03 Enhancing HCV screening and treatment: lessons learned from field testing and follow up treatment uptake

P08-04 YI Prevalence of hepatitis C virus infection in patients attending the emergency department at university hospital of Wales, Cardiff

P08-05 YI Public opinion and HCV elimination program: does it matter in public payer systems? A preliminary survey

ACKNOWLEDGEMENTS
SCIENTIFIC PROGRAMME
SCIENTIFIC ORGANISING COMMITTEE

Alessio Aghemo, Italy
Jason Grebely, Australia
Francesco Negro, Switzerland

DAY 1 – Friday 2 February 2018

08:00–08:10  Welcome and introductory remarks
              Francesco Negro, Switzerland

1. EPIDEMIOLOGY AND PREVENTION

   CHAIRS:
   JASON GREBELY, AUSTRALIA
   DAGMAR HEDRICH, PORTUGAL

08:10–08:20  Patient experience
              Andi Hüttenmoser, Switzerland

08:20–08:40  Global HCV epidemiology
              Angelos Hatzakis, Greece

08:40–09:00  Morbidity and mortality associated with HCV infection
              Sharon Hutchinson, United Kingdom

09:00–09:20  Successful interventions for the prevention of HCV infection
              Matthew Hickman, United Kingdom

09:20–09:40  Do we still need a vaccine for HCV?
              Andrea Cox, United States

09:40–10:10  Discussion

10:10 – 10:30 Coffee break and ePoster session 1
2. Interventions to improve linkage of patients to HCV testing, care, and treatment

CHAIRS: MARTIN KABERG, SWEDEN
        JOHN DILLON, UNITED KINGDOM

10:30–10:50  Successful strategies to enhance HCV testing, linkage to care, and treatment
            Jason Grebely, Australia

10:50–11:10  Diagnostic tools to improve HCV testing and diagnosis: where do we stand?
            Jean-Michel Pawlotsky, France

11:10–11:30  Scale-up of interventions to improve testing, care and treatment: lessons learned from HIV
            Philippa Easterbrook, Switzerland

11:30–11:50  Engaging marginalized patients in the DAA era
            Magdalena Harris, United Kingdom

11:50–12:20  Discussion

12:20–13:30  Lunch break and ePoster sessions 2 and 3

3. Treatment of HCV

CHAIRS: ALESSIO AGHEMO, ITALY
        MARIETA SIMONOVA, BULGARIA

13:30–13:50  Management of acute HCV infection
            Heiner Wedemeyer, Germany

13:50–14:10  Management of chronic HCV infection
            Stefan Zeuzem, Germany

14:10–14:30  Direct-acting interferon-free therapies among people who inject drugs
            Olav Dalgard, Norway

14:30–14:50  Managing direct-acting antiviral therapy among people with HIV/HCV co-infection
            Jürgen Rockstroh, Germany

14:50–15:10  Management of treatment failures
            Massimo Puoti, Italy

15:10–15:30  Discussion

15:30 – 16:00  Coffee break and ePoster session 4
4. Settings to facilitate HCV elimination

CHAIRS: ANGELOS HATZAKIS, GREECE
SHARON HUTCHINSON, UNITED KINGDOM

16:00–16:20  Prisons
Gregory Dore, Australia

16:20–16:40  Drug, alcohol and psychiatry clinics
Martin Kaberg, Sweden

16:40–17:00  General practices, community health centres, and pharmacies
John Dillon, United Kingdom

17:00–17:20  Clinical reality treatment landscape in Eastern Europe
Marieta Simonova, Bulgaria

17:20–17:40  Clinical reality treatment landscape in Western Europe
Christophe Hézode, France

17:40–18:00  Discussion

18:15–19:00  EASL Clinical Practice Guidelines

DAY 2 – Saturday 3 February 2018

5. How far are we from reaching the WHO targets of HCV elimination?

CHAIRS: ANDREA COX, UNITED STATES
GRAHAM FOSTER, UNITED KINGDOM

08:00–08:20  WHO elimination targets and the development of national viral hepatitis plans
Hande Harmanci, Switzerland

08:20–08:40  What is required from a health systems perspective to achieve HCV elimination?
Jeffrey Lazarus, Denmark

08:40–09:00  Cost-effectiveness vs. affordability of HCV treatments
John Cairns, United Kingdom

09:00–09:20  MPP model to scale up access to generic medicines with special focus on LMICs
Ludmila Maistat, Switzerland

09:20–09:40  The role of patients’ associations
Tatjana Reic, United Kingdom

09:40–10:30  Coffee break and ePoster sessions 5 and 6
10:30–10:45  The Australian experience  
Gregory Dore, Australia

10:45–11:00  The UK experience  
Graham Foster, United Kingdom

11:00–11:20  The role of payers  
Ricardo Baptiste Leite, Portugal

11:20–11:50  The contribution from the industry  
Fernando Tatsch, United States (10 min)  
Gregg H. Alton, United States (10 min)  
Michael Robertson, United States (10 min)

11:50–12:30  Panel discussion  (all speakers from session 5 on stage)

12:30–14:00  Lunch break and ePoster session 7 and 8

14:00–14:30  State-of-the-Art lecture  
Rise and fall of a virus  
Antonio Craxi, Italy

6. Is the game over? The challenge of post-SVR management

CHAIRS:  
MASSIMO PUOTI, ITALY  
STEFAN ZEUZEM, GERMANY

14:30–14:50  HCV reinfection following successful DAA therapy  
Patrick Ingiliz, Germany

14:50–15:10  Harm reduction and drug user health  
Dagmar Hedrich, Portugal

15:10–15:30  Beyond the liver: SVR and extrahepatic manifestations  
Francesco Negro, Switzerland

15:30–15:50  Alcohol and SVR: yes, how much, not at all  
Nick Sheron, United Kingdom

15:50–16:10  The post-SVR HCC risk: life-long follow-up?  
Alessio Aghemo, Italy

16:10–16:30  Discussion

16:30–16:40  Concluding remarks
INVITED SPEAKERS’ ABSTRACTS
The global epidemiology of HCV

Angelos Hatzakis
National and Kapodistrian University of Athens Medical School, Athens, Greece
Hepatitis B and C Public Policy Association

Corresponding author's email: ahatzak@med.uoa.gr

The 69th World Health Assembly approved the Global Health Sector Strategy to eliminate hepatitis C virus infection by 2030. To follow up the progress of HCV elimination, reliable disease burden estimates nationally, regionally and globally are required. Disease burden estimates are available from pooling multiple studies and disease modelling. Successful implementation of HCV elimination will result in yearly reductions of chronic HCV prevalence.

In 2015, 71 million persons where living with chronic HCV infection for a prevalence (uncertainty interval) 1% (0.8-1%). The highest prevalence was in Eastern Mediterranean region 2.3% (1.9-2.4%) and the lowest was in South-East Asia region 0.5% (0.4-0.9%). Among 71 million people with chronic HCV, 2.3 million were HCV/HIV co-infected and 5.6 million were injecting drug users. The global estimate for HCV incidence is 23.7% (21.3-28.7%) per 100,000. The highest incidence was observed in European and Eastern Mediterranean regions. The projected global net change of chronic HCV prevalence in the years 2015-2016 is a reduction 0.4%. Only 10 countries are in the track for reaching the elimination goal by 2030.

These data in the beginning of HCV elimination era indicate serious gaps and challenges. However, there is a wide heterogeneity and an increasing number of countries may reach the goals of 2020 and 2030.
Morbidity and mortality associated with HCV infection

Sharon J Hutchinson
Glasgow Caledonian University, Glasgow, United Kingdom

Corresponding author's email: sharon.hutchinson2@nhs.net

Globally, the annual number of deaths due to the hepatitis C virus (HCV) has risen by a third from around 300,000 in 2000 to close to 400,000 in 2015, which is in sharp contrast to a downward trend in mortality observed for other major infectious diseases. Among the long-term complications of HCV infection, cirrhosis (65%) accounted for more HCV-related deaths than hepatocellular carcinoma (34%) in 2015. Without treatment, modelling studies have projected that liver morbidity and mortality associated with chronic HCV infection will continue to rise over the next decade and beyond. Long-term community-based studies have shown that chronic HCV leads to increased mortality from not just hepatic but also non-hepatic diseases. A large meta-analysis investigating the risk of all-cause mortality in the short-term (on average 5 years) after HCV treatment with interferon-based regimens demonstrated that attaining a sustained virologic response (SVR) reduced the risk of death by 50-80% compared with unsuccessful treatment in a range of populations infected with HCV. SVR has also been associated with reduced risk for a range of hepatic and non-hepatic events. Safe and highly-effective direct-acting antivirals (DAAs) for HCV have recently become available, with SVR rates in excess of 90% observed among patients, including those with cirrhosis, in real-life settings. Thus, the new therapies have major potential to reduce morbidity and mortality associated with HCV. Within two years of DAAs becoming available in the United States, the rate of new registrations for a liver transplant reduced by over 30% for HCV infected decompensated cirrhosis patients, compared to the previous period of interferon-based therapy. The Global Health Sector Strategy on viral hepatitis calls for the elimination of viral hepatitis as a public health threat, involving reducing mortality by 65% between 2015 and 2030. However only 10-20% of the estimated 70 million with chronic HCV globally have so far been diagnosed and only 1-2 million are initiated on treatment each year. Whilst major challenges remain in the identification and treatment of individuals with chronic HCV, countries have an opportunity and arguably an obligation to scale-up efforts to avert severe liver morbidity and mortality in this population in the short-term.
Do we still need a vaccine for HCV?

Andrea L. Cox
Johns Hopkins University, Baltimore, MD, USA

Corresponding author’s email: acox@jhmi.edu

Hepatitis C virus (HCV) infects approximately 71 million people in the world and is the leading cause of end stage liver disease and liver cancer in many countries. Although directly acting antivirals (DAAs) that target the viral life cycle have created enormous optimism about eliminating HCV infection, achieving that goal remains a substantial challenge. Both acute and chronic infections are largely asymptomatic, infection incidence remains high in many countries, and comprehensive screening programs are rare in many highly endemic regions of the world. As a result, less than 5% of the world’s HCV-infected population are aware that they are infected. Undiagnosed individuals will not receive treatment and will remain at risk for transmitting the infection to others. Successful control of HCV infection will most likely require a combination of mass global screening to identify those with infection, treatment of those infected, and prevention.

Prophylactic HCV vaccination represents an important component of prevention and would go a long way to reducing harm for uninfected people who are at risk even with effective treatment. If everyone with HCV infection were identified, treatment as the primary means to eradicate HCV disease still would be challenging. One reason is the prohibitive cost of DAAs for most countries with moderate to high HCV prevalence. HCV transmission occurs through receipt of contaminated blood and poor needle hygiene in many parts of the world. Nations lacking the financial resources and health care infrastructure to ensure safety of the blood supply or medical supplies likely cannot afford treatment. Even in high-income countries, treating all infected individuals would create financial burden. Access to HCV is also limited in high-income nations because those most at risk for HCV infection include people who inject drugs, many of whom do not routinely access the health care system. Pre-exposure protection with DAAs is difficult to envision given the cost and unproven long-term safety. Following successful therapy, the DAAs do not protect against reinfection of those at ongoing risk of infection or fully reverse severe liver damage. Liver disease usually stabilizes or improves after cure, but further disease progression can occur, necessitating ongoing monitoring for liver failure and cancer after successful therapy. Given the challenges of identifying infected people before severe liver disease occurs, the possibility of repeated infection, the cost of therapy, and the inability to heal the most severely damaged livers, maximal reduction of HCV-associated morbidity may require prevention of chronic HCV in the first place. Sources of HCV infection vary across countries, so the while there are multiple strategies to prevent HCV infection, a prophylactic vaccine is one that would have broad efficacy. In addition, a vaccine to prevent chronic HCV could be given before individuals are at risk, translating into a much larger window in which to prevent infection and liver damage associated with infection and reducing the need to engage at-risk populations at the time of greatest risk (such as during active drug use).

However, vaccine development is not without substantial barriers as well. These include the genetic diversity of HCV, the lack of immunologically competent and convenient model systems to test a vaccine, the numerous mechanisms through which HCV evades the immune response, and the infeasibility of using live attenuated and inactivated whole virus as HCV vaccines due to limited culture capacity and risk of reversion to virulence. However, there is evidence that protective immunity against HCV exists in natural HCV infection that could be mimicked through vaccination. Indeed, a candidate vaccine has moved to trials in an at-risk human population for the first time, with results expected in fall of 2018.
In sum, a multifaceted approach to global control of HCV infection is needed. Because infection elimination occurs only when the number of cured infections exceeds the number of new infections, prevention of incident HCV infection is an important adjunct to treating those infected. Now that effective treatment exists for HCV, focus on effective prevention strategies represents the next half of the equation that needs to be solved for us to tip the balance toward elimination in Europe and across the globe.
Successful strategies to enhance HCV testing, linkage to care, and treatment

**Jason Grebely**
The Kirby Institute, UNSW Sydney, Australia

**Corresponding author’s email:** jgrebely@kirby.unsw.edu.au

Globally, 71 million people are living with hepatitis C virus (HCV) infection, but the burden of HCV continues to increase. Direct-acting antiviral therapies (DAA) with HCV cure >95% provide an opportunity to reverse rising trends in HCV-related morbidity and mortality and reduce incidence. However, HCV testing, linkage to care, and treatment remain low due to health system, provider, societal, and patient barriers. Between 2015 and 2030, WHO targets include reducing new HCV infections by 80% and HCV deaths by 65%, and increasing HCV diagnoses from <5% to 90% and number of eligible persons receiving HCV treatment from <1% to 80%. However, in order to achieve these targets at a population level, targeted interventions to enhance HCV testing, linkage to care, and treatment (“the HCV care cascade”) are needed. This presentation reviews available evidence on strategies that have been successfully used to enhance HCV testing, linkage to care and treatment.
Engaging marginalised patients in the DAA era.

Magdalena Harris
London School of Hygiene & Tropical Medicine, London, United Kingdom

Corresponding author’s email: magdalena.harris@lshtm.ac.uk

Direct acting antivirals (DAAs) have transformed the HCV treatment landscape. Their simplicity, safety and efficacy hold great promise for treatment scale up, particularly among key populations most marginalised from treatment, such as people who inject drugs (PWID). Enhancing DAA treatment access to the most marginalised PWID, such as the homeless, is crucial for a comprehensive HCV elimination strategy. Australia provides a case example of democratised access in action, with DAA prescribing and provision incrementally shifting from the specialist to the primary and community sector. While this ameliorates many barriers associated with hospital system stigma, rigidity and inaccessibility for PWID – recent data indicates limited engagement among younger, potentially high risk, PWID. This presentation sets out to address two questions: firstly, what are the remaining barriers to HCV treatment engagement for PWID in the DAA era and secondly, what treatment engagement outcomes are important, and to whom? In addressing these questions, I draw on current literature and research in the field alongside qualitative data from a London-based programme of work exploring the social relations of treatment, prevention, risk and care with people who inject drugs from 2009 – to the present.

A broad heuristic for situating treatment barriers locates their action at five levels: policy, place, procedure, peers and person. Strategies to enhance engagement are, arguably, the most poorly developed for the latter domain, which incorporates social structural barriers to engagement (such as homelessness, criminalisation) as well as HCV awareness. Focusing on this domain, I illustrate the role of living spaces, trust and community action on HCV engagement for the most marginalised, before turning to address how differing conceptions of HCV ‘cure’ can impact engagement.

Engaging with a HCV elimination strategy requires enabling DAA treatment opportunity for the most marginalised PWID – those who are unstably housed, inconsistently accessing OST and experiencing multiple morbidities and social exclusions. Here, we need to look beyond the biomedical – both in terms of creating enabling environments with the most marginalised and continuing to support ‘transformative’ non-clinical treatment outcomes.
Management of acute hepatitis C

Heiner Wedemeyer
Department of Gastroenterology and Hepatology, University Clinic Essen, Germany

Corresponding author's email: wedemeyer.heiner@mh-hannover.de

Historically, acute hepatitis C has been treated with IFNa-based therapies. Treatment of acute hepatitis C did not require the addition of ribavirin and 12-24 weeks of pegylated interferon alfa cured between 85%-100% of patients. With the introduction of direct acting antivirals against HCV for the treatment of chronic hepatitis C, IFNa is no longer recommended in patients with acute hepatitis C. The safety and efficacy of IFN-free regimens has meanwhile been confirmed in acute or early chronic hepatitis C. Potential benefits of early treatment of acute hepatitis C could be that shorter therapies might be sufficient which would reduce the overall costs of antiviral drugs. Moreover, early treatment might prevent spread of HCV in high risk populations.

Treatment with sofosbuvir and ribavirin is not sufficient in acute hepatitis, even when treatment is provided for up to 12 weeks (Martinello et al., Hepatology 2016; Naggie et al., CID 2017). The combination of ledipasvir and sofosbuvir for 6 weeks has been explored in both HCV monoinfected patients as well as in HIV-positive individuals with acute hepatitis C. In the HepNet Acute HCV-IV study all 20 patients with acute hepatitis C genotype 1 monoinfection cured HCV with this regimen (Deterding et al., Lancet ID 2017). In a parallel trial performed in HIV-coinfected individuals, few relapses were observed which all occurred in patients with very high baseline viral load (>9 Million IU/ml) (Rockstroh et al., Lancet G&H 2017). Very importantly, early treatment of symptomatic acute hepatitis C was safe and led to a rapid improvement of liver enzymes and also hepatitis-associated symptoms.

Future trials will need to investigate if even shorter therapies might be sufficient in some patients with acute hepatitis C. Moreover, other DAA regimens need to be investigated in acute hepatitis C. In addition, future trials should also include HCV genotypes 2 and 3.

In summary, early treatment of acute hepatitis C is feasible and could be a tool to reduce costs of HCV therapy and to prevent HCV spreading in high risk populations. Still, optimal treatment regimens need to be defined.
Management of chronic HCV infection

Stefan Zeuzem
University of Frankfurt, Germany

Corresponding author's email: zeuzem@em.uni-frankfurt.de

Among patients with chronic hepatitis C, 20–30% develop cirrhosis and its complications within 30 years. The antiviral treatment of hepatitis C, previously interferon-based, has recently become interferon-free, with resulting improvements in sustained virological response rates, safety, and tolerability and a shorter duration of treatment.

The basis of current, interferon-free treatment is a combination of directly acting antiviral drugs with high antiviral efficacy, resistance barriers, and different sites of attack. RNA-dependent RNA polymerase inhibitors are categorized as either nucleotide inhibitors (NI) or non-nucleoside inhibitors (NNI). NI are phosphorylated within cells by the activity of cellular kinases, bind as triphosphates to the active center of the HCV-specific NS5B polymerase, and abort the construction of the growing viral RNA chain. NNI cause allosteric inhibition of NS5B polymerase. The generic names of all HCV polymerase inhibitors end in “-buvir.” Protease inhibitors are directed against HCV-NS3/4A serine protease; their generic names end in “-previr.” The HCV-NS5A protein plays a role in HCV replication and the modulation of cellular functions. Various NS5A inhibitors have been developed; these have generic names ending in “-asvir”. Ribavirin, a drug whose antiviral mechanism of action is still incompletely understood, continues to play a role in few antiviral drug regimens.

Various drug combinations have been approved for the treatment of chronic hepatitis C, including both fixed co-formulations (sofosbuvir/ledipasvir, sofosbuvir/velpatasvir, sofosbuvir/velpatasvir/voxilaprevir, paritaprevir/ombitasvir with dasabuvir, grazoprevir/elbasvir, and glecaprevir/pibrentasvir) and combinations in which the doses of the two agents can be freely chosen (sofosbuvir plus simeprevir, sofosbuvir plus daclatasvir). In the majority of patient populations these combinations result in sustained virological response rates above 95% and are generally safe and well tolerated. The duration of treatment ranges between 8 and 16 weeks.

Three regimens are considered pangenotypic (sofosbuvir/velpatasvir, glecaprevir/ pibrentasvir, sofosbuvir/velpatasvir/voxilaprevir), others are restricted to specific genotypes (e.g. genotypes 1 and 4 with paritaprevir/ombitasvir + dasabuvir or grazoprevir/elbasvir). Treatment duration may differ for some regimen according to the fibrosis stage (e.g. 8 weeks glecaprevir/ pibrentasvir in non-cirrhotics, 12 weeks in patients with cirrhosis), others are indicated for 12 weeks independent of the presence of cirrhosis (e.g. sofosbuvir/ velpatasvir). Sofosbuvir is not indicated for patients with an impaired renal function (GFR < 30 ml/min), protease inhibitors and non-nucleoside polymerase inhibitors are contraindicated in patients with decompensated cirrhosis. Patients, who failed a DAA treatment regimen, should be retreated. Strategies in this patient population comprise the change of drug classes, longer treatment duration, the addition of ribavirin and/or the use of triple therapies including a nucleotide polymerase inhibitor in combination with a protease and NSSA inhibitor (e.g. sofosbuvir/velpatasvir/voxilaprevir).

Beside viral characteristics (HCV geno/subtype, viral load and resistance-associated substitutions) and patient’s characteristics ((de)compensated cirrhosis, impaired kidney function), potential drug-drug interactions and the economic situation (access and price) must be considered.
Direct-acting interferon-free therapies among people who inject drugs

Olav Dalgard
Åkershus University Hospital, Norway

Corresponding author’s email: odalgard@medisin.uio.no

Approximately 2/3 of the burden of HCV related disease in Europe is attributable to injecting drug use (1). The goals of HCV treatment in PWID are to prevent liver cirrhosis and onward transmission of HCV. Among people receiving opiate substitution therapy (OST) and people with recent injecting drug use, therapy with direct-acting antivirals (DAA) has been demonstrated to be safe and effective. Post-hoc analyses of phase II and III trials of DAA therapy demonstrated a similar SVR in those receiving and not receiving OST (2, 3). In The C-EDGE CO-STAR trial patients with HCV genotype 1 or 4 on OST were treated with EBR/GZR for 12 weeks (n=301)(4). SVR 12 was achieved in 92% and those who used drugs had similar SVR 12 response as those who did not. The Simplify study included only people with recent injecting drug use (n=103)(5). Patients received SOF/VEL for 12 weeks and SVR 12 was obtained in 94%. Drug use within the last month at baseline was reported by 74 patients. SVR 12 in this subgroup was 95% and did not differ from that seen in patients who did not report drug use the past month.

In both the Simplify study and the C-EDGE CO-STAR study adherence was closely monitored and was found to be 97% and 94%, respectively (4).

Real world experience has replicated both high rate of treatment completion (93-100%) and good SVR results (84-100%) in people receiving OST (6-8)

A main challenge is linking people who inject drugs (PWID) to HCV care. In a treatment trial performed among inner city dwellers with HCV infection in Baltimore US only 67% initiated treatment(9), and in an Irish study only 36% of PWID who tested positive for HCV attended at the specialist consultation offered (10).

A major obstacle is the lack of treatment settings suitable PWID. Successful models have been multidisciplinary and often peer-supported in community-based clinics, substance abuse treatment clinics and specialized hospital-based clinics (11).

In conclusion, adherence to DAA therapy has been shown to be very good and SVR rates high in PWID.

References


Settings to facilitate HCV elimination: Prisons

**Gregory Dore**
The Kirby Institute, UNSW Sydney, Sydney, Australia

*Corresponding author’s email: gdore@kirby.unsw.edu.au*

The prison setting provides both challenges and opportunities in relation to HCV elimination. Key challenges include: 1) current lack of access to direct-acting antiviral (DAA) therapy in a majority of prison settings; 2) concerns around diversion of DAA therapy; 3) the risk of HCV reinfection following successful treatment, given access to harm reduction limited in most prisons; 4) logistic issues in relation to within-prison transport to medical clinic and DAA dispensing; and 5) a lack of advocacy for prison-based health. Key opportunities include: 1) the high HCV prevalence in most prison settings; 2) access to highly marginalized individuals who are generally difficult to reach in the community setting with regard to HCV treatment; 3) ongoing HCV transmission within the prison setting provides the opportunity for HCV treatment as prevention; and 4) capacity to provide support for treatment adherence.

In Australia, an estimated 50,000 individuals are incarcerated each year, with a HCV viraemic prevalence of 25% (12,500 with chronic HCV). As the large majority of those with HCV have a history of recent injecting drug use (IDU), they represent a sizeable proportion of the estimated 38,000 people with recent IDU. Since March 2016, DAA therapy has been Government-subsidised in Australia, including access for prisoners. DAA treatment uptake has increased from an estimated 1,500 treated in 2016 to more than 2,000 treated in 2017. Strategies to further enhance HCV treatment uptake include point of care HCV RNA screening (particularly in remand prison settings), self-dispensing of DAA therapy in prison cells (rather than daily directly-supervised therapy at clinics), and enhanced resources for HCV assessment and treatment. The SToP-C study is an ongoing trial evaluating HCV treatment as prevention in four New South Wales prisons.
HCV diagnosis and treatment in general practices, community health centres, and pharmacies

**John Dillon**
University of Dundee, United Kingdom

*Corresponding author’s email: j.f.dillon@dundee.ac.uk*

This lecture will explore and describe the role of General practices, community health centres, and pharmacies in the context of an integrated diagnosis and treatment service delivering elimination of HCV within a geographical territory. The lecture will explore the applicability of such models of care across the developed world. First it will lay out what is needed to be known in terms of epidemiology and distribution of HCV infection to plan elimination in a region. The lecture will than describe the pathways of care that lead to diagnosis, treatment and cure for all of the HCV infected population but with particular emphasis on those people who inject drugs. Finally, we will present evidence on the success of these pathways from within the Tayside Region of Scotland and the progress toward elimination.
Clinical reality treatment landscape in Central and Eastern Europe

Marieta Simonova
Clinic of Gastroenterology, Department of Gastroenterology, HPB surgery and transplantology, Military Medical Academy, Sofia, Bulgaria

Corresponding author's email: simonova_m@yahoo.co.uk

The prevalence of HCV infection varies greatly among the countries in Central and Eastern Europe (CEE) from 0.4% to 4.1%, making it the third most affected by HCV region in the world (1). There are two main routes of HCV transmission in the region - iatrogenic transmission and injection drug use. Over the last 30 years iatrogenic transmission diminished substantially and injection drug use has become the major driving force behind the HCV endemic in all countries. There are substantial differences in treatment reality landscape between EU and non-EU countries in CEE. In all EU countries there are at least two DAAs regimes that are reimbursed by the National Health systems. 50% of the countries have four of the registered DAAs regimes reimbursed. PegIFN/RBV is still a treatment option in a few EU countries, but rarely used for GT3 and mild disease patients. In every country restrictions towards DAAs reimbursement exist in regards of: level of fibrosis, drug and alcohol consumption, budget restrictions and health insurance. However, there are a positive trend of increasing the number of treated patients every year in all countries. Never the less, the available data are showing, that still in majority of EU countries the diagnostic and treatment levels are low. In the majority of the countries the diagnostic levels are around 20% and only a few countries report diagnostic levels up to 50% (2). Treatment levels are below 5% in all countries (2). In non-EU countries in CEE the main treatment regime, reimbursed by the National Health systems is still PegIFN/RBV. DAAs are reimbursed in only 4 counties, but restricted to small number of patients. In all CEE countries treatment is prescribed by specialists (gastroenterologist or/and infection disease specialist).

In CEE DAA treatment is available and reimbursed in all EU countries, but still not in every non-EU country. Diagnostic and treatment rates in the region are low and need to be scaled up. Conducting epidemiological studies on HCV national prevalence are necessary in the majority of CEE countries in order to have estimation on HCV disease spread. Adequate data on HCV disease burden are precondition for estimation and allocation of adequate resources for HCV prevention and treatment in order WHO 2030 goal to be reached.

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MPP model to scale up access to generic medicines with special focus on LMICs

Ludmila Maistat
Medicines Patent Pool, Geneva, Switzerland

Corresponding author’s email: lmaistat@medicinespatentpool.org

Access for affordable and quality assured medicines is crucial for all countries, and in particular, for resource limited settings. The Medicines Patent Pool increases access and promotes innovation in the field of treatment of viral hepatitis, HIV and tuberculosis through voluntary licensing and patent pooling. Founded in 2010 by Unitaid, MPP works with a range of partners – industry, civil society, international organizations, patient groups and governments – to prioritize and license new and existing medicines for low- and middle-income countries. The lecture will provide an overview of MPP’s model and progress in expanding access for treating viral hepatitis C in developing countries.
The role of patient's associations

Tatjana Reic
European Liver Patients’ Association (ELPA), Brussels, Belgium

Corresponding author's email: elpa-president@elpa.eu

"Awareness is the greatest agent for change" - Alan Watts

Viral hepatitis isn’t just a health issue, it affects various parts of our society and its elimination can only come about by collaboration between the government, civil society, nongovernmental organizations and WHO.

Role of patient organisations have traditionally been those of a support and advice to patients, but their activities are constantly developing and evolving. Through shared experiences and knowledge patients groups became not only the linchpin of care but a trusted source of information about the disease itself (Hep-CORE study).

Even though the world organizations have only recently expressed their alarm about the burden of viral hepatitis, patient's warnings has been voiced for decades already. According to the 2017 WHO World Hepatitis Report: "The response is still at an early phase in most countries, which limits the reliability and scope of available data. At the same time, some countries have taken groundbreaking actions to combat the epidemic, with results that bring encouragement everywhere."

In order to eliminate this global problem countries need to develop national plans and to include civil society in that process as advocates making sure that the right change happens. Over the years the associations have monitored trends in patient satisfaction and opinion; promoted the voice of the patient, fought for public recognition of different diseases thru websites, emails, social media and organizing events around important disease topic (important for patients). That is why today they form strong network of collected knowledge and experience that is essential for a speedy goal of viral hepatitis elimination.
How far are we from reaching the WHO targets for HCV elimination: The Australian Experience

Gregory Dore
The Kirby Institute, UNSW Sydney, Sydney, Australia

Corresponding author’s email: gdore@kirby.unsw.edu.au

Australia has been considered as one of the countries “on-track” for achieving WHO hepatitis C virus (HCV) elimination targets. Key features that have underpinned HCV elimination efforts in Australia have been: 1) National HCV Strategic development: currently in 4th National Hepatitis C Strategy (1st Strategy from 2000), developed through partnerships between Government, clinical, academic, and civil society stakeholders; 2) Broad implementation of harm reduction strategies for people who inject drugs (since early 1990s); 3) High levels of HCV screening facilitated by HCV education for primary care and addiction medicine physicians (since early 2000s), a National HCV Testing Policy, and free HCV testing; and 4) Government-funded direct-acting antiviral (DAA) therapy access program launched in March 2016. Key features of the DAA program include Government risk-sharing arrangement with the pharmaceutical companies with capped annual expenditure but no cap on number of treated patients; minimal out-of-pocket cost for patients; no restrictions based on liver disease stage or drug/alcohol use; prescribing authorization for all registered medical practitioners; and retreatment allowed (including for reinfections). Overall DAA uptake has been high (n=43,360 patients treated in the first 16 months, equivalent to 19% of chronic HCV population), and evidence suggests high uptake among people who inject drugs (around 20% in 2016). However, enhanced efforts are required to continue the momentum, including further community HCV awareness campaigns, continued development of diverse models of care and broad prescriber involvement, and maintenance of high-coverage harm-reduction services. An HCV elimination monitoring and evaluation plan is in progress to inform further strategies required to achieve HCV elimination targets.
The contribution from the industry: Perspectives from Gilead Sciences Inc.

**Gregg H. Alton**
Gilead Sciences, Inc., Foster City, United States

**Corresponding author’s email:** gregg.alton@gilead.com

Gilead Sciences, Inc. is a research-based biotechnology company that focuses on the discovery, development and commercialization of medicines in areas of unmet medical need. Gilead is a pioneer in HIV therapies; we were the first company to develop a once-daily, single tablet regimen (STR) that targets multiple mechanisms of HIV viral replication. Building on our model of innovative drug discovery in HIV, we embarked in 2003 on a research and discovery program to develop an STR that can cure hepatitis C virus (HCV). Ledipasvir (an NS5A inhibitor), velpatasvir (an NS5A inhibitor) and voxilaprevir (a protease inhibitor) are three compounds developed by Gilead scientists. Combinations of these compounds together with sofosbuvir (an NS5B polymerase inhibitor) result in high cure rates (>90%) within 12 weeks across all HCV genotypes. However, it is not enough to discover, develop and commercialize medicines without ensuring global access. The majority of the 71 million people living with HCV reside in resource-limited settings. Given the high burden of HCV in low income and low-middle income countries in Africa and Asia, we developed a model to increase access to essential medicines. Through this model that focuses on tiered pricing and generic licensing, nearly 1 million people with HCV are receiving a Gilead-branded or generic regimen in the developing world. Gilead also supports health systems strengthening initiatives around the world through public-private partnerships and corporate giving. We have embarked on several notable partnerships including with the government of Georgia and The Cherokee Nation, as well as supporting several Phase III/IV programs that promote the implementation science needed for HCV elimination. In summary, Gilead actively supports the efforts of governments and partners with professional organizations, patient advocacy groups, payers and healthcare professionals who have declared their intention and commitment to work toward the WHO goal of elimination of HCV by 2030.
The UK experience

Graham R. Foster
Professor of Hepatology QMUL, Barts Liver Centre, United Kingdom

Corresponding author’s email: g.r.foster@qmul.ac.uk

The UK is committed to eliminating hepatitis C in line with the WHO goals. The National Health Service, with universal policies and standards that reduce iatrogenic transmission and encourage needle exchange and easy access to methadone, has led to a low prevalence of infection, with around 0.3-0.4% of the population infected. The four different countries that make up the UK all have devolved health services and hence slightly different approaches are followed in the regions. Here I will concentrate on the procedures used in England, but similar policies are in place in Scotland, Wales and Northern Ireland.

The NHS England Hepatitis C strategy has focused on establishing treatment infrastructure and managing patients with more advanced disease in the first instance. Regional networks (Operational Delivery Networks) with clinical leadership have been established nationwide and each network is encouraged to establish local priorities for treatment. The networks have a quota of patients to be treated and receive incentive payments for meeting their targets. During the first two years the focus has been on treating patients with cirrhosis and the proportion of treated patients with cirrhosis has already fallen from 40% to under 20%, with an associated ~10% reduction in deaths from hepatitis C. To manage the costs of treating patients NHSE negotiates substantial discounts on medication and clinicians are required to use the lowest acquisition cost treatment, unless there are clinical contraindications. This approach has led to substantial falls in drug prices.

The reduction in patients with cirrhosis has led to a change in approach within the hepatitis C networks and the regions are now increasingly focused on case finding and engagement in therapy. NHSE follows an evidence-based approach with innovations undergoing efficacy assessments before being introduced. A major trial of over 90,000 immigrants in primary care has evaluated different models of testing and engagement and shown that targeted case-finding is likely to be highly cost effective. Studies in people who inject drugs have identified approaches (chiefly on-site therapy with peer support) that improve engagement and trials in MSM populations and the homeless are under way to identify the most appropriate way to manage these different cohorts. To help manage patients previously diagnosed with hepatitis C a national look back exercise has been initiated to ensure that all patients previously tested for hepatitis C are contacted and informed about the treatment options.

Over the next 5 years NHSE hopes to treat over 20,000 patients a year to allow the cohort of 100,000 English patients to receive effective treatment. We intend to partner with the pharmaceutical industry to adopt new, innovative approaches to engagement and case finding with the aim of eliminating hepatitis C in the next few years.
State-of-the-Art lecture
HCV: the rise and fall of a virus

Antonio Craxì
University of Palermo, Palermo, Italy

Corresponding author's email: antonio.craxi@unipa.it

Hepatitis C virus (HCV), which currently infects more than 1% of the world’s population, has been one of the most important viral epidemics of the twentieth century, along with HIV-1 and Ebola. Reliable epidemiological information until the discovery of the infectious agent is not available. Since acute HCV infection has non-specific and mild symptoms and chronic infection is asymptomatic until advanced liver disease develops, evidence in the pre-1989 period shows only that during the second half of the twentieth century occurrence of acute hepatitis could not be attributed to hepatitis A virus or hepatitis B virus was common among recipient of blood transfusions, particularly among those who received pooled or commercial plasma. At the time, it was unclear whether a state of chronic infection could exist, but the common sequela of chronically abnormal liver tests and transmission to chimpanzees even years after acute infection established a sound belief in chronic "non-A non-B hepatitis". When the disease-causing agent was identified in 1989 as HCV, an enveloped single-stranded positive-sense RNA virus classified in the family Flaviviridae by Houghton’s group, and reliable diagnostic tests for infection and viral replication were established, it became apparent that HCV was the cause of most cases of acute post-transfusion hepatitis and of a sizable proportion of chronic hepatitis, cirrhosis, and hepatocellular carcinoma, but could also be found in patients with normal liver tests. HCV is a highly divergent group of viruses classified in 7 major genotypes and a great number of subtypes, and circulating in infected individuals as a continuously evolving quasispecies destined to escape host immune responses and antivirals with a modest barrier to resistance. Despite the inability to culture patient viruses directly in the laboratory, efforts to define the infectious genome of HCV resulted in development of experimental recombinant in vivo and in vitro systems, including replicons and infectious cultures in human hepatoma cell lines.

Studies using phylogenetic, molecular clock and coalescent methods revealed a long and complex history of transmission that began substantially before the twentieth century. HCV genotype 1 diversity was already high in different areas of the world by the mid-twentieth century, suggesting estimates for the likely time of entry of the virus dating to the first half of the century. It is conceivable that HCV, originally present in the general community as sporadic cases and maintained mostly by traditional procedures, gained a widespread diffusion and a major relevance in terms of disease burden in a first phase due to the use of blood-tainted medical equipment and then to IVDA and unsafe sexual practices. In the Global Hepatitis Report, WHO estimates that in 2015 roughly 71 million people worldwide were living with HCV infection, accounting for 1% of the population, and that about 2.3 million persons with HIV had also HCV infection. This epidemiological picture accounts for HCV as the cause of more than 400,000 deaths, increased by 22% since 2000, most of them related to the development of life-threatening complications like cirrhosis (about 280,000 deaths) and hepatocellular carcinoma (HCC) (about 120,000 deaths), and projected to increase if no treatment will be provided. HCV infection is unevenly distributed throughout the world, with European and Eastern Mediterranean regions being at higher prevalence with some variations across and within countries. The Eastern Mediterranean Region has the highest estimated prevalence (2.3%) followed by the European Region (1.5%), the African Region (1%), and the South-East Asian Region, Western Pacific Region and Region of Americas, the latter with an estimated prevalence ranging from 0.5% to 0.7%. In some areas the prevalence is even higher: this is the case of central Asian countries like Mongolia, Uzbekistan and Georgia with an estimated HCV prevalence of 6.4%, 4.3% and 4.2%, respectively; or of African countries like Egypt and Gabon with a HCV prevalence of about 6.3% and 7%, respectively. When looking at Europe, Italy,
Romania, Spain, Germany, France, UK, Poland, Greece and Bulgaria account for more than 80% of all European HCV infections, with Romania and Latvia being the countries at higher prevalence (2.5% and 2.2%, respectively).

Ironically, HCV found a possible cure even before its positive identification, when in 1986 J. Hoofnagle reported the possibility to normalize aminotransferases and improve histology in patients with chronic non-A non-B hepatitis with alfa-interferon. IFN-based regimens, which could obtain HCV clearance in up to 50% of patients but were applicable only to a relatively small proportion of those infected due to tolerability issues, remained in use up to 2014, when the landscape and the perspective of hepatitis C virus (HCV) treatment was dramatically changed by the transition to strategies targeting viral proteins with a key role in HCV replication – HCV protease, NSSa, HCV polymerase. The optimal profile of safety and effectiveness of short regimens (8 to 24 weeks) of direct antiviral agents (DAA) has been shown in clinical trials and universally confirmed in real-life cohorts. DAA-based therapies are applicable to patients with HCV infection across the wide spectrum of liver damage from mild disease to decompensated cirrhosis. Older age, presence of comorbidities and co-medications do not contraindicate treatment and do not affect in most instances the achievement of a sustained virological response (SVR), even if drug-drug interactions and kidney function may drive the choice of regimen in the individual patients. DAA regimens have moved the scenario from the treatment of a high selected population of “not-too-sick” patients eligible to IFN-based therapies to a (potentially) generalized treatment of all infected persons. Consistently, the 69th World Health Assembly endorsed the Global Health Sector Strategy for Viral Hepatitis, with the final goal of eliminating viral hepatitis as a major public health threat by 2030. Elimination of a disease lies in the reduction of the disease prevalence in a regional population to zero, or the reduction of the global prevalence to a negligible amount. Along this line, WHO assumed as targets for 2030 to diagnose 90% of patients chronically infected by a hepatitis virus, to treat 80% of eligible infected subjects, and as a consequence to achieve an 80% reduction of new HCV viral hepatitis infections, and a 65% reduction in HCV liver-related deaths.

Notwithstanding the extreme effectiveness of DAAs, worldwide control of HCV will most likely require the development of a prophylactic vaccine, and numerous candidates have been pursued. Research characterizing features critical for antibody-based virus neutralization and T cell based virus elimination from infected cells is essential for this effort. If the world community promotes an ambitious approach by applying third-wave DAA broadly and invests in the development of a vaccine, it will be possible to eradicate HCV and prevent at least 400,000 deaths each year.
HCV reinfection following successful DAA therapy

Patrick Ingiliz
Zentrum für Infektiologie Berlin-Prenzlauer Berg, Center for Infectiology, Berlin, Germany

Corresponding author’s email: p_ingiliz@web.de

The hepatitis C virus (HCV) infection follows blood-borne transmission patterns and consecutively the highest risk for infection lies within medical procedures, needle exchange (for illicit drug use or tattoos), or to a lesser extent, sexual contacts.

In the industrialized world, transmission through blood products or surgical interventions has been successfully diminished since the discovery of HCV in 1989. However, the burden is particularly high in subpopulations that engage in behaviour at high risk for HCV acquisition: People who inject drugs (PWID) and HIV-positive men who have sex with men (MSM). In the latter, HCV is considered a sexually-transmissible disease and seems to be associated to intravenous and non-intravenous illicit drug use and consecutive high-risk sexual behaviour (“Chemsex”).

A successfully treated or immunologically cleared HCV infection leads to an insufficient innate or acquired immune response which does not protect entirely from reinfection with HCV. Consequently, HCV reinfections have been described in the interferon era in PWID and HIV-infected MSM. Since 2014, several direct-acting antiviral agents (DAA) have been licensed and are available for HCV treatment in many countries. These treatments are highly effective, well tolerated, and allow therapy initiations in classically difficult-to-treat populations. Increased treatment rates with DAAAs, however, in populations with a high prevalence and ongoing risk behaviour may lead to an increased number in reinfections within these populations. The published data on HCV reinfections in the DAA era is scarce, but several reinfections have been reported from follow-up periods from DAA phase 2 or 3 trials. However, in the German real-world GECCO cohort, the overall reinfection incidence was 2.8/100 person-years (py), but only 1.8/100py and 14.3/100py in MSM. The numbers in MSM seen here have nearly doubled compared to those seen in the interferon era.

In conclusion, high HCV reinfection rates will probably be seen in specific populations with high treatment rates and ongoing risk behaviour. If this phenomenon is capable to hamper elimination goals is unclear. However, care providers, patients representatives and policy makers need to be aware of this and implement this in prevention strategies.
Harm Reduction and drug user health

Dagmar Hedrich
European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), Lisbon, Portugal

Corresponding author’s email: dagmar.hedrich@emcdda.europa.eu

As part of the global Sustainable Development Goals, EU countries have agreed to achieve the ambitious goal of eliminating viral hepatitis as a major public health threat by 2030. The EMCDDA is the EU specialised agency that monitors the drug situation and the response in the European countries. In the EU, most studies among people who use drugs show that HCV antibodies are prevalent among more than 50% and up to 80% of this group. Those who inject drugs or have done so in the past may represent the majority of HCV disease burden in Europe. Globally, WHO estimates that 23% of new infections in 2015 could be attributable to injection drug use.

The established monitoring system of the agency contains robust and meaningful datasets that can contribute to monitoring the implementation of the regional Action Plan as part of a wider EU indicator framework. In addition, specialist networks maintained by the EMCDDA allow rapid access to up-to-date information on policies, new trends in epidemiology as well as to first-hand information on intervention practices that are relevant to the health of drug users.

The EU and its agencies complement Member States’ actions towards the SDGs and support them to achieve the commitments of the regional Action Plan for the health sector response to viral hepatitis. In the framework of its mandate, the work of the EMCDDA is focussed on four elements, the current state of play of which will be described in the presentation:

- Element 1: consolidate estimates of size of PWID population (to contribute to improve estimates of national disease burden);
- Element 2: consolidate estimates of the prevalence of HCV among PWID;
- Element 3: monitor range and coverage of effective harm reduction interventions (2018: focus on testing in drug treatment facilities);
- Element 4: exchange models of good practice in viral hepatitis policies, harm reduction, prevention and care responses for people who inject drugs.

As specialist data provider on the population of people who inject drugs, the EMCDDA collaborates closely with WHO and ECDC within an integrated EU policy framework to support the EU countries’ response to viral hepatitis.
Chronic hepatitis C virus (HCV) infection is associated with several extrahepatic manifestations. These encompass mixed cryoglobulinemia and its sequelae (skin and visceral vasculitis, membranoproliferative glomerulonephritis, B-cell non-Hodgkin lymphoma), sicca syndrome, porphyria cutanea tarda, glucose metabolic alterations (from insulin resistance to overt type 2 diabetes), neurologic manifestations (cognitive dysfunction, fatigue, depression), cardiovascular disorders (atherosclerosis, myocardial dysfunction), rheumatoid arthritis and other autoimmune disorders, like autoimmune anemia and thrombocytopenia. Overall, these manifestations significantly contribute to the morbidity and mortality associated with HCV, and add to the total medical costs of HCV-related disease burden. The mechanisms underlying the extrahepatic pathologies associated with HCV infection are multifactorial, ranging from direct replication in extrahepatic organs, paracrine effects, or dysimmune reactions with local and/or systemic effects. Treatment with interferon alpha-based regimens has shown how sustained virological response (SVR) may lead to the clinical improvement of several extrahepatic manifestations of HCV. More recently, the advent of effective and safe direct-acting antivirals (DAAs) has facilitated the access to treatment of patients in whom interferon alpha was poorly tolerated if not outright contraindicated for fear of exacerbation of autoimmune reactions. SVR has been shown to improve the clinical and histological picture of cryoglobulinemia-associated vasculitis, and the renal dysfunction caused by membrana-proliferative glomerulonephritis. Insulin resistance incidence and level improve after viral eradication, and this leads to reduced incidence of type 2 diabetes during long-term follow-up, and reduced risk of developing hepatocellular carcinoma also among patients without advanced liver fibrosis. The occurrence of some complications of diabetes, such as ischemic stroke, acute coronaryopathy and nephropathy, is also diminished, with impact on mortality. Finally, also cognitive dysfunction and fatigue are ameliorated by viral clearance, with evident positive effects on the patients’ quality of life. Thus, clinically significant extrahepatic manifestations are a sufficient indication to antiviral therapy even in the absence of severe liver damage.
Real life study of qurevo in chronic kidney disease Egyptian patients infected with HCV genotype 4

Doaa Elwazzan¹, Abdelfattah Hanno², Marwa Ibrahim³, Nermeen Abdeen⁴
¹Tropical medicine department, Faculty of medicine, Alexandria University Egypt, Alexandria, Egypt , ²Alexandria University Egypt, Alexandria, Egypt , ³Faculty of medicine, tropical medicine, Alexandria, Egypt , ⁴Tropical medicine department, Faculty of medicine, Alexandria university, Alexandria, Egypt

Background and Aims: The availability of new direct acting antiviral drugs for HCV allow for treatment of HCV infection associated with renal impairment by interferon free regimens, but the choice of the suitable drug is important because some of these drugs can accumulate to a toxic level due to renal impairment. The aim of this work was to confirm the efficacy and safety of qurevo (ombitasvir/ paritaprevir/ ritonavir) and ribavirin in the treatment of HCV genotype 4 infected Egyptian patients with impaired renal functions.

Method: The study enrolled 50 HCV infected patients with impaired renal functions. Pre-treatment assessment included complete liver functions with calculation of Child-Pugh score (patients with Child A only were included), renal function tests with calculation of estimated glomerular filtration rate (eGFR), HCV RNA, complete blood picture (CBC) and ultrasound abdomen. The patients were given Qurevo two tablets daily, each tablet contains paritaprevir 150 mg/ombitasvir 25 mg/ ritonavir100 mg± ribavirin (the dose was decided according to the body weight, eGFR and heamoglobin level follow up during treatment) for 12 weeks. Patients were followed up during treatment by routine laboratory investigations, HCV RNA was done at end of treatment, 12 and 24 weeks post-treatment.

Results: According to eGFR; 15 (30%) patients had chronic kidney disease CKD stage 2 (eGFR 60-89 ml/min/1.73m2), 22 (44%) patients were CKD stage 3(eGFR 30-59 ml/min/1.73m2), two (4%) patients were CKD stage 4 (eGFR 15-29 ml/min/1.73m2) and 11 (22%) patients were on dialysis; CKD stage 5 (eGFR <15 ml/min/1.73m2). No serious side effects were detected during treatment except for pruritis and GIT disturbances which were detected in 12 (24%) , jaundice was found in 7 patients (14%), anemia was observed in 8 patients (16%), was noticed in 12 patients(24%), anaemia (haemoglobin <10 g/dl) which was found in eight (16%) patients, which necessitated stoppage of ribavirin in five (10%) patients ,and increase in the total serum bilirubin (>2 mg/dl) in seven (14%) patients. SVR was achieved in 48(96%) patients.

Conclusion: The use of qurevo (paritaprevir 150 mg/ombitasvir 25 mg/ ritonavir100 mg) ± ribavirin for 12 weeks provided high rate of sustained virological response among chronic HCV genotype 4 infected patients with renal impairment without serious side effects.
P01-02YI

The association between chronic hepatitis C virus infection and colon cancer: A population-based study

Nga Le Thi

Taipei Medical University, Taipei, Taiwan

Background and Aims: Hepatitis C virus (HCV) is the common cause of hepatocellular carcinoma (HCC), a leading cause of cancer-related deaths worldwide. Besides, chronic hepatitis C (CHC) was revealed to be associated with various extra-hepatic malignancies, albeit inconclusive. One previous epidemiological study with 233 HCV carriers and 446 controls was demonstrated the higher rate of colorectal adenoma in individuals with CHC than the controls. Taiwan, in which colon cancer colorectal cancer rate led the third highest cancer, has reported as among the highest in prevalence of HCV infection in Northeast Asia region. Hence, we conducted a nationwide case-control study to evaluate the association between CHC and colon cancer.

Method: Applying the exclusion criteria of participants having HIV positive, missing age and gender-related information, we identified 71,103 colon cancer subjects, and 71,103 non-colon cancer controls matched for sex, age randomly selected from the Taiwan National Health Insurance claims data between 2000 and 2011. The socio-demographic characteristics, HCV, colon cancer status were collected based on the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes. Pearson’s chi-square test was used to compare the distributions of socio-demographic factors. The multivariate logistic regression was used to estimate the odds ratios (ORs) and 95% confidence intervals (CIs) to explore the association between colon cancer and CHC. Stratification by age and sex to evaluate sex- and age-specific risks of colon cancer.

Results: The proportion of colon cancer was higher in male than female (55.2% & 44.8%), increased in ages over 50 years old. Overall, patients with CHC had higher risk of colon cancer than non-CHC carriers (OR 1.11, 95% CI 1.02-1.20). Stratification by age and sex, it was revealed that middle aged male subjects (55-64 years old) infected with CHC had more risk of presenting with colon cancer (OR 1.13, 95% CI 1.01-1.70) than their controls. However, in females, the risk of colorectal cancer was increased in the older group (65-74 years old) (OR 1.24, 95% CI 1.01-1.53).

Conclusion: Chronic hepatitis C infection was significantly associated with colon cancer. Women with CHC were likely having the colon cancer later than males.
P01-03YI

High prevalence of hepatitis C virus among certified blood donors in general hospitals in general hospitals, Oyo state, Nigeria

Adeolu Oluremi¹, Oluyinka Opaleye², Olubisi Ajala³, Solomon Idowu⁴
¹Ladoke Akintola University of Technology, College of Health Sciences, Ogbomoso, Nigeria, ²Ladoke Akintola University of Technology, Osogbo, Nigeria, ³Ladoke Akintola University of Technology, Osogbo, Nigeria, ⁴Adeoyo Maternity Teaching Hospital, Ibadan

Background and Aims: Hepatitis C virus (HCV) infection is a major emerging infectious disease and of public health challenge in Nigeria. Four out of five people with Hepatitis C positive individuals developed hepatitis chronicity resulting into cirrhosis, hepatocellular carcinoma and liver related mortality worldwide. Contact with blood and its products are major mode of transmission. Blood transfusion is a major way treating anemia patients due to accident, prolonged laboring and infections. In Nigeria, almost every centers use immunochromotography (ICT), a rapid screening kit to test for HCV antibody, this study therefore aimed to determine the prevalence of HCV antibody among certified blood donors visiting General Hospitals, Oyo State, Nigeria using enzyme linked immunosorbent assay (ELISA).

Method: Ethical approval was sought from Ministry of Health, Oyo State, Nigeria. Informed consent questionnaire was used to fetch demographic information and risk factors. It is a cross sectional study in which 1738 certified blood donors participated. During donation, 5ml of blood was obtained from each certified blood donors; serum was separated and stored at -20 °C till time of test. The presence of HCV antibodies in serum samples of the donors were detected using third generation enzyme linked immunosorbent assay (ELISA) (WKEA Med Supplies Corp, China). Serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels were measured using appropriate kit. Data were analyzed using packages within SPSS software and p ≤ 0.05 was considered significant.

Results: Of the 1738 certified blood donors, 51 (2.93%) were positive for HCV antibody. The study participants were made up of 1549 males and 189 female and their mean age was 28 years (22-38). The major significant risk factors for positive HCV antibody include: singleness (p = 0.046); age less than 25 years (p= 0.021); first time donors (p= 0008); studentship (p=0.003); commercial donors (p=0.028); previous hospitalization (p= 0.005); polygamy (p=0.041) and travelers (p=0.043). The mean baseline ALT and AST are 55IU/ L and 28IU/L respectively.

Conclusion: This study reported significantly high prevalence (2.93%) of HCV antibody among certified regular blood donors in Oyo State, Nigeria, therefore screening of blood donors with ELIZA kit is highly recommended in blood banks. Government should also have screening centres in all regions so that all blood to be transfused will be properly retested and fully certified.

Figure: Nil
Multicenter study on outcome of HCV elimination using LDV/SOF combination in Mongolian population

Lkhaasuren Nemekhbaatar¹, Baatarkhuu Oidov², Dorjderem Radnaa³, Sugargarid Ulziibayar³, Munkhtsetseg Sarandavaa³, Jargalsuren Palam⁴, Tserendolgor Davaadorj⁴, Enkhtuya Damba⁴, Badamsuren Dorjgotov⁵, Dulmaa N⁶, Amangul Jenskhan⁴, Choijamts Nagir⁴, Bat-Ulzii Saruul⁷, Ganbod Uugantsetseg⁷, Munkhbat Batmunkh¹, Amarsanaa Jazag⁴

¹Institute of Medical Sciences, Mongolia, Ulaanbaatar, Mongolia, ²Mongolian National University of Medical Sciences, Mongolia, ³Otoch Manramba Medical University, ⁴Mongolian Association for the Study of Liver Diseases (MASLD), ⁵Third General Hospital of Mongolia, ⁶Central Hospital of Darkhan Province, ⁷National Center of Communicable Diseases, Ulaanbaatar

Background and Aims: The incident of liver cancer in Mongolia generally caused by HBV and HCV, and it is 7 times higher than that of world average. HCV, the most prevalent cause of HCC in Mongolia, is number one public health issue. Mongolia is one of the first countries that registered Ledipasvir/Sofosbuvir (LDV/SOF) regimen from developing countries. By the support of Access program run by Gilead Sciences, USA, we started HCV treatment program from January 2016.

Method: We followed and evaluated treatment outcome of patients with HCV infection using combination of 90mg ledispavir/400mg sofosbuvir (manufactured by Gilead Science) in 937 treatment naïve and 83 treatment experienced patients. All patients were treated with LDV/SOF for 12 weeks and, their treatment was evaluated by quantitative HCV-RNA assays prior and W (week) 4 and W12 of treatment. Sustained virological response (SVR) after 12 weeks treatment was assessed. Virus genotype analysis using cDNA microarray, liver enzymes, CBC and drug related adverse events were assessed in every patient. The laboratory tests were conducted at National Center of Communicable Diseases, Happy Veritas Laboratories and other provinces’ health care center.

Results: We conducted largest ever (415/1020) HCV genotype (GT) distribution study in Mongolian chronic HCV patients. 96.6% (n=401) of assessed patients were GT1b; 0.7% (n=3) were GT2; 0.2% (n=1) were GT1a and b; 0.9% (n=4) were GT1b and 2; 0.5% (n=2) were GT1b and 6; 0.2% (n=1) were GT5 and 0.2% (n=1) were GT1b and 80k mutants respectively. 992/1020 (97.3%) patients achieved SVR12W, 28 (2.7%) patients who did not achieve SVR12W were all genotype 1b. Median ALT level significantly dropped during treatment from 95.5±84.1 IU/L to 27.2±18.6 IU/L and slightly increased by the end of treatment 42.9±17.4IU/L. Total of 39 adverse events were observed in 959/1020 patients (58.3%). Single adverse events were observed in 401/1020 (39.3%) whereas 2 and more events were observed in 194 (19%) patients respectively. Unreported adverse events such as partial facial palsy, AFP (alpha-fetoprotein) increase, melasma were observed.

Conclusion: We achieved 97.3% SVR12W for 3 months treatment with LDV/SOF this time. But viral relapse has to be determined repeatedly at weeks 24 and 48 post treatment. All viral relapses (n=14) and non-responders (n=14) were GT1 in our study. According to HCV genotype assessment, there was no difference in treatment outcomes between patients who had different genotypes. Genotype distribution of Mongolian patients confirmed the results of other smaller studies. HCV RNA clearance during treatment was no different than clinical trials, but the slight increase of ALT by the end of treatment was commonly observed. It might have happened due to rebound of immune reaction after clearance of HCV or a drug induced effect.
High rates of active undiagnosed hepatitis C in urban emergency department testing – a case for expansion of routine testing beyond traditional settings

Stacy Todd¹, Mark Hopkins¹, Roberto Vivancos², Mike Beadsworth³, Murad Ruf⁴, Anuradha Chawla³

¹Royal Liverpool University Hospital, Liverpool, United Kingdom, ²Public Health England, Liverpool, United Kingdom, ³Royal Liverpool University Hospital, Liverpool, ⁴Gilead Sciences, United Kingdom

Background and Aims: There is limited local epidemiological data on prevalence of active hepatitis C (HCV) infection across England. Around 250,000 people attend the Emergency Department (ED) of the Royal Liverpool University Hospital (RLUH) each year, including marginalised groups at increased risk of blood borne viruses (BBV) who may not regularly access healthcare. Yet no routine BBV testing is offered within the ED. We aimed to estimate the local prevalence of active BBV infection in adult ED attendees.

Method: We conducted an unlinked anonymous BBV seroprevalence survey through testing of residual biochemistry blood samples of unselected attendees aged 18-65 years to RLUH ED. Prevalence of previously diagnosed BBV in this cohort was estimated through hospital laboratory IT records. Samples were then irreversibly anonymised except for gender, age, and ethnicity. Sera were screened for Hepatitis B surface antigen (HBsAg), HCV antibody and HIV antigen/antibody. Positive results were confirmed using neutralisation, RNA and lineblot assays. Estimation of undiagnosed BBV in this population was made by subtracting previously diagnosed prevalence from survey diagnosed prevalence.

Results: 1,598 samples collected from unique patients between May and August 2017 were analysed. 46% of samples were from male patients. 75.8% samples belonged to white ethnicities, 1.7% Asian, 1.6% Black ethnic groups and 20.9% unknown. Overall active BBV prevalence was 3.2%. Prevalence of HCV-RNA, HBsAg, and HIV was 2.69%, 0.44% and 0.06% respectively. There were marked demographic patterns in HCV-RNA prevalence, peaking among 36-45 and 46-55 year age groups (5.59% and 4.68%), it was higher in males than females (4.63% and 1.04% respectively) and mostly from white ethnic background. Undiagnosed prevalence for active HCV, HBV and HIV infection was estimated at 0.94%, 0.13% and 0.06%.

Conclusion: We found a high overall and undiagnosed local HCV-RNA prevalence in ED attendees in our study, substantially higher than the estimated national average of 0.29%. 79% of infections were in the 36-55 year age group. In comparison HBV and HIV rates were in keeping with previous estimates. To achieve HCV elimination, novel testing and pathways to encourage engagement with care for marginalised populations must be developed.
Effect of hepatitis C virus infection on metabolic and cardiovascular risk profiles of patients with diabetes

Muhammad Nauman Arif Jadoon 1, M. Asif Shahzad 2, Mansoor Hussain 2, Nouman Arshad 1

1 Hull Royal Infirmary, Hull, United Kingdom, 2 Nishtar Medical College Hospital, Multan, Pakistan

Background and Aims: The aims of this study were to: 1. Determine the prevalence of Hepatitis C virus infection in diabetic patients. 2. Elucidate the presence of an association between diabetes and hepatitis by comparing prevalence in diabetics with controls. 3. Determine the effect of Hepatitis C virus infection on metabolic and cardiovascular risk profiles of diabetic patients.

Method: Five hundred and fifty diabetic patients attending diabetes clinic were enrolled in the study. Patients’ data was collected after taking consent. A control group comprising of 550 healthy blood donors who donated blood in blood bank of hospital during the study period were taken as controls. Hepatitis C virus antibody presence was checked using ELISA in both control and study group. Patients’ glycemic control was checked and lipid profile was analyzed. Blood pressure, body mass index (BMI) and waist-hip ratio (WHR) were measured. All the ethical requirements were met before starting the study.

Results: The age of patients was 47.58 years and the duration of diabetes was 7.02 years. Out of 550 patients included in study, 304 were female, 428 were from urban locality and 143 had a positive family history of diabetes mellitus. HCV infection was present in 160 (29.09%) diabetic patients as compared to control in whom prevalence was 8.18% (OR=4.60, 95% CI= 3.22–6.57, p<0.01). Patients with HCV infection had significantly lower total serum cholesterol, serum triglycerides, LDL cholesterol, LDL cholesterol/HDL cholesterol ratio and a lower waist to hip ratio as compared to diabetic patients without HCV infection. In contrast, they had significantly higher random blood sugar value. Furthermore, diabetic patients with HCV infection had insignificantly lower HDL cholesterol, fasting blood glucose and HbA1c level. They also had insignificantly higher systolic blood pressure diastolic blood pressure and BMI when compared with diabetic patients who tested negative for HCV infection.

Conclusion: The study shows that there is a possible association between HCV infection and diabetes. Although HCV infection is associated with high random blood sugar values, the remaining metabolic and cardiovascular risk indicators show a favorable pattern. It is an intriguing finding as HCV infection has been shown to induce insulin resistance.
P02-01YI

Risks of hepatitis B (HBV) virus and hepatitis C (HCV) viruses co-infection among HIV positive individuals visiting general hospitals in Nigeria

Adeolu Oluremi¹, Oluyinka Opaleye², Olusoga Ogbolu³, Olubisi Ajala⁴
¹Ladoke Akintola University of Technology, College of Health Sciences, Ogbornoso, Nigeria, ²Ladoke Akintola University of Technology, Osogbo, Nigeria, ³Ladoke Akintola University of Technology, Nigeria, ⁴Ladoke Akintola University of Technology, Osogbo, Nigeria

Background and Aims: Triple infection of Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are common due same route of transmission and can results in increased hepatic complications. This study aimed to evaluate the prevalence of HBV and HCV in HIV infected individuals on Highly Active Antiretroviral therapy (HAART) attending general hospitals in Oyo state, southwestern Nigeria.

Method: Ethical approval was obtained from Ministry of Health, Nigeria and data was fetched through an informed consent questionnaire. A total of 1529 HIV infected individuals participated in the study. Samples were tested for hepatitis B surface antigen (HBsAg) and anti-HCV antibodies by rapid assay and later confirmed with enzyme linked Immunosorbent assay (ELISA). Hepatitis B e antigen (HBeAg) and anti-HBe antibodies were tested on HBsAg positive samples. Quantification of HBVDNA was performed with quantitative real-time PCR. HBV-DNA and HCV-RNA were extracted from each sample and subjected to polymerase Chain reaction (PCR) using specific primers and PCR conditions. Each PCR products was then electrophoresed on 1.5% agarose gel. Data was analyzed using packages within SPSS software and p-values less than 0.05 was considered significant.

Results: Triple infection of HBV, HCV and HIV was seen in 45 (2.94%). Co-infection of HIV with of HBeAg and anti-HBe antibodies was seen in 177 (11.6%) and 544 (35.5%) respectively. Serum concentration of ALT and AST were higher in those with triple infection than those with co-infection. Average CD4 count in triple infection was 149cell/mm³ compare to 221cell/mm³ of those with co-infection. Averagely, the HBV viral load in triple infection was 65copies/ml compares to 84copies/ml in co-infection in the OBI samples. The mean average age is 32 years. Sexual promiscuity, blood transfusion history and multiple sex partners were significantly associated with triple infection (p=0.04; p=0.05 and p=0.049) respectively.

Conclusion: This study found high prevalence of triple infection and co-infection of HIV, HBV and HCV among study population which are mostly youth which is alarming; therefore HBV and HCV screening like viral load must be compulsory included in routine screening of HIV positive individuals in Nigeria. Also liver enzymes must be closely monitored in those with triple and co-infection.

Figure: Nil
Single agent DAA in HCV PCR positive liver transplant patients, experience from a developing country

Hafiz Abdul Basit Siddiqui1, Rabeea Azmat1, Wasim Jafri1
1Aga Khan University Hospital, Karachi, Pakistan

Background and Aims: Chronic hepatitis C (CHC) is the leading cause of decompensated liver disease and liver transplant indication in Pakistan which is the third most prevalent country with a prevalence of 3.5% to 5.2%. Being the seventh most populous country of the world, lacking significantly on medical grounds reflected by only one liver transplant centre for more than 10 million chronically affected liver disease patients. Before the era of directly acting antiviral agents (DAAs) most common problem faced in the post liver transplant period was recurrence of HCV and most of the patients were non responder to interferon therapy well before the transplantation of liver graft.

Method: This cross sectional analysis was carried out in CHC infected post liver transplant patients with high viremia. The effect of DAAs were noted in the form of eradication of virus and achievement of sustained virological response (SVR). DAAs used, were also recorded. Also to note the interaction with immunosuppresants and development of side effects notably derangement of liver function tests or failure of graft and anemia. And to note the development of acute kidney injury or any other untoward effect.

Results: During study period of 24 months, from January 2015 to December 2016, 51 HCV positive post liver transplant patients were enrolled in the study. 26 (52%) out of 51 found to have active viral replication with positive PCR. All 26 received combination of Sofosbuvir (only DAA available till December 2016 in Pakistan) and Ribavirin. Achievement of viral eradication was 100% so was for SVR. There was no interaction with immunosuppresants. Most commonly reported side effect was fatigue and a feeling of nausea. Kidney and liver function tests remained normal. Contrary to recent data, there was no recurrence of hepatocellular carcinoma (HCC) in patients who received liver graft for HCC on background of CHC cirrhosis

Conclusion: Directly acting antiviral therapy has revolutionized outcomes of HCV infected post liver transplant patients in a country lacking modern and advanced health care system. Even the single agent therapy has done wonders for the economically less privileged.
Life quality assessment of the chronic hepatitis C patients treated with direct acting antivirals

Sümeyye Kaya Cseke¹, Merve Demiröz¹, Melek Ertas¹, Kübra Saka¹, Merve Şekerçoğlu¹, Oğuzhan Kesen², Haluk Tarık Kanlı², Aysê Sakalli Kanlı², Osman Cavit Özdoğan²

¹Marmara University Faculty of Medicine, Istanbul, Turkey, ²Marmara University Pendik Training and Research Hospital, Istanbul, Turkey

Background and Aims: Hepatitis C differs from the other chronic diseases by affecting the life quality and having the depression tendency. Direct acting antiviral (DAA) agents that have been used since 5 years with highly effective response rates; however life quality and psychological status of these patients after DAA treatments are not investigated appropriately. The aim of this study is to evaluate the effects of DAA's on life quality, social relations and depression status of HCV patients at the end and 3 months after the treatment.

Method: Forty out of the 137 patients who are followed in the Marmara University School of Medicine Gastroenterology Clinics, diagnosed with cirrhotic or non-cirrhotic HCV patients, treated with DAA were assessed by SF-36 (Short Form-36 Health Survey) for life quality status and HAD (Hospital Anxiety Depression) Survey for depression/anxiety status at the beginning of the 12 weeks treatment (basal), at the end of the treatment (3rd month) and 12 weeks after the end of treatment (6th month). Moreover, biochemical laboratory results of the patients were collected from their files and analysed. All the collected data is assessed by ANOVA test in the SPSS 21.0 software.

Results: Participants consist of % 60 (n=24) women and %40 (n=16) men. Their age groups are 50 years old and younger which constitutes 15%, between 51 and 64 years old which constitutes 47,5% and 65 years old and older which constitutes 37,5% of all participants. When the basal, 3rd month and 6th month biochemical laboratory data of the participants are compared to each other, a significant decrease is detected in the liver enzyme levels (p<0,05). HCV RNA becomes negative in all patients except two of them. When the patients are evaluated by HAD scale in the basal, 3rd month and 6th month, their anxiety status are determined as %30 (n=12), %15 (n=6), %20 (n=8) respectively and a significant decrease is determined between basal and 3rd month. (p=0,028) Their depression status are determined as %40 (n=16), %30 (n=12), %22,5 (n=9) respectively and a significant decrease is determined between basal and 6th month. (p=0,004). When the SF-36 survey is evaluated by comparing 6th month to basal, a significant improvement are shown at the social functioning (p=0,015) and role limitations due to emotional problem (p=0,036) scales.

Conclusion: Direct acting antiviral therapy is well-tolerated with 95% of HCV patients have sustained response rate. At the end of the treatment and after 3 months, depression levels of the patients decreased significantly with improvements of their social and emotional life quality. It can be suggested that these favourable effects in psychological and social status were related to both the treatment of a chronic disease and cessation HCV direct effects on the patients’ emotional factors.
P02-04

Cost-effectiveness analysis of direct-acting antivirals for patients with chronic hepatitis C from global health perspectives: a systematic review

Hyun Phil Shin¹, Xibei Liu², Ji Yoo
¹Kyung Hee University College of Medicine, Seoul, Korea, Rep. of South ; ²University of Arizona College of Medicine, Tucson, United States

Background and Aims: Cost-effectiveness analysis (CEA) of hepatitis C virus (HCV) treatment with direct-acting antivirals (DAAs) was introduced since 2012. However, little is known about systematical review of CEAs in DAA therapy from global health perspectives. We aim to synthesize all available CEA studies and globally suggest striving towards the elimination of HCV infection.

Method: We conducted a systematic review of the PubMed and EMBASE databases for cost-effectiveness of DAAs versus previous standard-of-care or no treatment. We restricted analysis original studies in English from their inception up to November 5, 2017. Figure 1 presents the study selection process in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.

Results: Our search yielded 389 studies. After two-step screening, 66 unique studies were included. Figure 2 presents study specification by countries; 83% (55/66) studies from the Organisation for Economic Co-Operation and Development (OECD); 35% (23/66) studies from United States; 38% (25/66) studies from European OECD countries; 17% (11/66) studies from non-OECD countries; 64% (43/66) studies used payer’s perspectives; 62% (41/66) studies evaluated sofosbuvir-based therapy; 71% (47/66) studies used both naïve and experienced treatment; 59% (39/66) studies included multiple genotypes 1 and other; 8% (5/66) studies evaluated liver transplant waitlist patients.

Conclusion: CEA of DAA therapy in chronic HCV treatment was mainly conducted in the OECD countries using payer’s perspectives. Further CEA should be more highlighted on non-OECD countries by societal perspectives that can put forward to identify the most affordable ways in DAA coverage.
ABSTRACTS
Striving towards the elimination of HCV infection
02-03 February 2018, Berlin, Germany
Health-economic evaluation of different organizational models to manage the hepatitis C patient journey

Stefano Fagioli, Luisa Pasulo1, Franco Maggiolo1, Rosaria Spinella2, Paolo Del Poggio3, Roberto Boldizzoni4, Mariella Di Marco5, Alessandro Aronica6, Chiara Benedetti7, Paolo Correale7, Chiara Garavaglia7, Carlo Nicora8

1ASST Papa Giovanni XXIII, Bergamo, Italy, 2Istituti Ospedalieri Bergamaschi, Ponte San Pietro, Italy, 3Istituti Ospedalieri Bergamaschi, Zingonia, Italy, 4ASST Bergamo Ovest, Treviglio, Italy, 5ASST Bergamo EST, Seriate, Italy, 6Tefen Management Consulting, Milan, Italy, 7Tefen Management Consulting, Milano, Italy, 8ASST Papa Giovanni XXIII, Bergamo, Italy

Background and Aims: Directly Acting Antivirals (DAAs) transformed Hepatitis C (HCV) treatment, by contributing to the elimination of the disease. Access to DAAs in Italy was initially constrained to more severe patients. As of mid-2017, the Italian Medicines Agency expanded access to DAAs to all HCV patients, to achieve the elimination by 2030. Treatment capacity of the healthcare system is pivotal for 2030 elimination. The study objective is to investigate different hospitals' organizational models in terms of their treatment capacity.

Method: The study compares two models: Centralized Model (CM), where only few Centres of Excellence (CoE) in a region prescribe and deliver new DAAs, and Hub&Spoke (H&S) model, where the Hub (CoE) prescribes and delivers DAAs, while Spokes (smaller hospitals) can only prescribe them. Patient journey and workloads were mapped and quantified through interviews with hospital stakeholders. Healthcare cost data were collected through the hospital's IT system; the sample comprised 2,278 HCV mono-infected patients, treated or deferred over one year (Jun2015–Jun2016). The comparison of the two models highlighted how to optimize the patient journey while managing a larger number of HCV patients.

Results: The study estimated that average costs to treat HCV patients are comparable between H&S and CM (€1,479 vs. €1,470 per patient). Key cost drivers are lab tests (60%), 75% of which related to devices, and specialist visits (30%). Over one year, the H&S model is able to treat 68% more patients than the CM. As it was observed that deferred patients absorb up to 40% of total healthcare costs, two key improvements have been identified to optimize the H&S, creating “optimized H&S model”:

- Reduction of the number of specialists’ visits, during diagnosis and treatment, due to less severe patients being on waiting lists;
- Involvement of General Practitioners (GPs) during follow-up of treated patients without comorbidities / side-effects.

These two organizational levers accelerate depletion in waiting lists and reduce management costs of the deferred patients by 72% vs the CM (Figure 1).

Conclusion: The study demonstrates the importance of a hospital’s organizational model in achieving 2030 HCV elimination as efficiently as possible.
**Figure:** Organizational models comparison

<table>
<thead>
<tr>
<th>Organizational Model</th>
<th>Time to Waiting list depletion (years)</th>
<th>% vs. Centralized</th>
<th>Healthcare Costs for management of deferred patients (€)</th>
<th>% vs. Centralized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized</td>
<td>8.7</td>
<td></td>
<td>3.2M</td>
<td></td>
</tr>
<tr>
<td>Hub&amp;Spoke</td>
<td>4.5</td>
<td>-50%</td>
<td>1.4M</td>
<td>-56%</td>
</tr>
<tr>
<td>Optimized Hub&amp;Spoke</td>
<td>2.9</td>
<td>-66%</td>
<td>0.9M</td>
<td>-72%</td>
</tr>
</tbody>
</table>
The association between chronic hepatitis C infection and colon cancer: a nationwide case-control study

Nga Le Thi¹, Su Fu-Hsiung²
¹Taipei Medical University, Taipei, Taiwan, ²School of Medicine, Fu Jen Catholic University, New Taipei, Taiwan

Background and Aims: Hepatitis C virus (HCV) is the common cause of hepatocellular carcinoma (HCC), a leading cause of cancer-related deaths worldwide. Besides, chronic hepatitis C (CHC) was revealed to be associated with various extra-hepatic malignancies, albeit inconclusive. One previous epidemiological study with 233 HCV carriers and 446 controls was demonstrated the higher rate of colorectal adenoma in individuals with CHC than the controls. Taiwan, in which colon cancer colorectal cancer rate led the third highest cancer, has reported as among the highest in prevalence of HCV infection in Northeast Asia region. Hence, we conducted a nationwide case-control study to evaluate the association between colon cancer and CHC.

Method: Applying, the exclusion criteria of participants having HIV positive, missing age and gender-related information, we identified 71,103 colon cancer subjects, and 71,103 non-colon cancer controls matched for sex, age randomly selected from the Taiwan National Health Insurance claims data between 2000 and 2011. The socio-demographic characteristics, HCV, colon cancer status were collected based on the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes. Pearson’s chi-square test was used to compare the distributions of socio-demographic factors. The multivariate logistic regression was used to estimate the odds ratios (ORs) and 95% confidence intervals (CIs) to explore the association between colon cancer and CHC. Sex- and age-specific risks of colon cancer for CHC were evaluated by stratification.

Results: The proportion of colon cancer was higher in male than female (55.2% & 44.8%), increased in ages over 50 years old. Overall, patients with CHC had higher risk of colon cancer than non-CHC carriers (OR 1.11, 95% CI 1.02-1.20). Stratification by age and sex, it was revealed that middle aged male subjects (55-64 years old) infected with CHC had more risk of presenting with colon cancer (OR 1.13, 95% CI 1.01-1.70) than their controls. However, in females, the risk of colorectal cancer was increased in the older group (65-74 years old) (OR 1.24, 95% CI 1.01-1.53).

Conclusion: Chronic hepatitis C infection was significantly associated with colon cancer. Women with CHC were likely having the colon cancer later than males.
Interventions to improve testing, linkage to care and treatment of hepatitis C virus (HCV) infection among people in prisons: a systematic review

Nadine Kronfl¹, Blake Linthwaite¹, Giada Sebastiani¹, Mathieu Maheu-Giroux², Marina B. Klein¹, Bertrand Lebouche¹, Eric Latimer², Joseph Cox¹

¹McGill University Health Centre - Glen Site, Montréal, Canada, ²McGill University, Montréal, Canada

Background and Aims: While the burden of chronic hepatitis C virus (HCV) infection is significantly higher among people in prisons compared to the general population, testing and treatment uptake remain suboptimal. The aim of this systematic review was to evaluate interventions to enhance HCV testing, linkage to care and treatment uptake among people in prisons, a key population for HCV elimination.

Method: We searched Medline and Embase for English language articles published between January 2007 and November 2017. Studies evaluating interventions to enhance HCV testing, linkage to care and treatment uptake for people in prison were included. Two independent reviewers evaluated articles selected for full-text review and extracted data for analysis. Disagreements were resolved by consensus.

Results: A total of 472 unique articles were identified, 29 were retrieved for full text review and eight were included (Figure). The majority of studies focused on testing in prison settings; one study was dedicated to linkage and one to treatment uptake. Only two were randomized controlled trials (RCTs); the remainder were primarily single arm uncontrolled trials. Interventions to enhance HCV testing in prison settings included universal opt-out screening, combination risk-based and birth cohort screening strategies, on-site nurse-led opt-in screening clinics with pre-test counseling and education, and systematic dried blood spot (DBS) testing. All increased HCV testing, albeit risk for bias was high. Only DBS interventions were evaluated using RCTs; one study showed increased HCV testing by 14.5% while the other showed no effect. Interventions to enhance linkage to care included facilitated referral for HCV assessment and scheduling of specialist appointments. Interventions to enhance HCV treatment uptake included distance-learning programs and consultations for on-site primary care providers via telemedicine. While demonstrating positive effects on linkage and treatment uptake, risk of bias was high. All but two studies were conducted in the pre-direct-acting antiviral (DAA) era; no studies were conducted in low- or middle-income countries.

Conclusion: While the majority of studies have focused on improving access to HCV testing in the interferon era, rigorous controlled studies evaluating interventions to improve testing, linkage and treatment uptake in the DAA era are necessary. With the introduction of short-course, well-tolerated DAAAs, ensuring timely continuity of care from diagnosis to treatment for people in prison will be crucial to eliminating HCV.
Figure:

Study selection process

Records identified through database searching (n=715)

Records screened after removing duplicates (n=472)

Records excluded based on title (n=392)

Abstracts screened (n=80)

Abstracts excluded (n=51)
- No intervention (n=34)
- Not relevant (n=9)
- No data on outcomes (n=5)
- Not prison population (n=2)
- Not available (n=1)

Full-text articles assessed for eligibility (n=29)

Full-text articles excluded (n=21)
- No comparator (n=15)
- No intervention (n=2)
- Not relevant (n=2)
- No data on outcomes (n=2)

Studies included for analysis (n=8)
A tool to measure the impact of inaction towards elimination of hepatitis C virus: a case study in Germany

Markus Cornberg¹, Yuri Sanchez², Andreas Pangerl², Homie Razavi³
¹Hannover Medical School, Hannover, Germany, ²AbbVie Inc., North Chicago, United States, ³Center for Disease Analysis, Louisville, United States

Background and Aims: Chronic infection with hepatitis C virus (HCV) and its sequelae presents a significant source of economic and societal burden. Introduction of highly effective curative therapies has made elimination of HCV attainable. Our study aimed to develop a predictive model scalable at national, regional or local level to assess the clinical and economic impact of implementing screening and treatment policies towards HCV elimination, using Germany as a case study.

Method: A Markov disease progression model of HCV infection was developed to analyse the clinical and economic impact of delaying diagnosis and treatment of HCV using modules that quantified the disease burden and medical costs associated with CHC (chronic hepatitis C) and its sequelae. The model was built using national-level inputs, but the modelled population was scalable to support decision-making on a regional or treatment-facility level as well. In this analysis, the model compared the clinical outcomes of the national status quo in Germany of 13,125 treatments and 4,371 newly diagnosed HCV-infected cases annually, starting in 2017 to 1) a scenario that met WHO’s diagnosis, incidence, and mortality targets for elimination of HCV by 2030, and 2) a scenario of delaying these interventions by two years. Modelled historical incidence of HCV was calibrated to match the reported prevalence of antibodies against HCV (0.5% in 2012) by sex and age group. Elimination scenario required 17,983 treatments and 9,811 newly diagnosed cases annually, starting in 2018, to reach the 2030 targets.

Results: Compared to base case, elimination would avert 9,995 incident cases of HCV, 1,219 cases of decompensated cirrhosis (DCC), 1,587 cases of hepatocellular carcinoma (HCC), 289 liver transplantations (LTs), and 1,329 liver-related deaths (LRDs) over the 2017–2030 period. Delaying treatment and diagnosis interventions for elimination until 2020 would avert 6,418 incident cases, 925 cases of DCC, 1,190 cases of HCC, 224 LTs, and 1,004 LRDs versus base case.

Conclusion: The Markov model is a tool to visualize the impact of screening and treatment interventions and track their progress towards WHO targets. In this example for Germany, HCV elimination would avert a significant portion of incident cases, as well as new cases of end-stage liver disease (ESLD) and LRDs due to HCV. Postponing this intervention by just two years would fail to avert over 3,500 new HCV infections, nearly 700 cases of ESLD, 65 liver transplantations, and 325 LRDs by 2030.
Figure:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Base case</th>
<th>Elimination</th>
<th>Delay of elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total new cases, 2017–2030</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incident cases of HCV</td>
<td>54,911</td>
<td>44,916</td>
<td>48,493</td>
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<tr>
<td>New cases of DCC</td>
<td>2,200</td>
<td>981</td>
<td>1,276</td>
</tr>
<tr>
<td>New cases of HCC</td>
<td>3,008</td>
<td>1,421</td>
<td>1,818</td>
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<tr>
<td>Liver transplantsations</td>
<td>479</td>
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<td>254</td>
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<tr>
<td>Liver-related deaths</td>
<td>2,479</td>
<td>1,150</td>
<td>1,475</td>
</tr>
</tbody>
</table>

HCV — hepatitis C virus; DCC — decompensated cirrhosis; HCC — hepatocellular carcinoma
P03-04

HCV & HEV: Two players in one Egyptian village, a study of prevalence and incidence

Mohammed Elhendawy¹, Abdel-Raouf Abou-Elazm¹, Abdelrahman Kobtan¹, Lobna Abou-Ali¹, Maha Hagras², Ibrahim Kabbash³, Loai Mansour¹, Sherief Atia⁴, Ferial El-Kalla¹
¹Tanta University, Tropical Medicine and Infectious Diseases Department, Tanta, Egypt, ²Tanta University, Clinical Pathology Department, ³Tanta University, Public health department, ⁴Kafr Elsheikh liver institute,

Background and Aims: Egypt has the highest HCV prevalence in the world which is the leading cause of chronic liver disease and hepatocellular carcinoma in Egypt. A high prevalence of antibodies to hepatitis E virus has been reported in developing countries. Some studies have reported a high prevalence of HEV antibodies in patients with chronic liver disease.

The Aim of the work was to study the prevalence of HCV infection among inhabitants of an Egyptian village in the Nile delta region and to evaluate the association between anti-HEV infection and chronic liver disease.

Method: This cross sectional study included 2085 inhabitants of Nagreej village, Basyoun, Gharbia Governorate; a small Egyptian village. Mass HCV screening was performed for the residents with random sampling for HEV detection. Follow up of the HCV –ve population was performed after one year to estimate the incidence of new infections.

Results: The overall prevalence of positivity for HCV antibody in serum was 25.9% (542 persons) with 505 patients had +ve HCV RNA PCR while 37 persons had –ve PCR. Prevalence rates increased with age and the male gender. The risk factors of acquiring viral infection, reported in the patients’ past history revealed parenteral therapy for Schistosomiasis by tarter emetic injection to be at the top of the list; followed by blood transfusion. Random sampling for HEV IgM and IgG prevalence was performed. HEV was positive in 30/60 with chronic HCV (50%), 72/75 cirrhotics (96%), 72/75 with HCC (96%), and in 33/60 control subjects (55%). The age and sex of the studied groups were matched. HEV IgM was -ve in all studied populations. These results indicate that there is a possible association between HEV infection and advanced stages of chronic liver disease.

After one year, 29 from 1543 HCV –ve population turned to HCV +ve which mean that the new incidence of HCV infection is 1.87%.

Conclusion: Egypt still has a high prevalence of HCV infection mainly in the older populations. Egyptian patients with cirrhosis and HCC have a significantly higher seroprevalence of anti-HEV compared to healthy individuals from the same geographical area. HCV-HEV coinfection may worsen the prognosis of Egyptian chronic hepatic patients. The role and association of anti-HEV with advanced stages of chronic liver disease, remain to be determined. The new incidence of HCV infection in a small village is 1.87% and further studies are needed to estimate the new incidence allover Egypt.
Integrating HCV screening and linkage to care of baby boomers at community hospital emergency department

Sung Kwon¹, Kyung Hee Choi¹, Angelica Mercado¹, Emma Yamada¹, Adam Jarrett¹
¹Holy Name Medical Center, Teaneck, United States

Background and Aims: Approximately 3.5 million Americans are infected with hepatitis C virus (HCV) and persons born from 1945 through 1965 (i.e., baby boomers) account for nearly three-fourths of all HCV infections. Latest guidelines from the Centers for Disease Control and Prevention recommend that all baby boomers be screened for HCV at least once. The purpose of this study was to implement HCV screening for baby boomers presenting to a community hospital emergency department (ED) and to facilitate linkage to care (LTC).

Method: In a community-based facility with around 50,000 ED visits per year, we developed a process within our electronic medical record (EMR) system to screen patients for HCV testing eligibility, link eligible patients to laboratory orders, notify patients of HCV test results (via patient navigator), and track follow-up care while minimizing interruptions to work flow in the ED. We tracked our performance from February 2016 to January 2017. Racial and ethnic compositions as well as self-awareness of the patients’ infection LTC rates of all participants were evaluated.

Results: An integrated EMR process determined eligible patients upon ED registration based on their date of birth and no prior HCV screening. The EMR then prepopulated a lab order and alerted staff to notify patient. If a patient declined then the staff must click declination to de-populate the lab order. Those who were tested positive for HCV antibody was reflexively tested for HCV RNA. We found 12,335 eligible patients and 5,069 patients underwent HCV testing (41%). Testing rates were lowest during the hours when project navigators were absent. Of those tested, 202 (4.0%) had a positive HCV antibody test and 74 were HCV RNA positive patients (1.5%) demonstrating that only 37% of HCV antibody positive individuals were chronically infected. Initially only 17.6% of patients were ultimately linked to care. After the implementation of patient navigation support, LTC rate improved to over 65%.

Conclusion: There is a need for HCV screening protocol in the community. The cost of implementing an HCV screening program must include information technology and team of care coordinators to improve screening rates and facilitate linkage to continual care.
Figure:

Automated flow for HCV testing with verbal notification of HCV test

- Registration
  - Pretest Info
  - Patients sign 'Consent to Care' form

- EHR
  - Determines eligible patients and populates the order form
  - Alerts the staff

- Triage
  - Notification and Written documentation of decline

- MD
  - Physician reviews and orders

- Blood Draw
  - Phlebotomy
  - Samples sent to Lab

- Lab
  - All the results under hepatitis C category
  - Data analyst will retrieve all data from EHR
Program of HCV elimination in Italy on HIV/HCV co-infected population of ICONA network by 2020

Ilaria Mastrorosa1, Alessandro Cozzi-Lepri2, Alessandro Tavelli3, Cristina Mussini4, Antonella Castagna5, Sergio Lo Caputo6, Francesca Ceccherini Silberstein7, Carlo Federico Perno8, Enrico Girardi1, Massimo Puoti9, Andrea Antinori1, Antonella D’arminio Monforte10

1National Institute for Infectious Diseases, IRCCS, Lazzaro Spallanzani, Rome, 2Institute for Global Health, 3Icona Foundation, 4AOU di Modena, University of Modena Reggio Emilia, Modena, 5San Raffaele Scientific Institute, University Vita-Salute San Raffaele, Milano, Italy, 6University Hospital Policlinico, University of Bari, Bari, 7University of Rome Tor Vergata, 8University of Milan, Milano, Italy, 9ASST GOM Niguarda, Milano, Italy, 10ASST Santi Paolo and Carlo, University of Milan, Milano

Background and Aims: Up to 2.3 million persons are HIV/HCV co-infected by 2015 and eliminating viral hepatitis is a public health target by 2030 (WHO Hepatitis Report 2017). Now that curative treatment options for HCV are available (Direct Acting Antivirals Agents - DAA), a few major barriers to HCV elimination can be identified: unawareness of HCV infection, absence of a convenient cascade of care, lack of universal access to DAA, incidence of new/re-infection especially in specific at risk populations. In Italy, from December 2014 DAA were reimbursed only for higher fibrosis stage, but since March 2017 DAA treatment is available without restrictions. Whether the increasing rate of access and response to DAA may impact on the prevalence and incidence of HCV infection and if counselling and patients’ (pts) commitment will improve treatment success and prevention of new/re-infections, need to be evaluated. The main aim of this program, is to obtain HCV elimination in the HIV/HCV co-infected population in Italy over a 3-year period.

Method: Pts from ICONA Network (50 clinical sites across Italy) will be included. All HIV-infected pts will be tested for HCVAb in a 6 months screening period. Those who will result to be HCVAb- and HCV-RNA- positive will be included in a staging program and treated with available DAA until exhaustion. Yearly test and clinic visit will be guaranteed for all the other pts, including those who achieve HCV cure, in order to promptly detect new/re-infections (Figure). All study participants will also receive a counselling program through background information leaflets delivering sexual health-related information and harm reduction advice.

Expected Results: By May 31, 2017, a total of 17,724 pts are enrolled in ICONA cohort. For the purpose of this elimination program, we aim to involve approximately 96,000 HIV individuals in follow up at the ICONA Network sites, of whom 15% are estimated to be already HIV/HCV co-infected. In our report on the first 606 cases, Sustained Virological Response was of 92% [d’Arminio et al., PlosOne 2017]. By the end of the year 3, we expect that: i) at least 90% of HIV/HCV positive pts in the ICONA Network will be treated, ii) 95% of the treated population will achieve HCV cure, iii) the rate of new/re-infections will be halved compared to that recorded in the previous decade (0.6%) [Puoti et al., CMI 2017].

Conclusion: Increasing awareness of HCV infection through screening, expanding access to curative drugs and providing education programs to prevent transmission, must be combined in an effective HCV eradication strategy.
ABSTRACTS
Striving towards the elimination of HCV infection
02-03 February 2018, Berlin, Germany

Figure:
Flow chart of the 3-year program

* If tested in the previous 3 months, not to re-test
* Blood tests, transient elastography, HCV genotype (if not available in the past year)
P04-01

8 weeks of sofosbuvir/velpatasvir in GT3 patient’s with significant fibrosis: high SVR rates irrespective of opioid substitution therapy status

Alison Boyle¹, Fiona Marra¹, Erica Peters¹, Stephen Barclay²
¹Gartnavel General Hospital, Glasgow, United Kingdom, ²Glasgow Royal Infirmary, Glasgow, United Kingdom

Background and Aims: 12 weeks of Sofosbuvir/Velpatasvir (SOF/VEL) is highly effective against genotype 3 (GT3) hepatitis C. A phase 2 trial reported high SVR rates amongst treatment naïve non cirrhotic patients, treated with 8 weeks of SOF/VEL (SVR12 98.1% (52/53)). In order to upscale treatment and achieve elimination of HCV, shorter treatments are desirable and must be effective in cohorts of people who use drugs (PWUDs). In our addictions teams, PWUDs still injecting/in the early stages of recovery are typically prescribed opioid substitution therapy (OST) as directly observed therapy (DOT). This allows for direct acting antivirals to be co-administered as DOT. Working with a fixed budget for HCV therapy, we elected to treat eligible (F2/3) patients with 8 weeks of SOF/VEL, to maximise the number of patients cured. Here we report baseline characteristics and SVR rates according to whether treatment was administered as DOT.

Method: By local treatment protocol, treatment naïve patients with F2 or F3 fibrosis (LSM >6.9kPa & <9.5kPa, ≥9.5kPa & <12.5kPa respectively), were eligible for treatment with 8 weeks of SOF/VEL. Such patients, commencing treatment before August 2017 were identified from the Scottish HCV database, and baseline data on age, gender, liver stiffness measurement (LSM) and virological response were obtained. HCV RNA was measured using the Abbot realtime assay, with a lower limit of quantification 12IU/ml. DAA dispensing data (DOT vs non DOT) was obtained from pharmacy prescription records.

Results: 56 patients (43 (76.8%) male, mean age 45.7 (± 8.0)) started an 8 week SOF/VEL regimen, prior to August 2017. Median LSM was 8.5 kPa (IQR 2.1). LSM was in keeping with F2 fibrosis in 41 (73%), and F3 in 15 (27%). Median baseline viral load was 5.62 log IU/ml (IQR 1.64), with 25 (44.6%) > 800,000 IU/ml. 21 (37.5%) received treatment as DOT. To date 35/37 (94.6%) of patients have achieved SVR. 1 DOT patient had low level viraemia at SVR12 in the context of ongoing injecting, with a subsequent negative PCR, suggesting re-infection with spontaneous clearance (intention to treat (ITT) DOT SVR 11/12 (91.2%)). 1 non DOT patient discontinued treatment at week 4 and did not achieve SVR (non DOT ITT SVR 24/25 (96%). Modified ITT SVR, excluding re-infection and non compliance, was 35/35 (100%). Further SVR data will be presented.

Conclusion: 8 weeks of SOF/VEL is highly effective in GT3 infected patients with significant fibrosis. Patients on daily supervised methadone have excellent SVR rates when SOF/VEL is administered as directly observed therapy. Widespread adoption of 8 week treatment would reduce drug acquisition costs, and increase clinic treatment capacity, without sacrificing SVR.
P04-02YI

On-treatment HCV RNA monitoring is not a cost-effective means of identifying non-adherence and has no predictive value

Shirin Demma¹, William Rosenberg², Douglas Macdonald²
¹Royal Free London NHS Foundation Trust, London, United Kingdom, ²Institute of Liver and Digestive Health, United Kingdom

Background and Aims: The high cost of directly-acting antiviral (DAA) treatment for HCV means local guidelines often mandate frequent HCV RNA testing on treatment to detect non-adherence or allow early-termination of treatment in on-treatment relapse. It is unclear whether this monitoring is sensitive or cost-effective for this purpose. An HCV RNA increase of >1log from an on-treatment nadir may indicate either non-adherence or viral breakthrough. We aimed to determine the frequency of this event in a retrospective cohort study of patients treated with DAA. We also examined whether slow responses to treatment (HCV RNA quantifiable at week 2) were more common in patients with advanced disease and if this predicted relapse.

Method: We analysed viral loads, disease stage, HIV status, treatment experience, liver transplant status and outcome in 547 patients who underwent baseline and on-treatment testing on at least 3 occasions during treatment (total 3957 HCV RNA tests) between May 2014 and June 2016 at the Royal Free London NHS Trust).

Results: 4 patients had a viral load increase >1 log from an on-treatment nadir all of which occurred at week 8. One of these was suspected to be non-adherent and with close supervision achieved a full response at end of treatment and sustained virological response (SVR) at week 12(Figure A). 3 had on-treatment relapses despite adequate adherence. Compared with a control group of non-cirrhotic patients, proportions of patients with a quantifiable HCV RNA at day 10-20 were greater in patients with decompensated (62% vs 47%, p =0.0279 two-tailed χ² test) and compensated cirrhosis (63% vs 47%, p = 0.002). HIV, transplant and treatment experience status had no significant impact on viral load at week 2 independently of disease stage. Across the whole cohort, those with a positive viral load at Week 2 (or any time point thereafter) did not have a significantly higher likelihood of relapse (Figure B).

Conclusion: We estimate the cost of on-treatment viral load monitoring in this cohort to be €231,000. Only one patient was identified with poor adherence by this means. On-treatment relapses were all identified after dispensing their final 4 weeks of treatment. On-treatment HCV RNA monitoring is not a cost-effective or cost-saving method of identifying nonadherence or on-treatment breakthrough respectively and has no predictive value with regard to treatment outcome.

Figure:
A. 
B. 

[Graphs and figures mentioned in the text]
Modelling sustainable HCV elimination strategies among people who inject drugs

**Ilias Gountas¹, Vana Sypsa¹, Sarah Blach², Homie Razavi³, Angelos Hatzakis⁴**

¹Department of Hygiene, Epidemiology & Medical Statistics, Athens University Medical School, Athens, Greece, Athens, Greece, ²CDA Foundation, Lafayette, United States, ³Center for Disease Analysis, Louisville, United States, ⁴Athens Medical School, Athens, Greece

**Background and Aims:** Elimination of hepatitis C virus (HCV) among people who inject drugs (PWID) is a costly investment, so strategies should not only focus on eliminating the disease, but also on preventing disease resurgence. The aims of the study are to compute the minimum necessary antiviral therapies to achieve HCV elimination with/without additional expansion of harm reduction (HR) coverage and to examine the sustainability of HCV elimination after 2030, if treatment is discontinued.

**Method:** We considered two types of epidemic (low (30%) / high (50%) proportion of PWID who engage in sharing equipment (sharers)) within two baseline chronic HCV (CHC) prevalence settings (45% / 60%), assuming a baseline HR coverage of 40%. We define sustainable elimination strategies, those that could maintain eliminations results for a decade (2031-2040), in the absence of additional antiviral therapy.

**Results:** The necessary treatment rate to achieve HCV elimination under 45% CHC prevalence setting without expanding HR coverage, would be 4.5% (95% CrI: 4.3-4.8%) and 5.4% (5.1-5.6%) under settings with high or low proportion of sharers, respectively. Similarly under 60% CHC prevalence with high or low proportion of sharers, the needed treatments rate would be 8.1% (7.8-8.3%) and 11.5% (11.1-11.7%), respectively. Increasing HR coverage to 70% reduces the required treatment rate by 0.6-1.3% and 1.4-2.2% under 45% or 60% CHC prevalence, respectively.

In settings with baseline CHC prevalence ≤45%, antiviral treatment and HR of 70% could sufficiently prevented disease rebound after 2030 regardless of the structure of the epidemic. Under high prevalence setting, HR is capable of preventing disease resurgences only under medium prevalence of risk behaviors. In settings where CHC prevalence and risk behaviors are both high, counseling interventions need to be implemented in addition to previous interventions, to prevent the disease from rebounding.

**Conclusion:** Harm reduction strategies have a vital role in HCV elimination strategy, as it reduces the required treatments to eliminate HCV and provides sustainability after the elimination. In high prevalence and risk settings, HR should be intensified by counseling interventions in order to prevent the disease resurgence. The above underlines that HCV elimination strategies should be built upon the existing HR services, and argue for HR expansion in countries without services.
Figure: Predictions for 60% CHC prevalence with 30% sharers
Interim evaluation and projected impact of the hepatitis C virus elimination program in Georgia

Josephine Walker¹, Lia Gvinjilia², Muazzam Nasrullah³, Amiran Gamkrelidze⁴, Juliette Morgan⁵, Peter Vickerman¹
¹University of Bristol, United Kingdom, ²CDC Foundation, Tbilisi, Georgia, ³CDC, United States, ⁴National Center for Disease Control and Public Health, Tbilisi, Georgia, ⁵CDC, Tbilisi, Georgia

Background and Aims: Georgia has one of the highest hepatitis C virus (HCV) prevalence rates in the world, with >5% of the adult population (~150,000 people) chronically infected. In April 2015, the Georgian government and international partners launched a national program to eliminate HCV through scaling up HCV prevention and treatment interventions, with the aim of achieving a 90% reduction in prevalence by 2020. We evaluate the impact of the HCV treatment program so far and assess the feasibility of achieving the elimination goal by 2020.

Method: We developed a dynamic HCV transmission model that aims to capture the current and historical epidemic dynamics of HCV in Georgia, including the main drivers of transmission. Using the 2015 national sero-survey and PWID surveys from 1997-2015, the model was calibrated to data on HCV prevalence by age, gender and PWID status, and the age distribution of PWID. We use the model to project the interim impact of intervention strategies currently being undertaken as part of the ongoing Georgia HCV elimination program, in order to determine whether they are on track to achieving their HCV elimination targets by 2020 or whether strategies need to be modified to ensure success.

Results: A treatment rate of 2,000 patients/month was required from the start of the national program to achieve 90% reduction in prevalence by the end of 2020, with equal rates of treatment for PWID and the general population. From April 2015 to September 2017, 39,396 patients were treated, or an average of ~1,300 per month, with 1,000 per month over the last few months. The treatments given already have reduced adult chronic prevalence by 21% (15-29%) to 4.0%, reduced total incidence by 19% (13-27%), prevented 1457 (802 – 2563) new infections, and prevented 80 (27-140) HCV-related deaths. If this treatment rate continues, prevalence will reach a 50% reduction by 2020. In order to reach a 90% reduction in the same time frame, the treatment rate must be quadrupled to approximately 4,000 per month (Figure).

Conclusion: The Georgia HCV elimination program has accomplished an impressive scale up of treatment, which has already had an impact on prevalence and incidence, and averted deaths due to HCV. However, treatment initiation has fallen short of the target and extensive scale up will be needed to achieve a 90% reduction by 2020.
Figure:
P04-05YI

The cost-effectiveness of needle and syringe provision in preventing transmission of hepatitis C virus in the era of highly effective HCV treatment

Zoe Ward¹, Sedona Sweeney², Lucy Platt², Matthew Hickman¹, Peter Vickerman¹
¹University of Bristol, United Kingdom, ²London School of Hygiene & Tropical Medicine, United Kingdom

Background and Aims: Over 80% of Hepatitis C virus (HCV) infections in the United Kingdom (UK) are acquired by people who inject drugs (PWID). Needle and syringe programmes (NSP) are a major component of most harm reduction strategies and a recent Cochrane systematic review has shown high coverage needle and syringe provision (HCNSP defined as obtaining more than one sterile needle and syringe per injection reported) can halve the risk of HCV acquisition amongst PWID. This study evaluated the impact and cost-effectiveness of current levels of NSPs in preventing HCV transmission in the UK and determined the cost-effectiveness of HCNSP when HCV treatment is scaled up to reach the World Health Organization (WHO) target of reducing HCV incidence by 90% by 2030.

Method: Three UK settings with different HCV antibody prevalence were described using a dynamic transmission model: Bristol (60%), Dundee (46%) and Walsall (32%). The model estimated the prevention benefits achieved by the status quo scenario (HCNSP coverage Bristol 56%, Walsall 28%, Dundee 49%) from 2016 compared to a counterfactual scenario where the effectiveness of HCNSP on HCV transmission risk was removed for 10 years. A healthcare perspective was taken with the health benefits measured in quality adjusted life years (QALY). Costs and QALY’s were discounted at 3.5% over the 50-year time horizon. A willingness to pay (WTP) threshold of £20,000 per QALY was used for the incremental cost-effectiveness ratio (ICER) and a scenario analysis whereby direct acting antiviral HCV treatment numbers were increased to achieve the WHO elimination targets was carried out.

Results: Compared to removing NSP for 10 years, current HCNSP is associated with costs of £454,711 and 502 QALYs gained over 50 years in Bristol, cost savings of £972,074 and 195 QALYs in Dundee and costs of £398,592 and 192 QALYs in Walsall. The ICER was cost saving in Dundee and £906 and £2,076 per QALY in Bristol and Walsall respectively. Treatments per 1000 PWID need to be scaled up in Bristol (from 9 to 43) and Walsall (from 2 to 18) to reach the WHO elimination targets with no treatment scale up needed in Dundee. Scaling up treatments resulted in NSP being cost saving in Bristol and remaining cost-effective in Walsall with an ICER of £9330 per QALY.

Conclusion: NSPs are highly likely to be cost-effective at the £20,000 per QALY threshold, and could be cost saving in many settings. As HCV treatment is scaled up NSPs remain cost-effective.
A network based approach to hepatitis C treatment in people who inject drugs can prevent transmission - results of an individual based model in a real-world contact network

Ryan Buchanan¹, Rudabeh Meskarian¹, Leonie Grellier², Julie Parkes¹, Salim Khakoo¹
¹University of Southampton, Southampton, United Kingdom, ²St Mary's Hospital, Newport, United Kingdom

Background and Aims: In the UK the most common risk factor for Hepatitis C virus (HCV) is current or previous injecting drug use and modelling has indicated that the treatment of people who inject drugs (PWID) could lead to a faster reduction of viral prevalence. However, there is a lack of modelling data incorporating real-world risk relationships. In this study we describe the results of a model testing HCV treatment within an injecting network of PWID living in an isolated community on the Isle of Wight (UK).

Method: We recruited PWID to a social network survey via respondent driven sampling. Participants were asked to describe their social network with other PWID in triangulation matrices. These were then carefully combined to form a representation of their social network. The structure of this network was triangulated against a qualitative exploration, which included interviews with PWID and a focus group with drug support centre professionals.

We used the network in a discreet time stochastic HCV transmission model and explored the effectiveness of HCV treatment in three scenarios: 1. Treating at random, 2. Treating PWID with the most injecting partners first and 3. Treating the most socially well-connected PWID first.

Results: The social network survey described 179 PWID, the majority were male (70%) and the mean age was 38 years (SD 9.8). They were connected together into a cohesive network component via injecting partnerships. On average each PWID had 2.6 injecting partners (range 16 to 0). The cohesive structure of the network was supported by the qualitative findings. In a logistic regression being HCV positive was associated with a higher proportion of positive injecting partners 3.8 (95% 1.2-11.4, p=0.003) and increasing age (OR 1.061 (95%CI 1.014-1.11, p=0.011).

In the model over a 12-month period preferential treatment of well-connected PWID (via injecting and social relationships) led to significantly fewer new infections of HCV than treating at random (10 vs. 6, P<0.01 and 10 vs. 8, 0.011 respectively). In all treatment scenarios less than one treated individual was re-infected.

Conclusion: The results indicate that PWID in this isolated community are linked together in a dense network and the preferential treatment of well-connected individuals may be an effective treatment as prevention strategy for the elimination of HCV.
**Figure:** The injecting network, with isolated nodes excluded, sized according to *in-degree* centrality. Red nodes are HCV positive, blue nodes are HCV negative and white nodes have an undetermined HCV status. Lines indicate an injecting partnership between two nodes.
P05-01YI

Differences in presentation of hepatitis B and hepatitis C induced decompensated chronic liver disease and predictors of in-hospital mortality

Muhammad Nauman Arif Jadoon¹, Athesham Zafar¹, Aamir Ijaz¹
¹Hull Royal Infirmary, Hull, United Kingdom

Background and Aims: In Pakistan, prevalence of HBV is 2.6% and HCV is 5.3% with an overall decrease in incidence of HBV infection and an increase in HCV infection, however, the differences in their presentation and prognosis are not known.

Method: We conducted a prospective study on 325 patients who were admitted with a primary diagnosis of decompensated liver failure due to HBV or HCV at two major tertiary care hospitals. Statistical analysis was performed using SPSS version 20 and all values were considered significant at p<0.05.

Results: Patients with HCV had esophageal varices (34.07 %) confirmed by endoscopy whereas, none of the patients with HBV had esophageal varices p<0.002. HBV patients most frequently had grade 0 hepatic encephalopathy (HE) (46.67%) whereas, HCV patients had grade 3 HE (38.30%); p<0.005. Peripheral edema was found to be significant amongst patients with HBV and HCV; p<0.023. 12% patients died in hospital. Both the CP Class and MELD category had no relation with in-hospital mortality (p= 0.155, 0.259 respectively). Etiology of cirrhosis, presence of co-morbid conditions (diabetes and hypertension), thrombocytopenia, hyponatremia, hyperkalemia and raised blood urea levels were also not associated with in-hospital mortality. The only predictor of in-hospital death was raised serum creatinine (p= 0.001).

Conclusion: HCV causes a higher incidence of decompensated liver cirrhosis than HBV leading to liver failure. Major manifestations are neurological with a smaller portion being related to gastrointestinal tract and edema of extremities. Being able to detect these changes promptly can halt the progress of disease. Having a primary prevention program in place will help with the future burden of disease. Child-Pugh and MELD scores were not related to in-hospital death in our study. The only predictor of in-hospital death was raised serum creatinine.
A framework for designing and evaluating interventions to eliminate HCV in key HIV-coinfected populations in Canada

Charlotte Laniece¹, Mathieu Maheu-Giroux¹, Bertrand Lebouche², Joseph Cox¹, Nadine Kronfl³, Kim Engler², David Lessard², Marina B. Klein³

¹McGill University, Montreal, Canada, ²McGill University, Montreal, Canada, ³McGill University, Montreal, Canada

Background and Aims: HIV-HCV coinfection affects an estimated 25% of the 70,000 HIV-infected persons in Canada. Oral direct acting antivirals (DAAs) have increased cure rates in HIV-HCV coinfected patients previously considered difficult to treat. Curing HCV in all coinfected persons, leading to less disease burden and the elimination of new infections is now possible. Yet, data from the Canadian Coinfection Cohort (CCC) show that the rapid DAA scale-up has left several key populations behind: indigenous people, people who actively inject drugs (PWID), and women. Further, other groups such as men who have sex with men (MSM) have high reinfection rates. To reach the WHO targets for HCV elimination, group-specific tailored interventions need to be designed and evaluated before scale up. Here, we present a framework for designing and evaluating promising interventions to eliminate HCV in key HIV-coinfected populations in Canada.

Method: A sequential phased mixed-method approach will be used to design and evaluate evidence-based interventions. Our approach has three key aims (see figure). First, we will perform knowledge syntheses of HIV-HCV patients and providers’ perceived barriers and facilitators to HCV treatment and then engage these groups to assess perceived acceptability of potential interventions. Second, we will examine the potential impact of interventions identified in Aim 1 using dynamic mathematical models of HCV transmission in PWID, MSM, and indigenous communities. Third, we will pilot the most promising interventions identified in the models to increase HCV treatment rates and having the greatest potential to reduce HCV incidence and prevalence in key populations. We will use a difference-in-difference design to compare treatment uptake in intervention and control sites within the CCC.

Results: Our protocol, grounded in public health needs, is responsive to the differing contexts of priority groups and to their needs, thus maximizing potential for success, scalability, and generalizability to other practice settings.

Conclusion: Our proposed research framework will produce the essential evidence needed to generate public policy support and financing to broadly implement elimination strategies for coinfected patients in Canada. The knowledge gained from this study will help Canada to reach HCV elimination targets and reduce poor health outcomes and societal costs associated with HCV in HIV-infected persons.
Figure:

**AIM 1**
Characterize barriers and facilitators to HCV elimination in priority populations in Canada

Knowledge synthesis and stakeholder engagement to:
(1) Assess barriers and facilitators to DAA uptake and HCV elimination
(2) Identify relevant interventions

**AIM 2**
Model the impact of potential interventions on HCV transmission in specific subgroups

Dynamic mathematical models to:
(1) Estimate the impact of potential interventions on reducing HCV incidence and prevalence
(2) Inform intervention selection and design of the trials

**AIM 3**
Pilot the most promising elimination interventions in highest need population(s)

Quasi-experimental trials to provide evidence for:
(1) Reducing HCV incidence and prevalence
(2) Scaling up these interventions

Figure A. A Framework for designing and evaluating interventions to eliminate HCV in key HIV-coinfected populations in Canada
The sphere-C project - development of a standardized European protocol for hepatitis C prevalence surveys in the general population

Ida Sperle¹, Stine Nielsen², Martyna Gassowski¹, Erika Duffell³, Lara Tavoschi³, Andrew J Amato-Gauci³, Ruth Zimmermann¹
¹Robert Koch Institute, Berlin, Germany, ²Independent consultant, Madrid, Spain, ³European Centre for Disease Prevention and Control, Stockholm, Sweden

Background and Aims: Reliable and standardized estimates of hepatitis C virus (HCV) prevalence are needed to effectively plan and monitor responses. The heterogeneous methodology used in many surveys makes obtaining comparable prevalence estimates challenging. To address this, the European Centre for Disease Prevention and Control (ECDC) contracted the Robert Koch-Institute to help carry out the SPHERE-C project aiming at developing an evidence-based protocol for undertaking HCV prevalence surveys in the general population by June 2019, to support EU/EEA Member States in their efforts to generate robust estimates of HCV prevalence.

Method: The development of the protocol is based on a synthesis of evidence based methodologies, priorities of Member States identified through a survey and the outcomes of two consultations with international experts organised at ECDC (in December 2016 and September 2017). In 2018, the protocol will be piloted in three countries:
   o Finland: nested survey collection
   o Italy (not yet confirmed): residual samples
   o Bulgaria: stand-alone survey

Results: The protocol covers three different survey designs: 1) A nested survey design, where an HCV prevalence survey is nested in a larger health survey of the general population, e.g. a national health examination survey (HES); 2) A residual sera testing design, where specimens already collected are tested retrospectively for HCV; 3) A stand-alone survey, with the main aim to measure HCV prevalence. All designs rely on probability-based sampling (Figure 1). The protocol covers all key areas of survey planning, including specimen- and data collection, laboratory methods, ethical issues, quality control measures, data management and budgetary considerations. Some elements differ according to design, e.g. sampling is outlined in detail for the stand-alone survey, including possible sampling frames, sampling methods and sample size, which are already determined for the nested and residual designs.

Conclusion: The SPHERE-C protocol aims to contribute to better and more standardised HCV prevalence surveys. Lessons learned from the pilots will be incorporated in the final protocol and will contribute to understanding and addressing challenges with each of the designs. The protocol will be one part of a larger toolkit that ECDC is developing to support countries in their efforts to eliminate HCV.
Figure 1: Points to consider when planning a prevalence survey for hepatitis C in the general population

--- Text further elaborated on in protocol

*If necessary, to conduct a stand-alone survey, but there is lack of resources, alternative methods can be used. These include: samples from routine procedures e.g. from antenatal care screening, blood donor or pre-employment screening or residual samples collected for another purpose, (e.g. people visiting health care clinics). The final protocols will include an Annex with useful references as well as pros and cons for these alternative methods (currently under development).
Challenges in eligibility assessment for direct-acting antiviral therapy in patients with chronic hepatitis C

Andreea Ruxandra Cazan¹, Dutei Catalin², Husar-Sburlan Ioana², Balaban Vasile¹, Ciocirlan Maria¹, Barbu Mihaela², Balas Oana², Horeanga Boroka², Oprisanescu Denisa², Diculescu Mircea², Manuc Mircea²

¹“Carol Davila” University of Medicine and Pharmacy, Bucharest, ²Fundeni Clinical Institute of Gastroenterology and Hepatology, Bucharest

Background and Aims: With the introduction of direct acting antivirals in the therapeutic armamentarium of hepatitis C (HCV), policy makers have set criteria for treatment eligibility. In Romania, the combination of ombitasvir/paritaprevir/ritonavir and dasabuvir is reimbursed for F4 fibrosis on liver biopsy/Fibromax, or F3 with contraindication to interferon (IFN). Our aim was to assess treatment eligibility and discordance between serological, elastometric and imaging evaluation of fibrosis in a cohort of patients with HCV.

Method: We evaluated both newly diagnosed and previously known HCV patients with advanced fibrosis, from our database, during a period of 7 months, between November 1st, 2015 and May 31st, 2016. Clinical, biological, ultrasound, elastography and endoscopy data were collected.

Results: Altogether 146 patients were assessed for treatment eligibility. Among them, 61% were females, with a mean age of 60 ± 8 years. Regarding treatment status, 52.5 % were naive, 27.4% nonresponders, 17.81% relapers and 2.74 % intolerant to bitherapy. 54.8 % had elevated alpha-fetoprotein and were checked by advanced imaging for exclusion of hepatocellular carcinoma (HCC) – of them, 8 were diagnosed with HCC. On ultrasound, almost 1/2 patients had dilated splenoportal axis and at endoscopy 42% had esophageal varices. Transient elastography (Fibroscan) was done in 88/146 patients: 82.95% were F4, 1.14% F3-F4, 9.09% F3 and 6.82% <F3. 125/146 underwent biomarker evaluation of fibrosis: 78.4% were F4, 3.2% F3-F4, 11.2% F3 and 7.2% <F3; 1/5 patients had significant steatosis (S≥2). On discordance analysis of the fibrosis evaluation methods, 7 cases had low fibrosis on serum markers but advanced fibrosis on elastography; 4 of them were approved for treatment after considering additional evidence of portal hypertension, anteriority of severe fibrosis or comorbidities. In our cohort, 8/10 patients were eligible for treatment. All had genotype 1b, except for 2 patients (one G2 and the other G3) and the mean viremic load was 1812994 UI/ml. Reasons for ineligibility were: HCC (8/146), decompensation (9/146) and <F4 fibrosis without arguments for cirrhosis or contraindication for interferon treatment.

Conclusion: In our cohort, there was a high rate of patients meeting eligibility criteria. The great number of naive patients reflects a low acceptance rate for IFN-based therapy and late diagnosis of infection. There was little discordance between the noninvasive methods of fibrosis staging in our group.
Working towards eliminating HCV among men who have sex with men in Amsterdam using an innovative and multilevel approach: the MC free project

Tamara Prinsenberg1, Freke Zuure2,3, Paul Zantkuilj4, Udi Davidovich5,6, Wim Zuilhof4, Maria Prins5,6, Janke Schinkel7, Marc van der Valk8

1Amsterdam Institute for Global Health and Development, Amsterdam, Netherlands, 2Public Health Service of Amsterdam, Amsterdam, Netherlands, 3Academic Medical Centre (University of Amsterdam), 4STI AIDS Netherlands, 5Public Health Service of Amsterdam, 6Academic Medical Center (University of Amsterdam), Amsterdam, Netherlands, 7Academic Medical Centre (AMC), Amsterdam, 8Academic Medical Center (AMC), Amsterdam, Netherlands

Background and Aims: In the Netherlands, unlike in many other countries, current transmission of hepatitis C virus (HCV) occurs primarily among HIV-positive men who have sex with men (MSM) as HCV incidence dropped to nearly zero among people who inject drugs. Since 2000, there has been a substantial increase in acute HCV infections among HIV-infected MSM and re-infection rates are high. Early testing and treatment in combination with upscaling of preventive measures may curb the HCV epidemic among this population. Within the MC Free (Amsterdam MSM Hepatitis C Free) project we developed an innovative multilevel strategy aiming to reduce HCV incidence among MSM in Amsterdam.

Method: MC Free includes online and face-to-face interventions aimed to increase HCV awareness and promote risk reduction behavior and willingness to test. The project web-app at www.NoMoreC.nl offers information, videos and personalized advice on risk reduction and testing options, including a C-test service. C-test is a low-cost internet-guided home-based testing service for HCV-RNA using dried-blood-spots (home-collection testing involving a certified laboratory). This service allows MSM to test confidentially using a highly sensitive test for the detection of acute HCV infection. Test results are communicated via the project's website and online counseling will start immediately.

To help men reduce their risk for HCV (re)infection, owners of sex venues and organizers of sex parties are involved and given advice on how to create an enabling environment for risk reduction. We developed a ‘NoMoreC prevention toolbox’ containing samples of items that can be used to reduce risk of infection. They will be distributed through fetish shops, sex venues and health professionals. E-learning modules are developed to increase awareness and skills among health care professionals.

Results: The MC Free/NoMoreC-strategy is developed through active involvement of the MSM community, commercial stakeholders and health professionals and will be launched in Fall-2017. We aim to distribute 1000 tests and 450 toolboxes and we will evaluate the use and effectiveness of all aspects of the interventions.

Conclusion: We expect that our multilevel approach including closely linked online and face-to-face interventions will increase the uptake of testing and engagement in preventive behaviours among MSM. When successful, this approach can be expanded to other cities that face a similar epidemic among HIV-positive MSM.
Patient-led policy monitoring of viral hepatitis: the HEP-core study's contribution to meeting WHO elimination goals in Europe

Samya R Stumo¹, Kelly Safreed-Harmon¹, Mojca Maticic²,³, Achim Kautz⁴, Jeffrey Lazarus¹⁵
¹ISGlobal - Campus Clinic, Barcelona, Spain, ²Clinic for Infectious Diseases and Febrile Illnesses, University Medical Centre Ljubljana, Ljubljana, Slovenia, ³Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia, ⁴Leberhilfe Projekt gUG, Berlin, Germany, ⁵CHIP, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark

Background and Aims: The Hep-CORE study was a multinational patient-led survey developed as a viral hepatitis policy monitoring tool by the European Liver Patients' Association in late 2015. In May 2016, the first WHO global health sector strategy (GHSS) on viral hepatitis was approved amidst increasing political attention on viral hepatitis elimination. This attention is partially due to the advent of new hepatitis C treatments with cure rates surpassing 95%. The Hep-CORE study currently serves as the only major international viral hepatitis policy monitoring tool. In this study, we examine Hep-CORE against current WHO hepatitis policy recommendations.

Method: Hep-CORE employed a cross-sectional survey which engaged patient groups from 25 European countries. The 39-item online tool had 7 categories: national response, awareness and engagement, monitoring and data collection, prevention, testing, clinical assessment, and treatment. We systematically compared survey questions and their results to the 5 strategic directions and 56 priority actions for countries from the GHSS to determine how they could contribute to global viral hepatitis monitoring.

Results: Hep-CORE survey items correlated with 4 (80%) GHSS strategic directions and 30 (54%) country priority actions. Patient groups in 14 (56%) of 25 countries reported the absence of a national viral hepatitis strategy, which is strongly called for in the GHSS. The recommendations emphasize national hepatitis B and C prevention guidelines for healthcare settings, which Hep-CORE demonstrated were present in 19 (76%) countries. Strategic direction three focuses attention on populations with highest prevalence of hepatitis B and C; patient groups reported that high-risk populations had no access to testing or treatment in non-hospital settings in 8 (32%) and 20 (80%) countries, respectively. The fourth direction calls for reducing financial barriers for access to hepatitis services. Of the 21 countries that were reported to offer ≥1 DAA therapies, 19 (90%) offered them for free and 2 (10%) made them available by co-payment.

Conclusion: Hep-CORE survey questions had substantial overlap with WHO strategic directions for viral hepatitis, thereby contributing to monitoring countries' alignment with WHO aims. In areas that went beyond GHSS priority actions, the Hep-CORE study points to the benefits of increased patient involvement in monitoring viral hepatitis policy. Further application of this policy monitoring tool may contribute to closing gaps between national practice and global recommendations as countries work towards viral hepatitis elimination.

Figure: n/a
The feasibility of treating HCV in low resources settings the MSF projects in Mozambique and Myanmar

Aude Nguyen¹, Fortas Camille², Natalia Tamayo Antabak¹, Molfino Lucas¹, Andrea Incerti¹, Anne Loarec²

¹Médecins sans Frontières, Genève, Switzerland, ²Epicentre- Médecins Sans Frontières, Paris, France

Background and Aims: With the development of Direct Acting Antiviral (DAAs), access to Hepatitis C (HCV) care has become an opportunity in low resource settings allowing simplified treatment for infected patients. Since 2013, Médecins Sans Frontières (MSF) started to implement HCV care in different projects in 11 countries. The MSF Swiss section has two sites, one in a referral center for complex HIV cases, in Maputo, Mozambique and one in a decentralized clinic providing HIV services for high risk groups and vulnerable populations, in Dawei, Myanmar. In both sites, HCV treatment is integrated in a comprehensive HIV care and there is no prioritization among the patients.

Method: An observational cohort analysis was performed on patients followed in these two settings since August 2016 for Mozambique and since November 2016 for Dawei. We describe patients’ characteristics, viral genotypes, and antiviral treatment outcomes. The study did not assess the treatment of patients with a specific drug regimen. Different regimens are used following national regimen or in their absence, international recommendations.

Results: From the 1st November 2016 until the 25th October 2017, 128 HCV patients, mostly co-infected with HIV (96%), were initiated on DAAs, respectively 104 patients in Dawei and 24 in Maputo. Overall, the median age was 42 years old (IQR 39-45) with a majority of men (79%). In the Myanmar cohort, genotype 3 was predominant whereas genotype 1 is prevailing in Mozambique. 37% of the patients have advanced liver fibrosis (stage F3-F4 assessed by FibroScan). Preliminary results indicated that 17 (13%) patients are cured (Sustained Virologic Response (SVR) at 12 weeks), 79 (62%) patients are still under treatment, and 27 (21%) completed the regimen waiting for testing at 12 weeks. 2 (1.6%) patients were loss to follow-up before SVR 12 and 2 (1.6%) patients had a failure. No serious adverse event was reported. 9 patients had non serious adverse events mainly due to ribavirin leading to modification of treatment.

Conclusion: These are two examples of real-life projects managing HCV in low resource settings, showing feasibility in a decentralized site and among patients with multiple comorbidities. Outcome results seem for the moment not different than in high resources settings.
(Re)- Diagnosing and (re)-engaging older patients with chronic HCV in a central London emergency department - interim findings from the vira+emic project

Gaia Nebbia¹, Sam Douthwaite¹, Laura Hunter¹, Murad Ruf²
¹Guy’s and St Thomas Hospital NHS Trust, London, United Kingdom , ²Gilead Science Ltd, London, United Kingdom

Background and Aims: Over half of HCV infections in England are attributable to either historical drug use (non-current) or other routes, like blood transfusion before September 1991. Universal opt out Hepatitis C (HCV) screening test in Emergency Department (ED) in London may be ideally suited to identify infected individual who would have not been tested in any other healthcare setting. We describe the interim findings of the VirA+EmiC project, an ongoing ED opt-out testing and enhanced linkage to care intervention.

Method: An electronic blood order set was developed with preselected request for HCV antibodies (Ab) (including a confirmatory HCV antigen (Ag) test when positive) for patients over 16 years requiring any blood test. A dedicated linkage to care coordinator contacted those with a HCV Ag positive result for rapid linkage to care.

Results: 15,624 individuals had a blood test, of which 11,485 had HCV Ab test (74% uptake). Of the 239 HCV Ab positive patients, 146 were also HCV Ag positive (adjusted prevalence for HCV Ab: 2.38% (95% CI 2.06-2.76%); HCV Ag: 1.55% (95% CI 1.29-1.87%). 121/146 (82%) of Ag positives were male, 73% belonged to white ethnicities, 11% not stated. Median age was 44 years (range 26-82). 44/146 (30%) were successfully contacted. 18/44 (41%) had no fixed abode, median age 45 (27-59). Most commonly reported risk factor was current IVDU (80%). 12/18 (67%) required linkage to care (LTC) (disengaged or newly diagnosed). Median fibroscan score was 8 (range 4-38 ). 5/12 (41%) attended once and 1/12 (8%) remained in long term follow up (LTFU). Only 26/44 (59%) were living in fixed accommodation, median age 57 years (range 32-81). Among the disengaged 2 were not suitable for care. 16/24 (66%) required LTC; median age 59 (range 32-81), 75% were ex-IVDU, had blood transfusions before 1990 or no identifiable risk factor. Median fibroscan 6 (range 4-21). 13/16 (81%) attended the clinic once and 9/16 (56%) patients are in LTFU (8 treated, 1 not suitable)

Conclusion: Our ED opt-out testing initiative demonstrated high test uptake and a high screen diagnosed active HCV prevalence. While better coordination with community health services is needed to improve linkage to care generally, our ED testing initiative was particularly able to diagnose and (re)-engage older patients who are unlikely to access other testing services. Identifying this subpopulation will be crucial to achieving elimination.
Loss-to-follow-up is an important problem in the diagnosis and follow-up of hepatitis C

**Background and Aims:** Many hepatitis C (HCV) projects focus on screening but little is known about the drop-out during follow-up (FU). The aims of this study were to evaluate the loss-to-follow-up (LTFU) between the moment of positive HCV serology and hepatological assessment; and to evaluate the drop-out rate during hepatological FU.

**Method:** In the first part, a retrospective analysis was performed on patients with positive HCV antibodies (Ab) in a blood test requested by a non-hepatologist. In the second part, a retrospective analysis was performed on patients with positive HCV RNA that were followed at the hepatology department to discover patients LTFU (untreated or unsuccessfully treated patients that never showed up at suggested FU date).

**Results:** In the first part of the study, 70 patients with positive Ab were included (49±13 years, 54% male) from 19 different departments with a majority from the haematology (23%) and nephrology (19%) clinic. Blood tests were mostly performed as a routine test (63%). Of all patients, 16% had already been successfully treated in the past, 33% had a past infection with spontaneous clearance, 33% had an active chronic infection and 18% is unknown. Of patients in need for further testing, 33% was not referred for hepatological assessment nor was the result mentioned in the consultation or discharge report.

In the second part of the study, 250 patients were included (66% male, 21% HIV positive) of which 112 patients were waiting for (new) treatment at the last consultation. Of these 112 patients, 81 (72%) were LTFU. Of these 81 patients, 31% did not show for a planned consultation and 69% never made/received a new appointment. Twenty-eight percent could not be contacted (changed phone number, no longer in FU at GP), 42% was treated/followed at another hospital, 6% was deceased and 3% was in a weak physical condition that did not permit FU. Twenty-one percent could be contacted and were not in FU at our or any other centre. Of these last patients, 29% didn't realize FU was necessary, 53% realized the necessity but hadn't come to organizing it and 18 % was waiting for the hospital to contact them.

**Conclusion:** Many patients are lost between diagnosis and treatment. These results show the importance to implement strategies to optimize FU of HCV patients such as sending all positive HCV Ab results to the hepatologist, automatically planning new FU appointments and routinely revising patient databases to discover patients LTFU.
Chronic hepatitis C in children of the Russian Federation

Galina Volynets¹, Tamara Skvortsova², Victoria Panfilova³, Natalia Rogozina⁴, Oxana Komarova¹, Anatoly Khavkin¹

¹Pirogov Russian National Research Medical University (RNRMU), Moscow, Russian Federation, ²Federal State Budgetary Institution “Scientific Centre of Children Health” of the Ministry of Health of the Russian Federation, Moscow, Russian Federation, ³Krasnoyarsk State Medical University of the Ministry of Health and Social Development of the Russian Federation, Красноярск (Красноярский край), Russian Federation, ⁴Federal State Budgetary Institution “Research Institute of Childhood Infections of the Federal Biomedical Agency”, St Petersburg, Russian Federation

Background and Aims: there is little information on the problem of chronic hepatitis C (CHC) in children in Russia.

Method: the multicenter of CHC in children in Russia for the period from November 2014 to September 2017 with the participation of three hepatological centers: Moscow, St. Petersburg, Krasnoyarsk.

Results: 306 children (48.4% of girls), average age 10.6 years (IQR 7.2, 14.6) were examined. The mean age of diagnosis of CHC is 3.1 years (IQR, 1.1, 15.1). In 226 children (73.9%), family members were infected. The most common way of infecting children is vertical (65.4%); parenteral/nosocomial pathway - in 10.5%, in 12.4% of cases - transfusion of blood and/or its components in the anamnesis. HCV genotypes: 1a - 3.3%; 1b - 52.0%; 2 - 4.9%; 3 - 36.6%; it is unknown - 3.3%. Hepatomegaly had 50.7% of patients, splenomegaly - 12.4%. 82 children (27%) had ALT> 40 IU/l. ALT to 2 norms were 68 patients (22.2%), up to 5 norms - 10 children (3.3%). The level of ALT was reduced to reference values when treated with ursodeoxycholic acid (Ursosan) in 57 patients (73.1%). 18.3% of patients had mild fibrosis with fibroelastometry (n=223): ≥7.2 kPa - F2 and/or biopsy (n=89); 16% had severe fibrosis (F3). According to ultrasound data, 15 children (4.9%) had steatohepatosis, 9 children (2.9%) had signs of portal hypertension. 205 (67%) of children received treatment (Table), 93% had side effects, in 3% this resulted in discontinuation of treatment. Of those who received PegIFN + ribavirin, SVR24 was established in 66% of cases (69/104). A decrease in the dose of drugs due to toxicity and severe side effects was observed in 19 patients (9%): the dose of ribavirin decreased in 57.9% of patients, the dose of PegIFN-α-2b decreased in 68.4%, the dose of IFNα2a decreased in 5.3%.

Conclusion: It is shown that 67% of children with HCV and liver fibrosis in Russia underwent interferonotherapy. The incidence of side effects was significant, although the treatment was discontinued due to the side effects of drugs in just a few children. It is emphasized the need to select treatment options to prevent the progression of liver disease.
Figure:

Table. Treatment characteristics and side effects

<table>
<thead>
<tr>
<th>Treated children (n=205)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>PegIFN alfa-2b and ribavirin</td>
<td>112 (55)</td>
</tr>
<tr>
<td>IFN alfa-2b plus ribavirin</td>
<td>12 (6)</td>
</tr>
<tr>
<td>IFN alfa-2a plus ribavirin</td>
<td>2 (1)</td>
</tr>
<tr>
<td>PegIFN alfa-2b only</td>
<td>2 (1)</td>
</tr>
<tr>
<td>IFN alfa-2a +rIL2*</td>
<td>31 (15)</td>
</tr>
<tr>
<td>IFN alfa-2b only</td>
<td>28 (14)</td>
</tr>
<tr>
<td>Other</td>
<td>16 (8)</td>
</tr>
<tr>
<td><strong>Reasons for treatment</strong></td>
<td></td>
</tr>
<tr>
<td>Liver fibrosis (based on biopsy or TE)</td>
<td>61 (30)</td>
</tr>
<tr>
<td>Persistently elevated transaminases with no fibrosis</td>
<td>58 (29)</td>
</tr>
<tr>
<td>Family decision to treat</td>
<td>77 (38)</td>
</tr>
<tr>
<td>Other</td>
<td>7 (3.4)</td>
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<tr>
<td><strong>Reasons for premature discontinuation</strong></td>
<td></td>
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<tr>
<td>Inadequate response</td>
<td>29 (74)</td>
</tr>
<tr>
<td>Drug reactions</td>
<td>6 (15)</td>
</tr>
<tr>
<td>Family decision</td>
<td>4 (10)</td>
</tr>
<tr>
<td><strong>Side effects</strong>**</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>14 (7)</td>
</tr>
<tr>
<td>Flu-like symptoms</td>
<td>187 (91)</td>
</tr>
<tr>
<td>Local reaction at injection site</td>
<td>122 (60)</td>
</tr>
<tr>
<td>Neutropenia</td>
<td>63 (31)</td>
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<tr>
<td>Anaemia</td>
<td>50 (24)</td>
</tr>
<tr>
<td>Poor weight gain/weight loss</td>
<td>44 (21)</td>
</tr>
<tr>
<td>Hair loss</td>
<td>43 (21)</td>
</tr>
<tr>
<td>Depression/anxiety</td>
<td>34 (17)</td>
</tr>
</tbody>
</table>
Treating HCV in people who inject drugs with elbasvir/grazoprevir

Arshia Alimohammadi¹, Julie Holeksa¹, Aman Bassi¹, Astou Thiam¹, Brian Conway¹
¹Vancouver Infectious Diseases Centre, Vancouver, Canada

Background: Up to 70 million people are infected with Hepatitis C virus (HCV) worldwide, with more than 240,000 individuals in Canada. The availability of simpler, safer and more effective HCV treatment modalities over the past few years have made it possible for the World Health Organization (WHO) to set goals for the elimination of HCV as a public health concern by 2030. In this context, the combination of Elbasvir (E), a NS5A inhibitor, with grazoprevir (G), a NS3/4A inhibitor, has been shown to be effective in clinical trials in a broad range of populations, including individuals on opiate agonist therapy. There is a need for additional real-world data in vulnerable populations to confirm these findings and establish the role of E/G in achieving the WHO goals for HCV control.

Method: An observational evaluation was conducted among HCV-infected patients seen at the Vancouver Infectious Diseases Centre, where they had access to a multidisciplinary care model to address medical, psychiatric, social and addiction-related needs prior to, during and after HCV therapy. All individuals received E/G according to current clinical guidelines. The primary endpoint was defined as SVR-12 (HCV cure), with evaluation of demographic and clinical correlates.

Results: Since 03/16, 39 individuals have started HCV therapy with E/G. Population demographics include: mean age of 51.3 years, 14 females, 39 active PWID, 6 HIV+ (all HIV plasma viral load < 40 copies/mL), and 18 on opiate substitution therapy, 31 naïve to HCV therapy. Genotype distribution is 28 GT1a (none on RBV), two GT1b, seven GT3a (receiving E/G with sofosbuvir), and two GT4. 77% injected opiates, with only one occurrence of non-fatal overdose occurring during treatment. Of 31 individuals that have completed treatment and completed SVR-12 testing, the ITT SVR12 rate was 90% (28/31), with a mITT SVR rate of 100% (28/28). Of the 3 lost to follow-up, one took E/G for only 2 weeks, reintegrated care 24 weeks later, and has undetectable HCV RNA.

Conclusion: The combination of E/G is a highly effective HCV therapy for people infected in vulnerable individuals with genotypes 1a, 3a and 4 infections, with no evidence of virologic failure in approximately 40 patients. There was little opioid-related morbidity and no mortality. Engagement in multidisciplinary HCV care and treatment with E/G may play a significant role in meeting the WHO objectives for HCV control and may also help us address the opioid crisis in the same population.
PH8 a french national study of completion rate of HCV treatment in prison

André-Jean Remy
1CH de Perpignan, Perpignan, France

Background and Aims: Prevalence of viral hepatitis C (HCV) is higher in prison environment in France than in the general population and is estimated by the PREVACAR study to be 4.8%. The impact in prison environment is little-known as based only on local studies. Inmate health care falls under USMP (prison setting medical unit), hospital specific units as by the January 18, 1994 law. Access to antiviral treatment for inmates has always been difficult in France, would it be for interferon and ribavirin or use of protease inhibitors, with less than 20% of treated patients. French recommendations for HCV screening recommend systematic screening of inmates. The arrival of all oral therapies by direct antiviral agents (DAA) with shorter treatment times was an opportunity for doctors to propose a treatment and the patient to accept it. In 2014, the French guidelines recommended that HCV carriers in prison should systematically be treated independently of the stage of fibrosis. Our objective was to evaluate the completion rate of an 8-week antiviral C treatment by sofosbuvir/ledipasvir combotherapy in non-cirrhotic genotype 1 patients in deprivation of liberty and achieve sustained virological response (SVR) and to measure the effectiveness of an 8-week treatment by protocol analysis.

Method: Prospective non-interventional multicenter trial among inmates with chronic hepatitis C genotype 1 with METAVIR fibrosis score F0 to F2 and who will receive a daily combination of sofosbuvir/ledipasvir for 8 weeks.

Results: Seven prisons included consenting patients. In 100 first inclusions, there was 91% men, mean age 37 years. Route contamination was drug injection for 72%, others drug uses for 19% and unknown for 9%. HCV genotype was 1a for 77% and 1b for 21%. Mean Fibrosan measure was 3.5 KPa : 66% of patients were F0, 24% F1 and 10% F2; 95% of patients completed DAA 8 weeks treatment; only 5 stopped DAA treatment before 8 weeks but only 4 relapsed; one patient took DAA during 6 weeks and was cured.

Conclusion: In these study PH8, we observed completion rate of 95% for the included patients with 8 weeks ledipasvir/sofosbuvir treatment; only 4 patients relapsed, which gives us a 96% efficiency. Short DAA treatment was efficient in prisoners and could be preferred in these patients.

Figure: none
**P07-01**

Exploring HCV eradication through diagnosis and treatment strategies

Michael Harvey¹, Chih-Yuan Cheng¹, Emilio Leone², Anne Postulka², Elisabeth Adams¹

¹Aquarius Population Health Limited, United Kingdom, ²Cepheid Europe, Maurens-Scopont, France

**Background and Aims:** The World Health Organization aims to eradicate hepatitis C virus (HCV) by 2030. To achieve this, improved HCV diagnosis and treatment coverage are required. We explored the relationship between diagnosis and treatment in the next 5 years in Italy, France, and the UK to understand how to achieve the most benefit.

**Method:** We created an HCV state-transition model based on published models. The model allowed incidence to change dynamically given population level disease characteristics. Primary model outcomes were total number of chronic HCV cases, and number of HCV cases cured after 5 years. We performed one-way, two-way, and three-way sensitivity analyses to determine how primary outcomes changed. Probabilities of diagnosis and treatment were changed between 0 – 100%. Treatment algorithms were varied to simulate treating stage(s) [4], [3,4], [2,3,4], [1,2,3,4], and [0,1,2,3,4] liver fibrosis. Treating stages [2,3,4] fibrosis was the base case. The baseline model was parameterised with data from Polaris Observatory and the published literature.

**Results:** In France and Italy, a 100% probability of treatment reduced chronic HCV cases by 40% and 30%, respectively Figure. A 20% - 25% reduction in chronic HCV cases could be achieved in France and Italy at a 100% probability of diagnosis. The UK had the highest initial probability of treatment and showed probability of diagnosis had the largest impact on outcomes. A 100% probability of diagnosis resulted in a 30% reduction in chronic HCV cases; a 100% probability of treatment only resulted in a 20% reduction in chronic HCV cases.

Two-way analysis showed increasing both diagnosis and treatment probabilities to 100% could cure up to 55% of HCV cases in all countries. Three-way analysis showed treating stages [0,1,2,3,4] fibrosis, and increasing diagnosis and treatment probabilities to 100%, 95% of HCV cases could be cured in 5 years in all countries.

**Conclusion:** Diagnosis and treatment share an exponential type relationship (Figure). Given this relationship, focusing on only treatment or diagnosis is likely to lead to diminishing marginal returns. Therefore, countries should consider the interaction between diagnosis and treatment to maximize their limited resources. Future work will adapt this model to other countries and continue to investigate this relationship between diagnosis, treatment, and HCV eradication.
Figure:

Reduction in Chronic HCV infections at 5 years
One-way sensitivity analysis

France  Italy  UK

Change in total chronic HCV infections at 5 years (%)

Probability of Event (%)

White dot denotes the base case value of the respective country
Base case: No virus treatment algorithm - stages 3, 4
HCV-FIS (hepatitis C virus fingerprick study): HCV RNA point-of-care testing by genexpert in the setting of DAA therapy

Vincenza Calvaruso¹, Fabrizio Bronte¹, Donatella Ferraro², Maria Grazia Bavetta¹, Salvatore Petta¹, Vito Di Marco¹, Antonio Craxi¹
¹ University of Palermo, Palermo, Italy, ²University of Palermo, Palermo, Italy

Background and Aims: Highly effective and tolerable DAA regimens have simplified the HCV patient care, but HCV RNA assessment at baseline, during and after therapy still relies on assays requiring blood collection and transport to a specialized laboratory, with a sensitivity ≤ 15 IU/ml. GeneXpert HCV Viral Load (GXHVL, Cepheid, Sunnyvale, CA, USA) is a point-of-care assay system using finger-stick capillary whole-blood samples allowing on-site HCV RNA quantification with a sensitivity of ≤ 10 IU/within 2 hours from sampling (1). In HCV-FiS we evaluated the performance of GXHVL in the setting of an hospital-based outpatient clinic caring for HCV patients.

Method: 59 consecutive chronic HCV patients (F3 24:40.7%; F4 35:59.3%) were enrolled in HCV-FiS. HCV genotype was 1a in 7 patients, 1b in 41, 2 in 8, 1 in 3 patients, and 2 in 4. Capillary blood collected by fingerprick was processed on site by a trained nurse on the GeneXpert platform. HCV viral load (VL) was tested on a simultaneous venous blood sample by the Hospital’s Virology Lab using a standardized Real Time (RT) PCR (Roche TaqMan). DAA regimens were prescribed according to the current EASL recommendations. The performance of the GXHVL and of the Taqman assay were compared at baseline (BL), at week 4 (W4) and at end of therapy (EOT) and at week 12 of follow up to evaluated the sustained virological response (SVR12).

Results: 57 patients (mean age 65.8 ± 12.1 years; 54% males) were tested with both assays, while 2 were excluded due to mishandling of the GXHVL specimen at BL. At BL 56/57 (98.2%) patients were HCV RNA positive. In one patient HCV RNA was undetectable by both methods, while it had tested positive by TaqMan two months earlier, possibly due to spontaneous HCV clearance. Linear regression analysis confirmed the high concordance in HCV RNA quantification between GXHVL test and standard HCV VL assay (R=0.809; R²: 0.654 p<0.001) at BL (median VL: 778400 vs 1230000 IU/ml respectively). At W4, 39/56 (69.6%) and 42/56 (75%) patients had undetectable HCV RNA by GXHVL and RT-PCR test, respectively. Six patients had HCV RNA levels < 10 IU/ml by GXHVL test and were RT-PCR undetectable, and 5 patients had undetectable HCV RNA by GXHVL and RT-PCR lower than 15 IU/ml. Both assays demonstrated undetectable HCV RNA in all 56 patients (100%) at end of treatment. At SVR12 both assays identified the single case of HCV relapse in the cohort (HCV RNA: 248600 vs 822000 IU/ml by GXHVL and RT-PCR respectively) with a concordance rate, a sensitivity and specificity of 100%.

Conclusion: GeneXpert point-of-care assay, used in the outpatients setting, obtains results fully comparable to the laboratory-based test. Its excellent performance characteristics and ease of use suggest its adoption in non-specialist settings where simplicity of care is paramount to implement HCV eradication campaigns.

Reference
P07-03

Comparative effectiveness analysis of patient-centered care and health care delivery: systematic review

Hyun Phil Shin¹, Xibei Liu², Ji Yoo³
¹Kyung Hee University College of Medicine, Seoul, United States , ²University of Arizona College of Medicine, Tucson, United States , ³University of Nevada Las Vegas School of Medicine, Las Vegas, United States

Background and Aims: Comparative effectiveness analysis of patients with chronic hepatitis C was mainly focused on drug treatment. Little is known about comparative effectiveness analysis from perspectives of patient-centered care and health care delivery and model.

Method: We conducted a systematic review of the PubMed and EMBASE databases for comparative-effectiveness (using economic model) of patient-centered care and health care delivery and model including screening, diagnosis, and treatment model. We restricted analysis original studies in English from their inception up to November 5, 2017. Figure 1 presents the study selection process in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.

Results: Our search yielded 135 studies. After two-step screening, 7 unique studies were included. Figure 2 presents study specification.

Conclusion: Few studies confirmed cost-saving effect of patient-centered care and more expanded screening and multidisciplinary care model.

Figure:
### Patient-centered care

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<td>Groessl, 2017</td>
<td>U.S.</td>
<td>Randomized controlled trial and economic model</td>
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<td>Mohlbacher, 2017</td>
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<td>Matza, 2015</td>
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<td>Semi-structured interviews using time trade-off interviews</td>
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### Health care delivery and model

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P07-04

Recurrence and occurrence of hepatocellular carcinoma following ledipasvir and sofosbuvir treatment for chronic hepatitis C in patients with advanced liver disease: Turkish multi-centre early access program

Ramazan Idilman1, Mehmet Demir2, Murat Aladag3, Sabahattin Kaymakoglu4, Cihan Erol1, Bilger Cavus5, Raim Iliaz6, Ulus Salih Akarca6, Seyfettin Koklu6, Yilmaz Cakaloglu7, Memduh Sahin8, Itifihar Koksal9, Meric Ozgenel10, Bilal Toka11, Zeki Karasu5, Galip Ersoz5, Murat Kiyici12, Meral Akdogan13, Early Access Program Turkey14

1Ankara University School of Medicine, 2Mustafa Kemal University School of Medicine, 3Inonu University School of Medicine, 4Istanbul University School of Medicine, 5Ege University School of Medicine, 6Hacettepe University School of Medicine, 7Sisli Memorial Hospital, 8Mersin State Hospital, 9Karadeniz Technical University Farabi Medical Faculty, 10Osmangazi University School of Medicine, 11Sakarya University School of Medicine, 12Uludağ University School of Medicine, 13Turkiye Yuksek Ihtisas Hospital, 14Turkey

Background and Aims: The aim of the present study was to investigate the efficacy and safety of ledipasvir (LDV)/sofosbuvir (SOF)±ribavirin (RBV) in chronic hepatitis C (CHC) patients with advanced liver disease and in patients with liver transplantation (LT) in a Turkish multicenter early access program. The natural course of HCC after LDV/SOF treatment was also assessed.

Method: Patients received LDV 90mg and SOF 400mg in a fixed dose combination tablet once daily plus RBV (800-1200 mg/day) according to the physician’s discretion. Recommended treatment duration was 24 weeks.

Results: Between Apr2015-Jan2016, a total of 200 patients were enrolled; 8 patients were lost to follow-up, 16 patients died during the study; 11 during the treatment, 5 after discontinuing the treatment. All patients were Caucasian, 53% were female and the median age was 62 years. Median serum HCVRNA level was 5.14 log10 IU/mL and ALT was 55 U/L, 81% of the patients had GT1b HCV infection. 58% of patients had previously received interferon-based treatment. Median CTP and MELD scores were 8 and 16, respectively. 7 patients had HBV co-infection. 37 patients had the previous HCC treated by surgical resection, LT, ablation, trans-arterial chemo/radio embolization or medical treatment. 48 (24%) had liver transplantation. The median interval between transplantation and LDV/SOF treatment start was 29.4 months. With ITT analysis, SVR12 was 86.0% (172/200), whereas SVR12 was 98.3% (172/175) with per protocol analysis. Three patients with GT1b experienced a virologic failure (relapse). From baseline to SVR12, serum ALT level and MELD score were significantly improved (p<0.001). Most common adverse events (AE) were headache (5%), nausea (1%), anaemia (1%), constipation (1%), pruritus (1%) and rash (1%) 3 patients had serious AE, one patient had to prematurely discontinue therapy. No HBV reactivation was observed. No clinically relevant drug-drug interactions were noted. None of the deaths was related to LDV/SOF.

37 patients (M/F: 21/15, 85% GT1b) had previous HCC. During the follow-up period; the median time between HCC treatment and the start of LDV/SOF treatment was 4 months. Twelve (12/200, 6.0%) (M/F: 7/5, median age: 68 years) of them had HCC recurrence or progression after treatment. Median time from LDV/SOF treatment start to recurrence was 7 months. Among these 12 patients, 10 had GT1b, 2 had radical HCC treatment (surgical resection, LT). De novo HCC was detected only in one patient without previous HCC. Four patients died due to liver function deterioration and HCC progression.
Conclusion: Based on the results of this study, LDV/SOF±RBV treatment is an effective treatment for HCV genotype 1,4 infected patients with the advanced liver disease. LDV/SOF treatment was well tolerated. Virologic suppression is associated with an improvement of hepatic function but does not seem to reduce HCC recurrence.
Is macro-elimination of HCV infection the right approach for Canada?

Julie Holeksa1, Arshia Alimohammadi1, Aman Bassi1, Astou Thiam1, Brian Conway1
1Vancouver Infectious Diseases Centre, Vancouver, Canada

Background and Aims: The WHO has set a goal to eliminate HCV infection as a public health concern by 2030. Though some jurisdictions may implement country-wide macro-elimination strategies, feasibility of such approaches may be reduced due to diversity of healthcare systems and populations being served. Micro-elimination strategies to eliminate HCV in given subpopulations may be more applicable. The 70% prevalence of HCV infection in the vulnerable population of Vancouver makes this setting an attractive one for evaluating a micro-elimination approach, especially if the proper care model can be designed. This intervention may also reduce the risk of opioid-related morbidity and mortality, in a community where there is one documented overdose each hour, and up to 3 overdose-related deaths each day.

Method: As a pilot for HCV micro-elimination in Vancouver's inner city, we have developed a "four-legged chair" model to promote engagement with healthcare and social services. This model addresses the four main priorities of our population – medical, psychiatric, addictions, and social needs. The purpose of this analysis is to report on the outcomes of HCV treatment within this model to date, as well as opioid-related morbidity and mortality.

Results: Since 2014, 195 active/recent people who inject drugs have received HCV treatment, with all oral therapies. Of patients with available sustained virologic response (SVR12) data, our overall success rate has been 140/149 (93%), with the remaining 7% experiencing a virologic relapse and requiring retreatment. Of the total cohort, 3% have been lost to follow up and will require novel strategies for re-integration in care. Over the past 2 years (almost 2,000 opioid-related deaths in our province), there have been only 22 medically significant overdose events and 2 opioid-related deaths in our cohort.

Conclusion: Given the broad range of health care delivery jurisdictions and target populations, a macro-elimination strategy for HCV infection in Canada will not be feasible. The model we have developed will be an ideal micro-elimination approach that will allow us to address both HCV infection as well as respond to the opioid crisis in a high-risk population. It is likely that Canada's optimal response to HCV infection will include a series of micro-elimination strategies, designed to optimize the social and healthcare needs of the population of interest.
Chronic hepatitis B and C infections in the Netherlands: estimated prevalence in risk groups and the general population

Jelle Koopsen¹², Jim van Steenbergen¹³, Jan Hendrik Richardus⁴⁵, Maria Prins²⁶, Eline Op de Coul¹, Esther Croes⁷, Jeanne Heil⁸, Freke Zuure², Irene Veldhuijzen¹

¹RIVM, Bilthoven, Netherlands, ²GGD Amsterdam, Amsterdam, Netherlands, ³Leids Universitair Medisch Centrum, Leiden, Netherlands, ⁴Erasmus MC, Rotterdam, Netherlands, ⁵GGD Rotterdam-Rijnmond, Rotterdam, Netherlands, ⁶Academic Medical Center, Netherlands, ⁷Trimbos-instituut, Utrecht, Netherlands, ⁸GGD Zuid Limburg, Geleen, Netherlands

Background & aims: Worldwide, it is estimated that 248 million people are chronically infected with HBV and that 71 million are chronically infected with HCV. In the countries of the European Union (EU) and European Economic Area (EEA), approximately 4.7 million people live with chronic HBV and 5.6 million people are anti-HCV positive. Because chronic HBV and HCV infections are usually asymptomatic for decades, targeted screening is needed to diagnose infected individuals and prevent irreversible damage. Insight in the number of chronic HBV and HCV infections in the general population and in specific risk populations is needed to aid the design of screening programs.

Methods: Using a modified workbook method, originally designed for HIV estimations, the total number of ever chronically infected individuals in 2016 was determined for HBV and HCV. Population size and prevalence estimates were used, derived from studies in the general Dutch population and in populations at higher risk, including men who have sex with men (MSM), people who inject drugs (PWID), first-generation migrants from low-intermediate to high prevalence countries, sex workers and hemophilia patients. MSM and PWID were stratified by human immunodeficiency virus (HIV) status and first-generation migrants by country-of-origin.

Results: The estimated 2016 chronic HBV infection prevalence is 0.34% (low 0.22%, high 0.47%), corresponding to approximately 49,000 (low 31,000, high 66,000) HBV-infected individuals aged 15 years and older in the Netherlands. The estimated ever-chronic HCV infection prevalence is 0.16% (low 0.06%, high 0.27%), corresponding to approximately 23,000 (low 8,000, high 38,000) ever HCV-infected individuals. First-generation migrants account for most infections with 81% and 60% of chronic HBV and HCV infections, respectively. The migrant groups that were estimated to harbor most chronic HBV infections in the Netherlands are migrants from Turkey, Somalia and China. The migrant groups that were estimated to harbor most chronic HCV infections in the Netherlands are migrants from Surinam, Morocco, and the former Soviet Union.

Conclusion: The prevalence of chronic HBV and HCV infections in the Netherlands is low. First-generation migrants are disproportionally affected, although about one fifth of HCV infections is found in the general population at low risk of infection. Targeted screening efforts are needed to diagnose and link infected persons to care. Our method could serve as an example of an accessible method to estimate risk group specific and overall HBV/HCV prevalences. Outcomes can be used to implement screening effectively and monitor progress towards elimination of chronic viral hepatitis.
Figure:
Comparison of resistance profiles among DAA-naive and DAA-failed patients infected with HCV non-1 genotype in Italy

Velia Chiara Di Maio1, Silvia Barbaliscia1, Elisabetta Teti2, Ilaria Lenci3, Marianna Aragri1, Ennio Polilli1, Laura Giansserra1, Valeria Pace Palitti3, Bianca Bruzzone6, Stefania Paolucci6, Nicola Coppola4, Tina Ruggiero3, Teresa Pollicino9, Fosca Niero10, Valeria Micheli11, Antonio Di Biagio5, Ada Bertoli4, Laura Sticchi5, Ivana Maida12, Simona Francioso2, Luca Forighi2, Vincenza Calvaruso13, Filomena Morisco14, Ana Lleo15, Alessia Ciancio16, Renato Maserati17, Giuseppina Brancaccio7, Massimo Puoti18, Pierluigi Toniotto19, Vincenzo Vuolo20, Alessio Aghemo15, Roberta D’ambrosio21, Giuseppe Cariti22, Stefano Bonora22, Sergio Babudieri12, Guido Gubertini11, Maria Rendina23, Adriano Pellicelli24, Vincenzo Sangiovanni25, Antonio Ciaccio26, Gloria Taliani27, Giovanni Raimondo9, Antonio Craxì13, Caterina Pasquazzi4, Loredana Sarmati2, Giustino Parrutì3, Mario Angelico2, Massimo Andreoni2, Valeria Cento1, Carlo Federico Perno28, Francesca Ceccherini-Silberstein1

1University of Rome Tor Vergata, Rome, Italy, 2University Hospital of Rome Tor Vergata, Rome, Italy, 3Pescara General Hospital, Pescara, Italy, 4Sant’Andrea Hospital – “La Sapienza” University, Rome, Italy, 5IRCCS AOU San Martino-IST, Genoa, Italy, 6IRCCS Policlinic Foundation San Matteo, Pavia, Pavia, Italy, 7Second University of Naples, Naples, Italy, 8Amedeo di Savoia Hospital, ASL Città di Torino, Turin, Italy, 9University of Pavia, Pavia, Italy, 10ASST Fatebenefratelli Sacco, Milan, Milan, Italy, 11ASST Fatebenefratelli Sacco, Milan, Milan, Italy, 12University of Sassari, Sassari, Italy, 13P. Giaccone University Hospital, Palermo, Palermo, Italy, 14University “Federico II” of Naples, Naples, Italy, 15Humanitas University, Rozzano, Milan, Italy, 16University of Turin, Department of Medical Sciences, City of Health and Science of Molinette Turin Hospital, Turin, Italy, 17University of Pavia, Pavia, Italy, 18Hospital Niguarda Ca’Granda, Milan, Italy, 19Medical Liver Transplant Section, Udine, Italy, 20Sapienza University of Rome, Rome, Italy, 21IRCCS Foundation “Ca’ Granda-Ospedale Maggiore Policlinico”, Milan, Italy, 22Amedeo di Savoia Hospital, University of Turin, Turin, Italy, 23University Hospital, Bari, Italy, 24San Camillo Forlanini Hospital, Rome, Rome, Italy, 25Hospital Cottugno, Naples, Italy, 26University of Milan-Bicocca, Milan, Italy, 27“La Sapienza” University, Rome, Italy, 28University of Milan, Milan, Italy

Background and Aims: Pangenotypic direct-acting antivirals (DAA) will soon be the most used anti-HCV regimens against HCV genotypes (GTs) 2-3-4. However, their use in short, ribavirin-free regimens may be affected by presence of resistance-associated substitutions (RASs), whose prevalence is highly variable in different geographic areas. Aim of this study was to investigate the prevalence and characteristics of RASs in GT2-3-4 infected patients (pts) naïve to DAA and DAA-failures in Italy.

Method: Patients with HCV GT2-3-4 (N=109/289/121) infection, either naïve (N=419) or DAA-experienced to an interferon-free recommended regimen according to European 2016 guidelines (N=116, including 16 with also baseline sample available) were included. Sanger sequencing of NS3±NS5A±NS5B was performed by home-made protocols.

Results: By phylogenetic analysis, various HCV-subtypes were identified: GT2c (100%), GT3a/h (99.3%/0.7%), GT4a/d (11.6%/88.4%). Overall, 67/419 (16.0%) DAA-naïve and 97/116 (83.6%) DAA-failures had at least 1 RAS (p<0.001), that indeed showed a different distribution. Notably, 11.2% of pts were treated with a suboptimal DAA-combination due to a wrong previous GT assignment, and in them overall RASs prevalence was 92.3% (12/13).

The NS3-Q80K was mainly detected in GT3a paritaprevir (PTV)-failures (25%, vs 1% DAA-naïve, p=0.007). The major NS3-D168V was rarely detected in naïve GT2c and GT4d pts (0.2-6%, respectively), while it was detected in 66.7% GT2c and 100% GT4d PTV-failures, and in 45.4% GT4d simeprevir-failures.

ABSTRACTS
Striving towards the elimination of HCV infection
02-03 February 2018, Berlin, Germany
The major Y93H NS5A-RAS was highly prevalent in NS5A-experienced GT3a (78.9%), GT4a (25%) and GT4d (14.3%) pts, while it was rarely detected in DAA-naïve (3.9% prevalence in GT3a, and <2% in GT4a/d). No pts with GT2c infection ever showed the Y93H RAS, while the F28C was detected in 71.4% GT2c NS5A-failures and in 27.8% in GT2c DAA-naïve (p=0.03).

The S282T sofosbuvir (SOF)-RAS was found in a minority of pts failing a SOF-containing regimen with GT4d (3.3%) and GT3a (4.4%) infection, while was frequently detected (75%) in GT4a pts failing a SOF-containing regimen (p=0.001).

**Conclusion:** HCV-sequencing allows RASs identification in all HCV-GTs, along with “correct” genotype assignment. RASs prevalence significantly varies among DAA-naïve and experienced patients, and differently within the HCV-GTs. When it occurs, failure was frequently associated with RASs, particularly with Y93H-NS5A in GT3a, F28C-NS5A in GT2c and S282T-NS5B in GT4a.
Decrease in liver stiffness due to HCV treatment using LDV/SOF measured by transient elastography in Mongolian population

**Lkhaasuren Nemekhbaatar**, Baatarkhuu Oidov, Dorjderem Radnaa, Sugargarid Ulziibayar, Munkhtsetseg Sarandavaa, Jargalsuren Palam, Tserendolgor Davaadorj, Enkhtuya Damba, Badamsuren Dorjgotov, Amanguul Jenskhan, Choijamts Nagir, Sayabold Batmunkh, Bat-Ulzii Saruul, Ganbold Uugantsetseg, Amarsanaa Jazag

1Institute of Medical Sciences, Mongolia, Mongolia, 2Mongolian National University of Medical Sciences, 3Mongolian Association for the Study of Liver Diseases (MASLD), 4Third General Hospital of Mongolia, 5National Center of Communicable Diseases

**Background:** The prevalence of liver cancer in Mongolia is 7 times higher than that of world average, generally caused by HBV and HCV. The most prevalent cause of HCC in Mongolia, HCV, accompanied with liver stiffness and cirrhosis, is an emerging public health issue. Mongolia is one of the first countries that registered Ledipasvir/Sofosbuvir (LDV/SOF) regimen from developing countries. By the support of Access program run by Gilead Sciences, USA, we started HCV treatment program from January 2016.

**Methods:** We followed and evaluated treatment outcome of patients with HCV infection using combination of 90mg ledispavir/400mg sofosbuvir (manufactured by Gilead Science) in 298 treatment naïve patients. All patients were treated with LDV/SOF for 12 weeks and, their treatment was evaluated by quantitative HCV-RNA assays prior and W (week) 4 and W12 of treatment. Sustained virological response (SVR) after 12 weeks treatment was assessed. Virus genotype analysis using cDNA microarray, liver enzymes, CBC and drug related adverse events were assessed in every patient. The laboratory tests were conducted at National Center of Communicable Diseases and Happy Veritas Laboratories.

**Result:** Out of 298 patients underwent treatment, 138 patients were examined for pre-treatment liver stiffness using Fibroscan. When patients were examined by Fibroscan test, 25% (n=35) of assessed patients were F0 stage; 13,57% (n=19) were F1 stage; 10% (n=14) were F2 stage; 20,71% (n=29) were F3 stage; and 30,72% (n=43) were F4 stage. Patients (n=35) with fibrosis stage F0 were omitted from post-treatment control examinations. The one hundred three patients were selected for further post-treatment fibrosis staging. The twenty-three patients were successfully contacted and complied post-treatment Fibroscan scanning. 23/23 (100%) patients achieved SVR12W, were all genotype 1b. Median ALT level significantly dropped during treatment from 121,19±98,3 IU/L to 33,2±14.7 IU/L and slightly increased by the end of treatment 41,4±18,8IU/L. The ninety one percent of the patients had improved in liver stiffness while remaining patients were observed increased stiffness.

**Conclusion:** After treatment, 30,43% (n=7) of patients moved to the F0 stage from liver stiffness. There are many studies that assess liver fibrosis after cure of HCV, but varying numbers were observed. We assess liver stiffness after treatment of HCV in Mongolian population for the first time. Though study population was small, we had 91% of patients improved in liver stiffness. Better compliance, active doctor’s participation is needed in further studies.

**Keywords:** Anti-HCV treatment, LDV/SOF combination, SVR12W, Liver stiffness, Fibroscan
P08-03

Enhancing HCV screening and treatment: lessons learned from field testing and follow up treatment uptake

Tony Lee¹, Sandra Karumberia¹, Ashley Gilmore¹, Ricardo Franco¹
¹UAB School of Medicine,

Background and Aims: We combine the use of rapid Point-of-care (POC) testing for hepatitis C virus (HCV) with dedicated patient navigation for HCV sero-positives facilitate linkage to care and progression in the treatment cascade in a primary care setting. We evaluate the POC testing yield, linkage to care (LTC) rates, the typical demographic profile of patients who enter and progress through the treatment cascade with primary care providers throughout Alabama.

Method: With support from FOCUS (Frontlines of Communities in the United States), and 17 community based testing sites, we targeted dense population centers in Alabama utilizing POC for community based screening efforts. A centralized coordinator reported positive cases to FOCUS and contacted subjects for LTC to partnering community health centers. For treatment uptake, with the support of Gilead Foundation we partnered with Federally Qualified Health Centers (FQHC) under the auspices of the Alabama Coalition for Testing, Interventions and Engagement in Hepatitis C Care (ACTIVE-C). Viremic patients were assigned to an ACTIVE-C On-Site Coordinator for follow-up medical evaluation. Primary care providers were supported with CME lectures and tele-video case consultations.

Results: Community sites tested 3930 unique individuals from November 2016 to October 31 2017. Among screened subjects, 419 or 10.7% were positive HCV antibody. Of these, 280 or 67% had a confirmatory RNA test performed and 223 or 80% were HCV viremic. Among HCV viremic individuals, greater than 90% successfully attended an appointment with an HCV treatment provider. Testing in opioid dependence treatment centers yielded 229 positives or a 29% antibody positivity rate. Among the 223 confirmed viremic, 13 cases were presented for case consults with a UAB ID physician to determine readiness for uptake into the treatment cascade. 9 cases entered treatment with SVR status pending. Among the 9 patients on treatment, 2 were in the baby boomer birth cohort and 7 were younger than the birth cohort.

Conclusion: The combination of partnership with community organizations and community health centers created a unique opportunity for targeting hard to reach populations. Utilizing primary care treaters created new access points particularly for the uninsured but challenges remain for patients who do not traditionally access medical care because of employment restrictions, transportation, and confinement in substance abuse treatment centres.
Prevalence of hepatitis C virus infection in patients attending the emergency department at university hospital of Wales, Cardiff

Yusra Qamar\textsuperscript{1}, Ian Blyth\textsuperscript{1}, Catherine Schofield\textsuperscript{2}, Rachel Jones\textsuperscript{1}, Jonathan Evans\textsuperscript{1}, Jo Mower\textsuperscript{3}, Wayne Parsons\textsuperscript{3}, Brendan Healy\textsuperscript{1}
\textsuperscript{1}Public Health Wales/ University Hospital of Wales, \textsuperscript{2}Cardiff University, Cardiff, United Kingdom, \textsuperscript{3} University Hospital of Wales

Background and Aims: Introduction of Direct-acting Antiviral (DAA) therapy has begun to reduce the burden of Hepatitis C Viral (HCV) infection in the UK. One limiting factor in the aim to eradicate HCV infection is the ability to identify undiagnosed patients, who are often asymptomatic. Additionally, many positive patients live in socio-economic deprivation with limited contact with healthcare services, making testing and treatment difficult.

Previous studies of Emergency Department (ED) attendees in UK hospitals found a HCV sero-prevalence of approximately 1-2\%. This is around 3 times higher than in the general UK population. Our aims were to:

1. Assess if University Hospital of Wales (UHW) ED patients have a similar HCV sero-prevalence as other UK city centres.
2. Determine whether an ED based screening programme is an effective and economically viable means of identifying patients with active HCV, amenable to treatment.

Method: This study was partly funded by a Gilead Fellowship grant. We tested the HCV antibody (HCV Ab) status of 1000 consecutive adult patients (>18 years old) attending the ED in UHW. Alongside this we contacted the antibody positive individuals and offered PCR testing and treatment if deemed appropriate.

Results: Over a ten month period 963 people were tested, with 11 individuals (1.1\%) testing HCV Ab positive. Out of these, 5 were contactable, 3 were PCR negative, 2 PCR positive; we have successfully linked 1 individual to HCV treatment via the Drug and Alcohol Treatment (DAT) service. Many of the patients found to be antibody positive had either no recorded telephone number/address to enable follow up, or did not respond to attempts of contact.

The approximate cost was £857 per sero-positive result, close to the cost at other sites in the UK, and £9,397 per successful link to treatment.

Conclusion: Despite an estimated 200 adult patients visiting UHW ED daily, patient testing took longer than expected. Due to the small number of eligible patients offered testing per day, there is likely to have been some selection bias. Some barriers to consenting all adults in the department may include: high staff turnover; unable to consent due to reduced consciousness/intoxication; time pressures; and lack of engagement from staff in the testing process.

Our results have demonstrated that the prevalence in UHW ED is similar to previous studies. However, the prevalence is much higher than the population as a whole, suggesting that testing in the ED department in Cardiff could be successful in identifying patients with hepatitis C. Despite this, the adoption of this strategy is not currently recommended due to the difficulties encountered in following patients up and linking them to care. For such a screening programme to be effective, solutions to the issues raised (selection bias and patient traceability following a positive result) would need to be addressed.
P08-05YI

Public opinion and HCV elimination program: does it matter in public payer systems? A preliminary survey

Jordan Boudreau¹, Jill Moore², Sharon Oldford¹, Lisa Barrett¹ ²
¹Dalhousie University, Halifax, Canada, ²Nova Scotia Health Authority, Halifax, Canada

Background and Aims: Population level HCV treatment strategies will be necessary to garner most benefit from HCV treatment and affect elimination. Most countries will need to engage broad scale public payer systems to cover the costs of such plans, however public opinion may play a role in influencing healthcare policy in democratic systems. Our goal was to assess public awareness and opinion around HCV treatment and elimination prior to introduction of a provincial HCV elimination strategy.

Method: Health care associated opinions were assessed in a Canadian province. A questionnaire was developed and beta tested to assess knowledge and attitudes related to nationally relevant health care initiatives, including HCV treatment, care and elimination. 30 adults (>18 years of age) were approached in public areas, and those providing appropriate informed consent completed the anonymous questionnaire. Those with self-identified literacy issues completed the task with assistance from a study team member. A combination of Likert scale, binary responses, and free text answers were used to gauge opinions. Open ended questions were analyzed by Braun and Clarke’s six phase analytic method.

Results: Of 28 respondents, none viewed HCV treatment and care as more of a priority than the 4 other health care priorities (youth mental health, cancer care costs, hip replacement wait times, homecare for seniors), and this was associated with high media coverage of the other issues. Only 8% of individuals had previously heard of HCV treatment plans, and 35% of respondents did not feel they knew enough about any of the health care issues to offer an opinion. In contrast, 66% of respondents believe the government and public health care system should make cure of all persons with HCV a priority. Thematic analysis identified proximity and prevalence as key factors in health prioritization, as well as a lack of knowledge. A minority of individuals linked risk behavior to treatment access, suggesting those who had ‘fault’ in HCV acquisition should not get access to publicly funded treatment.

Conclusion: While the majority of individuals feel HCV is an important public treatment priority for all persons, opinions surrounding HCV treatment and elimination are informed by lack of education in a beta testing public sample in one Canadian province. These preliminary data will be supplemented with a larger survey, and highlight that HCV is an important public issue even before education.
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