ISSUE BRIEF

MÉDECINS SANS FRONTIÈRES

NOT EVEN CLOSE

While advances in treatment offer new hope for millions of people living with hepatitis C, only a paltry fraction of people can access treatment; government inaction and industry monopolies continue to stand in their way.

Worldwide, an estimated 71 million people have chronic hepatitis C virus (HCV) infection, 72 per cent of whom live in low- and middle-income countries (LMICs).[1] HCV is a blood-borne virus that can lead to cirrhosis, liver failure and liver cancer, as well as a range of systemic health problems.[2] In 2015, more people were newly infected with HCV than were treated for it (1.75 million versus 1.1 million),[1] and more than 490,000 people died from HCV-related complications.[3] Estimates indicate that only 2.1 million people had been treated with newer sofosbuvir-based treatment regimens as of the end of 2016,[4] leaving 68.9 million people waiting for access to safer, more tolerable and more effective direct-acting antivirals (DAAs) to treat their HCV.

This issue brief provides information on currently available HCV diagnostics and treatments, including pricing and registration information from manufacturers of DAAs. Reasons underlying the continued lack of access to HCV treatment are discussed, including delayed scale-up by governments, intellectual property barriers, regulatory challenges and high prices.

Noor Alam, pictured with his son, Noor, was the first patient to be cured of HCV at MSF's Machar Clinic in Karachi, Pakistan.

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MEDECINS SANS FRONTIERES

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MSF nurse, Em Thyda, takes a patient's blood at the MSF HCV clinic at Preah Kossamak Hospital in Phnom Penh, Cambodia

PREVENTING HCV

HCV is a blood-borne disease that is transmitted most commonly through injection drug use, unsafe injection practices, unsafe health care, and the transfusion of unscreened blood and blood products.[5] Currently, there is neither a vaccine against HCV, nor any means to prevent mother-to-child transmission.

People who inject drugs are particularly vulnerable to HCV infection, 52 per cent of whom live with HCV worldwide.[6] Interventions to prevent HCV transmission among people who inject drugs are profoundly lacking in scale and impact. Only 68 of the 158 countries and territories where injection drug use has been documented have syringe exchange programmes. Only 78 countries offer opioid substitution treatment – and in most that do, coverage is inadequate.

TREATING HCV

Until 2011, HCV was treated with 24 to 48 weeks of pegylated interferon (PEG-IFN) and ribavirin (RBV), a regimen with a hefty price tag that cured barely half of the people who could endure its debilitating and toxic side effects.

In 2011, the first oral drugs, the HCV protease inhibitors boceprevir and telaprevir, were approved for use with PEG-IFN and RBV. At the same time, proof-of-concept was established for interferon-free treatment, and all-oral directly-acting antiviral (DAA) regimens were already in the pipeline. The combination of PEG-IFN with boceprevir and telaprevir was quickly replaced by newer interferon-free HCV treatment regimens based on DAAs, which are safer and more effective, and also simpler and more tolerable for people with HCV.

PAN-GENOTYPIC TREATMENT

Today, there are DAA regimens that are effective against all six HCV genotypes (pan-genotypic), that can achieve cure rates over 95 per cent after 12 weeks of treatment.[7] Pan-genotypic DAA regimens also eliminate the need for, and expense of, pre-treatment genotype testing. They will simplify procurement and delivery of HCV treatment, and facilitate scale-up of 'test-and-treat' programmes in LMICs. HCV is curable, and for people who can access these new treatment options, the standard of care has dramatically improved.

However, unjustifiably high prices have limited access to lifesaving DAAs in many countries, a pattern that has continued in 2017.[8] In middle- and high-income countries, high prices have made it difficult for governments and patients to get access to DAAs due to financial constraints (see Table 1). As a result, many countries are rationing HCV treatment with DAAs, providing them only for those with most advanced stages of disease. In most low-income countries, access to HCV treatment is even rarer – including in countries where low-cost generics can, in principle, be procured – due to general health system weaknesses and lack of health financing.

FROM THE LABORATORY TO THE BANK

GILEAD'S DAAS

In December 2013, the US Food and Drug Administration (US FDA) approved Gilead's sofosbuvir (SOF),[9] a pan-genotypic, once-daily nucleotide polymerase inhibitor that has become the backbone of many HCV treatment regimens. Gilead set a shocking launch price in the US: US$1,000 per tablet, or US$84,000 for a 12-week treatment course[10] (not including the other drug or drugs required for a full regimen). By Q2 of 2017, Gilead had made US$20.3 billion[4] on SOF alone. Meanwhile, their pricing schemes led to treatment rationing, whereby only the sickest patients are eligible for SOF in many countries. It also brought long-simmering concerns about drug pricing into the spotlight, triggered protests around the world, and even led to an extensive US congressional investigation. Although the US government did not take further action on its findings, the investigation uncovered Gilead's pricing strategy, which was solely based on maximizing profits,[10] and even framed SOF as a bargain, by comparing it to the price for a liver transplant in the US[11] (estimated at over US$575,000 in 2011).[12]

In October 2014, the US FDA approved a fixed-dose combination (FDC) of SOF and ledipasvir (LDV), an NS5A inhibitor, for genotypes 1, 4, 5 and 6,[13] which Gilead launched in the US with another hefty price tag of US$96,000 per 12-week treatment course.[14] In June 2016, Gilead's pan-genotypic FDC of SOF and velpatasvir (VEL, an NS5A inhibitor) was approved by the US FDA, and launched in the US at US$74,000 per 12-week treatment course.[15]

BRISTOL-MYERS SQUIBB'S DACLATASVIR (DCV)

In 2014, the European Medicines Agency (EMA) approved DCV, a pan-genotypic NS5A inhibitor from Bristol-Myers Squibb (BMS), for use with other HCV medicines.[16] The approval was based in part on results from clinical trials of interferon-free regimens including DCV and SOF, with or without RBV. DCV was approved by the US FDA in mid-2015; BMS launched it in the US at US$63,000 (or US$750 per tablet) for a 12-week treatment course.[17]

In a ground-breaking phase II clinical trial, DCV/SOF cured more than 90 per cent of the 206 participants.[18] DCV/SOF has since been proven safe, tolerable and highly effective, both in clinical trials and real-life practice.[18,19,20,21] In 2015, the European Association for the Study of the Liver (EASL) recommended DCV and SOF as the first interferon-free, pan-genotypic regimen, despite a limited amount of data in genotypes 5 and 6.[22]

COST OF PRODUCTION VS. PRICE

SOF and DCV are inexpensive to produce. In early 2015, the estimated mass-production cost for generic versions of SOF and DCV was US$122 per 12-week treatment course, including a 50 per cent profit margin.[23] As economies of scale are achieved and more companies have started producing generic DAAs, their production prices have dropped: by 2017, the estimated cost to profitably mass-produce a generic 12-week course of DCV/SOF had fallen to US$76 (with an estimated cost of $14 for DCV and $62 for SOF).[24]

TABLE 1: PRICES FOR AVAILABLE ORIGINATOR AND GENERIC DAAS IN SELECTED MIDDLE-INCOME COUNTRIES (IN $US PER 28-TAB BOTTLE)

COUNTRY* (Income Classification)	GILEAD SOF[25]	GENERIC SOF	GILEAD SOF/LDV[25]	GENERIC SOF/LDV	GILEAD SOF/VEL[25]	GENERIC SOF/VEL	BMS DCV 60MG	GENERIC DCV 60MG
Brazil[1] (UMIC)	$2,292						$850	
Egypt (LMIC)	$250	$51[(4)]	$300	--†			$167[(1)]	$7[(4)]
India (LMIC)	$250	$22[(4)]	$300	$65[(4)]		$283[(26)]	$167[(27)]	$13[(4)]
Jordan[28] (UMIC)			$22,220				$11,800	
Malaysia[29] (UMIC)	$11,053		$14,212		$18,239		$3,746	
Pakistan (LMIC)	$250	$15[(1)]		--†				
Thailand[73,‡] (UMIC)	$1,200		$2,000				$1,500 [(30)]	
Ukraine (LMIC)	$250		$300				$300[(31)]	

* Included in both BMS and Gilead voluntary licences: Egypt, India, Pakistan; included in Gilead voluntary license only: Malaysia, Thailand, Ukraine; excluded from both BMS and Gilead voluntary licenses: Brazil, Jordan.

† Generic SOF/LDV available; price not reported.

‡ SOF and SOF/LDV prices are for the private market. Thailand was recently added to Gilead's VL, but reduced price is not yet available.

Boxes shaded in grey indicate that the DAAs are not available in that country. All prices converted to USD using Oanda: https://www.oanda.com

UMIC = upper middle-income country; LMIC = lower middle-income country.

BREAKING DOWN THE BARRIERS

Several barriers must still be removed or prevented to ensure SOF/DCV, SOF/VEL and other pan-genotypic DAA regimens are available worldwide – particularly in LMICs, where only a million people had been treated for HCV with DAAs by 2016, the majority of them in Egypt.[1]

INTELLECTUAL PROPERTY (IP)

Patent and other IP monopolies are major barriers, preventing sustainable access to affordable DAAs for people with HCV in many countries. These monopolies enable originators to dictate prices as they please, without fear of competition, for 20 years – and sometimes even longer. However, countries are able to overcome many of these barriers through the use of multiple legal and policy flexibilities.

History has shown that generic competition plays a crucial role in making medicines more affordable and accessible. While the initial price of first-generation antiretroviral treatment for HIV/AIDS was over US$10,000 per patient per year, the introduction of generic formulations by producers in India and Brazil had a dramatic effect on the market, precipitating a 99 per cent price reduction over a short period of time.[32] This was possible because there were no IP barriers limiting production of first-generation ARVs in these two countries, allowing quicker market entry of generics and, therefore, price competition among suppliers. Subsequently, as patents became enforced more globally, both countries used different public health safeguards in their patent laws to ensure continued production and supply of affordable generic second-line ARVs.

Regrettably, the expansion of IP rules on medicines globally over the past 15 years has had a chilling effect on generic competition and sustainable access to affordable medicines, especially in middle-income countries (MICs). More countries have had to introduce patent protection on pharmaceutical products as required under the World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In addition, more countries are under pressure to negotiate and sign – or have already signed – free trade agreements that give pharmaceutical corporations additional monopoly rights that exceed countries' legal obligations under the WTO TRIPS agreement. Many of the additional obligations relate to harmful so-called 'TRIPS-plus' provisions, which are shown to undermine efforts to ensure access to affordable medicines and public health.

But countries can also be proactive and creative in using existing TRIPS flexibilities to promote affordable access to medicines.

In Egypt, access to more affordable generic DAAs has been possible because primary patent applications filed by Gilead and BMS were either rejected or withdrawn. Countries like Bangladesh, which is classified as a least-developed country (LDC), are not obliged to implement TRIPS or to provide patent protection for pharmaceutical products.* Generics companies in Egypt and Bangladesh have been able to produce and supply generic DAAs for their own populations, and also for people in other countries where patent and data exclusivity barriers are not a concern.

Early production of generics in other countries – and in India, in particular – has been possible due to the introduction of voluntary licensing agreements, which allow generic manufacturers to produce and supply medicines in countries that are specified under the license terms. However, the influence of these agreements on access to affordable DAAs is limited by geographic scope and other restrictions (see *Voluntary Licences*, page 5).

PATENT OPPOSITIONS

Oppositions on patents† for DAAs are being filed – and won – in some countries, because some of the primary patents or patent applications concerning DAAs represent old science, and do not merit patent protection according to patent laws in many countries. Similarly, the lack of inventiveness of combining different drugs in an FDC makes patents on FDCs of SOF plus other DAAs vulnerable to be challenged in many countries. Furthermore, companies have filed numerous secondary patent applications on DAAs that often lack merit, some of which may also need to be challenged to better ensure access.

In December of 2013, The Delhi Network of Positive People (DNP+) and the Initiative for Medicines, Access and Knowledge (I-MAK) filed the first patent challenge for SOF in India. Since

EGYPT MOVES TOWARDS HCV ELIMINATION

The rapid development of low-cost generic versions of DAAs in Egypt has revolutionised HCV treatment in the country, which has the world's highest prevalence of HCV (7 per cent). By not granting patents on SOF and rejecting Gilead's primary patent applications, the Egyptian government enabled local production and supply of generic SOF for the government HCV treatment programme. As of March 2017, Egypt had provided treatment for over a million people in the public sector via a massive national 'test-and-treat' initiative.[1]

* According to WTO laws, least-developed countries are exempted from obligation to provide patent protection, in general, until 2021, and are exempted from the obligation to provide patent protection for medicines until 2033.

† Challenging unmerited patents and patent applications through patent oppositions can remove or shorten the length of monopolies and enable the robust generic competition needed to dramatically reduce prices. Successful patent oppositions have created access to lifesaving drugs for millions of people in the past, and are now being employed as a legal measure to improve access to hepatitis C treatment.

then, numerous patent oppositions have been filed, or are being drafted, to challenge key patent applications on DAAs around the world, especially in high-burden countries where there are barriers to accessing affordable generic DAAs from Egyptian and Indian generics manufacturers (see Appendix 2 – *Examples of patent oppositions on DAAs led by civil society organisations*). Generics companies have also filed patent oppositions in India, but some have chosen to withdraw their cases (see *Voluntary Licences*, page 5).

In the European Union, a patent opposition filed by Médecins du Monde (MdM) and competitor companies resulted in a decision in February 2015 that invalidated one of Gilead's SOF patent applications (including many of the critical claims underpinning it).[34] Subsequently, Médecins Sans Frontières (MSF) joined forces with an MdM-led coalition of 17 civil society organisations to file post-grant oppositions against Gilead's primary patent on SOF in the EU.[35] In March 2017, the coalition filed additional patent oppositions with the European Patent Office to challenge another key SOF patent application that could block generic competition in 38 European countries.[35]

In China, I-MAK filed a patent opposition challenging one of Gilead's key patent applications on SOF, leading to a 2015 decision by the State Intellectual Property Office to reject the patent application.[36] In 2017, I-MAK also filed an invalidation in China to challenge another key Gilead patent on SOF.[37]

DATA EXCLUSIVITY

Beyond patents, other types of market exclusivities must also be addressed, especially those derived from regulatory provisions. One example is data exclusivity, which temporarily prevents a national drug regulatory authority (NDRA) from using clinical trial data from originators for the registration of a generic drug, as is the normal procedure for generics.[38] This blocks NDRAs from granting marketing authorisation to competitors, delaying the launch of generics for a certain period of time – even when no patent exists or a patent has expired – which can stretch from three to ten years. In Russia, the primary patent for SOF has been partially revoked,[39] but data exclusivity will prevent access to generic versions for six years[40] after registration of the originator. In Ukraine – where the primary SOF patent had not been granted – data exclusivity monopolies on SOF still prevented the sale of generic versions by producers who did not sign Gilead's voluntary licence (VL) agreement covering SOF until 2020.[41]

VOLUNTARY LICENCES (VL)

VLs are legal agreements between originator pharmaceutical corporations and generics manufacturers or third-party license management entities, such as the Medicines Patent Pool, through which they allow the supply of generic versions of a medicine in certain countries under set conditions. VLs include specific supply conditions, and often include a royalty paid to the originator. Patent-holding originator companies often determine the terms of VLs – including in which countries generic products can be made and sold.

India is often called the 'pharmacy of the developing world' for its role in producing affordable, quality assured generic medicines that have opened the pathway to treatment for millions of people around the world affected by HIV, tuberculosis and other infectious diseases. With encouragement from civil society organisations, generics companies in India made early progress in planning for the production of generic DAAs. As they began developing and filing registration dossiers for SOF and DCV, Gilead (and then BMS via Medicines Patent Pool) opted to manage this competition from Indian generics producers by offering VLs for SOF, SOF/LDV, SOF/VEL and DCV – even as the primary patent applications on the relevant products were under examination.

While VLs help to improve access for countries that are included in the geographic scope of the licenses, they exclude many high-burden countries – such as Brazil, China and Russia – which must pay whatever Gilead or BMS decides to charge for their DAAs.

Gilead

In 2014, Gilead signed VL agreements with multiple Indian generics companies, allowing generic versions of Gilead's DAAs to be sold in over 100 countries, leading to a significant lowering of prices due to competition.

Gilead tactically excluded most middle-income countries (MICs) – home to 72 per cent of people living with HCV[42] – from their VL, seeing them as lucrative markets for DAAs. Prices in these countries are still far out of reach for many governments that wish to implement wide-scale HCV treatment programmes, and also for people who must pay for DAAs out of pocket. Gilead has recently come under increasing pressure from civil society organisations in MICs, and from governments considering the option of compulsory licences (CLs).*

In Malaysia, SOF was initially priced at MYR 155,442 (US$40,000) per treatment course in the private market. Combinations of two DAAs were priced even higher at around MYR 300,000 (US$70,000). When the government negotiated to reduce prices for its public health programme, Gilead refused to lower prices below US$12,000 per course, a price considered too high to provide universal access to nearly half a million patients estimated to have chronic HCV in Malaysia.[43,44] The high price of SOF in Malaysia led the government to take substantial steps towards issuing a CL. In September 2017, Gilead finally announced its decision to expand its VLs to include Belarus, Malaysia, Thailand and Ukraine.[43] Recognising the need to foster competition beyond Indian licensed manufacturers, the government issued a government-use licence (a type of CL). This license will ensure access to DAA combination treatment at US$300 per 12-week course for Malaysia's public health program.[45,46] (see *Gaps in research and development*, page 11).

* TRIPS flexibilities give countries the right to use measures to increase access to medicines by overcoming patent barriers, including the use of compulsory licencing (the right to grant a licence on a patented pharmaceutical product without the patent holder's permission, so that countries can produce or import it) and parallel importing (the right to import patented medicines that are being sold at lower prices in other countries).

Gilead's VLs have also complicated efforts to increase access in other MICs. Some of the generics companies that filed patent oppositions in India chose to withdraw their cases. Instead, these companies signed Gilead's VL, limiting their sales of generic versions of Gilead's DAAs to countries within the geographic scope of the licence. The VL thus prevents them from supplying their generics (as well as raw materials) to many high-burden MICs in Latin America and Asia. Governments in these countries now need to explore importation of the raw material and/or generic DAAs from generics-producing companies that have not signed the VL.

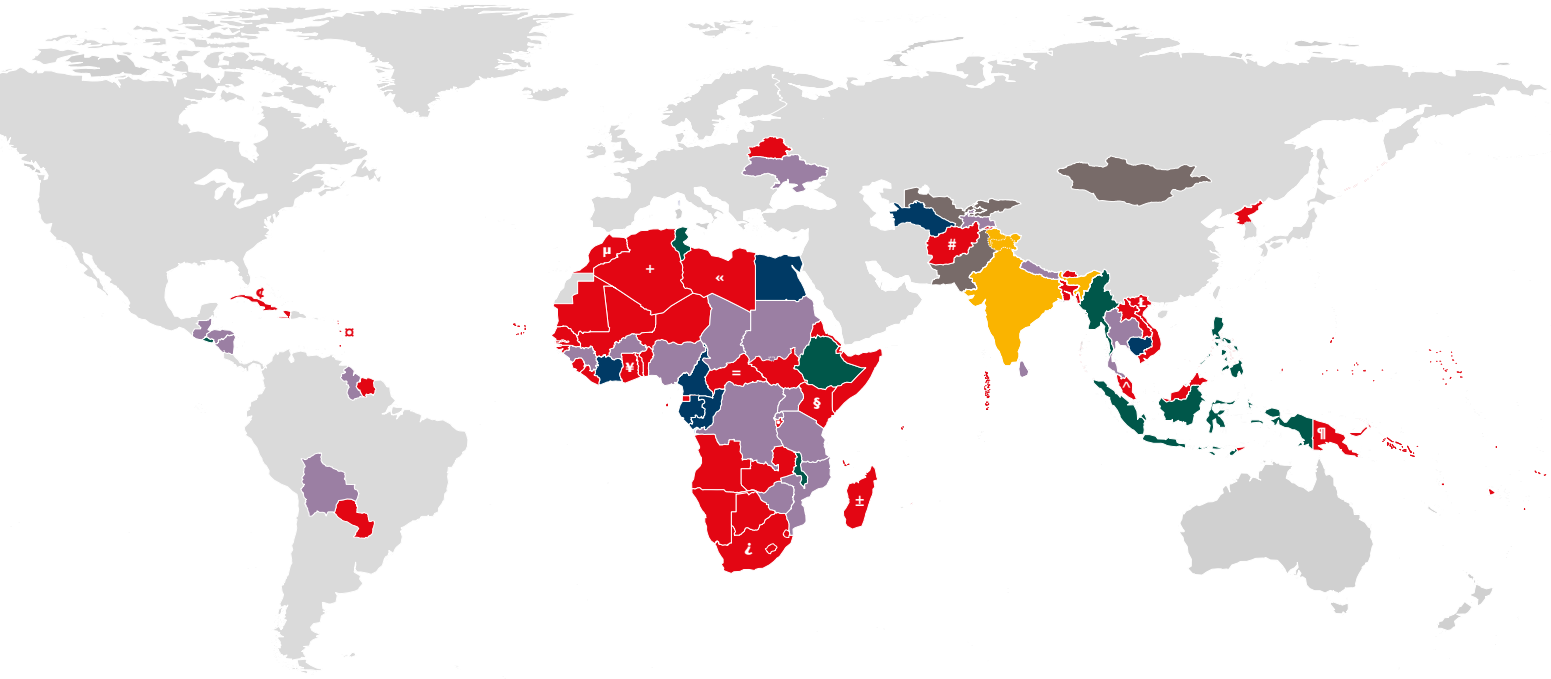
BMS

In November 2015, BMS introduced a VL for DCV via the Medicines Patent Pool. The geographic scope of the DCV VL is limited to most of the same countries as the Gilead VL, although some of its terms are less restrictive than those imposed by Gilead. Companies that did not accept a technology transfer package (when an originator company makes its technology available to a commercial partner) can register and sell their generic versions of DCV in countries that are outside of the territories included in the VL – as long as these countries have not granted patents on DCV.*

Strict patent examination and/or successful patent oppositions could facilitate generic competition in a number of the countries that have been excluded from VLs (such as Argentina, Brazil and China), allowing them access to lower-priced generics. These oppositions could also pressure Gilead and BMS to revisit the terms and conditions of their VLs.

REGISTRATION OF QUALITY-ASSURED SOFOSBUVIR IN COUNTRIES INCLUDED IN GILEAD'S VOLUNTARY LICENSE

People in 65 countries included in Gilead's voluntary license have **no access** to quality-assured source of sofosbuvir.



Number of quality-assured sources available

- No source
- 1 source
- 2 sources
- 3 sources
- 4 sources
- 5 sources

Note: Number of registered sources (as reported by manufacturers) that are quality assured by (i) Stringent Regulatory Authority, (ii) World Health Organization Prequalification Program, or (iii) Global Fund Expert Review Panel.

Estimated number of people infected with HCV who lack access (examples, select countries only)

# 184,000	¤ 68,000	^ 382,000
+ 275,000	¥ 404,000	µ 303,000
• 396,000	§ 393,000	¶ 94,600
= 15,500	« 36,000	¿ 357,000
¢ 49,500	± 169,000	Ł 998,000

Source: The CDA Foundation. Hepatitis C. 2017 [accessed 2017 Oct 17]. Available from: http://polarisobservatory.org

* BMS has withdrawn its primary patent on the DCV compound in many LMICs, such as Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan and Turkmenistan. Apart from Azerbaijan and Turkmenistan, the countries are not excluded from the territory of the BMS-Medicines Patent Pool licence.

REGISTRATION

The significant delay between the first regulatory approval of a medicine, which is often by the US FDA or EMA, and later marketing authorisation in developing countries – known as 'regulatory lag' – is another challenge to accessing DAAs. This delay is caused by the failure of originator companies and/or NDRAs to prioritise drug registration and availability in developing countries. So far, the trend among originator companies seems to be to abandon registration in countries that are not lucrative (or that are included in the territory of their VLs), including some high-burden MICs.[47,48,49,50]

NDRAs may wish to waive particular registration requirements (local phase III clinical trials, for example) to allow faster access to medicines for pressing public health needs. The waivers could then be followed by post-marketing submissions with additional data from companies to ensure the NDRA can fulfil its mandate to ensure the quality and safety of those medicines.

While there are finally two sofosbuvir formulations approved by the WHO Prequalification (PQ) Program, generics manufacturers are encouraged to prioritise dossiers, especially for DCV, for submission to WHO PQ. This will help to ensure availability of a quality-assured, pan-genotypic HCV treatment regimen for LMICs.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Shaukat, from Abidabad, Pakistan, is tested to see how he is responding to treatment for HCV during his first week receiving DAAs.

BMS has not publically disclosed DCV registrations in LMICs. Although BMS does make DCV available in countries where they have not registered it (via a UK distributor), the process must be done on a patient-by-patient basis, using import waivers. These waivers require patient-related information collected by the distributor, which is both unnecessary and unethical. In Malaysia and Ukraine, where BMS has made no effort to register DCV, HCV treatment options will remain limited until generic versions of DCV enter the market.

Gilead's failure to register their DAAs in many of the 105 countries within the VL territory has delayed or obstructed access to their products. To date, Gilead has registered SOF in only 27 countries,[48] SOF/LDV in only 24 countries,[49] and SOF/VEL in only three countries.[50] Gilead has created additional delays in access to generic DAAs by not registering their products in countries where originator registration is a prerequisite for registration of generic versions. In South Africa, for example, generics companies would not likely be able to provide the clinical trial data needed for registration without prior registration by the originator. Despite having signed VLs with multiple generics companies, quality-assured sources of SOF (from either Gilead or a generic company) are only registered in 40 countries, leaving behind two-thirds of countries in the VL.

Gilead's registration strategy was designed to maintain its monopoly in as many countries as possible. Gilead stopped filing dossiers for registration of SOF once SOF/LDV was US FDA- or EMA-approved, and halted SOF/LDV registration once SOF/VEL was US FDA- or EMA-approved.

REGULATORY CHALLENGES

In India, Indonesia, Malaysia, Thailand and Ukraine, people living with HCV have sensitised ministries of health (MoH) and NDRA officials about existing safety and efficacy data on DAAs, and have requested timely registration for SOF, DCV and SOF/LDV, including from generics manufacturers.[51]

In India, BMS did not conduct a phase III clinical trial for DCV or submit a registration dossier; instead, a generics producer filed the first registration dossier for DCV. Initially, India's NDRA refused the DCV dossier because of the country's requirement for a local clinical trial, which is a routine requirement for a new drug in India. Civil society organisations sent letters to the Indian MoH and NDRA, highlighting the unmet medical need for DCV, especially among people with cirrhosis who could not tolerate PEG-IFN, and the urgent need for DAA combination therapy.[52] India's Central Drugs Standard Control Organisation (CDSCO) finally waived the local clinical trial requirement and allowed registration of DCV on 14 December 2015.[53]

When SOF is not available as a single drug, it cannot be combined with non-Gilead drugs such as DCV to form a pan-genotypic, preferred treatment option. Gilead's measures forced countries to use SOF/LDV, a combination that is not effective against all HCV genotypes.

WHO PQ AND GLOBAL FUND EXPERT REVIEW PANEL (ERP)

To date, five generics manufacturers have submitted SOF dossiers for WHO PQ approval,[54] with two validated as of September 2017.[55]

Beyond its role in ensuring the quality, safety and efficacy of medicinal products, WHO PQ validation has an additional value: companies with prequalified products can take part in the WHO Collaborative Registration Procedure, which allows their DAAs to be registered in participating countries within three months, while reducing work load and burden for NDRAs.

Several companies have also submitted SOF dossiers to the Global Fund ERP; as of September 2017, four have been validated. The risk-benefit analysis of the ERP should not usually take more than eight weeks,[56] yet, despite having recently implemented a mechanism to prioritise new applications, SOF dossiers submitted in Oct 2015 took more than 18 months to finalise.[57]

As of September 2017, no generics manufacturers had submitted dossiers for other DAAs to WHO PQ, which means quality-assured, generic DCV, SOF/DCV FDC, SOF/LDV or SOF/VEL products will likely not be available for at least one year.

An MSF pharmacist distributes hepatitis C medicine at the MSF clinic at Preah Kossamak Hospital in Phnom Penh, Cambodia.

MAJOR THREAT TO HCV TREATMENT ACCESS DEFEATED IN UKRAINE

Although Ukraine, a MIC, has the highest HCV prevalence in Europe,[58] it was excluded from Gilead's DAA VL for SOF, SOF/LDV and SOF/VEL until only recently. In addition to its VL, Gilead had deployed a package of strategies to prevent generics producers from entering the Ukrainian market.

In Ukraine, Egyptian generics producer Pharco registered their generic version of SOF at a time when there was no blocking patent in force. Subsequently, Gilead also filed for registration of SOF, and used the argument that it was entitled to data exclusivity to challenge the registration of Pharco's generic SOF. Gilead lost the case, and appealed the decision. At the same time, Gilead threatened to sue Ukraine's government for more than US$800 million in damages for future profits, using 'investor-state dispute settlement' (ISDS) – a mechanism included in some trade and investment agreements – to bully Ukraine's government.[58] ISDS allows pharmaceutical corporations to sue governments for millions of dollars, and the process is conducted confidentially in arbitration courts, outside of a country's judicial system. Pharmaceutical corporations have used ISDS cases, or the threat of them, to pressure governments to give in to their demands for monopoly control above access to affordable, lifesaving medicines.

Under Gilead's threat to use ISDS, Ukraine abandoned its national judicial process and cancelled the marketing approval previously granted to Pharco's generic SOF. Subsequently, in September 2017, Gilead finally extended their VL to include Ukraine.[43] Price reductions for generic DAAs in Ukraine can be expected as a result, with the market now open to competition among multiple generics manufacturers.

MSF HCV TREATMENT PROGRAMMES

MSF has HCV projects in 11 countries. Since April 2014, thousands of people have been screened, with 10,513 testing positive and 4,858 of them started on treatment. Of those who have completed treatment to date, the overall cure rate – measured by sustained viral response – is 94.9 per cent.[59] MSF procures generic SOF and DCV from multiple sources, with the lowest prices from generic manufacturers reaching US$120 per 12-week treatment course.[60]

In Pakistan, MSF has set up a patient-support service where qualified counselors advise people on their hepatitis C treatment regimens and how to manage the disease in their daily lives.

FOCUS ON CAMBODIA

Given the originally high price of treatment, people with HCV have not been able to access treatment easily in Cambodia. In 2016, MSF started an HCV treatment project in collaboration with the Cambodian MoH and WHO at the Preah Kossamak National Hospital in Phnom Penh. It immediately attracted a huge number of people seeking the free diagnosis and treatment it offered. The project's ultimate goal is to demonstrate the feasibility and cost-effectiveness of a simplified, affordable 'test-and-treat' model of care for HCV.

"Most patients in the project are over 40 years old and have been aware of their HCV status for decades but unable to do anything about it – because treatment was either not accessible or not effective enough, or was associated with severe side effects. Although there was an increase in international funding for Cambodia in the 2000s that strengthened the health system, treatment for HCV was not prioritised. As people living with HCV got older, their lack of access to treatment became more critical.

Back in 2016, there were a few public announcements about the opening of the clinic. But in the first few days, a massive number of people showed up – hundreds of them. More than half of the people coming to the clinic today live outside the city; people come from all over the country, often traveling many hours, to access treatment at the clinic in Phnom Penh."

-MICKAEL LE PAIH - MSF HEAD OF MISSION, CAMBODIA

Dr Kim San is a Cambodian doctor who has been working with MSF since 2006. He's worked in various projects where MSF offered treatment for HIV and later, drug-resistant tuberculosis. In 2016 Dr San was part of the MSF team that started to screen for HCV in patients with HIV. He's now working with the team in Phnom Penh where people are receiving HCV treatment with DAAs.

"The small physical space, overwhelming number of patients and limited resources for expanding the project led, at one point, to waiting lists of up to eight months for treatment. Our ambition is to treat everyone diagnosed with HCV in our clinic, of course, but we do have very limited resources, and that's why we chose to prioritise people who needed treatment immediately. We haven't abandoned everyone else and they have appointments to come back in a year or when they are not feeling good. They're told treatment will still be available.

If they haven't been admitted in to our programme yet, patients try to be calm, they try to keep silent, but it is clear they really want to be treated. Even if we tell them the evolution of the disease is really very slow, and they say yes, they can wait, because they have no choice, I know in their mind they dream about treatment.

I feel very proud to be working on this project. When we started the HIV project here in Cambodia, nobody could treat the disease, and a lot of people were dying. MSF not only treated patients but also provided information on medical care to healthcare workers, and worked to convince drug companies to bring down drug prices for antiretrovirals for HIV. The same is now happening with HCV; the drugs were too expensive and the diagnostic procedures very complicated. But we are finding ways to make diagnostics and treatment simpler and faster so that everybody can access treatment."

-DR KIM SAN, CAMBODIA

Nov Sokha is 61 years old and lives in the outskirts of Phnom Penh. She was first diagnosed with HCV about twenty years ago. She had started feeling quite weak and went to have her blood tested. She said she hasn't had any formal treatment before coming to MSF, but followed some dietary recommendations from friends and family. Nov Sokha provided the following testimony before she started treatment with SOF and DCV in April 2017. Following her treatment, Nov Sokha had blood tests and learned in October 2017 that she was cured of HCV.

"The first time I felt sick, I went to hospital. I always felt tired. They told me that I have hepatitis C. I felt really apprehensive getting home from the hospital. I didn't know what to do. I just had to accept it and leave everything up to fate. I felt hopeless since I found out that I have this disease, but I always try to laugh and be happy on the outside. However, the inside of me is really sad and hopeless.

I went to the hospital and asked the other patients there how they felt after taking the medicines. They told me they felt better and stronger. Then I felt hopeful and believed that if I take the medicine I will also get better just like them.

I have been waiting and living with the tiredness for 20 years. I feel that after I get treated I will be very happy. I will start my new life."

Nov Sokha and MSF doctor, Dina Nhim, take a moment to celebrate after Nov learned she was cured of HCV following her treatment at the MSF HCV clinic at Preah Kossamak Hospital in Phnom Penh, Cambodia

Din Savorn is 50-year old father of three young children who lives and works as a police officer in Phnom Penh. Like many people with HCV in Cambodia, Savorn knew he was sick with the virus many years ago and struggled to find any effective and affordable treatment so he could continue to stay well and support his family. In early 2017, Savorn started on treatment, and in May, he heard the good news that he was cured.

Din Savorn poses with his children at his apartment in Phnom Penh, Cambodia.

"Before I started this treatment, I felt hopeless. I couldn't afford the new treatment and was waiting to die. Some people were bragging to me that they went to get treatment in Singapore and spent about [US]$10,000. Others went to Vietnam and spent about [US]$7,000 or $8,000. If I wanted to have the treatment, I needed to sell my house. If I sold my house, my kids would not have any shelter.

Then someone told me about a post on Facebook that Médecins Sans Frontières was offering this new treatment for free at Preah Kossamak Hospital. It was what I had been waiting for. I went straight to the hospital, and searched for the MSF clinic and registered myself.

This morning in the clinic when the doctor showed me the result, I was overwhelmed with relief. I was really happy and on the edge of crying."

ACCESS TO HIGH-PRICED DAAS IN HIGH-INCOME COUNTRIES

The high prices charged by drug companies for DAAs in wealthy countries have put major financial strains on their health systems, especially those built around the principle of universal health care. In many countries, including Australia, Italy and Canada, high DAA prices have led governments to ration treatment, thus limiting access to people with more advanced liver disease.

All countries are entitled under the WTO TRIPS agreement to utilise legal safeguards like compulsory licensing to lower prices and introduce affordable generics to meet the needs of people with HCV while maintaining the financial sustainability of the public health system.

AUSTRALIA

In Australia, the government responded to public pressure and negotiated with pharmaceutical corporations for better prices for HCV treatment. The Australian government negotiated a five-year, volume-based deal. It will ultimately spend a total of AUS$1 billion (US$767 million) to provide DAA treatment without a cap on the number of people who can receive it over the five-year period. In March 2016, HCV treatment became available without restrictions in Australia. By the end of the year, more than 30,000 people had started treatment, bringing the price per treatment course down to AUS$7,700 from $9,300 (to US$5,810 from $7,020).[61]

ITALY

In Italy, the government plans to eliminate HCV. Until recently, high DAA prices have limited treatment access to only the sickest patients.[62] After a long and unsuccessful negotiation process with Gilead, with the Italian government threatening to issue a compulsory license, Italy decided to list SOF and SOF/LDV as non-refundable under the country's national health service. Instead, they started negotiation with Gilead for pan-genotypic SOF/VEL, concluding with a confidential price. At the same time, AIFA (the Italian Medicines Agency) started to negotiate better prices with Merck and AbbVie. AIFA also broadened the treatment eligibility criteria to include all patients with HCV, with the intention to progressively eliminate the disease.[63] Finally, in March 2017, the Italian MoH allowed personal use of unregistered generic versions of medicines imported into Italy in order to overcome any outstanding restrictions on access caused by high prices.[64]

CANADA

In Canada, high prices have restricted DAA access to people with moderate-to-severe liver disease.[65] The pan-Canadian Pharmaceutical Alliance (pCPA) recently negotiated better prices for DAAs with pharmaceutical corporations by leveraging the collective buying power of the country's provinces.[66] The lower prices allow some provinces to improve access to DAAs for people with milder liver damage, but the newly negotiated prices remain a secret. This lack of transparency does nothing to help other high-income countries to negotiate prices.

GAPS IN RESEARCH AND DEVELOPMENT

Late-stage research and development (R&D) in HCV has been led by pharmaceutical corporations, who prioritise lucrative markets and non-collaborative strategies over public health needs. Companies are developing regimens with their own drugs only, instead of looking at combinations of the best-in-class DAAs.

Pharmaceutical corporations have prioritised development of DAAs for the HCV genotypes that are prevalent in high-income countries, instead of conducting clinical trials in all genotypes. Despite preclinical data that supports their efficacy in genotypes 5 and 6 (found commonly, but not exclusively, in South Africa and South East Asia),[67] only a handful of people with these genotypes have been included in clinical trials. For this reason, WHO was unable to recommend DCV/SOF as a pan-genotypic regimen in the 2016 update to their treatment recommendations,[68] although the combination is recommended as such in EASL guidelines[22] and will hopefully be included in the next WHO HCV guideline update.

The Drugs for Neglected Diseases *initiative* (DND*i*) is using a different approach to develop a pan-genotypic HCV regimen, with access and affordability built into their R&D plan. DNDi is collaborating with Pharco, an Egyptian generics manufacturer, to study a new DAA, ravidasvir (RAV), an NS5a inhibitor, in combination with SOF. Their clinical trials aim to develop a safe, tolerable and effective pan-genotypic regimen, while addressing various IP, price and regulatory issues in high-burden middle-income countries like Malaysia and Thailand. Pharco has committed to providing the combination of SOF/RAV for many LMICs at US$300 or less per patient once it has completed development.[69]

HCV DIAGNOSTICS

Access to affordable, adapted HCV diagnostics is limited by the complexity and cost of HCV testing. Currently, diagnosing active HCV infection is a two-step process (people who are anti-HCV positive need confirmatory viral load testing), making scale-up challenging – and expensive. Access to testing remains limited, especially in LICs, leaving many people unaware of their status.

Many people in high-burden countries must pay for their own diagnostics – which are priced out of reach and often only available at laboratories. Prices for viral load testing – used both for diagnosing HCV and to confirm if treatment is successful – range from US$25 to $200.[70] Affordable, high-quality rapid tests are urgently needed to sharply increase testing in countries with the highest HCV burden. But diagnostics companies are reluctant to invest in products that are more suitable for resource-limited settings because they see the developing world market as non-lucrative and fragmented. Simplified diagnostics (such as HCV rapid tests, viral load point-of-care technologies and dried blood spot testing) are needed to decentralise HCV testing and treatment. Until recently, only one rapid test (OraQuick) was WHO-prequalified, but its high price renders it unaffordable for resource-limited settings. Fortunately, a cheaper rapid test (SD Bioline) has now been WHO-prequalified and will be instrumental in expanding screening outside of health facilities.

Because high prices are forcing many countries to ration treatment, HCV programmes may perform liver disease staging on all patients so that they can identify and prioritise people with advanced liver disease. Several other tests must be done before treatment can be initiated, such as pre-treatment genotyping. As more data on new, pan-genotypic regimens and on DCV/SOF in genotypes 5 and 6 become available, it is likely that genotyping will no longer be necessary.

FINANCING

There is no international, global-level funding for HCV test-and-treat programmes. Unlike HIV, countries must rely on domestic funding, which has stifled the development of price-lowering, market-shaping strategies, including pooled procurement. However, a number of MICs, such as Brazil, Egypt, India and Malaysia, have started to domestically finance and scale up DAA treatment and develop plans in line with the WHO goal of elimination by 2030.

Unitaid and the Global Fund to Fight AIDS, Tuberculosis and Malaria have provided funding for HCV in the context of HIV co-infection, but only 3 per cent of all people with HCV are also HIV-positive.[71] Funding for this sub-population is a welcome first step, but is clearly inadequate for HCV elimination. Donors have not coordinated an effort to leverage their resources to impact markets for HCV diagnostics and DAAs.

CONCLUSION

Despite the WHO's ambition to eliminate HCV by 2030 – and despite the availability of a short-course, well-tolerated cure – access to HCV diagnosis and treatment is severely lacking. A determined course correction is required to ensure the public health potential of recent medical innovation is brought to bear to end needless suffering and death from HCV. Pharmaceutical companies and countries alike must begin by prioritising registration of quality-assured HCV diagnostics and medicines and ensuring sustainable and affordable pricing. Countries must also develop more accurate estimates of disease burden and strengthen HCV prevention programmes.

While many countries still lack the financial resources required to bring national HCV treatment programmes to full scale, prices for DAAs are rapidly decreasing in countries where generic DAAs are available. In 2015, MSF started procuring SOF and DCV from originator companies via their access programmes at a price of US$1,400 to $1,800 per 12 weeks of treatment. Today, MSF pays US$120 for generic formulations of this treatment regimen – a dramatically lower price that countries should target in their negotiations. While HCV treatment regimens remain priced out of reach for people paying out of pocket around the world, ongoing price reductions for generic DAAs should enable many countries to scale up access in the public sector at a more rapid pace. Governments with access to these lower prices must work harder to rapidly expand access to HCV treatment, and governments without access to these lower prices must employ strategies to bring down prices by other means.

APPENDIX 1:
ORAL HEPATITIS C VIRUS (HCV) TREATMENT OPTIONS AND PRICES

The **'General information'** section includes: the history of the product (first approval, originator company and brand name), relevant WHO guidance, latest available world sales of the originator and basic patent information. Products presented are approved by a Stringent Regulatory Authority, World Health Organization Prequalification Program or Global Fund Expert Review Panel.

Information in the table **'Developing country prices for direct-acting antivirals (DAAs)'** is presented as follows:

PRICE

All prices are quoted in United States Dollars (US$). Currency conversions were made on the day the price information was received using the currency converter site www.oanda.com. Prices are rounded up to the third decimal for unit price and to the nearest whole number for monthly price per bottle. The price of the smallest unit is included in brackets. Prices as quoted by companies, presented in US$ per bottle (28 tablets). The price in brackets corresponds to the price of one unit (tablet, capsule, etc).

CATEGORIES 1 AND 2 – ACCESS TO PRICE DISCOUNTS

Companies may apply different eligibility criteria to determine who can access their discounted prices for DAAs. This means that a country that is eligible for a price discount from one company may be excluded from the list of eligible countries by another company. When companies provide different tiers of discount, the countries eligible for the lowest price are grouped as 'category 1' and countries eligible for a discounted price that is not the lowest price are grouped as 'category 2'.

QUALITY

Products quality-assured by WHO Prequalification Programme, Global Fund Expert Review Panel or US FDA (as of September 2017) are in **bold** in the table of drug prices. Readers and purchasers wishing to obtain more information about the quality of DAAs are encouraged to consult their respective websites for approved and tentatively approved DAAs, as these lists are updated regularly.

GENERAL INFORMATION

DACLATASVIR (DCV)

Originator company and product brand name:
Bristol-Myers Squibb; Daklinza

Therapeutic class: *NS5A Inhibitor*

2016 WHO HCV & EASL Guidelines:
12-24 weeks in combination with SOF
(add ribavirin or extend treatment if cirrhotic)
Recommended for all genotypes in EASL Guidelines
GT 1-4 in combination with SOF in WHO Guidelines 2016 (due to limited information in other genotypes)

First approved by the US FDA/EMA:
US FDA 2015, EMA 2014

World sales of originator product (from Q3, 2014 to Q2, 2017): US$3.1 billion

Price information:

Company	Quality Assurance	Price per bottle, 28 tablets ($US)
BMS*	US FDA, EMA	167 – 250

* See DAA pricing table (page 16) for further information on BMS prices.

SOFOSBUVIR (SOF)

Originator company and product brand name:
Gilead; Sovaldi

Therapeutic class:
Nucleotide analog NS5B polymerase inhibitor

2016 WHO HCV & EASL Guidelines:
see DCV, SOF/LDV & SOF/VEL boxes

First approved by the US FDA/EMA:
US FDA 2013, EMA 2014

World sales of originator product (from Q4, 2013 to Q2, 2017): US$20.3 billion

Price information:

Company	Quality Assurance	Price per bottle, 28 tablets ($US)
Gilead*	US FDA, EMA	250
Hetero	Global Fund ERP	55
Mylan	WHO PQ	40 – 60
Pharco	Global Fund ERP	71 – 200
Cipla	WHO PQ	60
Strides	Global Fund ERP	Declined to provide pricing information.

* Originator prices only apply to countries in Gilead's "Access" program.

SOFOSBUVIR/LEDIPASVIR (SOF/LDV)

Originator company and product brand name:
Gilead; Harvoni

Therapeutic class:
Nucleotide analog NS5B polymerase inhibitor + NS5A Inhibitor

2016 WHO HCV & EASL Guidelines:
GT 1, 4, 5, 6 in WHO & EASL HCV Guidelines 2016. Treatment for 8 to 12 weeks, depending on pre-treatment viral load, cirrhosis and HCV treatment experience; extend treatment if cirrhotic

First approved by the US FDA/EMA:
US FDA 2014, EMA 2014

World sales of originator product (from Q3, 2014 to Q2, 2017): US$27.8 billion

Once daily, only available as FDC

No quality assured generic source of combination of SOF 400mg and LDV 90mg

No dossiers yet submitted to WHO PQ or Global Fund ERP

SOF cannot be used with amiodarone

Some drug-drug interactions with ARVs (nevirapine, and with boosted protease inhibitors AND tenofovir) and other commonly used drugs

Price information:

Company	Quality Assurance	Price per bottle, 28 tablets ($US)
Gilead*	US FDA, EMA	300

* Originator prices only apply to countries in Gilead's "Access" program.

SOFOSBUVIR/VELPATASVIR (SOF/VEL)

Originator company and product brand name:
Gilead; Epclusa

Therapeutic class:
Nucleotide analog NS5B polymerase inhibitor + NS5A Inhibitor

2016 WHO HCV & EASL Guidelines:
Not included in WHO Guidelines 2016
GT 1-6 in EASL Guidelines

First approved by the US FDA/EMA:
US FDA 2016, EMA 2016

World sales of originator product (from Q2, 2016 to Q2, 2017): US$3.8 billion

General information:
Once daily HCV treatment, only available as FDC

12 weeks treatment (if decompensated cirrhosis, add ribavirin)

No quality assured generic source of combination of SOF 400mg and VEL 100mg

No dossiers yet submitted to WHO PQ or Global Fund ERP

VEL cannot be used with efavirenz

SOF cannot be used with amiodarone

Price information:

Company	Quality Assurance	Price per bottle, 28 tablets ($US)
Gilead*	US FDA, EMA	300

* Originator prices only apply to countries in the Gilead voluntary licence

SOFOSBUVIR/VELPATASVIR/VOXILAPREVIR (SOF/VEL/VOX)

Originator company and product brand name:
Gilead; Vosevi

Therapeutic class:
Nucleotide analog NS5B polymerase inhibitor + NS5A Inhibitor+ NS3/4A protease inhibitor

2016 WHO HCV & EASL Guidelines:
Not included in WHO Guidelines 2016
Not included in EASL Guidelines 2016

First approved by the US FDA/EMA:
US FDA 2017, EMA 2017

World sales of originator product:
No data available

General information:
Once daily HCV treatment, only available as FDC

8 weeks treatment: (EMA only): non-cirrhotic and treatment-naive, all genotypes; consider 8 weeks for genotype 3 with cirrhosis)

12 weeks treatment: (EMA) treatment naive with compensated cirrhosis or treatment-experienced, non-cirrhotic or compensated cirrhosis, all genotypes; (US FDA) treatment-experienced (NS5A) non-cirrhotic or compensated cirrhosis, all genotypes; treatment-experienced (SOF, no NS5A) non-cirrhotic or compensated cirrhosis, genotype 1a or 3

Not recommended for use in Child-Pugh Class B or Class C cirrhosis

No quality assured generic source of combination of SOF 400/VEL 100mg/VOX 100mg

No dossiers yet submitted to WHO PQ or Global Fund ERP

SOF cannot be used with amiodarone

VEL and VOX cannot be used with efavirenz

VOX cannot be used with atazanavir or lopinavir

Price information:

Company	Quality Assurance	Price per bottle, 28 tablets ($US)
Gilead	US FDA, EMA	24,920 in US market ("Access" price/plans not publicly available)[72]

GLECAPREVIR/PIBRENTASVIR (G/P)

Originator company and product brand name:
AbbVie; Maviret, Mavyret

Therapeutic class:
NS3/4A protease inhibitor, NS5A Inhibitor

2016 WHO HCV & EASL Guidelines:
Not included in WHO Guidelines 2016
Not included in EASL Guidelines 2016

US FDA/EMA:
US FDA 2017, EMA 2017

World sales of originator product:
No data available

General information:

Once daily HCV treatment, only available as FDC (3 pills)

8 weeks treatment: treatment-naive, no cirrhosis, all genotypes (EMA and US FDA); treatment-experienced (SOF/RBV with or without PEG-IFN), no cirrhosis, all genotypes EXCEPT 3(EMA and US FDA)

12 weeks treatment: treatment-naive, compensated cirrhosis, all genotypes (EMA and US FDA); treatment-experienced (SOF/RBV with or without PEG-IFN), compensated cirrhosis, all genotypes EXCEPT 3 (EMA and US FDA); treatment-experienced (NS3/4A inhibitor only), no cirrhosis or compensated cirrhosis, genotype 1 (US FDA)

16 weeks treatment: treatment-experienced (SOF/RBV with or without PEG-IFN), with or without compensated cirrhosis genotype 3 (EMA and US FDA); treatment-experienced (NS5A inhibitor only), with or without compensated cirrhosis, genotype 1 (US FDA)

Maviret is not recommended for use in NS3/4A and/or NS5A treatment-experience (EMA)

Not recommended for use in Child-Pugh Class B cirrhosis; contraindicated for use in Child-Pugh Class C cirrhosis

No quality assured generic source of combination of G 300/P 120mg

No dossiers yet submitted to WHO PQ or Global Fund ERP

G/P cannot be used with ethinyloestradiol-containing products (i.e. some oral contraceptive pills)

G/P cannot be used with some ARVs including atazanavir/ritonavir, darunavir/ritonavir, lopinavir/ritonavir and efavirenz

Price information:

Company	Quality Assurance	Price per bottle, 28 tablets ($US)
AbbVie	US FDA, EMA	Abbvie has not released any 'access' plan for LMICs.

Sources: US FDA prescribing information and EMA summary of product characteristics for DCV, SOF, SOF/LDV, SOF/VEL, SOF/VEL/VOX and G/P; world sales data from Unitaid Technology and Market Landscape for Hepatitis C Medicines, August 2017. Available from: https://unitaid.eu/assets/HCV-Medicines-Landscape_Aug-2017.pdf

DEVELOPING COUNTRY PRICES FOR DIRECT-ACTING ANTIVIRALS (DAAS)

Developing country prices for DAAs have fallen considerably over the past two years. MSF started treating HCV with SOF and DCV from originators, via their access prices – between US$1,400 - $1,800 per 12-week treatment – in eligible countries. Today, generic manufacturers list prices as low as US$178.50, while MSF procures at US$120 for the same combination. Despite being included in Gilead's access pricing program, SOF/VEL has not yet been made available in any access country by Gilead.

DAAs in alphabetical order	Daily dose	Originator company		Generic companies							
Daclatasvir (DCV)		**BMS***		**Cipla**	**Hetero**	**Mylan†**		**Pharco**			**Strides**
		Category 1 countries	Category 2 countries			Category 1 countries	Category 2 countries	MSF & LICs	LMICs	UMICs	
DCV 30mg	1	**166.67 (5.952)**	**250 (8.93)**								
DCV 60mg	1	**166.67 (5.952)**	**250 (8.93)**		25 (0.893)	25 (0.893)	35 (1.250)	19.5 (0.696)	40 (1.429)	40 (1.429)	
Sofosbuvir (SOF)		**Gilead**		**Cipla**	**Hetero**	**Mylan†**		**Pharco**			**Strides**
						Category 1 countries	Category 2 countries	MSF & LICs	LMICs	UMICs	
SOF 400mg tablet	1	**250 (8.93)**		**60 (2.14)**	**55 (1.964)**	**40 (1.429)**	**60 (2.14)**	**70.5 (2.518)**	**110 (3.929)**	**200 (7.143)**	--‡
Sofosbuvir/ Daclatasvir (SOF/DCV)		**N/A**		**Cipla**	**Hetero**	**Mylan†**		**Pharco**			**Strides**
						Category 1 countries	Category 2 countries	MSF & LICs	LMICs	UMICs	
SOF/DCV (400/60mg)	1					70 (2.500)	100 (3.571)				
Sofosbuvir/ Ledipasvir (SOF/LDV)		**Gilead**		**Cipla**	**Hetero**	**Mylan†**		**Pharco**			**Strides**
						Category 1 countries	Category 2 countries	MSF & LICs	LMICs	UMICs	
SOF/LDV (400/90mg)	1	**300 (10.714)**			95 (3.393)	110 (3.929)	150 (5.357)				
Sofosbuvir/ Velpatasvir (SOF/VEL)		**Gilead**		**Cipla**	**Hetero**	**Mylan†**		**Pharco**			**Strides**
						Category 1 countries	Category 2 countries	MSF & LICs	LMICs	UMICs	
SOF/VEL (400/90mg)	1	**300 (10.714)**				150 (5.357)	200 (7.143)				

* BMS prices are reflective of their direct import / named patient program. Category 1 = Low-income & least-developed countries, Category 2 = low-middle income countries. Procurement is per 12-week supply.

† Mylan prices to be negotiated based on country and volume.

‡ Product approved by Global Fund Expert Review Panel. Company declined to provide pricing info.

APPENDIX 2:

EXAMPLES OF PATENT OPPOSITIONS FOR PATENTS ON DIRECT-ACTING ANTIVIRALS (DAAS) FOR TREATMENT OF HEPATITIS C VIRUS LED BY CIVIL SOCIETY ORGANISATIONS

Medicine(s)	Country	Filed by	Date	Remarks
Sofosbuvir (SOF)	European Patent Office	Médecins Sans Frontières (MSF)	27/03/2017	Molecules; under examination
		European Public Health Alliance; Just Treatment;	27/03/2017	Molecules; under examination
		Médecins du Monde	27/03/2017	Molecules; under examination
		Genzyme data, as reported by OTA	10/02/2015	Pro-drug; maintained in an amended form, under appeal
	India	Initiative for Medicines, Access & Knowledge	21/11/2013	Pro-drug; under appeal
		Initiative for Medicines, Access & Knowledge; Delhi Network of Positive People	17/03/2014	Molecules
		Sankalp Rehabilitation Trust	30/01/2015	Molecule; under appeal
		Sankalp Rehabilitation Trust; Hepatitis C Coalition of Nagaland; Asia Network of Positive People	25/08/2014	Pro-drug; under examination
		India Cares Foundation	23/06/2015	Molecules
		Initiative for Medicines, Access & Knowledge; Delhi Network of Positive People (DNP+)	10/02/2017	Polymorph; under examination
	Argentina	Fundación Grupo Efecto Positivo	18/05/2015	Pro-drug
		Fundación Grupo Efecto Positivo	14/02/2017	
	Brazil	Grupo de Trabalho sobre Propriedade Intelectual	06/2015	Base compound
	Ukraine	All-Ukrainian Network of People Living with HIV/AIDS	30/04/2015	Polymorphs; under examination
		All-Ukrainian Network of People Living with HIV/AIDS	09/02/2016	Processes; under examination
	China	Initiative for Medicines, Access & Knowledge	26/09/2014	Pro-drug; rejected
	Thailand	Thai Network of People Living with HIV/AIDS; AIDS Access Foundation	11/04/2017	11/04/2017
Sofosbuvir/ ledipasvir (SOF/LDV)	Ukraine	All-Ukrainian Network of People Living with HIV/AIDS	16/03/2016	Combination; under examination
Daclatasvir (DCV)	India	Hepatitis Coalition, Nagaland; Sankalp Rehabilitation Trust; Mumbai and Asia Pacific Network of Positive People (all of which are represented by the Lawyers Collective)	18/04/2015	Base compound; under examination
		Initiative for Medicines, Access & Knowledge; Delhi Network of Positive People	11/02/2017	Process; under examination
		Initiative for Medicines, Access & Knowledge; Delhi Network of Positive People	10/02/2017	Polymorph; under examination
Velpatasvir (VEL)	India	Initiative for Medicines, Access & Knowledge; Delhi Network of Positive People	11/02/2017	Molecules; under examination

REFERENCES

[1] World Health Organization. Global Hepatitis Report 2017. [Online]. 2017 [Cited 2017 May 30]. Available from: http://apps.who.int/iris/bitstream/10665/255016/1/9789241565455-eng.pdf?ua=1

[2] Ferri C, Ramos-Casals M, Zignego AL et al. International diagnostic guidelines for patients with HCV-related extrahepatic manifestations. A multidisciplinary expert statement. Autoimmun Rev. [Online]. 2016 Dec [Cited 2017 Jun 13]; 15(12): 1145-1160. Available from: https://doi.org/10.1016/j.autrev.2016.09.006

[3] Wang H, Naghavi M, Allen C et al. GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. The Lancet. [Online]. 2016 Oct 8 [Cited 2017 Jun 11]; 388(10053). Available from: http://dx.doi.org/10.1016/S0140-6736(16)31743-3

[4] Unitaid. Technology and Market Landscape Hepatitis C Medicines August 2017. [Online]. 2017 [Cited 2017 Oct 9]. Available from: https://unitaid.eu/assets/HCV-Medicines-Landscape_Aug-2017.pdf

[5] World Health Organization. Hepatitis C fact sheet. [Online]. July 2017 [Cited 2017 Oct 11]. Available from: http://www.who.int/mediacentre/factsheets/fs164/en/.

[6] Stone K. The Global State of Harm Reduction 2016. Harm Reduction International. [Online]. 2016 [Cited 2017 Jun 12]. Available from: https://www.hri.global/files/2016/11/14/GSHR2016_14nov.pdf

[7] Falade-Nwulia O, Suarez-Cuervo C, Nelson DR, Fried MW, Segal JB, Sulkowski MS. Oral Direct-Acting Agent Therapy for Hepatitis C Virus Infection: A Systematic Review. Ann Intern Med. [Online]. 2017 May [Cited 2017 May 28]; 2;166(9). Available from: https://doi.org/10.7326/M16-2575.

[8] Hill AM, Nath S, Simmons B. The road to elimination of hepatitis C: analysis of cures versus new infections in 91 countries. J Virus Erad. [Online]. 2017 Jul 1 [Cited 2017 Sep]; 3(3). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5518239/

[9] Gilead Sciences. U.S. Food and Drug Administration Approves Gilead's Sovaldi™ (Sofosbuvir) for the Treatment of Chronic Hepatitis C. Press Release. [Online] 2013 Dec 6 [Cited 2017 Jun 12]. Available from: http://www.gilead.com/news/press-releases/2013/12/us-food-and-drug-administration-approves-gileads-sovaldi-sofosbuvir-for-the-treatment-of-chronic-hepatitis-c

[10] United States Senate Committee on Finance. The Price of Sovaldi and its Impact on the US Healthcare System. [Online]. 2015 [Cited 2017 Jun 7]. Available from: https://www.finance.senate.gov/imo/media/doc/1%20The%20Price%20of%20Sovaldi%20and%20Its%20Impact%20on%20the%20U.S.%20Health%20Care%20System%20(Full%20Report).pdf

[11] The Economist. Costly Cures. [Online]. 2014 [Cited 2017 Jun 8]. Available from: http://www.economist.com/news/business/21603453-american-fight-over-expensive-new-treatments-has-global-implications-costly-cures

[12] United Network for Organ Sharing. Transplant Living. Costs. 2017 [Cited 2017 Jun 8]. Available from: https://www.transplantliving.org/before-the-transplant/financing-a-transplant/the-costs/

[13] Gilead Sciences. U.S. Food and Drug Administration Approves Gilead's Harvoni® (Ledipasvir/Sofosbuvir), the First Once-Daily Single Tablet Regimen for the Treatment of Genotype 1 Chronic Hepatitis C. Press Release. [Online]. 2014 Oct 10 [Cited 2017 Jun 14]. Available from: http://www.gilead.com/news/press-releases/2014/10/us-food-and-drug-administration-approves-gileads-harvoni-ledipasvirsofosbuvir-the-first-oncedaily-single-tablet-regimen-for-the-treatment-of-genotype-1-chronic-hepatitis-c

[14] Toich L. Will Hepatitis C Medication Costs Drop in the Years Ahead? Pharmacy Times. [Online]. 2017 Feb 8 [Cited 2017 Jun 14]. Available from: http://www.pharmacytimes.com/resource-centers/hepatitisc/will-hepatitis-c-virus-medicaton-costs-drop-in-the-years-ahead

[15] Chen C. Gilead's New Hepatitis C Drug Approved by FDA, Priced at $74,760. Bloomberg. [Online]. 2016 Jun 28 [Cited 2017 Jun 13]. Available from: https://www.bloomberg.com/news/articles/2016-06-28/gilead-wins-fda-approval-of-hepatitis-c-drug-for-all-genotypes

[16] European Medicines Agency. European Medicines Agency recommends approval of Daklinza in chronic hepatitis C. [Online]. 2014 Jun 27 [Cited 2017 Jun 14] Available from: http://www.ema.europa.eu/ema/index.jsp?curl=pages/news_and_events/news/2014/06/news_detail_002133.jsp&mid=WC0b01ac058004d5c1

[17] University of Washington. Hepatitis C Online. Daclatasvir (Daklinza). [Online]. [Cited 2017 Jun 14]. Available from: http://www.hepatitisc.uw.edu/page/treatment/drugs/daclatasvir

[18] Sulkowski MS, Gardiner DF, Rodriguez-Torres M, et al. Daclatasvir plus sofosbuvir for previously treated or untreated chronic HCV infection. N Engl J Med. 2014 Jan 16 [Cited 2017 Sep 12];370(3). Available from: https://doi.org/10.1056/NEJMoa1306218

[19] Pol S, Bourliere M, Lucier S, et al. Safety and efficacy of daclatasvir-sofosbuvir in HCV genotype 1-mono-infected patients. J Hepatol. [Online]. 2017 Jan [Cited 2017 Jun 14]; 66(1). Available from: https://doi.org/10.1016/j.jhep.2016.08.021

[20] Hézode C, Lebray P, De Ledinghen V, et al. Daclatasvir plus sofosbuvir, with or without ribavirin, for hepatitis C virus genotype 3 in a French early access programme. Liver Int. [Online]. 2017 Feb 8 [Cited 2017 Jun 14]; 37(9). Available from: https://www.ncbi.nlm.nih.gov/pubmed/28177199

[21] Wyles DL, Ruane PJ, Sulkowski MS, et al; ALLY-2 Investigators. Daclatasvir plus Sofosbuvir for HCV in Patients Coinfected with HIV-1. N Engl J Med. [Online]. 2015 Aug 20 [Cited 2017 Jun 14]; 373(8). Available from: https://doi.org/10.1056/NEJMoa1503153

[22] European Association for the Study of the Liver (EASL). EASL Recommendations on Treatment of Hepatitis C 2016. J Hepatol. [Online]. 2017 Jan [Cited 2017 May 30]; 66(1). Available from: https://doi.org/10.1016/j.jhep.2016.09.001

[23] Hill A, Simmons B, Gotham D, Fortunak J. Rapid reductions in prices for generic sofosbuvir and daclatasvir to treat hepatitis C. J Virus Erad. [Online]. 2016 Jan [Cited 2017 Jun 14]; 2(1). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4946692/

[24] Hill AM, Gotham D, Barber M, Pozniak A, Fortunak JM. Hepatitis C could now be cured for under $100 USD per person: analysis of mass generic production of Direct Acting Antivirals. Hepatology. 2016 Oct 1 [Cited 2017 Jun 14]; 63(1). Available from: https://liverlearning.aasld.org/aasld/2016/thelivermeeting/143849/andrew.hill.hepatitis.c.could.now.be.cured.for.under.us.24100.per.person.html?f=p14m3s893

[25] Gilead. Chronic Hepatitis C Medicines Pricing. [Online]. 2016 Sep [Cited 2017 Sep 13]. Available from: http://www.gilead.com/~/media/files/pdfs/other/chronic%20hepatitis%20c%20medicines%20pricing%20-%20september%202016.pdf

[26] MSF. Email communication with Leena Menghaney. 2017 Oct 13.

[27] MSF. Email communication with BMS. 2017 Mar.

[28] Jordan Food and Drug Administration. [Online]. [Cited 2017 Oct 11]. Available from: http://www.jfda.jo/Default.aspx

[29] National Hepatitis C Symposium, Kuala Lumpur, Malaysia: Increasing Surveillance, Improving Awareness & Eliminating HCV. 2017 Mar 9-10.

[30] Ministry of Public Health (Thailand). Drug and Medical Supply Information Center. [Online]. 2017 [cited 2017 May 5]. Available from: https://dmsic.moph.go.th/dmsic/index.php?p=1&type=3&s=3&id=drug_normal&keyword=SOFOSBUVIR%20FILM-COAT%20TB%20400%20MG&sch=3&sid=SOFOSBUVIR%20FILM-COAT%20TB%20400%20MG

[31] MSF. Email communication with BMS. 2017 Mar.

[32] MSF. Untangling the Web of Antiretroviral Price Reduction. [Online]. 2013 [Cited 2017 Jun 8]. Available from: https://www.msf.org/sites/msf.org/files/msf_access_utw_16th_edition_2013.pdf

[33] Elgharably A, Gomaa AI, Crossey MM, Norsworthy PJ, Waked I, Taylor-Robinson SD. Hepatitis C in Egypt – past, present, and future. Int J Gen Med. [Online]. 2016 Dec [Cited 2017 Oct 9]; 20;10. Available from: https://doi.org/10.2147/IJGM.S119301

[34] Silverman ED. European regulator amends some Gilead hep C patent claims. STAT News. [Online]. Boston, MA: STAT; 2016 Oct 6 [Cited 2017 Aug 27]. Available from: https://www.statnews.com/pharmalot/2016/10/05/gilead-sovalid-europe-invalidated/

[35] MSF. MSF joins Europe-wide action challenging patent on key hepatitis C drug. Press release. [Online]. 2017 Mar [Cited 2017 Aug 28]. Available from: https://www.msfaccess.org/about-us/media-room/press-releases/msf-joins-europe-wide-action-challenging-patent-key-hepatitis-c

[36] MSF. China rejects Gilead patent on hepatitis C drug sofobuvir. [Online]. 2015 Jun [Cited 2017 Sep 13]. Available from: https://www.msfaccess.org/about-us/media-room/press-releases/china-rejects-gilead-patent-hepatitis-c-drug-sofobuvir

[37] Shankar R. After India, I-MAK Files Legal Challenge Against Gilead's Hepatitis C Drug Sofosbuvir In China. Press release. [Online]. 2017 Apr [Cited 2017 Sep 13]. Available from: http://www.i-mak.org/media-articles/2017/4/24/after-india-i-mak-files-legal-challenge-against-gileads-hepa.html

[38] 't Hoen E. Private Patents and Public Health: Changing Intellectual Property Rules for Access to Medicines. Amsterdam: Health Action International. [Online]. 2016 [Cited 2017 Sep 13]. Available from: http://accesstomedicines.org/wp-content/uploads/private-patents-and-public-health.pdf

[39] International Treatment Preparedness Coalition Eastern Europe and Central Asia. [Patent for sofosbuvir partially annulled in the Russian Federation]. 2017 May 24 [Cited 2017 Oct 11]. Available from: http://itpcru.org/2017/05/24/v-rf-chastichno-annulirovan-patent-na-sofosbuvir/

[40] Meuller LL. Current State of Data Protection and Exclusivity in Russia. [Online]. 2015 Dec [Cited 2017 Sep 13]. Available from: https://bricwallblog.com/2015/12/30/current-state-of-data-protection-and-exclusivity-in-russia/

[41] Medspal. Medicines patens and licences database. [Online]. [Cited 2017 Oct 11]. Available from: www.medspal.org

[42] Woode ME, Abu-Zaineh M Perriëns J, Renaud F, Wiktor S, Moatti JP. Potential market size and impact of hepatitis C treatment in low- and middle-income countries. J Viral Hepat. [Online]. 2016 July [Cited 2017 Sep 16]; 23(7). Available from: https://www.ncbi.nlm.nih.gov/pubmed/26924428

[43] Rahman F. Inside views: Malaysia Inclusion In Gilead Voluntary Licence – A Product of Compulsory Licence Pressure. Intellectual Property Watch. [Online]. 2017 Aug [Cited 2017 Sep 17]. Available from: https://www.ip-watch.org/2017/08/24/malaysia-inclusion-gilead-voluntary-licence-product-compulsory-licence-pressure/

[44] Saez C. Malaysia Grants Compulsory Licence for Generic Sofosbuvir Despite Gilead Licence. Intellectual Property Watch. [Online]. 2017 Sep [Cited 2017 Sep 17]. Available from: https://www.ip-watch.org/2017/09/15/malaysia-grants-compulsory-licence-generic-sofosbuvir-despite-gilead-licence/

[45] DNDi. DNDi welcomes Malaysia's move to secure access to more affordable treatments for hepatitis C. [Online]. 2017 Sep [Cited 2017 Oct 9]. Available from: https://www.dndi.org/2017/media-centre/press-releases/dndi-welcomes-malaysia-move-access-affordable-treatments-hepc/

[46] Khor M. Action at last on Hepatitis C? The Star Online. [Online]. 2017 Sep 11 [Cited 2017 Sep 17]. Available from: http://www.thestar.com.my/opinion/columnists/global-trends/2017/09/11/action-at-last-on-hepatitis-c-the-decision-to-issue-a-governmentuse-licence-to-make-a-generic-drug-a/#

[47] Map Crowd. Registration status of Sovaldi® and Daklinza® world wide. [Online]. [Cited 2017 Sep 17]. Available from: http://mapcrowd.org/en/registration_status_of_sovaldi_and_daklinza

[48] Gilead. Sovaldi® registration in the developing world. [Online]. 2017 Jul [Cited 2017 Sep 7]. Available from: http://www.gilead.com/~/media/files/pdfs/other/registeration/sovaldi%20registration%20%20071917.pdf

[49] Gilead. Harvoni® registration in the developing world. [Online]. 2017 Jul [Cited 2017 Sep 7]. Available from: http://www.gilead.com/~/media/files/pdfs/other/registeration/harvoni%20registration%20document%20%2071917.pdf

[50] Gilead. Epclusa® registration in the developing world. [Online] 2017 Jul [Cited 2017 Sep 7]. Available from: http://www.gilead.com/~/media/files/pdfs/other/registeration/epclusa%20registration%20document%20%2071217.pdf

[51] Nagarajani R. Hepatitis C cure may cost as low as Rs 67k. Times of India. [Online]. 2015 Nov [Cited 2017 Sep 17]. Available from: http://timesofindia.indiatimes.com/home/science/Hepatitis-C-cure-may-cost-as-low-as-Rs-67k/articleshow/49966218.cms

[52] Mukherjeel R. Hepatitis C drugs face multiple hurdles. Times of India. [Online] 2014 Aug [Cited 2017 Sep 19]. Available from: http://timesofindia.indiatimes.com/business/india-business/Hepatitis-C-drugs-face-multiple-hurdles/articleshow/41127767.cms

[53] Central Drugs Standard Control Organization. List of Approved Drugs. [Online]. [Cited 2017 Sep 7]. Available from: http://www.cdsco.nic.in/forms/list.aspx?lid=2034&Id=11

[54] World Health Organisation. FFPs Under Assessment. [Online]. [Cited 2017 Sep 18]. Available from: https://extranet.who.int/prequal/content/dossier-status

[55] World Health Organisation. List of Prequalified Medicines. Sofosbuvir. [Online]. [Cited 2017 Sep 18]. Available from: https://extranet.who.int/prequal/search?search_api_views_fulltext=sofosbuvir&op=search

[56] The Global Fund. Timeline of the ERP Process for Pharmaceutical Products. [Online]. [Cited 2017 Sep 18]. Available from: https://www.theglobalfund.org/media/5587/psm_2017-02-selectedmedicinesmanufacturersexpressionofinterest_timeline_en.pdf

[57] MSF. Email communications with Pharco. 2015 Nov and 2017 Jun.

[58] Kovensky J. Company sues Ukraine in bid to corner hepatitis C drug market. Kyiv Post. [Online]. 2017 Jun [Cited 2017 Sep 8]. Available from: https://www.kyivpost.com/business/company-sues-ukraine-bid-corner-hepatitis-c-drug-market.html

[59] MSF. Internal communication. 2017 Oct 2.

[60] MSF. Internal communication. 2017 Oct 10.

[61] Dore GJ, Grebley J. Negotiating better discounts for DAA therapy is critical to achieve HCV elimination by 2030. J Hepatol. [Online]. 2017 Aug [Cited 2017 Sep 19]; 67(2). Available from: https://doi.org/10.1016/j.jhep.2017.03.035

[62] Cattaneo A. A pill too hard to swallow: how the NHS is limiting access to high priced drugs. BMJ. [Online]. 2016 Jul [Cited 2017 Sep 1]. Available from: http://www.bmj.com/content/354/bmj.i4117/rr-5

[63] Ansa R. E' arrivato in Italia il superfarmaco contro tutti tipi di epatite C. Ansa. [Online]. 2017 Apr [Cited 2017 Sep 25]. Available from: http://www.ansa.it/canale_saluteebenessere/notizie/sanita/2017/04/27/arrivato-il-superfarmaco-contro-tutti-tipi-di-epatite-c_b2aecfea-cf02-43d9-bb55-7efab867e054.html

[64] Bocci M. Epatite C, via libera all'acquisto dei generici all'estero. Repubblica Italy. [Online]. 2017 Mar [Cited 2017 Sep 25]. Available from: http://www.repubblica.it/salute/2017/03/29/news/epatite_c_via_libera_all_acquisto_dei_generici_all_estero-161724239/?ref=search

[65] Government of Ontario, Canada. Ontario Drug Benefit Formulary/Comparative Drug Index. [Online]. [Cited 2017 Oct 11]. Available from: https://www.formulary.health.gov.on.ca/formulary/limitedUseNotes.xhtml?pcg9Id=081800369.

[66] Grant K. Deal reduces prices of life-saving hepatitis C drugs for Canadians. Globe and Mail. [Online]. 2017 Feb [Cited 2017 Sep 19]. Available from: https://beta.theglobeandmail.com/news/national/deal-reduces-price-of-life-saving-hepatitis-c-drugs-for-canadians/article34107225/?ref=http://www.theglobeandmail.com&

[67] Messina JP, Humphreys I, Flaxman A, et al. Global distribution and prevalence of hepatitis C virus genotypes. Hepatology. [Online]. 2015 Jan [Cited 2017 Sep 19]; 61(1). Available from: https://www.ncbi.nlm.nih.gov/pubmed/25069599

[68] World Health Organization. Guidelines for the Screening, Care and Treatment of Persons with Chronic Hepatitis C Infection. [Online]. 2016 Apr [Cited 2017 Sep 18]. Available from: http://apps.who.int/iris/bitstream/10665/205035/1/9789241549615_eng.pdf?ua=1

[69] DNDi. Drugs for Neglected Diseases initiative and Pharco Pharmaceuticals to test affordable hepatitis C regimen with support of Malaysian and Thai governments. Press release. [Online]. 2016 Apr [Cited 2017 Sep 13]. Available from: https://www.dndi.org/2016/media-centre/press-releases/dndi-pharco-hepc-malaysia-thailand/

[70] MSF. Putting HIV and HCV to the Test. 3rd Edition. [Online]. 2017 Jul [Cited 2017 Sep 25]. Available from: https://www.msfaccess.org/sites/default/files/HIV_Report_PuttingHIVHCVtotheTest_ENG_2017.pdf

[71] Platt L, Easterbrook P, Gower E, et al. Prevalence and burden of HCV co-infection in people living with HIV: a global systematic review and meta-analysis. Lancet Infect Dis [Online] 2016 Jul. [Cited 2017 Sep 26]; 16(7). Available from: https://doi.org/10.1016/S1473-3099(15)00485-5

[72] Carly Helfand. Gilead gets its go-ahead for blockbuster hopeful Vosevi, but will 12-week dosing give it trouble? Fierce Pharama. [Online]. 2017 Jul 19 [Cited 2017 Oct 16]. Available from: http://www.fiercepharma.com/pharma/gilead-wins-blockbuster-approval-for-hep-c-trio-vosevi-but-will-12-week-dosing-give-it

[73] MSF. Email communication with Giten Khwairakpam. 2017 Oct.

A patient receives medication to treat his hepatitis C at MSF's clinic at Preah Kossamak Hospital in Phnom Penh, Cambodia.

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