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Hepatitis C: Public Policy Implications of a Silent Virus

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Requested by Assemblymember Mark Leno

JULY 2008

CRB 08-009

CALIFORNIA RESEARCH BUREAU

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ISBN 1-58703-239-2

Acknowledgements

The author would like to express her appreciation to several agencies and individuals for their assistance in locating, compiling, and providing resource for this report.

Thank you to various staff at the United States Centers for Disease Prevention and Control, the United States Centers for Medicare & Medicaid Services, the California Department of Corrections and Rehabilitation, the California Department of Health Services, the California Department of Public Health, the California Department of Veterans Affairs, the California Employment Development Department, and the California State Compensation Insurance Fund for their input on programs information, for allowing the use of prevention program graphs and data, and for compiling and providing budget data.

Thank you to former California Department of Health Services hepatitis C Coordinator Lori Fries and current Coordinator Rachel McLean for their assistance clarifying California program information, providing resource, and helping me to find the right person to talk to at various agencies and outreach organizations.

A special thank you to the *Kansas City Star* and Karen Dillon for allowing me access to web-archived files and resources that were part of an expose published in 2003 on hepatitis C. Ms. Dillon, along with Mike McGraw, wrote a series of articles related to post-transfusion hepatitis C and the archive contains numerous blood industry documents that were unavailable from other sources. Their series won multiple awards including the 2004 Heart of America Award for investigative journalism from the Society of Professional Journalists, and (as finalists) the 2004 Investigative Reporters and Editors Certificate. Karen Dillon is the winner of numerous national, state and local journalism awards including the George Polk Award in Journalism, Harvard University's Goldsmith Prize and she was once a finalist for the Silver Gavel.

Thank you to California Research Bureau Assistant Director Charlene Wear Simmons, Ph.D. for her indispensible assistance determining the content to include in this report.

Thank you to California Research Bureau Director Dean Misczynski for his comments on the final draft.

A huge thank you to Pat Kinnard, California State Library staff, and Ken Umbach of Umbach Consulting, for their unconditional assistance in locating and removing the "ghosts in the machine" that wreaked havoc during the formatting of the final report.

Finally, thank you, thank you, thank you to Danny Chang, Wanda Green, Katie Sarber, Amy Sullivan, and Megan Quirk for their assistance in the editing and final preparation of this report for publication. With special kudos to Wanda for her keen eye and skill as a gramatical editor and huge accolades to Amy, Danny, Katie, and Megan, who never once complained in spite of the literally hundreds of endnotes they had to proofread!

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EXECUTIVE SUMMARY

- Millions of people in the United States were potentially exposed to the Hepatitis C Virus (HCV) between 1943 when blood transfusions began and 1991 when blood screening for HCV was initiated. Although discussions regarding notification of blood recipients exposed to HCV began in 1989, regulations were not codified requiring notification until August of 2007. A 2000 study found that 76 percent of the identified recipients had died without having received notification of their potential exposure;

- Knowledge of HCV infection is the primary key to avoiding disease progression. It has been shown that lifestyle choices, such as *not* drinking alcoholic beverages, can greatly decrease the risk of disease progression;

- It is estimated that there are currently more than 5 million people in the United States infected with HCV. According to the United States Centers for Disease Control and Prevention most of them are unaware they are infected;

- Prevention efforts in support of reducing incidence of HCV have not kept pace with efforts for HIV/AIDS. In 1982 the first incidence of HIV/AIDS was noted. In 1983 the cause was found and by 1985 blood screening tools had been implemented for HIV/AIDS. In 1988 the *Understanding AIDS* brochure was sent out in a mass mailing to all United States households by then Surgeon General C. Everett Koop. A similar mailing for HCV was planned in 2000 by then Surgeon General David Satcher but never happened due to a lack of funding for postage. Funding enacted in 2008 in support of HIV/AIDS prevention at the federal level totaled $691,860 million. Funding for viral hepatitis for this same period totaled $17,504 million.

- Prevention efforts focusing on risk factor awareness are essential to reaching all individuals at risk for HCV infection including middle-aged working class men and women who were infected via blood transfusion, young adults who had blood transfusions as premature babies, veterans receiving transfusions or exposed to blood in combat, and individuals who experimented, even just once, with IV drugs;

- It is estimated that by 2021 more people will die annually from HCV than from AIDS;

- Up to 40 percent of all HCV infections are due to unknown causes;

- Enhancing HCV surveillance will assist public health officials to gain a better understanding of the disease process, improve our understanding of the financial burden, causes, prevalence, mortality and morbidity rates of the virus, and aid in the effort to halt the spread of HCV.

HEPATITIS C: OVERVIEW

Hepatitis means, simply, inflammation of the liver. It can be caused by one of five known hepatitis viruses (A-E), various bacteria, chemical exposures, parasites, alcohol abuse, toxic drug reactions, or other non-hepatitis viruses. Hepatitis C Virus (HCV) can manifest as an acute short-term illness or

a chronic long-term illness; with both forms being potentially life-threatening. Persons with HCV often show no signs or symptoms of the disease until they have reached end-stage liver disease; earning the virus the moniker, "The Silent Virus." Once a person has developed end-stage liver disease, their only treatment option is often a liver transplant.

> *"[Hepatitis C] rarely causes immediate illness, is often diagnosed by chance years or even decades after a person contracts it, and about 85 percent of the people develop "chronic" infections. Without significant additional research and medical intervention, the medical system may be increasingly overcome with people chronically ill from hepatitis C."*
>
> *~ Alan Brownstein, Former President/CEO, The American Liver Foundation*[1]

AN EMERGING EPIDEMIC: DISCOVERING A SILENT VIRUS IN THE BLOOD SUPPLY

Hepatitis C first came to the attention of scientists and the public health community in the 1940's. Although the cause and name of the virus had not yet been discovered, hepatitis infections had been noted at an alarming rate among recipients of blood transfusions. In 1970, a group of National Institute of Health Scientists speculated that up to 150,000 new cases of post-transfusion hepatitis were occurring annually. The study, written by the scientists in their private capacity, took issue with the failure of the National Research Council to recommend implementing screening devices that could potentially eliminate up to 40,000 infections annually. In 1987, in response to research revealing that HCV is potentially fatal, blood organizations voluntarily began screening. In 1988, the cause for the virus was discovered and by 1992 blood screening protocols were in place effectively eliminating additional incidence of post-transfusion hepatitis.

HCV is spread primarily through large and/or repeated blood-to-blood contact. Persons at high risk for HCV infection include intravenous drug users, recipients of blood clotting factors prior to screening in 1987, recipients of blood and organ donations prior to 1992, hemodialysis patients, people with undiagnosed liver problems, and infants born to women who have HCV. Emerging evidence suggests that life-style practices such as tattooing (including permanent cosmetics) and body piercing may be a greater transmission risk than previously thought.

Diagnosis of HCV is a complex process that requires medical evaluation and multiple laboratory tests. Current treatment options are expensive and often accompanied by debilitating side effects. The goal of treatment protocols is to render the virus undetectable in the blood. Because some patients experience a return of the detectable virus, the outcome of treatment is not referred to as a cure. Treatment of the most prevalent form of HCV in the United States renders the HCV virus undetectable in 42-46 percent of patients who complete the treatment protocol. It is estimated that 5,000,000 people in the United States are infected with HCV. Based on this, there are roughly 600,000 Californians infected with HCV, with 5,000 new infections occurring in the state annually. Based on national figures, it is estimated that 1,000 to 1,200 Californians die from HCV related complications each year. This figure is expected to triple by 2021 making the death rate associated with HCV higher than the death rate from AIDS.

In the United States, HCV is the most common blood borne viral infection, the leading cause of liver cancer, the tenth leading cause of death among adults, and the primary reason for liver transplants.

DIRECT AND INDIRECT COSTS ASSOCIATED WITH HEPATITIS C

In 1998, the United States Centers for Disease Control and prevention (CDC) estimated overall costs (direct and indirect) related to HCV to be $600 million nationwide. However, subsequent estimates of 1998 costs by independent researchers reveal overall costs upwards of $1.6 billion. One research group, Wong et al, found that the *direct* costs (i.e., the cost of health care interventions) of caring for individuals known to be HCV+ in 1991 will reach $10.7 billion annually between 2010 and 2019. This same group states that *indirect* costs (i.e., losses in worker productivity due to office appointments and hospitalizations, sick days, decreased worker status, disability, and/or death) for this population during this same period are likely to reach $75.5 billion per year.

Using the figures in the study by Wong et al, it is estimated that in California, during the period between 2010 and 2019, the annual *direct* costs of care for individuals known to be HCV+ in 1991 will reach $888 million. The annual *indirect* costs for this same time period are estimated to be roughly $6 billion. Because the estimates by Wong et al *do not* include costs for individuals diagnosed after 1991 their estimate should be considered conservative.

Although new infections may be decreasing as a result of blood screening protocols and increased awareness, experts agree that direct and indirect costs are anticipated to *increase* for the next 10 to 20 years as more persons reach end-stage-liver disease and more undiagnosed cases are discovered. Furthermore, as Sandler et al state, even when they do not develop chronic liver disease or cirrhosis, HCV patients incur substantial medical costs throughout their lifetime for the monitoring of their disease.

One clear example of the trend in rising costs is the continual increase in HCV related liver transplants between 1990 and 2006. Using the prevalence figure of 5 million HCV+ Americans, it can be expected that roughly 125,000 of them will one day require liver transplants; 15,000 of them will be Californians.

HEPATITIS C: POLICY ISSUES

DISEASE SURVEILLANCE: DATA TRACKING AND REPORTING

The surveillance of disease-related information first began in 1878 when Congress authorized the collection of epidemiologic data for cholera, smallpox, plague, and yellow fever in an effort to stop the spread of these life-threatening diseases. By 1928, all states as well as the District of Columbia, Hawaii, and Puerto Rico were reporting case history information on 29 different diseases. As of 2006, there are 80 reportable infectious diseases on the list, each with a clearly stated case definition detailing the laboratory and clinical diagnostic criteria that must be met before a case is reported

With regard to HCV data collection, a common theme among researchers and public health experts is the need for improved tracking and reporting. Challenges with diagnosis, a complex and non-standardized reporting system, and a lack of understanding among health providers of

the need to report new incidence of HCV all contribute to a lack of accurate data related to HCV.

PREVENTION AND CONTROL EFFORTS

Beginning in Fiscal Year (FY) 2001 at the federal level, a small pool of funding was earmarked for viral hepatitis prevention. Totaling less than 3 percent of the budget allocation for domestic prevention of HIV/AIDS and included as one of five types of viral hepatitis to be targeted, the proposed United States funding for viral hepatitis in FY 2009 is criticized by many as too little to be effective. Federal efforts focused on HCV prevention have been criticized as slow and ineffective by interest groups and Congressional Committees, as well as current and former Surgeon's General.

In October 1998 the House Committee on Government Reform and Oversight released *Hepatitis C: Silent Epidemic, Mute Public Health Response*. The report begins, "Called 'the silent epidemic,' the spread of hepatitis C Virus infection has evoked a Federal public health response almost as mute." The report states that United States Department of Health and Human Services (HHS) lookback attempts have "sputtered, and little has been accomplished," "disease reporting and surveillance is uneven," "research into HCV is uncoordinated," and that "[u]nless confronted more boldly, more directly, and more loudly by the Department of Health and Human Services, the threat posed by hepatitis C will only grow more ominous." The report summary closes by stating emphatically that "The time for aggressive implementation is at hand."

The CDC, in partnership with various governmental agencies, released *The Hepatitis C Prevention Strategy* in the summer of 2001. The strategy was written at the request of the Secretary of the Department of Health and Human Services, who specified the strategy should include details for notifying recipients of blood transfusions potentially infected with HCV, a process called *lookback notification*. Other than a brief mention in the Executive Summary, the prevention strategy discusses lookback notification only briefly by stating that "Development and distribution of educational messages for groups of persons at increased risk for infection should include persons transfused prior to July 1992."

A 2000 study focused on determining the effectiveness of HCV lookback programs reveals that of the 314 identified recipients, 238 of them (76 percent) were already dead.[2] As with regulations related to screening the blood supply, regulations requiring lookback notification were slowed by ongoing debate at the federal level and were not promulgated until August 2007.

As of the publication of this report, aggressive implementation of HCV prevention programs has not occurred, with one of the biggest oversights being the notification of recipients of HCV infected blood via the blood donation system.

California – The Hepatitis C Strategic Plan. In response to CDC recommendations, in the spring of 2001 California published *The Hepatitis C Strategic Plan: A Collaborative Approach to the Emerging Epidemic in California*. California is one of only 18 states that have published a strategic plan.

California hired its first HVC coordinator in 2001. The coordinator provides outreach and support to local governments and advocacy groups. While initially these efforts were supported using the appropriation in the amendments codified in 2000 to the [California] hepatitis C Education,

Screening, and Treatment Act, the funds have been spent and no additional funding has been appropriated.

California HCV Prevention Funding. According to staff at the California Department of Public Health, all funding appropriated specifically for HCV prevention in California has been spent. The California Department of Health Services Office of AIDS has diverted $427,519 of their budget to provide HCV testing for IV drug users in 54 local health jurisdictions throughout the state. At this time, this is the only pool of funding available for HCV prevention in California.

WORKERS COMPENSATION AND PRESUMPTIVE INFECTION

To receive worker's compensation benefits for lost wages and health care expenses related to HCV, employees must prove that they contracted the virus through work place injuries. While twelve states have enacted laws that presume public safety and health care workers who develop HCV while employed contracted the infection at work, unless the employer can prove otherwise, individuals infected at work outside of these fields have no such protection. Yet even in states with presumptive infection laws, specified workers are finding it difficult to collect benefits as employers fight to disprove workplace infection. This is especially true of workers infected prior to the inception of occupational exposure reporting guidelines.

There are no California laws providing for HCV presumptive infection of exposed workers.

ACCESS TO CARE AND INSURANCE

The successful treatment and management of HCV is dependent upon continuous access to health care resources. It is a well-known fact that people with health insurance are more likely to have continuous access to health care. Continuous access to health care has been shown to result in more positive health outcomes for patients and better management of chronic illnesses. While having insurance of some type provides a higher level of access to care than being uninsured, just being insured does not guarantee access; the type of insurance that a beneficiary has plays a major role in access to care. Persons with HCV infections are at risk for having no insurance coverage if employer based coverage or coverage via a spouse are not available to them. Public insurance programs are available, but eligibility and availability can be limited depending on the situation of the individual.

HEPATITIS C PREVENTION POLICY OPTIONS

DISEASE SURVEILLANCE: DATA TRACKING AND REPORTING

- **Implementation of full compatibility with the United States Centers for Disease Control and Preventions' Public Health Information Network (PHIN) and National Electronic Disease Surveillance System (NEDSS) (pp. 31-33, 35);**

  California began this process in June 2003 with the enactment of the California Public Health Information Network (Cal-PHIN). It is unclear when Cal-PHIN will be fully implemented (pp. 38-39).

- **Implementation of laboratory based reporting nationwide (p. 35);**

  California codified regulations requiring laboratory based reporting in 2007 (p. 37). It is unclear when electronic reporting via the Cal-PHIN network will be operational (pp. 38-39).

- **Standardization of reporting requirements to mandate use of the CDC's Draft Viral Hepatitis Surveillance Report (VHSR) form (p. 33, 36);**

  California requested, via a January 2006 memo titled "Reporting of Acute Hepatitis C", that all communicable disease officers utilize the CDC's Draft Viral Hepatitis Case Report; aka Draft Viral Hepatitis Surveillance Report (p. 37). The letter noted that a working group had been created to provide "better guidance on the reporting of chronic hepatitis C." To date, no additional guidance has been published.

- **Enhanced laboratory testing and education (p. 36); and**
- **Creation of a confidential database to track chronic infections (p. 36).**

PREVENTION AND CONTROL EFFORTS

- **Increase funding allocated to hepatitis C prevention (pp. 54-55);**

  According to advocacy groups, the current level of federal funding for HCV is inadequate to fight an epidemic of this magnitude (p. 54-55).

  In California, all funding appropriated in the 2000 Hepatitis C Education, Screening, and Treatment Act has been spent. No additional funds have been appropriated (p. 56-57).

- **Implement new strategies for prevention based on 26 years of experience with HIV/AIDS prevention (pp. 43-46); and**
- **Emerging evidence suggests tattooing, permanent cosmetics, and body piercing may hold more risk for transmission than previously recognized. Research funds should be provided to allow further exploration of these risk factors (pp. 4-5).**

  Ensure sterilization, sanitation, and safety standards for Tattooing, Permanent Cosmetics, and Body Piercing as recommended by the California Conference of Local Health Officers are enforced at the local level (pp. 4-5, 56).

ACCESS TO CARE AND INSURANCE

- **Continuity of care is essential to slowing the progression of HCV, reducing the direct and indirect costs, and to ensuring that effective disease management practices are in place. Therefore, unrestricted access to health care providers must exist (pp. 63-66).**

HEPATITIS C: OVERVIEW

Hepatitis means, simply, inflammation of the liver. Hepatitis may be caused by one of the five known hepatitis viruses (A-E), various bacteria, other non-hepatitis viruses, alcohol abuse, certain chemical exposures, parasites, and toxic drug reactions.[3] Hepatitis C Virus (HCV) can manifest either as an acute short-term illness, or as a chronic long-term, potentially life-long illness.[4] For the purposes of this report, when referring to someone who is HCV Positive (HCV+) this means that the person has been tested and shown to have active virus present in their blood. As will be discussed in a later section of this report, this differs from testing positive for HCV anti-bodies.

AN EMERGING EPIDEMIC: DISCOVERING A SILENT VIRUS IN THE BLOOD SUPPLY

In 1943, medical professionals noticed that some patients receiving blood transfusions were developing hepatitis.[5] Blood banking had just begun in earnest and transfusion rates were increasing.[6] The resulting increase in transfusions raised concerns for medical professionals who feared this new life-saving measure might also provide a route of transmission for agents that cause hepatitis.[7]

By the late 1960's, blood transfusions had been shown to be a high risk transmission route for hepatitis and, as a result of on-going scientific studies, the various causative agents for post-transfusion hepatitis began to emerge.[8] A paper published in July 1970 by three research scientists with the National Institutes of Science in their private capacity, estimated that there were over 150,000 incidences of post-transfusion hepatitis occurring annually.[9] The study, written by the scientists in their private capacity, also took issue with the failure of the National Research Council to recommend implementing screening devices that could potentially eliminate up to 40,000 infections annually.[i] After medical scientists identified the hepatitis B virus, it was discovered that only 20 percent of post-transfusion hepatitis was caused by hepatitis B and the search for other causative agents of hepatitis in the blood supply continued.[10] As a result of this research, it was discovered in the early 1970's that paid blood donors were more likely to be carriers of the causative agents than non-paid blood donors. This discovery eventually resulted in a shift to an all-volunteer blood donation system. This is also when discussions on screening donors for hepatitis began.[11]

By 1973, researchers had discovered the hepatitis A virus and a second unknown hepatitis virus in the blood supply. After testing post-transfusion hepatitis sufferers for both viruses, they were shocked to discover that not a single case of post-transfusion hepatitis was caused by the hepatitis A virus. They could now conclusively show that 80 percent of all post-transfusion hepatitis was caused by a virus of unknown origin. The unknown virus was temporarily named (non-A, non-B hepatitis) while researchers continued to search for the cause.[12]

In 1988, the cause for the new virus was discovered and it was renamed hepatitis C.[13] By 1994, blood-screening protocols for HCV were designed and implemented all but eliminating the risk of HCV transmission through the blood donor system.[14]

---

[i] See section titled, *Post-Transfusion Hepatitis – Cleaning Up the Blood Supply*, for more details.

RISK FACTORS AND SOURCES OF INFECTION

According to the United States Centers for Disease Control and Prevention (CDC), sources of infection for HCV include injection drug use (60 percent), receipt of a blood transfusion prior to blood screening protocols being implemented in 1994 (10 percent), occupational exposures (4 percent), and other exposure routes (1 percent). The "other" category includes nosocomial infections[ii], iatrogenic infections[iii], and perinatal[iv] transmissions.

Sources of infection for HCV are divided into three risk categories (see Table 1): High Risk, Intermediate Risk, and Low Risk. Those at high risk of infection include injection drug users and recipients of blood clotting factors (generally hemophiliacs) made before 1987. Persons at intermediate risk for infection include recipients of blood and organ donations prior to 1992, hemodialysis patients, people with undiagnosed liver problems, and infants born to women who are HCV+.[15]

HCV is spread primarily through large and/or repeated blood-to-blood contact.

Hugging, kissing, sharing eating utensils or beverages, sneezing, coughing, and other casual contacts are not transmission routes.

Infection status should not exclude HCV+ individuals from work or school environments, social activities, childcare, or other casual contact settings.

Low risk individuals include healthcare and public safety workers, persons with multiple sexual partners, and persons in monogamous long-term sexual relationships, even if one partner is known to be HCV+.[16]

With regard to sexual transmission, although 15 percent of currently infected individuals report sexual transmission as their only risk factor, studies of long-term sexually monogamous partners with no other risk factors reveal only a 1.5 percent risk of transmission from sexual activity. Furthermore, as with the Human Immunodeficiency Virus (HIV), transmission from males to females is more likely than transmission from females to males.[17] Unless other risk factors are present, sexual transmission of HCV is unlikely to occur.

[ii] Nosocomial infections are infections that are acquired in a hospital or hospital like setting such as a hemodialysis center.

[iii] Iatrogenic infections are infections that are a direct result of health worker error.

[iv] Perinatal transmissions are infections that are passed to the fetus by the mother in vitro.

Risk Factors and Sources of Infection

HCV is spread most efficiently through large and/or repeated direct blood-to-blood transfer.[18] There is evidence that HCV may be present in semen samples, but risk factor reporting and studies have shown that there is a low risk of transmission in bodily fluids other than blood.[19]

Table 1 – Sources of Infection for Persons with hepatitis C

High Risk	Intermediate Risk	Low Risk
• Injection Drug Users • Recipients of clotting factors prior to 1987	• Recipients of blood and organ donations prior to 1992 • Hemodialysis patients • Persons with undiagnosed liver problems • Infants born to women infected with HCV	• Healthcare and public safety workers • Persons with multiple sexual partners • Persons in monogamous long-term relationships even if one partner is known to be infected with HCV

Table Source: United States Centers for Disease Control, *hepatitis C Fact Sheet*

Less common routes of infection include sharing objects such as razors, nail files, nail clippers, toothbrushes, and dental devices. The sharing of delivery devices for nasally inhaled substances[v] is suggested, but not proven, and is considered low-risk.[20] Lifestyle practices where there is the potential for blood-to-blood contact such as tattooing, body piercing, and acupuncture[vi] are considered by the CDC to be low risk activities.[21] Tattoos received in prisons cause a much greater risk of HCV transmission due to the lack of sterile equipment and high rate of infection among prison populations.[22]

However, a growing pool of evidence is emerging that reveals tattooing, body piercing, and acupuncture may have an increased risk of transmission for the *chronic*[vii] form of the virus.[23] According to Haley and Fischer, the CDC has focused primarily on discovering transmission routes for acute hepatitis C while overlooking transmission routes that lead directly to chronic infection, such as tattooing.[24] They note that, "Tattooing in commercial tattoo parlors is known to transmit

[v] Such implements include straws or similar objects for powder cocaine use and nasal inhalers for other substances such as allergy medicines and nasal irrigators.

[vi] Although considered low risk routes of transmission, the Hepatitis C Support Project encourages people who are considering a tattoo, body piercing, or acupuncture to avoid disease transmission by ensuring that the facility they choose practices adequate safety precautions such as using only new or sterilized equipment and not sharing ink pots or other materials that may come into contact with blood.

[vii] A discussion clarifying the distinction between acute and chronic hepatitis C is included in the section titled, "Disease Progression."

blood-borne viral infections, including hepatitis C virus (HCV), in other countries, but its contribution to the high population prevalence of HCV infection in the United States has been incompletely evaluated."[25] In the 2000 study Haley and Fischer conclude, "We found that commercially acquired tattoos accounted for more than twice as many hepatitis C infections as injection-drug use. This means it may have been the largest single contributor to the nationwide epidemic of this form of hepatitis." Likewise, a study published in 2005 suggests a link between transmission of HCV and the sharing of jewelry used in body piercings.[26] It has also been suggested that jewelry used in ear piercings is not considered a higher risk because ear tissue is composed primarily of cartilage, unlike other areas of the body where there is more blood flow to tissues.[27] Although one study that calls for additional research in this area suggests ear piercings may be also be a significant risk.[28] Teresa Hanbey, Executive Director for the Hepatitis C Outreach Project, finds this especially concerning given the high number of teens and college age students who receive tattoos and piercings.[29]

It is generally accepted that hugging, kissing, sharing eating utensils or beverages, sneezing, coughing, and other casual contacts do not transmit HCV.[30] Given this, infection status should not exclude HCV+ individuals from work or school environments, social activities, childcare, or other casual contact settings.[31]

HCV of Unknown Origin. According to the CDC, roughly 10 percent of individuals that are HCV+ do not know how they contracted the virus; they have no risk factors or known exposure to the virus.[32] Other estimates place this number as high as 40 percent.[33]

"Prior studies were unable to account for a substantial proportion of infections… [t]hat suggested that important risk factors were yet to be identified. Tattooing appears to be one of those. It has been proven to be an important route of infection in other countries, but its role in the United States has received too little study until now."

~ Dr. Robert Haley, Director of Epidemiology, University of Texas Southwestern Medical Center [34]

RISK FACTORS FOR CHILDREN

Before 1990 when blood-screening protocols were implemented, blood transfusions were the primary cause of HCV in children.[35] Also, as stated earlier, some studies show that women with HCV are capable of passing the virus on to their unborn children via perinatal transmission.[36]

Breastfeeding is not known to be a route of transmission. Studies of bottle-fed versus breastfed babies born to HCV+ mothers reveal an equal level of risk (4 percent) associated with both.[37] However, if an HCV+ mother develops cracked or bleeding nipples, the risk of transmission may increase. The CDC suggests bottle-feeding the infant until the condition resolves.[38]

RISK FACTORS FOR WORKPLACE EXPOSURES

The CDC defines persons considered at risk for workplace exposure to HCV as persons "whose activities involve contact with patients or with blood or other body fluids from patients in a health-care, laboratory, or public-safety setting." This includes physicians, nurses, nurse's aids, phlebotomists, laboratory techs, police officers, fire fighters, paramedics, emergency medical technicians, janitors working in these facilities, and other health and safety personnel.[39]

Routes of exposure include needlestick injuries or cuts with other sharp objects that may have infected fluids on them (i.e. scalpels) and contact of infected fluids with worker mucous membranes, eye conjunctiva, or non-intact skin. Fluids of utmost concern are blood and other body fluids containing visible blood, semen, and vaginal secretions. Other bodily fluids (feces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomit) are not considered infectious unless they contain blood. Of main concern are percutaneous injuries such as cuts with sharp objects or needlestick injuries. Of secondary concern are mucous membrane exposures. Although rare, there are some documented cases of HCV transmission to healthcare and public safety workers resulting from blood splashes entering the eyes. Direct contact with the virus (i.e. where there is no protective barrier such as gloves used) in a laboratory or production facility is also cause for clinical evaluation. At this time, there are no documented cases of infection related to other routes of transmission for healthcare and public safety workers.[40]

RISK FACTORS FOR VETERANS

Currently, military service alone is not considered a risk factor for HCV, although the period of time in which a veteran served may be a factor.[41] The U.S. Department of Veterans Affairs (VA) reports that veterans who served in Vietnam (63 percent), post-Vietnam (18 percent) and Korea (5 percent) are most likely to test positive for HCV antibodies, meaning they were exposed to the virus, but, as will be explained in more detail in a later section of this report, do not necessarily have active HCV.[42]

It has been suggested that the reuse of needles, jet injectors, and vaccine vials prior to the installation of universal precautions among the military medical corps may explain the high rate of infection in these veterans.[43] While there is one case in which a veteran has been awarded a service-connected disability package as a result of jet injector associated HCV infection,[44] a subsequent large-scale VA study found jet injector transmission to be a highly unlikely, but a theoretically potential source of HCV infection.[45] The same study found that that primary risk factors reported by HCV+ veterans are a history of IV drug use, having spent more than 48 hours in jail, and having tattoos.[46]

DIAGNOSTIC TESTING

The CDC strongly urges testing individuals who are in the high or intermediate risk categories for HCV. For those individuals at low risk for infection, testing is recommended only for health and safety workers after a known potential exposure takes place. Regarding others in the low risk category group, the CDC states that "[a]nyone who wants to get tested should ask their doctor."[47]

Confirming Exposure to HCV. Diagnosing hepatitis C requires a series of laboratory tests and continued medical evaluations making on-going access to care and sufficient resources to cover related costs necessary conditions for treatment.[48] Unlike many ailments where a positive laboratory test is all that is needed to confirm infection, interpretation of HCV related test results is much more complex. Even some health-care professionals do not understand how to interpret HCV test results, when to order more specific tests, or which tests to use.[49] Details regarding the diagnostic process are outlined in this section and illustrated in Figure 1[50] at the end of the section.

SCREENING FOR HCV ANTIBODIES

After the initial medical history and evaluation have been completed, an anti-HCV blood test should be performed to check for antibodies to HCV in the patient's blood. Antibodies are produced by the body in response to viral infections as a means of fighting the infection; with HCV this process can take up to several weeks. The presence of antibodies to HCV (anti-HCV) in a patient's blood indicates that they were exposed to the virus, but does not distinguish between a current or past infection.[51] The presence of antibodies to HCV also does not protect people from infection or re-infection to HCV.[52] Anti-HCV testing is done using one of three available immunoassay tests.[53]

SUPPLEMENTAL HCV TESTING – CONFIRMING POSITIVE RESULTS

Because false positive screening tests are common among low-risk groups, initial CDC guidelines recommend that all positive anti-HCV tests be confirmed using one of two supplemental serologic tests, either a recombinant immunoblot assay (RIBA) or a nucleic acid test (NAT).[54]

RIBAs can be interpreted as positive (confirming the presence of HCV antibodies), negative, or indeterminate. Positive RIBA results confirm the presence of HCV antibodies in the blood. Follow up interventions include medical counseling and evaluation (including additional blood tests) to determine if there is active HCV (HCV RNA[viii]) present in the patient's blood.[55]

A negative RIBA result means that the initial anti-HCV test was a false positive and that the patient has no HCV antibodies present in their blood. Because it can take several weeks after the initial exposure to HCV for antibodies to be produced, if the supplemental testing is done within the first few weeks after the potential exposure, retesting at a later date may be necessary to confirm a negative RIBA result.[56]

[viii] HCV RNA refers to Hepatitis C Ribonucleic Acid.

When a RIBA result is indeterminate, it could mean the initial test was a false positive, or that the exposure was very recent and antibodies have not yet been produced. In this circumstance, the CDC recommends retesting the patient with RIBA or testing for HCV RNA after at least a month has passed.[57]

Up to 10 percent of HCV+ individuals are also HIV+.
Roughly 6 percent of individuals co-infected with both viruses will not develop antibodies to HCV making detection of the virus more complicated.

The second type of supplementary test is the NAT. Unlike RIBA, which can only detect HCV antibodies, a *qualitative* NAT is capable of detecting HCV RNA. Both qualitative and quantitative NATs are used, at various times, for the diagnosis, evaluation, and management of HCV patients. If the NAT is positive, it verifies both the presence of HCV antibodies and HCV RNA, making this test more clinically useful than RIBA. (Unfortunately, not all laboratories are capable of performing NATs as they require specialized facilities.) A positive result confirms the presence of an active infection.[58]

Because there are situations under which persons with an active infection might have HCV RNA levels that are undetectable by currently available tests, a negative NAT result is interpreted as being indeterminate. In this situation, the CDC recommends that a RIBA be performed to confirm the negative result. If confirmed to be negative, no further medical follow up or evaluation is required.[59]

A negative NAT can also indicate that a once-active HCV infection has run its course. This is referred to in medical terms as a *resolved infection*. If the patient has had a positive anti-HCV test confirmed by RIBA and a negative NAT, they should be periodically retested using NAT to confirm that the infection has indeed resolved.[60]

Although other viruses also have testing protocols that require supplemental testing (HIV, hepatitis B) prior to confirming a positive result, the CDC discovered that many laboratories were not performing the supplemental HCV confirmation tests after the initial anti-HCV immunoassay.[ix] In response, the CDC issued a revised guidance in 2003 utilizing newly realized scientific advances showing that immunoassay results with a signal-to-cut-off-ratio (a laboratory based mathematical calculation) above a specific value are predictive of the true anti-HCV status of the patient. The revised guidance states that only those positive test results with a signal-to-cut-off-ratio less than the predictive value must be confirmed using supplemental testing. The predictive value varies based on the manufacturer and test type used by the laboratory performing the test.[61]

[ix] Reasons cited by the CDC in the 2003 guidelines for laboratories not performing the supplemental tests include: the high cost of supplemental testing, a lack of an established laboratory standard for the tests, as well as a lack of knowledge regarding how to perform the test and interpret the results.

Because RIBAs are expensive, less clinically useful than NAT, and require repeat testing of all follow-up tests that continue to be indeterminate with no definitive means of interpreting that result, some laboratories with the ability to perform NAT have opted to discontinue the use of RIBA as a means of confirming positive anti-HCV tests.[62]

It is important to note that up to 10 percent of individuals infected with chronic HCV (approximately 500,000 people) also suffer from HIV. Of these co-infected individuals, roughly 6 percent will fail to develop HCV antibodies, making detection of the virus more complicated. Because co-infected individuals often experience a more rapid advancement to end-stage liver disease, diagnosis of this population is of particular importance.[63]

DETERMINING IF AN ACTIVE HCV INFECTION IS PRESENT

Regardless of which supplemental test is used, a confirmed positive anti-HCV test indicates the need for additional medical evaluation by a licensed physician to determine whether or not the virus is active or resolved.[64] Post confirmation tests include *quantitative* NATs[x], a polymerase chain reaction (PCR) test used to measure the number of HCV particles in the patient's blood stream; a measure of the patient's alanine aminotransferase levels (ALT) to assess the patient's liver function; an HCV genotype test; and in some cases, a liver biopsy.[65]

Figure 1 – HCV Infection Testing Algorithm for Diagnosis of Asymptomatic Persons

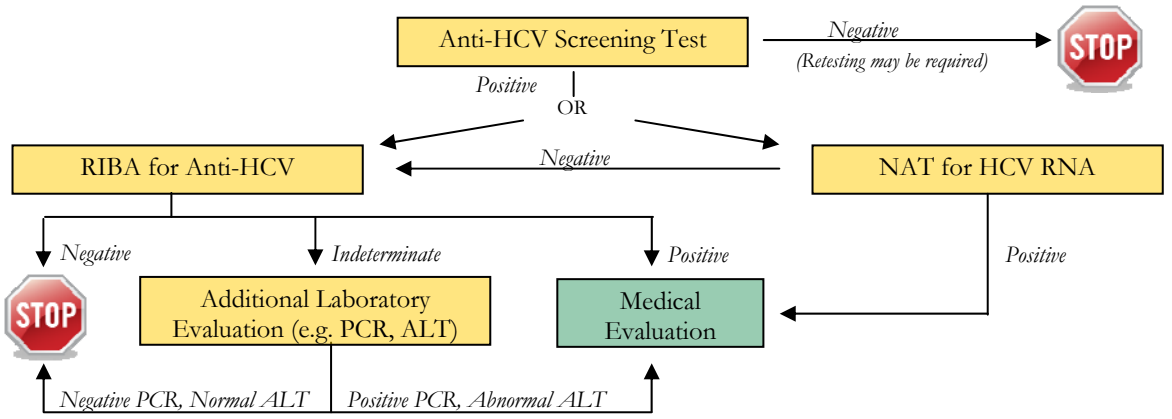


Chart Source: United States Centers for Disease Control and Prevention

HCV Genotype Testing. There are currently six known genotypes[xi] and 50-recorded subtypes of HCV.[66] Genotype 1 is the most prevalent form of HCV in the United States accounting for 70-75 percent of all HCV infections. Genotypes 2 and 3 account for the remaining 25-30 percent of

[x] NATs can be both quantitative and qualitative.

[xi] Genotypes are slight variations in the genetic makeup of the virus.

cases.[67] Genotypes 4 through 6 are generally not found in the Americas and Europe, occurring most often in Egypt, Africa, South Africa, and Southeast Asia.[68] Genotype is not an indicator of disease progression and is generally used only to determine appropriate treatment options for a particular patient. Once the genotype is determined, the test need not be repeated.[69]

Liver Biopsy. Generally performed as an outpatient procedure in a hospital setting, a liver biopsy is used to determine the level of damage and inflammation present in the liver.[70]

DIAGNOSIS OF INJURED WORKERS

CDC recommended post exposure follow up for injured workers entails testing both the source and the exposed worker for various infectious diseases, including HCV. Because multiple tests are required to confirm an HCV diagnosis and because the infection does not always reveal itself right away, it can take months to verify the infection status of the injured worker. No changes in employment status are mandated during the post-exposure testing period. Likewise, the CDC states that there should be no employment restrictions placed on HCV+ workers.[71]

DISEASE PROGRESSION

ACUTE HEPATITIS C

Exposure to blood infected with HCV RNA results in acute HCV, a short-term viral condition.[72] The majority of acute HCV sufferers (60-70 percent) experience no signs or symptoms of disease; or they experience just mild illness.[73] Potential symptoms of acute infection include jaundice[xii] (20-30 percent) and/or non-specific symptoms such as malaise, abdominal pain, or anorexia (10-20 percent).[74] Once HCV RNA is no longer detectable, the infection is considered cleared or resolved.[75] Liver failure and/or death from acute HCV are rare.[76] For reasons not yet fully understood, of all persons who contract acute HCV, 15-25 percent will resolve the infection spontaneously, never developing the chronic form of the HCV.[77]

CHRONIC HEPATITIS C

Seventy five-85 percent of persons with acute HCV (see Figure 2[78]) will develop the chronic form of the disease.[79] As with the acute form of the virus, most people who develop chronic HCV often do not exhibit any signs or symptoms of the disease.[80] The physical impact and progression of both acute and chronic HCV is measured by monitoring the level of liver inflammation and fibrosis (accumulation of scar tissue). Production of scar tissue is the body's natural response to injury, and in a person not infected with HCV, the scar tissue is broken down by an immune system response almost as soon as it is created. In the presence of HCV, sometimes the balance of this process is disrupted and scar tissue is created faster than it can be repaired, resulting in an accumulation of scar tissue referred to as liver fibrosis. Fibrosis occurs at varying rates among HCV+ individuals. It has also been shown to regress over time.[81] Individuals with low levels of fibrosis often experience little disease progression.[82] Heavy use of alcohol, being male, being over the age of 50, co-infection with HIV, and the use of immunosuppressive drugs after a liver transplant have all been shown to contribute to the advancement and accumulation of fibrosis.[83]

Based on national figures, it is estimated that 1,000 to 1,200 Californians die from HCV related complications each year.

This figure is expected to triple by 2021 making the death rate associated with HCV higher than the death rate from AIDS.

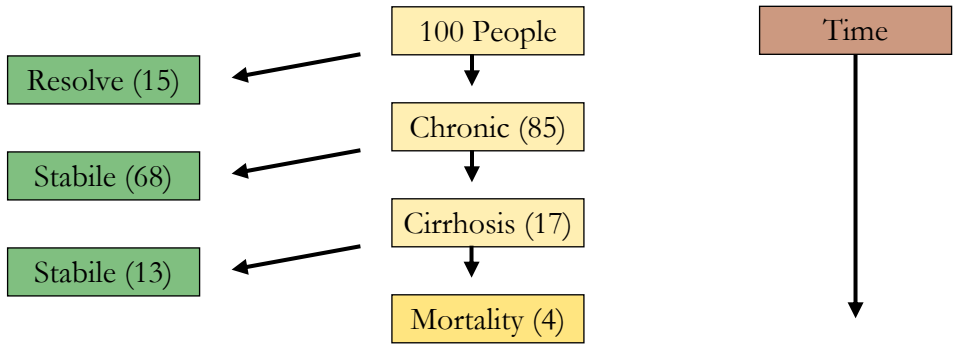
HCV is the fourth leading cause of premature death from infectious disease in the United States.

[xii] Yellowing of the skin and eyes.

Disease Progression

Within 20-30 years, 10-20 percent of chronically infected people will develop cirrhosis[84], a condition in which liver function is impaired by the presence of severe scarring. Cirrhosis is divided into two categories, *compensated* and *decompensated*. In compensated cirrhosis, the liver is heavily scarred but remains able to perform important bodily functions. In decompensated cirrhosis, the liver can not function properly; it is at this time that many previously asymptomatic HCV+ individuals begin to develop signs and symptoms of liver disease.[85] The presence of cirrhosis significantly increases an individual's risk for advancing to end-stage liver disease, developing liver cancer (1-5 percent of cirrhosis patients develop liver cancer), and/or requiring a liver transplant.[86]

Figure 2 – The Natural History of Hepatitis C Infection



Leading Indication for Liver Transplant

Data Source: United States Centers for Disease Control and Prevention

At this time, little is known about the progression of the disease in individuals who have been infected for longer than two decades.[87] However, in the United States, HCV infection is recognized as the most common blood borne viral infection,[88] the leading cause of viral liver cancer,[89] the tenth leading cause of death among adults,[90] and the primary reason for liver transplants.[91]

The United States Centers for Disease Control estimates that 1-5 percent of persons infected with HCV will die from complications related to the virus.[92] A National Institutes of Health (NIH) Consensus Conference Statement from 2002 notes that nationwide there are 10,000 to 12,000 deaths annually attributable to HCV related complications; this figure is believed by many to be conservative.[93] Based on national figures, it is estimated that 1,000 to 1,200 Californians die from HCV related complications each year.[94] This figure is expected to triple by 2021 making the death rates associated with HCV higher than the death rate from AIDS.[95]

In 2004, the most recent year data is available, deaths related to HCV increased 123.3 percent overall from 1995 levels, with the greatest increase being among persons aged 45-64. HCV is considered the fourth leading cause of premature death from infectious disease behind HIV/AIDS, influenza/pneumonia, and septicemia, and the 16th leading cause of premature death overall in the United States.[96]

Determining the progression of HCV requires on-going diagnostic testing. There are some non-invasive procedures that can be performed to assess liver function and advanced liver disease, but these tests are not capable of assessing the amount of liver fibrosis present. A liver biopsy is the most accurate means of determining the current stage of fibrosis and degree of liver inflammation from HCV in a given patient.[97]

In the absence of a co-infection such as HIV, advancement to cirrhosis and end-stage liver disease appears to be more related to life-style choices, health status, and genetics rather than virologic factors and the amount of active virus found in the blood.[98] Because everything we consume is ultimately filtered through the liver, life-style choices such as drinking alcoholic beverages, using street drugs, using certain prescription drugs and non-prescription drugs (such as acetaminophen, the main ingredient in Tylenol™, and aspirin), use of herbs and herbal supplements that are toxic to the liver, as well as regular exposure to poisonous liquids and fumes including chemical or organic fertilizers and insecticides, toxic chemicals used in household cleaners, solvents and paint thinners, and toxic industrial chemicals can cause rapid disease advancement. [99]

TREATMENT OF HEPATITIS C

MEDICATIONS USED IN THE TREATMENT OF HCV

Although treatment advances have been made that promise new protocols in the near future, there are currently only two FDA-approved medications used for treating HCV. The first, interferon, is an injectable chemotherapeutic agent that bolsters the immune system. The type of interferon used determines the frequency of injections; some interferons require a daily injection, some three times a week, others need only be administered once per week. Side effects are often debilitating and can include flu-like symptoms, extreme fatigue, nausea, hair-loss, thyroid problems, increased blood sugar, loss of appetite, and eczema-like skin reactions. More serious side-effects include psychosis, heart problems, internal organ damage, decreased blood counts, and autoimmune disorders similar to rheumatoid arthritis.[100]

> *"If we had a treatment that was safe, good, and not unpleasant, we should treat everybody."* [101]
>
> *~ Dr. Leonard Seef, M.D.*

Interferon can be used as a monotherapy, but has been shown to be more effective when combined with the second FDA approved medication, ribavirin, an oral medication that prevents viral replication.[102] As with interferon, the side effects of ribavirin are often debilitating and can include anemia, fatigue, irritability, skin rashes, nasal stuffiness, sinusitis, and cough. Also, because of the risk of birth defects, women should wait at least 6 months post treatment to become pregnant.[103] Because ribavirin has only been shown to increase the potential for successful treatment of HCV when used in combination with interferon, it is never prescribed as a monotherapy in the treatment of HCV.[104]

ADDITIONAL MEDICATIONS USED DURING TREATMENT OF HCV

To combat certain side-effects of interferon and ribavirin, it may be necessary for some patients to use additional medications during anti-viral treatment. For example, a common side effect of ribavirin use is extreme anemia. To combat this, it is not uncommon for patients to be placed on a second injectable medication, eerythropoietin (EPO), to encourage red blood cell production and resolve the anemia. Although found to be a cost effective medication for treatment-induced anemia[105], weekly EPO injections are quite expensive, and depending on the dose needed, use of this medication can increase the cost of treatment significantly.[106]

Because treatment with ribavirin and interferon has been shown to cause adverse psychological side effects including depression, suicidal tendencies, and irritability in users, it may also be necessary for patients to take anti-depressants while on chemotherapy for HCV.[107]

MEASURING THE SUCCESS OF TREATMENT

The goal of any treatment protocol is to halt progression of the disease and avoid long-term complications by eliminating the virus. The success of HCV treatment protocols is measured by determining the level of HCV RNA in the person's system; this is referred to as their *viral load*. The goal of all treatment protocols is to get the viral load to levels undetectable by lab tests during the treatment process. Although different HCV RNA tests provide results in varying units of measure, all results are converted into International Units per milliliter (IU/mL) to allow for comparison. Currently available diagnostic tests are capable of detecting the HCV virus at 50 IU/mL and above.[108]

Although current treatment protocols are capable of rendering the virus undetectable and halting the progression of the disease, because some patients relapse and experience a reactivation of the virus, at this time treatment for HCV is not considered a cure.

After the first 12 weeks of treatment, all patients are checked to determine their response to treatment. If at 12 weeks the viral load of the patient is either undetectable or markedly decreased, they are determined to have had an early viral response (EVR) indicating a strong likelihood for success and the treatment protocol is continued to fruition. Patients who continue to have an undetectable HCV RNA upon completing therapy are said to have an *end of treatment response* (ETR). *Non-responders* are individuals who experience no drop in viral load in response to treatment, while those who never achieve a non-detectable HCV RNA are deemed *partial responders*.[109]

Patients who experience an undetectable viral load during treatment are referred to as *responders*. Responders who have undetectable viral levels 6 months or more after treatment ends are considered to have achieved a *Sustained Viral Response* (SVR). Because of the short period of time treatment options have been available, patients with an SVR require periodic monitoring of their viral load to confirm they have not relapsed. Roughly 5 percent of patients who achieve an SVR at the end of treatment will relapse and their viral load will once again increase. Re-treatment of patients who relapse and of non-responders is possible, but is not likely to work with the same regimen previously attempted.[110]

The length of time a patient must remain on treatment and their potential for achieving a SVR depends on what genotype of HCV is being treated. A person with genotype 1 is likely to respond to treatment with an SVR 42-46 percent of the time and would generally remain on treatment for 48 weeks.[111] A patient with genotype 2 or 3 would be expected to respond to treatment with an SVR 76-82 percent of the time and would generally remain on treatment for 24 weeks.[112] In the event of a relapse, re-treatment of persons with genotype 1 has a lower success rate than re-treatment of people with genotypes 2 and 3.[113]

Further complicating the decision to treat is the reality that the protocols are expensive (The cost of treatment is discussed in a later section of this report.). Treatment protocols are also complex, long-

term, and sometimes accompanied by debilitating side effects. Roughly 80 percent of all persons on treatment experience mild side effects, and 10 percent experience severe or disabling side effects that can compromise their ability to work and sometimes result in them quitting treatment.[114] The side effects of treatment can come and go and may persist for months after treatment has ended. Some effects may be permanent.[115] For these reasons, and because the benefits of attempting treatment may or may not always out-weigh the risks, the decision to treat is made on a case-by-case basis and generally involves the patient, their family or care giver, and their physician.[116]

In the United States HCV is the most common blood borne viral infection, the leading cause of liver cancer, the tenth leading cause of death among adults, and the primary reason for liver transplants.

Treatment of the most prevalent form of HCV in the United States renders the HCV virus undetectable in only 42-46 percent of patients who complete the protocol.

Treatment protocols exist that are capable of rendering the virus undetectable in a patient's blood and slowing, if not stopping, the progression to end-stage liver disease. However, because of the low response rates to treatment and the relapse rate of those who do respond, at this time health care professionals are cautious with regard to calling successful treatment of HCV a cure.[117]

PROTOCOL FOR TREATMENT OF ACUTE HCV

Because most individuals experience no sign or symptoms of acute HCV, the infection often runs its course without the infected individual ever seeking medical attention. Of those individuals who do experience signs and symptoms, studies suggest that most of them will resolve the virus spontaneously.[118]

Efforts to determine appropriate protocols for treating acute HCV have been severely hindered by a lack of study subjects and a pool of literature that "consists of studies of uncontrolled case series receiving a variety of treatment regimens administered at varying times after acute infection."[119] One German study[120] published in 2003 found that when treated with interferon alone, 81 percent of patients who did not spontaneously clear the acute infection cleared the virus and did not progress to chronic HCV. This study is cited by the American Association for the Study of Liver Diseases (AASLD) as "helpful, though incomplete." AASLD notes that additional studies are needed to confirm the usefulness of treating acute HCV to avoid development of chronic HCV infection.[121]

Individuals who spontaneously clear the virus have no risk of disease progression and do not need treatment.[122]

PROTOCOL FOR TREATMENT OF CHRONIC HCV

While all chronic HCV+ individuals are potential candidates for HCV treatment, the decision to treat is made on a case-by-case basis. The decision to treat is a personal choice based on the patient's prognosis, their likelihood to advance to end-stage liver disease, the genotype of HCV present, the presence of other medical conditions which may complicate treatment, and their current HCV disease state.[123]

For individuals with little or no evidence of fibrosis who are at low risk for advancement to end-stage liver disease or those persons who have already developed compensated cirrhosis, a nutritious diet, not drinking alcoholic beverages, avoiding chemicals that are potentially liver damaging, regular exercise, and periodic medical monitoring of their disease may be all the management they need. In the case of patients with cirrhosis (compensated and decompensated), these lifestyle change options may be all they are capable of tolerating due to the harsh nature of the medications used for treating the virus.[124]

In patients with genotype 1, it is common for a liver biopsy to be performed prior to treatment to determine the extent of fibrosis (staging) and level of inflammation (grading) present in the liver. Clinicians use rating systems such as the Metavir scoring system and the Ishak grading system as tools for guiding the decision whether or not to initiate treatment (see Table 2[125]). According to AASLD, treatment is generally advised for patients with a Metavir score of ≥ 2 or an Ishak score of ≥ 3. Studies have shown that patients with a low level of fibrosis are more likely to achieve an SVR. However, because these individuals are also less likely to advance to end-stage liver disease and often have a good prognosis, the nature of the available medications often results in the decision to not treat these patients. In patients where treatment is deferred, a liver biopsy may be performed every four or five years to monitor disease progression and potentially reevaluate the decision to treat.[126]

Table 2 – Liver Biopsy Scoring Systems

Stage	Metavir System	Ishak System
0	No fibrosis	No fibrosis
1	Periportal fibrosis expansion	Fibrosis expansion of some portal areas, with or without short fibrous septae.
2	Portal-portal septae (>1 septum)	Fibrous expansion of most portal areas, with or without short fibrous septae.
3	Portal-central septae	Fibrous expansion of most portal areas with occasional portal-portal bridging.
4	Cirrhosis	Fibrous expansion of portal areas with marked bridging (portal-portal or portal-central)
5	-	Marked bridging (portal-portal or portal-central) with occasional nodules (incomplete cirrhosis).
6	-	Cirrhosis

Table Source: American Association for the Study of liver Diseases'

Because patients with HCV genotypes[xiii] 2 and 3 generally respond favorably to treatment, some clinicians believe all of them should be treated, regardless of their disease status.[127] Little is known about the success of treatment for persons with genotypes 4, 5, and 6 resulting in a lack of recommendations regarding treatment. In these patients, the decision to treat should be made on a case-by-case basis by an experienced clinician. Treatment guidelines are available from AASLD for individuals co-infected with HIV, transplant recipients, individuals with kidney disease, and active injection drug users.[128]

For patients unable to achieve an SVR, adoption of positive life-style choices to slow disease progression and lifetime monitoring of disease status via periodic liver biopsy and HCV RNA testing is suggested.[129]

TREATMENT FOR END-STAGE LIVER DISEASE

Once a patient has advanced to end-stage liver disease, current treatment protocols may not be well tolerated and could worsen the health status of the patient. For these individuals, the only available treatment option is a liver transplant.[130] However, while a liver transplant will extend the life expectancy of the patient, it will not eradicate the virus. HCV often recurs after a liver transplant, and it is believed that the rate of disease progression after a transplant is directly correlated to the post-transplant status of the patient's immune system. In other words, the more compromised the immune system of the transplant recipient, the more rapidly the disease may progress.[131] It has been reported that treatment of HCV after a transplant should be considered experimental and only carried out under the close watch of a clinical trial setting.[132]

Once a patient has advanced to end-stage liver disease
the only available treatment option is a liver transplant.

TREATMENT OF CHILDREN

Approximately 50 percent of all children born with HCV clear the virus from their systems naturally. Experts agree that treatment of children with HCV "should not be considered before 3 years of age."[133] Although there is limited experience with treatment of HCV in children, available data reveals success rates in children similar to those of adults.[134] At this time, the long-term effects of HCV treatment on children are unclear making additional study warranted to determine the rates of SVR and relapse.[135] Although children are less likely than adults to acquire HCV, children with cancer or who receive multiple blood transfusions experience a high rate of advancement to end stage liver disease.[136]

[xiii] Refer to page 10 for a discussion on HCV genotypes.

TREATMENT IN PRISONS

Treatment in prisons is as effective as treatment among the non-institutionalized population. [137] Interestingly, in prison settings few inmates experience the adverse psychological effects to treatment seen in the non-institutionalized population implying that an institutionalized setting may provide a safe environment for treatment of mentally ill patients.[138] Unfortunately, treating incarcerated individuals has its own special challenges. For example, if an early release is granted, patients may not be able to continue their treatment regimen if they do not have access to care on the outside. Likewise, those prisoners who do complete treatment may not have access to the required follow up care and monitoring. As a result, when considering treatment of prisoners, the Federal Bureau of Prisons advises assessing the inmate's likelihood for completion before beginning therapy.[139]

PREVALENCE

It is important to note that prevalence figures are considered highly conservative best guess estimates due to poor reporting practices nationwide. This is discussed in detail in a later section of this report. The figures reported in this section are the best estimates available given current surveillance and reporting practices.

It is believed that roughly 600,000 Californians are HCV+, with 5,000 new infections occurring in the state annually.

The CDC reports that 4.1 million Americans (1.6 percent) have been infected with acute HCV, resulting in 3.2 million Americans advancing to chronic HCV.[140] However, the studies used to compile the CDC figures excluded individuals who are homeless, incarcerated, active duty military personnel, people who were hospitalized at the time of study, and residents of nursing homes.[141] To fill in this research gap, Edlin et al performed a review of these populations. Their review estimates that there are closer to 5 million people in the United States that are HCV+, 4 million of which have developed the chronic disease.[142] For comparative purposes, it is estimated that there are currently 1.2 million HIV+ individuals in the United States.[143] According to the CDC most of them are unaware they are infected.[144] Based on these figures, it is believed that roughly 600,000 Californian's are HCV+, with 5,000 new infections occurring annually.[145]

Trends in infection rates. As seen in Figure 3[146], the incidence of new infections decreased significantly after blood screening protocols were implemented in the early 1990's and they continue to steadily decrease. Most experts attribute the decline in new infections to the behavioral changes of injection drug users (IDUs) as a result of on-going prevention and control efforts targeted specifically at this community.[147]

Figure 3 – Incidence of Acute Hepatitis C in the United States

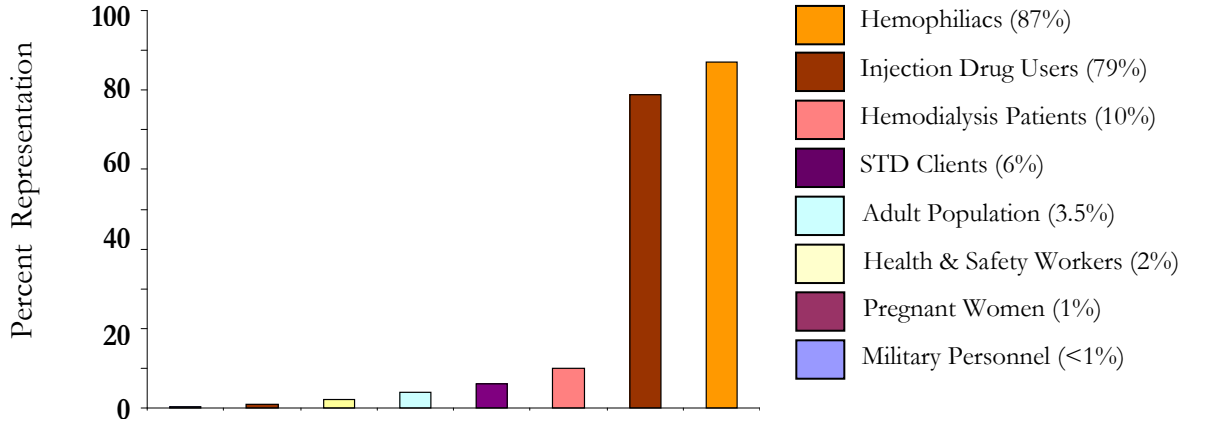
Data Source: United States Centers for Disease Control and Prevention

PREVALENCE AMONG SELECT POPULATIONS[xiv]

Some populations of individuals experience HCV infection at a much higher rate than others. For example, 87 percent of all hemophiliacs are HCV +, most having been infected by plasma-derived products used to treat hemophilia prior to virus inactivation and screening procedures.[148]

According to a CDC slide-set using data derived from the 1988-94 National Health and Nutrition Examination Survey III (NHANES III), the second highest prevalence rates are found among injection drug users (IDUs) with 79 percent of all IDUs being HCV+(see Figure 4 [149]). The CDC reports that individuals who have used injection drugs only once are at high risk for HCV infection. They also report that after five years of continuous use, 60-80 percent of IDUs are infected with HCV, compared to only 30 percent of this same population who are infected with HIV.[150]

Figure 4 – Prevalence of Hepatitis C by Selected Groups in the United States



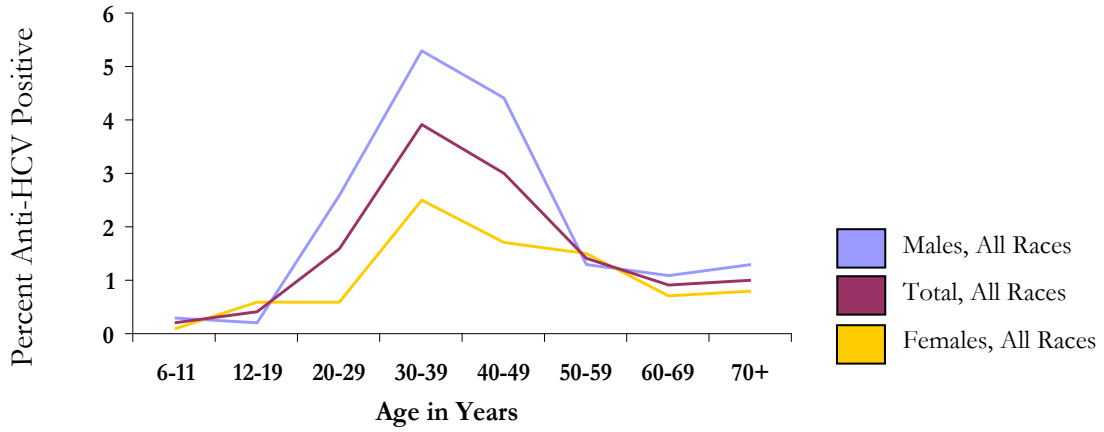
Data Source: United States Centers for Disease Control and Prevention

The next highest prevalence occurs in hemodialysis patients at 10 percent, sexually transmitted disease (STD) clients at 6 percent, the general United States population at 3.5 percent, and health and safety workers at 2 percent. Of the remaining populations less than 2 percent are HCV+.[151]

With regard to age and gender, men are more likely than women to contract HCV with most infections occurring in persons of both genders at the ages of 30-49 years old (see Figure 5 [152]).

[xiv] Prevalence figures reported in text and in graphs are based on acute HCV infections reported to the CDC.

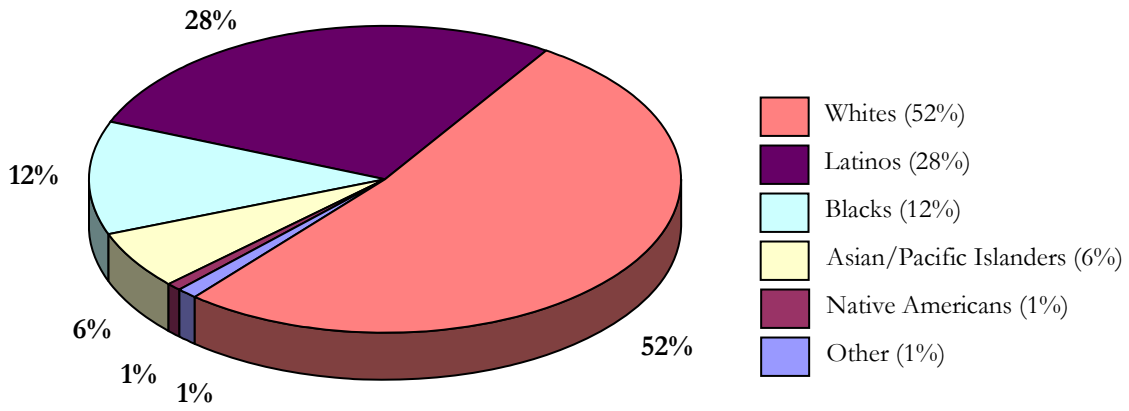
Figure 5 – Prevalence of HCV by Age and Gender, 1988-1994 Summary United States



Data Source: United States Centers for Disease Control and Prevention

Nationwide Latinos experience a higher rate of acute infection than Blacks, Whites, and Asian or Pacific Islanders.[153] However, among age groups most likely to contract HCV (those persons 30-49 years old), African Americans have the highest prevalence of infection, followed by Latino Americans and Whites.[154] In California, of all cases *reported* from 1996 – 1999 where race/ethnicity was reported (see Figure 6 on next page [155]), Whites had the highest incidence of HCV, followed by Latino Americans, African Americans, Asian/Pacific Islanders, and Native Americans.[156] It is unclear at this time why there is a discrepancy between the racial profile of HCV in California versus the nation. As is shown in the discussion of HCV surveillance, this difference may be a reflection lack of standardization in the reporting system.

Figure 6 – Race/Ethnicity of Hepatitis C Cases Reported in California, 1996-1999



Data Source: California Department of Health Services, *The Hepatitis C Strategic Plan*

Prevalence

The number of healthcare and public safety workers infected with HCV as a result of workplace exposure is unknown. The average risk of infection to healthcare and public service workers from occupational exposure to HCV is 1.8 percent. Studies have shown that 1 percent of healthcare workers in hospitals are HCV+.[157] The American Nurses Association states that health care workers experience between 600,000 and 1 million injuries from needles and other instruments annually. They estimate that there may be "thousands and thousands of nurses with occupationally acquired HCV who do not know it."[158]

Prisoners. Overall prison populations throughout the nation tested positive for HCV at a rate 3-5 times greater than the general population with 15-40 percent of all prisoners testing positive for HCV.[159] In California, 34.3 percent of the prison population is infected with HCV.[160] With a total prison population (including parolees) of 318,711 in California, there are potentially 109,318 HCV+ prisoners and parolees in California.[161] Rates of infection in prison populations are often 20 times greater than rates of infection among the general public;[162] this is likely due to the high rate of IV drug use among prisoners.[163]

Military Personnel. Although NHANES III data showed a prevalence rate of <1 percent for military personnel, a 2004 study found that prevalence among military personnel and veterans is higher than among the general population. Although exact figures with regard to *all* military personnel and veterans are unclear, of those veterans who utilize the health care services provided to them via the Veterans Affairs Medical Centers (VA), 4.0 percent of active duty military personnel and 5.4 percent of veterans are HCV+.[164] A positive HCV test does not render individuals unable to complete their military service. HCV+ military personnel are individually evaluated regarding disease severity, treatment options, and follow up care to determine their future level of service.[165]

DIRECT AND INDIRECT COSTS ASSOCIATED WITH HEPATITIS C

To consider the economic impacts of a disease on society one must consider both direct and indirect costs. Direct costs include the cost of medical care as well as the administrative costs of providing that care. Medical care expenses include the cost of prescription drugs, physician and hospital payments, medical supply expenses, and nursing home fees. Indirect costs include losses in worker productivity due to time off for physician visits, hospital stays, sick days, decreased worker status, disability, and/or death.[166]

The Projected Cost of Hepatitis C In California, 2010-19
For Patients Known to be HCV+ in 1991

Direct Cost Projection: $888.1 million Indirect Cost Projection: $6.2 billion

The actual costs related to HCV have not been well documented. The direct costs associated with HCV are calculated using estimates of prevalence that are known to be underreported and are recognized as conservative. Indirect costs are specific to the patient and are difficult to determine as losses in worker productivity due to employment changes, absenteeism, or decreased worker performance are not generally tracked and costs related to pain and suffering are difficult to quantify.[167]

Furthermore, indirect health care costs related to the individual *employee* are not the only impacts of HCV on the work force. Other economic issues impacting employers include workplace exposure prevention, worker's compensation premiums to protect workers at risk for infection at work, and the cost of recruiting and replacing employees who have left due to complications from HCV. These costs[xv], the indirect costs incurred by employers, the cost of decreased quality of life (aka pain and suffering), and the costs involved in designing and implementing prevention programs and research studies are not included in the cost estimates discussed below.[168]

In 1998, the CDC estimated overall costs related to HCV to be $600 million nationwide.[169] However, their findings have been questioned by researchers who believe the actual direct and indirect costs related to HCV far exceed the original estimate.[170]

Table 3 details the findings of a MEDLINE[xvi] search conducted in April 2007 for studies of overall cost estimates of HCV in the United States. This chart is not intended as a cost comparison as each author used differing methodologies to compile their results. Rather, it was compiled to allow for the quick review of the various results. There were three studies of annual costs found with the

[xv] It is unknown whether the CDC included these costs in their cost estimate.

[xvi] MEDLINE is a literature database of biomedical and scientific information compiled by the United States National Library of Medicine.

estimates of direct costs ranging from $694 million to $1.8 billion. One study on the future cost of caring for individuals known to be HCV+ in 1991, found that annual direct costs for the period 2010-19 will reach $10.7 billion.[171] Three of the four studies included indirect costs that were even more varied with estimates of $51 million and $3.7 billion annually, and a 10-year estimate of $75.5 billion overall.

In 2001, the study by Leigh et al[xvii] estimated the direct and indirect costs of HCV during 1997 to be $1.8 billion and $3.7 billion respectively. These findings represent a nine-fold increase over the original CDC estimate. Although the CDC did not publish the methodology used to determine their cost figure, it was reported by Leigh et al, that the CDC figure excluded the cost of liver transplants.[172]

Table 3 – National Estimates of Annual Direct & Indirect Costs Associated with HCV

Study	Focus	Direct Costs	Indirect Costs
CDC (1998)	**Overall Costs Estimated for 1998**	**$600 million**	
Kim (2002)	*1998 hospital costs*	*$1+ billion*	- - -
	1998 Outpatient Appointments	*$24 million*	- - -
	1998 Anti-Viral Treatments	*$530 million*	- - -
	Overall Costs 1998	**$1.6 billion**	
Leigh, et al (2001)	**Overall Costs 1997**	**$1.8 billion**	**$3.7 billion**
Sandler et al (2002)	**Overall Costs 1998**	**$694 million**	**$51.0 million**
Wong, et al (2000)	**Projected annual cost of care 2010-2019, for patients known to be HCV+ in 1991**	**$10.7 billion**	**$75.5 billion**

Clearly, the economic impacts of HCV are likely more significant than originally believed. This highlights the need for improving the tracking of both prevalence and health costs associated with HCV to understand more clearly the economic impacts of this disease.

THE HIGH COST OF HCV IN CALIFORNIA

The [California] hepatitis C Strategic Plan, estimates that there are 600,000 Californians with HCV resulting in estimated annual health care costs of more than $50 million.[173] This figure was derived by extrapolating California costs from the 1998 CDC estimate using an 8.3% multiplier. The direct and indirect costs for California in Table 4 were estimated using this same multiplier on the costs

[xvii] The Leigh et al study, is the most comprehensive of the cost estimate studies.

presented in the follow up studies referenced above; as with the national figures, these figures reveal a much higher cost than initially postulated. The study by Leigh et al reveals that in 1997 direct health care costs in California related to HCV were closer to $149.4 million.[174] Likewise, indirect costs, such as loss of workplace productivity due to illness, disability, or death, based on estimates by Leigh et al is upwards of $307.1 million. The study by Wong et al estimates that direct costs related to HCV will be $888.1 million *annually* to treat the pool of patients that were identified as being HCV+ as of 1991. Indirect costs for this same population, is projected to be $6.2 billion annually.[175] Because the estimates by Wong et al *do not* include costs for individuals diagnosed after 1991 their estimate should be considered conservative.

Table 4 – California Estimates of Annual Direct & Indirect HCV Costs

Study	Focus	Direct Costs	Indirect Costs
CDC (1998)	**Overall Costs Estimated for 1998**	**$49.8 million**	
Kim (2002)	*1998 hospital costs*	*$83 million*	
	1998 Outpatient Appointments	*$1.9 million*	
	1998 Anti-Viral Treatments	*$43.9 million*	
	Overall Costs 1998	**$128.9 million**	
Leigh, et al (2001)	**Overall Costs 1997**	**$149.4 million**	**$307 million**
Sandler et al (2002)	**Overall Costs 1998**	**$57.6 million**	**$4.2 million**
Wong, et al (2000)	**Projected annual cost of care 2010-2019, for patients known to be HCV+ in 1991**	**$888.1 million**	**$6.2 billion**

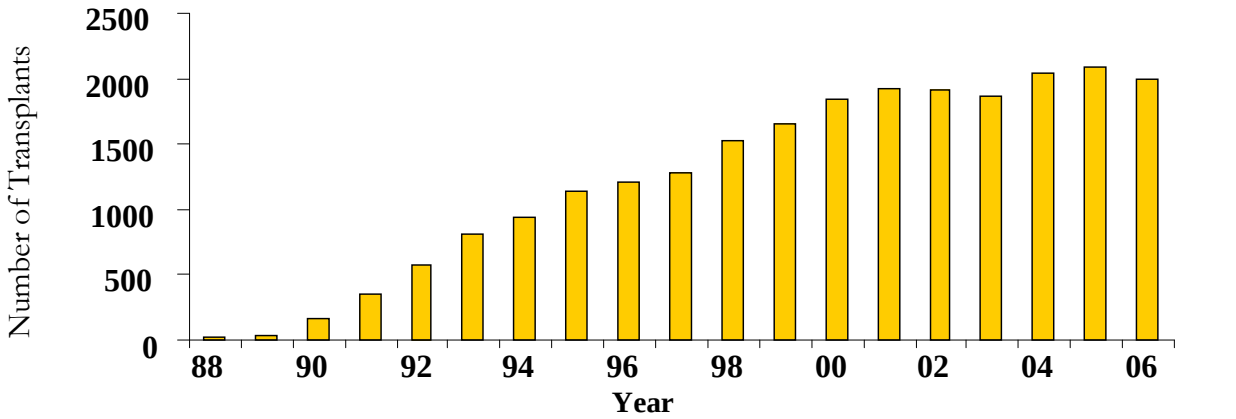
Although new infections may be decreasing as a result of blood screening protocols and increased awareness, experts agree that direct and indirect costs are anticipated to *increase* for the next 10 to 20 years as more persons reach end-stage-liver disease and more undiagnosed cases are discovered.[176] Furthermore, as Sandler et al state, even when they do not develop chronic liver disease or cirrhosis, HCV patients incur substantial medical costs throughout their lifetime for the monitoring of their disease.[177]

One clear example of the trend in rising costs is the continual increase in HCV related liver transplants between 1990 and 2006.[178] Assuming a prevalence of 5 million HCV+ Americans, it can be expected that roughly 125,000 of them will one day require liver transplants; 15,000 of them will be Californians.[179]

The United Network for Organ Sharing (UNOS) began tracking HCV-specific data for liver transplants in 1988 (see Figure 7 next page [180]). That first year there were 18 HCV-related liver transplants performed in the United States. After two years, the number of HCV-related transplants had increased nine-fold to 160. Ten years later, there were 1,845 HCV-related liver transplants

performed in the United States, a 100-fold increase since UNOS began tracking for HCV-related liver transplants. At roughly $250,000 per transplant, the direct cost of liver transplants in the United States in 1998, the year the CDC released their current cost estimate which excludes liver transplants, was $382.3 million for 1,529 liver transplants.[181] A more recent study reveals that by 2008 the cost of a liver transplant had increased, on average, to $523,400.[182]

Figure 7 – Hepatitis C Related Liver Transplants in the United States, 1988-2006



Data Source: United Network for Organ Sharing

Since 1990, on average 3,461 new HCV related registrations are added to the transplant list annually. According to the American Liver Foundation, nearly 1,000 people die each year while waiting for a liver transplant. Given that HCV is the primary cause of liver transplants in the United States, it is likely that most, if not all, of these deaths were HCV related.[183]

A similar trend has been noted with regard to HCV related deaths. In 1982, there were 814 deaths in the United States attributed to viral hepatitis. In 1999, HCV began to be specifically tracked as a cause of death and it was found that the number of deaths attributed to viral hepatitis had increased to 4,853, of which 77 percent (3,759) were related to HCV.[184]

With regard to annual costs, Leigh et al place HCV on par with asthma ($5.8 billion in 1994), rheumatoid arthritis ($7.1 billion in 1994), HIV ($30 billion in 1992), epilepsy ($11.1 billion in 1995), chronic obstructive pulmonary disease ($23.9 billion in 1993), and cancer ($107 billion in 1994). The authors also point out, however, that unlike HCV none of these illnesses are expected to experience the same rapid increase in societal burden in the near future.[185]

COSTS BY SELECT POPULATIONS

VETERANS AFFAIRS EXPENDITURES

The financial burden for the monitoring and treatment of veterans through the United States Department of Veterans Affairs (VA) falls entirely on the federal Government. While current figures with regard to total VA spending on HCV were not available, 2001 testimony by VA Deputy Undersecretary for Health Francis M. Murphy projected 2002 VA spending related to HCV prevention, research, and treatment to be $171 million.[186] VA Staff at the San Francisco VA Hepatitis C Resource Center (HCRC) report that first quarter FY 2006 expenditures for direct patient care were $42 million. The VA HCRC programs were initially funded in 2001 for a 5-year period.[187] In 2007 funding was extended for an additional five years through September 30, 2011.[188]

CORRECTIONAL FACILITY EXPENDITURES

Although the funding of California Correctional Facility health care programs falls directly on the state, the monitoring and distribution of health care benefits within the California Correctional System is in federal receivership. As a result of this all treatment protocols must adhere to federal guidelines.[189] Attempts to quantify HCV spending in both federal and California prisons were unsuccessful. According to staff at the State and federal levels, HCV diagnosis and treatment histories are not independently tracked within these systems.[190]

A Bureau of Justice Statistics Special Report published in April 2004 estimates that 1,679 California inmates underwent treatment for HCV between July 1, 1999 and June 30, 2000. The cost of treatment varies depending on the length of the regimen and the type of interferon prescribed with various sources citing costs ranging from a low of $8,000 for 24 weeks of treatment to a high of $34,380 for 48 weeks of treatment. These estimates do not include other prescriptions that may be necessary to successfully complete treatment such as anti-depressants and erythropoietin.[191]

MEDICAL, MEDICARE, SOCIAL SECURITY DISABILITY INSURANCE, AND SUPPLEMENTAL SECURITY INSURANCE EXPENDITURES

According to staff at the state and federal governments, HCV diagnosis and treatment histories are not independently tracked within these public assistance programs. No published estimates of the cost burden of HCV related to these public assistance programs could be located.[192]

WORKER'S COMPENSATION BENEFITS

Attempts to determine the burden of HCV related illness as a result of workplace injury were unsuccessful. A review of data available from the Bureau of Labor Statistics, the National Association of Social Insurance, the Worker's Compensation Research Institute, and the State Compensation Insurance fund revealed that HCV statistics are not independently tracked. Likewise, no published estimates of worker's compensation benefits paid as a result of work related infections could be found.[193]

NON-INDUSTRIAL DISABILITY INSURANCE & STATE DISABILITY INSURANCE

As shown in Table 5, staff at the California Department of Employment Development report the following HCV related expenditures for FYs 2001-02 through 2004-05.[194]

Table 5 – California Disability Claims Related to HCV

Fiscal Year	# of Claims	Amount Paid
2001-02	582	$5,628,821
2002-03	778	$7,270,417
2003-04	669	$7,507,126
2004-05	518	$6,583,502

HEPATITIS C: POLICY ISSUES

DISEASE SURVEILLANCE: DATA TRACKING AND REPORTING

BACKGROUND: FEDERAL NOTIFIABLE DISEASE LIST

The surveillance of disease-related information first began in 1878 when Congress authorized the collection of epidemiologic data for cholera, smallpox, plague, and yellow fever in an effort to stop the spread of these life-threatening diseases. By 1928, all states as well as the District of Columbia, Hawaii, and Puerto Rico were reporting case history information on 29 different diseases. As of 2006, there are 80 reportable infectious diseases on the list, each with a clearly stated case definition detailing the laboratory and clinical diagnostic criteria that must be met before a case is reported.[195] The national list is reviewed annually and periodically revised to remove diseases that no longer require monitoring and to add diseases that are emerging as potential threats to public health. The Council of State and Territorial Epidemiologists (CSTE), with input from the CDC and the various state health department staff, make annual recommendations for additions and deletions to the Federal Notifiable Disease List.[196]

> *To detect cases of infectious diseases, especially before they develop into widespread outbreaks, local, state, and federal public health officials as well as international organizations conduct disease surveillance. Disease surveillance is the process of reporting, collecting, analyzing, and exchanging information related to cases of infectious diseases. Disease surveillance provides national and international public health authorities with information for planning and managing [prevention] efforts to control these diseases.*
>
> *~ United States Government Accountability Office, 2004* [197]

State reporting of notifiable diseases to the CDC is voluntary; however, certain CDC funding opportunities are only available to states that regularly report notifiable disease information.[198] Nationwide local affiliate reporting to state health departments is mandated by state codes or regulations.[199] Penalties for local affiliates not reporting vary by state.[200]

In an effort to better protect the public health of their constituents, most states develop regionally targeted lists of reportable diseases that more closely reflect their specific public health concerns. The state list may include diseases not on the federal list and exclude others that are federally listed if they are not considered a threat in their region.[201]

Although there are several federal agencies and departments that are involved in disease surveillance, including, but not limited to the CDC, the Food and Drug Administration, the United States Department of Agriculture, the Department of Defense, and the Department of Health Services, at the federal level the CDC has primary responsibility for conducting and enhancing disease

surveillance.[202] Likewise, while the various state health departments have primary responsibility for disease surveillance in the United States, the responsibility for reporting new incidents of disease is shared among health care providers, local health departments,[xviii] private and public laboratories, and public health officials from certain state and federal departments and agencies.[203]

There are literally dozens of systems in place for receiving reported data among the various federal agencies and departments involved in disease surveillance. In an effort to streamline and standardize reporting, in 2000 the CDC implemented the National Electronic Disease Surveillance System (NEDSS) initiative, which will ultimately result in the integration of 60 to 100 different systems used by state health departments to report new incidents of disease to the CDC. Once fully operational, the NEDSS initiative will allow for the quick and easy exchange of information between public health partners at the local, state, and federal levels.[204] According to CDC staff, while some states are already capable of reporting to the NEDSS system, issues with compatibility of the various state systems and the NEDSS system are slowing the full implementation of NEDSS. At this time, there is no definite time frame for when NEDSS will be fully operational.[205]

Prior to the NEDSS initiative, new incidence of HCV was reported via the National Electronic Telecommunications System for Surveillance (NETSS). The NETSS system will be phased out as the NEDSS initiative reaches full implementation.[206]

NEDSS is one of four health information systems comprising the Public Health Information Network (PHIN)[xix] introduced by the CDC in 2002 to enhance disease surveillance. CDC PHIN will provide for the integration and networking of public health partners nationwide.[207]

In an effort to encourage state system compatibility with PHIN and NEDSS standards, the CDC has funding opportunities available to states that report public health information and are working to develop compliant systems.[208]

To enhance the monitoring of infectious diseases and in some cases to gather additional information not requested on reporting forms for the various diseases, some federal agencies set up supplemental surveillance systems. One example is the *sentinel surveillance system* that relies on a pool of select health care providers who regularly report information directly to the supporting federal agency. Another example is a *syndromic surveillance system* meant to "detect anomalous[xx] increases in certain syndromes, such as skin rashes, that may indicate the beginning of an infectious disease outbreak.[xxi]" While sentinel systems are considered a reliable tool for surveillance, the value of syndromic systems as a surveillance tool remains in question. Sentinel surveys are used by the CDC to track HCV.[209]

[xviii] Including county, city, and tribal health departments.

[xix] The other three systems are the Health Alert Network, the Laboratory Response Network, and the Epidemic information Exchange.

[xx] Some increases in symptoms are not anomalous, such as those associates with influenza during influenza season.

[xxi] Anomalous increases in certain syndromes may also indicate an environmental exposure representing a public health threat that may not be infectious.

A primary goal of disease surveillance is to provide information to assist policy makers in allocating resources for prevention and control activities. The information is also used to evaluate the success of intervention programs and provide program directors with data that will allow them to better target interventions to slow or halt the spread of infectious disease. The specific tactics used to monitor a given disease are determined based on what causes the disease and how it is spread.[210]

HEPATITIS C DATA COLLECTION

As with all reportable diseases, there are case definitions for HCV that outline the laboratory and clinical diagnostic criteria that must be met for an incidence to be reported. In 1982, the CDC published a case definition for *Hepatitis, non-A/non-B* and began tracking new incidence of symptomatic acute infections. In 1990, after the causative agent for the virus was discovered and the virus was officially named, the CDC revised the case definition to read *Hepatitis C, Virus Infection, Acute*.[211] Incidents of HCV submitted under these case definitions have been reported using the *NETSS Viral Hepatitis Case Record* (VHCR) form designed for the reporting of symptomatic acute HCV.[212]

Recognizing that identifying persons with both acute and chronic symptomatic and asymptomatic HCV is necessary to accomplish the goals of surveillance, in 2002 the CSTE approved a case definition for *Hepatitis C, Virus Infection (Past or Present*) and voted to add the new definition to the list of nationally notifiable diseases. A draft *Viral Hepatitis Surveillance Report*[xxii] (VHSR) form that allows for reporting of acute and chronic symptomatic and asymptomatic HCV was released by the CDC in February 2002 with the understanding that use of the draft form by states is optional until such time as the NEDSS system is fully operational.[213] In 2006, the CDC revised the title of the case definition to HCV on the draft VHSR form to read, *Hepatitis C, Virus Infection, Chronic or Resolved.*

The type of data to be reported varies depending on the form used for reporting. Both the VHCR and the draft VHSR form request basic information regarding the date of disease onset, patient residence (county & state), age, sex, race, and ethnicity of the infected individual. Both also request the reporting of supplemental extended data including laboratory test results, clinical information, and exposure history (i.e., transmission route) of the virus. The VHCR form requests information only for non-A, non-B symptomatic acute infections, while the draft VHSR form allows for the reporting of symptomatic and asymptomatic acute and chronic or resolved HCV.[214] Of states that do report, all include the basic data requested by the CDC. However, only 40 percent of all state case reports include the supplemental extended data.[215] As one can see, the reporting of new incidents of HCV is a complex process.

Use of the forms is not standardized nationwide. The CDC reports that currently only 20 states have begun using the draft form to report new incidence of HCV. Because the majority of states are not using the draft form, the data on asymptomatic and chronic infections is considered grossly inaccurate. For this reason, asymptomatic infections and chronic HCV are not yet included in the CDC's annual summary of notifiable diseases, nor is the data available for review. The CDC anticipates including this data in future annual summaries once the reporting system is stabilized, the

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[xxii] The web-link the CDC website refers to this as the *Viral Hepatitis Surveillance Form.* However, on the form is the name *Viral Hepatitis Case Report*, with the words *Draft Copy* noted in the upper right hand corner.

draft form is formalized and used by all states for reporting, and the NEDSS system is fully operational. Therefore, while some data on asymptomatic and chronic or resolved HCV has been gathered, reports issued utilizing the monitoring data and the CDC's annual summaries of notifiable disease report only on incidence of symptomatic acute HCV.[216]

Further complicating surveillance efforts is the lack of an available laboratory test that can both confirm exposure to HCV *and* differentiate between acute, chronic, or resolved infections as well as a lack of available staff resources at local health departments to confirm the reports represent new reportable cases of HCV in an efficient and timely manner. Antibody tests confirming exposure are reported to local health departments by physicians or laboratories. The local health department staff must then conduct an investigation on each report to differentiate between acute, chronic, and resolved infections, a difficult process that requires close scrutiny of the clinical features of the disease. Once differentiated, cases must be evaluated to determine if they are an incidence of new infection to be reported to the CDC, a repeat test of a previously reported infection, or a false positive report.[217]

Underreporting of disease incidence by physicians also complicates HCV surveillance. Many are not aware of their obligation to report or they do not fully understand the importance of their role in reporting infectious disease. Medical school curriculums often do not cover infectious disease reporting nor do residency programs address it. Continuing medical education programs are rarely, if ever, offered on the subject and it is not well integrated into board certification exams. It has also been noted that many providers fail to report simply because they do not know who to report to. While some states have programs in place to increase health provider awareness and reporting, nationwide underreporting by clinicians remains a challenge.[218]

Because of the various surveillance program challenges, the majority of HCV cases remain unreported. It is speculated that there are 2 to 5 unreported cases of HCV for each single case reported.[219]

In an effort to determine more accurate estimates of prevalence for HCV, the CDC adjusts reported figures to account for underreporting and asymptomatic infections using published study models and data from sentinel studies.[220] The sentinel studies are set up in six[xxiii] United States counties and represent the overall age and racial/ethnic composition of the U.S. population, thus enabling the extrapolation of what is believed to be more accurate data regarding transmission routes, prevalence, and disease outcomes.[221] A recent CDC comparison of sentinel study data to case data reported in 2003 by various States, has revealed that efforts to enhance surveillance has improved the reliability of reported figures, but there is still much work to be done to make reporting accurate.[222] For example, in 2005 there were 671 cases of acute HCV reported to the CDC. After adjusting the reported figures, the CDC determined that the number of new HCV infections in 2005 was likely closer to 20,000.[223] Until reported figures are determined to be more reliable, this duplication of efforts on behalf of the federal government (i.e. implementation of new reporting system enhancements and the sentinel study surveys) to determine accurate prevalence figures will continue.

[xxiii] The counties being monitored are Denver, CO; Jefferson, AL; Tacoma-Pierce Washington, Pinellas, FL; San Francisco, CA; and Multnomah, Or.

IMPROVING ESTIMATES OF PREVALENCE

A common theme among researchers and public health experts is the need for improved tracking and reporting of HCV. Enhancing HCV surveillance will assist public health officials to gain a better understanding of the disease process, enhance our understanding of the true prevalence, mortality, and morbidity rates of the virus, and aid in the effort to halt the spread of HCV.[224] Key areas identified for improvement are outlined below.

Nationwide implementation of PHIN and NEDSS Initiative. Full implementation of the state systems compatible with the standards for PHIN and the NEDSS initiative will provide states with the ability to identify asymptomatic and symptomatic acute and chronic or resolved HCV infections. This will assist public health officials at all levels in understanding the true prevalence of HCV, in identifying undiscovered transmission routes and risk factors, and will assist in the discovery of specific characteristics shared by individuals chronically infected with HCV. Understanding these factors will help local governments more fully understand the extent to which the disease is present in their areas and provide valuable information to local prevention program directors as they plan their strategies for identifying new infections and reducing the transmission of HCV in their region. The CDC has expressed their commitment to assist states in becoming PHIN and NEDSS compatible.[225]

> *"…[H]epatitis C reporting has been unreliable to date [in part] because most health departments do not have the resources required for case investigations to determine if a laboratory report represents acute infection, chronic infections, repeated testing of a person previously reported, or a false-positive result."*
>
> *~U.S. Centers for Disease Control and Prevention* [226]

Implementation of laboratory based reporting nationwide. States may choose to put the burden of reporting confirmed cases on physicians treating and interpreting results or on the laboratory staff who determine the test results.[227] All states currently have regulations requiring physician reporting of HCV to local public health authorities, while only some have shifted the focus to laboratory based reporting.[228]

Although there are some limitations with laboratory based reporting, according to the CDC implementation of laboratory based reporting results in more complete and timely case identification. Laboratory reports can more easily identify asymptomatic HCV infected persons with newly acquired infections and individuals with chronic HCV. Laboratory reports can also assist in the identification of HCV+ individuals who are co-infected with hepatitis B. Because laboratory reports are often automated and more complete than physician reports, they represent an important means of enabling state and local health departments to more easily and accurately identify individuals in need of counseling and medical follow up, thus increasing the potential for reduced transmission and enhanced health outcomes.[229]

Standardized reporting requirements. According to the CDC, standardizing reporting requirements at the state level to mandate the use of the draft VHSR form will decrease the number of unreported incidences of HCV, improve the reporting of risk factors for transmission, and allow for the tracking and monitoring of chronically infected individuals. This will enhance the reliability of reporting and planning of prevention and management programs and also allow for the monitoring of chronically infected individuals to ensure that they are receiving appropriate interventions. Furthermore, gaining a better understanding of who is chronically infected will allow for the creation of targeted testing protocols for currently unidentified high risk groups. As some states allow local reporters to choose which form they will use, shifting to requiring only one form will also streamline the review process by state health departments.[230]

Enhanced laboratory testing and education. There is no one test available that distinguishes acute HCV from hepatitis A and B, or from *chronic* HCV. The current testing protocols are only able to recognize the hepatitis virus in general. At this time, a diagnosis of HCV requires the presence of certain clinical symptoms and expensive follow-up testing to differentiate acute HCV from hepatitis A, hepatitis B and chronic or resolved HCV. The creation of standardized testing protocols can be expected to reduce false positives and unreported incidence of new infections. Finally, to increase awareness of testing protocols and reporting requirements, educational efforts should be developed to make reporters, whether they be physicians or laboratories, better aware of their responsibility.[231]

Creation of a confidential database to track chronically infected individuals. The CDC reports that implementation of a confidential database will facilitate the notification, counseling, and medical management of chronically infected individuals. The database would also assist local health departments in evaluating case reports for reporting as previously identified cases would already be documented and could be cross referenced electronically. The database would allow for ease in tracking the proportion of identified individuals with chronic hepatitis B or HCV.[232]

Data to be compiled will be determined based on the feasibility of acquiring the data and the objectives for establishing the data base. At a minimum, the CDC recommends collecting sufficient information to establish a unique identifier for each individual to allow for immediate discovery of duplicate reports (i.e., name, race, date of birth) as well as laboratory test results confirming the diagnosis and clinical data regarding symptoms, date of onset, and risk factors for transmission to which the individual was exposed. Basic demographic information would also be useful in facilitating follow up contact with chronic HCV+ individuals via telephone, electronically generated e-mail or traditional mail.[233] Of utmost importance is that the database be carefully constructed and protected to ensure the confidentiality of those persons whose private medical data is being compiled.[234]

Move forward carefully to avoid overwhelming local resources. Although understanding the prevalence of chronic HCV is an important tool for use in planning prevention strategies, experience at the local level tracking chronic infections has shown that the process for reporting these individuals must be carefully structured. The increased number of reports from chronic infections has been proven to overwhelm already scarce staffing resources, requiring surveillance systems to focus more on data management, rather than disease prevention. It is believed that eventual full implementation of the PHIN and NEDSS initiative will enable surveillance teams to more easily handle the large volumes of data anticipated.[235]

CALIFORNIA REPORTING PRACTICES

In California, health care providers and laboratories are required to report new incidence of HCV to the local health officers (via fax, telephone or mail). Health care providers must send the report within seven calendar days of identifying the incidence. Laboratories must report within one working day of notifying the care provider of the diagnosis.[236] Local health officers are required to evaluate each report and identify new incidences of acute HCV for reporting to the California Department of Public Health (CDPH)[xxiv] on a weekly basis.[237] Although reporting of state data by the CDPH to the CDC is voluntary, California regularly reports new incidences of acute HCV to the CDC.[238]

In January of 2005, CDPH sent a letter to all communicable disease control officers requesting that they use a CDPH modified version of the draft VHSR form when reporting new incidence of acute HCV to CDPH. The letter noted that the creation of "better guidance on the reporting of chronic hepatitis C" was in-process. To date, no additional guidance related to the reporting of chronic HCV has been published.[239]

The CDPH Division of Communicable Disease Control (DCDC) is the lead agency responsible for disease surveillance in California. DCDC receives, processes, and analyzes over 240,000 disease reports received from local health officers annually. It is anticipated that the number of reports will increase by 20 percent in the next five years.[240]

In California, some data on asymptomatic and chronic or resolved HCV is collected. However, because the data is considered to be unreliable it is not reported to the CDC by the CDPH.[241] In an effort to facilitate more accurate data reporting, the California Association of Communicable Disease Controllers (CACDC) formed a working group in 2005 to provide guidance on the reporting of *chronic* HCV in California.[242] The implementation of laboratory based reporting in California in 2007 is one outcome of the recommendations by this working group.

According to the CDC, implementation of laboratory based reporting results in more complete and timely case identification.

In California, regulations requiring laboratory based reporting were codified in 2007.

Non-reporting is a misdemeanor under California Health and Safety Code section 120295 and can result in the levying of fines ranging from $50 to $1,000, up to 90 days imprisonment, or both. Non-reporting is also a citable offense as defined by the Medical Board of California's Citation and Fine Program (Title 16, CCR section 1364.10 and 1364.11). First offenders may be fined anywhere

[xxiv] The California Department of Health Services was restructured in 2007 and split into two entities, the California Department of Health Care Services and the California Department of Public Health.

from $100 to $2,500. Repeat violators or citations involving multiple violations demonstrating a willful disregard for the law may be fined up to $5,000.

According the DCDC, it is estimated that only 20-50 percent of reportable cases are actually reported in California.[243] Because reporting is known to be inaccurate and unreliable, reported data is not utilized by CDPH for determining prevalence or allocating prevention resources. To determine statewide prevalence, California extrapolates estimated figures from the national estimates of HCV prevalence.[244]

At this time, CDPH systems do not meet the standards or specifications for reporting directly to NEDSS. However, in an effort to achieve compatibility, CDPH began the process of evaluating the state's reporting systems. When the CDC introduced PHIN in 2002, CDPH reevaluated their strategic plan and in June 2003 initiated the creation of the California Public Health Information Network (Cal-PHIN) project. The overarching goal of the project is full compatibility with PHIN and NEDSS.[245]

The Cal-PHIN network includes the following surveillance applications:[246]

- California Electronic Laboratory Reporting (CA-ELR);
- California Web Based Morbidity Reporting (Web-CMR);
- California Health Alerting Network (CAHAN); and
- Laboratory Information Management System (LIMS) for the California State Laboratory Complex in Richmond.[xxv]

In April 2007, CDPH announced the pending release of a request for proposals (RFP) for the California Electronic Laboratory Reporting system (CA-ELR) to be used in concert with the Web-CMR system.[247] In preparation for CA-ELR implementation, CDPH is consulting with laboratories statewide to educate them on appropriate testing protocols and standardized reporting procedures. These efforts are intended to reduce false positive reports and aid in creating a reliable laboratory-based reporting system that will produce a more accurate estimate of prevalence of HCV in California. The estimated date for full implementation of the CA-ELR system is not known.[248]

At the same time, CDPH also announced a pending RFP for the Web-Confidential Morbidity Reporting (Web-CMR) system.[249] The overarching goal of the Web-CMR system is to enhance and strengthen disease surveillance in California. Once operational, the system will provide for electronic reporting; the receipt of more accurate data; accessibility of data for purposes of planning, analysis and decision making; and elimination of duplicate records.[250] The estimated date for full implementation of Web-CMR is October 2008.[251]

The CAHAN system is an existing web-based disaster broadcast warning system that provides a means of alerting state and local government disaster officials of impending or current disasters.

[xxv] The tertiary public health lab for California that serves as the main reference lab for the 39 regional public laboratories.

The system is capable of sending messages via e-mail, telephone, fax, alphanumeric pagers, and cell phones with short message service capability. CAHAN is intended to facilitate alert communication between the various local health departments and CDPH as well as allowing for the dissemination of alerts among local health departments. As well as providing a means for the secure sharing of information, CAHAN also "offers organization-specific work areas to accommodate the products of local disaster planning and response efforts." The existing system requires some enhancements in order to reach the intended level of operation. It is not known when those enhancements will be completed.[252]

The process of upgrading the existing Laboratory Information Management System (LIMS) up to NEDSS and PHIN standards began in 2005. According to the departmental website, the new system, STARLIMS, will allow for the full integration of all public health laboratory reporting functions. The new system will fully integrate with the CA-ELR, Web-CMR, and CAHAN systems. It will also allow for the smooth transfer of data between CDPH and the various federal agencies who monitor disease and bioterrorism surveillance.[253]

HCV is currently the most commonly reported infectious disease in Los Angeles County with ~16,000 reports received in 2006. Care must be taken to not overwhelm local resources as the ability to accurately report data improves with the implementation of laboratory based reporting.

According to a Los Angeles County epidemiologist, HCV is currently the most commonly reported infectious disease test in Los Angeles County with ~16,000 reports received in 2006.[254] As mentioned in an earlier section of this report, care must be taken to ensure adequate resources are available to evaluate these reports so as not to overwhelm already scarce resources at the state and local levels as the ability to accurately report new incidence of HCV improves. CDPH anticipates that the full implementation of Cal-PHIN will provide a common format for all reported data and standardize lab test and clinical data coding systems thereby further enhancing the reliability of reported data. As a result, Cal-PHIN will assist in alleviating the potential for resource overload by providing high quality electronic reports that can be easily cross referenced to differentiate between acute and chronic HCV and to reveal cases that have been previously reported.[255]

PREVENTION & CONTROL EFFORTS

Past experience with HIV has proven that prevention programs can be effective in reducing the negative impacts of a potentially deadly virus on society.[256] Likewise, prevention efforts have been shown to slow the transmission of HCV and reduce the risk of disease progression, both of which reduce the direct and indirect financial burdens of HCV on society.[257]

In general, prevention efforts are separated into two distinct categories: primary prevention and secondary prevention. The focus of primary prevention programs is to decrease the number of *new* infections. For HCV, this is done by providing education and information regarding risk factors and transmission routes. The goal is to encourage high-risk populations to participate in screening and testing programs to determine their disease status and to educate low-risk healthy populations on how to continue to avoid contracting the virus. In Canada, primary prevention efforts include distribution of syringes, alcohol swabs, water vials, and crack pipes to drug users.[258] Once identified, primary prevention programs also include the education and counseling of infected individuals so they can be aware of ways to avoid spreading the disease to others.[259]

> *Despite primary prevention efforts to educate the public about hepatitis C, the most prevalent blood-borne human disease in the world today, most Americans remain unaware of their infection status. Widespread screening programs established to identify those at risk have been slow to emerge and difficult to implement, especially when compared to the nations rapid response to the HIV/AIDS epidemic.*
>
> *~Susan Instone et al, Lessons Learned About Barriers to Hepatitis C Testing*[260]

The hepatitis C Strategic Plan for California defines primary prevention activities for HCV as:[261]

- Screening and testing of blood, plasma, organ, tissue, and semen donations;
- Screening, testing, and counseling of individuals who have engaged in high risk behaviors such as injection drug use;
- Screening, testing and counseling of individuals who have had percutaneous (through the skin) exposures to blood in health care or emergency situations;
- Risk reduction counseling and services; and
- Implementation and maintenance of infection control practices.

Secondary prevention efforts focus on identifying individuals already infected with a disease and providing them with access to medical care, counseling and case management services to protect their health and the health of others. Because progression of HCV to end stage liver disease has been directly related to life style choices, educating infected individuals on progression reduction strategies is a primary focus. Counseling services to assist infected individuals in coping with the

medical, social, and psychological challenges of HCV are also included in these programs. Secondary prevention efforts often build on existing frameworks, making them economical and efficient. One example of this is the addition of HCV prevention interventions into existing HIV/AIDS programs.[262]

Secondary prevention efforts often build on existing frameworks, making them economical and efficient. One example of this is the addition of HCV prevention interventions into existing HIV/AIDS programs.

Health care provider education is a part of both primary and secondary prevention. Educating physicians and other medical personnel on how to identify and report new incidence of infection as well as understanding current disease management and treatment protocols are important aspects of health provider education.[263] Examples of educational content include notifying care providers of the importance of HCV+ individuals being immunized against hepatitis A and B, teaching them how to educate their patients on the effects of life-style choices and their impact on disease progression and transmission, and ensuring that care providers understand when, where, and how to report newly diagnosed cases.[264] Understanding changes in diagnostic protocols, such as the need to perform secondary testing on all HIV+ individuals[xxvi] at risk for developing HCV when a negative HCV test result is received, are important aspects of on-going health provider education.[265]

Increased awareness among physicians and other care providers could also serve to increase the number of specialists who are capable of effectively treating HCV+ individuals. Wong et all report that there are a limited number of qualified hepatologists in the United States and that it can take from several months to a year to get an initial appointment. Increasing the number of specialists in this area of medicine will help reduce wait times thereby improving prevention efforts as well as access to health care.[266]

There is no vaccine for HCV, and the efficacy of treatment to eradicate the virus in individuals is less than 40 percent for the most prevalent form of the virus in the United States, HCV genotype 1.[267] Therefore, until a vaccine can be found and treatment options yield stronger success rates in clearing infected individuals of the virus, prevention efforts are the primary means for controlling the spread of HCV.[268]

[xxvi] Strader et al report that 6 percent of HIV+ individuals co-infected in HCV do not create HCV antibodies, resulting in false negative HCV tests. They estimate that 25 percent of all HIV+ patients also have chronic HCV.

LESSONS TO BE LEARNED: 25 YEARS OF HIV/AIDS PREVENTION

The similarities between HCV and HIV/AIDS are many. Both viruses:

- Are bloodborne viruses that are potentially terminal;
- Carry a stigma related to the primary group of individuals identified as high risk;
- Were potentially transmitted to hundreds of thousands of individuals via blood transfusions prior to blood screening protocols being implemented; and
- With the proper medical oversight, can be managed as chronic conditions allowing infected individuals to live long, productive lives.

Although highly successful in reducing the incidence and transmission of HIV, recent reviews of HIV prevention programs have revealed specific areas of concern with regard to continued program effectiveness. For example, like HCV, many individuals that are HIV+ remain unaware that they are infected making them high risk for transmitting the disease to others and experiencing debilitating disease progression. Ironically, advances in medical intervention and changes in the public's perception of the disease have resulted in a misguided but widespread belief, especially among youth, that HIV/AIDS is no longer a problem in the United States.[269]

Prevention efforts need to keep pace with a changing epidemic. Most importantly, younger generations, who might not remember the deadlier, early days of the epidemic, continually need to receive basic HIV-prevention messages.

~ Twenty-Five Years of HIV/AIDS --- United States, 1981 – 2006[270]

Although post-transfusion HCV was noticed by public health officials prior to the outbreak of HIV/AIDS, scientific advances for HCV and subsequent efforts toward prevention and treatment have not kept pace with HIV/AIDS. Because of the similarities between the two diseases, public health officials have the opportunity to look back at 25 years of prevention efforts focused on HIV/AIDS for clues regarding how to move forward with future HCV prevention efforts.

A Brief History of HIV/AIDS prevention. AIDS prevention began as local grassroots efforts in 1982; within one year of the first reported case of acquired immunodeficiency syndrome (AIDS). In 1983, the cause of AIDS, the human immunodeficiency virus (HIV), was discovered providing a means for scientists to begin the development of screening tools, treatment options, and an HIV vaccine. The first blood screening tool for HIV was licensed for use by the FDA in March of 1985 and was widely implemented by the nation's blood banks, clinical centers, health departments, and plasma collection centers. At the same time, the U.S. Public Health Service announced the availability of local health department funding for establishing HIV test sites. Initial federal

government prevention efforts also included the establishment of the National AIDS Infoline in 1983, the creation of the National AIDS Clearinghouse in 1987, and the mass mailing of the *Understanding AIDS* brochure to all United States households in 1988 by then Surgeon General C. Everett Koop. This was the first ever mass mailing of public health information in the United States. By the late 1980's (less than ten years after the first cases of AIDS were reported), federal efforts had begun to target high schools, colleges, high risk individuals, minority populations, perinatal[xxvii] transmissions, and health care workers.[xxviii] As a result, these broad based efforts resulted in "increased basic knowledge about HIV transmission and prevention, reduced risk behavior within populations at high-risk for infection, and decreased negative attitudes towards persons living with HIV/AIDS."[271]

Scientific advances for HCV and subsequent efforts toward prevention and treatment have not kept pace with HIV/AIDS.

Early evaluations of prevention efforts revealed two major barriers in reaching prevention goals. Laboratory evaluation of HIV tests can take up to two weeks requiring individuals to return to the clinic for their test results. One survey revealed that at some clinics, 10-50 percent of all persons tested did not return for the results of their test. This barrier was eventually resolved by the creation of a rapid response test capable of delivering test results in 20 minutes.[272]

The second barrier required a shift in counseling focus. Initial counseling efforts focused on educating individuals about the test, the meaning of the results (positive or negative), and risk reduction. These efforts were successful in inspiring lifestyle changes among persons who tested positive for HIV, thus reducing their risk of spreading the virus to others. Yet the same counseling strategy did not result in similar behavioral changes among individuals who tested negative for HIV; they often made no changes in their behavior at all, leaving them at high risk for acquiring the virus. In response, the CDC recommended a shift in focus for counseling sessions. Counseling sessions would be more client-centered, focusing instead on the client's perception of risk and the development of a personal risk-reduction plan. The result was an increase in condom use among persons testing negative and a decrease in new incidences of sexual transmitted diseases (including HIV) among patients who tested negative.[273]

By the mid-1990's medical advances had dramatically reduced AIDS related deaths, newly diagnosed HIV patients could now anticipate living active, productive lives that might extend for decades. As a result, prevention programs expanded their focus to include strategies for living a healthy life with HIV. In 2001, the CDC launched the Serostatus Approach to Fighting the HIV Epidemic (SAFE) as a means of providing education to HIV+ individuals on ways to improve their own health and to avoid transmitting the virus to others. In 2003, the Advancing HIV Prevention (AHP) initiative was

[xxvii] Transmission of HCV from the mother to the fetus during pregnancy.

[xxviii] For comparative purposes a timeline for HCV prevention spanning 64 years is in the Appendix.

implemented by the CDC formally adopting the SAFE approach and providing the funding for "large-scale demonstration projects to evaluate public health strategies for identifying undiagnosed HIV infections and preventing transmission by persons living with HIV."[274]

Although great strides have been made in reducing the transmission of HIV, the CDC states that there is still work to be done. Remaining prevention challenges include defining strategies to reduce the racial disparities of HIV, especially among black men and women. Between 2003 and 2004, HIV transmission substantially increased among men who have sex with men (MSM). The CDC reports that prevalence among black MSM is reported to be as high as 46 percent in a study of five U.S. cities. Also, because of the growing number of persons living with HIV, existing support resources may soon be stretched too thin to provide adequate assistance with appropriate care, treatment, and prevention services. Successes aside, as with HCV, the CDC believes that up to one-quarter of all persons living with HIV are unaware of their disease status, making them high risk for passing on the virus to others. This is compounded by the continued stigma and discrimination associated with being HIV+ that often, out of fear of discovery, causes some individuals to avoid being tested and others living with HIV from accessing treatment for fear of being discovered.[275]

To continue to improve outcomes related to prevention efforts, the CDC has outlined six new strategies that, when implemented in combination with traditionally effective programs, are expected to increase the effectiveness of on-going prevention efforts. Because many of the challenges stated above also apply to persons with or at risk for acquiring HCV, these strategies are applicable to HCV prevention.[xxix]

The six strategies include:[276]

- Forming public health partnerships among individuals, communities, mental health services, government agencies, private sector businesses and religious groups;
- Increased access to voluntary testing through routine medical care, reduction of barriers to testing such as the stigma associated with the disease, and providing easy access to testing;
- Focus prevention messages based on disease status;
- Integrate prevention programs whenever possible;
- Improve disease monitoring; and
- Develop new prevention technologies.

[xxix] As with HIV many individuals infected with HCV do not know, are fearful of the stigma associated with the virus, and are slow to incorporate sometimes challenging live-style changes to protect their own health and the health of others. Unlike HIV there is no rapid response test for HCV, so the barrier of having to return for test results is a challenge that remains at the forefront of HCV prevention.

CHALLENGES SPECIFIC TO HCV PREVENTION[xxx]

Although not specifically targeted as a sexually transmitted disease, many prevention strategists encourage the integration of HCV testing and counseling into pre-existing HIV Counseling and Treatment Centers.[277] It is important to note, however, that while tying the programs together will increase the reach to *some* individuals who have already contracted or are at risk for HCV, it is not a strong enough strategy to reach them all. While there certainly will be some overlap between the populations at risk for HIV and HCV because both diseases are blood borne viruses, HIV is *primarily* a sexually transmitted disease and HCV is not. Prevention measures specific to HCV must be created to catch those individuals who do not access care through existing HIV centers.[278]

In California, challenges to designing and implementing successful prevention programs specific to HCV have been reported to include: [279]

- A lack of accurate epidemiologic data due to poor reporting practices. A lack of comprehensive and accurate data hinders the ability of public health officials to effectively target prevention programs, raise awareness among care providers, and educate the general public about HCV;
- A lack of public interest and support for programs serving substance abusers, the mentally ill, and persons with infectious disease;
- Certain categorical and programmatic restrictions that hinder the integration of HCV prevention into existing HIV programs; and
- The high cost of developing program materials that can be read and understood by the large variety of cultural and language groups in California's multi-lingual population.

Another challenge reported at the national level is that some HCV+ individuals do not know how they contracted the virus and many of them have no known risk factors or knowledge of exposure to the virus. Reported data reveals that many of these individuals live in low-income households and since we do not know how they were exposed to HCV, designing prevention measures to slow the spread of HCV in this population is challenging.[280]

Since many HCV+ individuals are not aware of the currently identified risk factors and experience no signs and symptoms of the disease, they often are undiagnosed leaving them at high risk for disease progression and transmission.[281] Enhanced prevention efforts detailing risk factors and noting the lack of sign or symptoms for HCV may convince some people to get tested in light of *potential* past exposures.[282] This also highlights the need for enhanced reporting procedures. As new routes of exposure are discovered by physicians and care providers at the community level, streamlining reporting procedures will serve to ensure that new routes of infection are not only discovered, but reported to the CDC for nationwide dissemination.

[xxx] A detailed timeline of prevention efforts is in the appendix.

REDUCING SOCIAL STIGMA WILL IMPROVE PREVENTION EFFORTS

> *Complacency, stigma, and discrimination persist and all decrease motivation among persons and communities to adopt risk-reduction behaviors, get tested for HIV, and access prevention and treatment services.*
>
> *~ Twenty-Five Years of HIV/AIDS --- United States, 1981 – 2006*[283]

Although more than 300,000 Americans contracted the virus through blood transfusions, HCV is seen by many as a disease that affects only IV drug users. However, as Ann Jesse, of the National hepatitis C Advocacy Counsel notes, "Hepatitis C is everyone's disease" including middle-aged working class men and women who were infected via blood transfusion, young adults who had blood transfusions as premature babies, veterans receiving transfusions or exposed to blood in combat, and individuals who experimented, even just once, with IV drugs.[284]

As with HIV, some people avoid being tested out of fear they will be stigmatized and discriminated against. As one New York City Police officer said about his HCV diagnosis, "There are a lot of ignorant people on the job. They'll treat you like a leper if they find out."[285]

One seventh grade teacher in Kansas City reports keeping her diagnosis a secret out of fear her students will lose respect for her, "I worry that my students would have the wrong idea. Their basic knowledge is that crackheads and prostitutes and inmates get hep C, not their favorite teacher."[286] There are also reports of HCV+ individuals attempting to hide their diagnosis by not accessing health care out of fear they will experience discrimination from peers, employers, and others.[287]

HCV is everyone's disease including middle-aged working class men and women who were infected via blood transfusion, young adults who had blood transfusions as premature babies, veterans receiving transfusions or exposed to blood in combat, and individuals who experimented, even just once, with IV drugs.

The 1998 House Report *Hepatitis C: Silent Epidemic, Mute Public Health Response*, notes that the majority of NIH resources spent on HCV research were spent by the National Institute on Drug Abuse "which may reflect an institutional bias within [the United States Health and Human Services Agency] that HCV is a disease of injection drug users. This bias may have worked against early recognition of HCV as a broader public health interest."[288] This lack of funding also impacts researchers outside of governmental agencies. One University of Washington Alumni Magazine article reports that because drug-addiction related diseases are often politically charged it can be difficult for researchers to obtain funding for HCV focused research. Noted in the article is a lack of funding University of Washington researchers to complete HCV research already in progress.[289]

POST-TRANSFUSION HEPATITIS – CLEANING UP THE BLOOD SUPPLY

Beginning in 1943 when the first case of post-transfusion hepatitis (PTH) was discovered, federal agencies and research scientists strived to determine (1) what was causing the infections; (2) how to screen the cause out of the blood donation system; and (3) how to prevent and treat the virus.[290] Although the primary cause of the virus remained elusive until 1988, various markers for the condition began to surface as early as 1955 when research was published suggesting that elevated levels of the liver enzyme alanine aminotransferase (ALT) in donated blood were associated with PTH.[291]

In 1969, the *hepatitis associated antigen* (HAA) was identified as another potential marker for the cause of PTH.[292] A study published in early 1970 postulated a 25 percent reduction in PTH if blood donations were screened for HAA using available screening tools.[293] A National Academy of Sciences, National Research Council (NAS, NRC) panel released a statement in response to the study calling for a more reliable test before mandating implementation.[294] Frustrated by the response of the NAS, NRC panel, in July 1970, three NIH researchers, in their private capacity, published an article showing that implementation of HAA screening tests could potentially prevent up to 40,000 of the 150,000 PTH infections occurring annually. The researchers noted that 69 percent of all blood transfusions testing positive for HAA result in PTH, and they called for the immediate implementation of routine screening for HAA at all laboratories nationwide equipped to perform the test.[295] In 1972, the NIH promulgated a regulation requiring HAA screening of all blood donations and the permanent deferral of all HAA positive donors.[296] In late 1972, regulatory authority for biological products, including blood and blood products, was shifted from NIH to the United States Food and Drug Administration (FDA).[297]

In response to emerging research revealing that PTH was more common when blood from paid donors was transfused, [xxxi] by 1970 United States blood banks voluntarily began to shift towards an all-volunteer donor system.[298] A November 1972 NIH study supporting the shift to an all volunteer blood donor system noted a 70 percent reduction in PTH when only volunteer donations were transfused.[299] In 1973, the incidence of PTH was determined to be as high as 21 percent.[300] In late 1975, the FDA issued a proposed rule requiring labels on blood products to distinguish between voluntary donations and paid blood donations, and noted that paid donations are associated with PTH. Final regulations are promulgated in January 1978.[301] By late 1978, widespread voluntary exclusion of paid donors by United States blood banks resulted in a drop of PTH from 21 percent to 10 percent.[302]

Ruling out hepatitis A and B as the cause of PTH, in 1973 researchers determined that non-A, non-B hepatitis was responsible for 90 percent of all PTH cases.[303] Unfortunately, the cause of non-A, non-B hepatitis remained unknown. Subsequent studies published in 1975, 1977, and 1980 revealed non-A, non-B hepatitis to be an asymptomatic, chronic illness leading to end-stage liver disease and cirrhosis in some patients. Again, the studies were unable to reveal the causative agent.[304]

Blood banks in Germany and Austria began screening donated blood for elevated ALT levels in 1970.[305] But United States blood banks did not begin to seriously consider ALT testing until

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[xxxi] Research that had begun in 1964.

1981.[306] Early on in the process of debating the usefulness of ALT screening, American Red Cross Director Alfred J. Katz reported in a letter to fellow Red Cross Director Louse J. Keating the outcome of a meeting on January 9, 1981. In his letter, he notes that many present "were talking about preventing a disease that we in fact help[ed] create through blood transfusion." He noted that the group "evaluated the scientific evidence and judged it good, but there were those whose opinions were heavily influenced by legal and public relations considerations."[307] After years of consideration, in 1987 United States blood banks began voluntarily screening for elevated ALT levels in blood donations. As a result, incidence of PTH dropped from 10 percent to 2-3 percent.[308]

According to an article by award winning journalist Karen Dillon, Canada waited even longer to test than the United States and as a result criminal charges were filed against the Canadian Red Cross in November 2006.[309] Although the charges were eventually dropped, the Canadian government has awarded a compensation package totaling more than $1 billion to be shared among individuals infected as a result of Canada's infected blood supply.[310] The threat of lawsuits or promises of government compensation have also occurred in Japan, France, Ireland, Scotland, Australia, and the United States on behalf of hemophiliacs and others who were infected through blood products.[311]

In 1988 hepatitis C was formally identified and in 1990 the FDA licensed the first tests detecting HCV anti-bodies (anti-HCV).[312] In 1991 the CDC, NIH, and FDA all recommended the routine screening of blood donations using the anti-HCV test.[313] After testing was implemented, incidence of PTH dropped to 1.5 percent.[314] The second generation of HCV screening tools implemented in 1992, all but eliminated PTH.[315] Regulations regarding HCV screening are promulgated by FDA in 2001.[316] Similar regulations regarding human tissue donations are promulgated in 1998.[317]

A DELAYED PUBLIC HEALTH RESPONSE – HCV LOOKBACK NOTIFICATION

HCV lookback is the process of identifying and locating blood and blood components of prior donations when a donor has been determined to be HCV+. The prior donations are quarantined and tested for HCV. The donations are then either destroyed or, if there is no risk of infection, released from quarantine. Any recipients who received blood or blood products from previously donated units by the donor identified as HCV+ are then notified of their potential risk for having been infected with HCV. First discussed in 1989, as will be shown below, in spite of various efforts by policy makers and advocacy groups, HCV lookback was repeatedly stalled due to a lack of consensus on the public health benefits by federal agencies.[318]

Further highlighting the disparity of prevention efforts between HCV and HIV is the timeframe in which HIV lookback was completed. HIV lookback was first considered as a proposed rule in June 30, 1993, nine years after the HIV virus was identified. Three years later, on September 9, 1996, HIV lookback was promulgated as a federal regulation.[319]

In a 1991 Morbidity and Mortality Weekly Report (MMWR), the CDC supported the notification of donors testing positive for HCV. The recommendation noted that targeted lookback of blood transfusion recipients and general screening programs for high-risk individuals were not recommended due to the lack of the ability of available testing tools to differentiate between active illness and recovery. They also noted the limited understanding of transmission routes and the lack of reliable and widely available treatment options for persons who are diagnosed.[320] Despite this, in 1995 at the request of House Government Reform and Oversight Committee, Chairman

Christopher Shays, then Health and Human Services Secretary Donna Shalala committed to making HCV notification the first issue to be considered by a newly created Health and Human Services Blood Safety Council (HHSBSC).[321]

A report released in August 1996 by the Committee on Government Reform and Oversight was the first in a series of governmental reports to call into question the quality of the government's response, including lookback, with regard to HCV prevention efforts. The report chastises governmental and private industry leaders for a "pattern of decision-making [sic] characterized by adoption of the most limited public health responses." It is noted that in 1990 (when screening tests were first introduced), an estimated 300,000 persons potentially infected via blood transfusions were still alive and likely unaware of their infection. The report stated that despite the availability of treatment options and the ongoing discussions by the FDA Blood Products Advisory Committee regarding the importance of notifying these individuals, no action had been taken. The report recommended the immediate notification of potentially infected individuals so they could seek diagnosis and treatment.[322]

"Why has the public health response to hepatitis C been so muted?"

~ Congressman Christopher Shays, 1998

"…we in the public health community have done practically nothing about [HCV]…"

~ Surgeon General Dr. C. Everett Koop, 1988

Likewise, a General Accounting Office report released in February 1997 and subsequent subcommittee testimony related to the same, recommended that FDA require the notification of recipients of their potential exposure to PTH. They stated that not doing so is a public health hazard and unfair to the recipients who did not know to seek treatment, would not learn that lifestyle choices (such as drinking alcohol) are directly related to disease progression, and would not be educated on ways to avoid transmitting the disease to others. The report and testimony highlighted that HCV was being handled differently at the public policy level than HIV. The three key differences noted in the report are that: 1) donor notification was recommended for HIV but not HCV, 2) blood quarantine was *required* in cases of HIV+ blood donations, yet only recommended for HCV+ blood donations, and 3) recipient notification was *required* in cases of HIV+ blood donations yet notification of recipients of HCV+ blood had yet to be even recommended.[323]

Two years after Secretary Shalala committed that targeted HCV lookback would be a priority, the HHSBSC discussed the notion of HCV lookback in meetings that took place in April and August of 1997. Although some members felt it was unethical to limit the effort, the Council endorsed only a limited lookback focusing on individuals potentially infected after the second generation of screening tools was implemented in 1992.[324] That same year, the NIH determined that 70-75 percent of persons with HCV were undiagnosed.[325]

A November 1997 memo to John M. Eisenberg M.D., Acting Assistant Secretary for Health, discussed the history of HCV blood screening and lookbacks and then offered policy options for consideration. The memo closed by noting that "[t]hose who were exposed to these potentially contaminated donations are now demanding equivalent treatment. It seems unlikely, based on the actions of the many other countries which have already conducted a hepatitis C lookback and our own political philosophy that this demand will not ultimately prevail."[326]

In January 1998 then Health and Human Services Secretary Donna Shalala called for the development of a comprehensive plan for HCV prevention and outreach. She ordered that the plan include guidance on appropriate public education efforts, outreach, and lookback notification of recipients of blood and blood products potentially infected with HCV.[327]

At a March 5, 1998 hearing of the House Government Reform and Oversight Committee regarding HCV, Committee Chair Christopher Shays and former Surgeon General C. Everett Koop discussed the slow response of the federal government to HCV prevention. Shays stated his frustration regarding the lack of initiation of a full lookback and slow governmental response to the 1996 Committee report. In his testimony Shays asks "Why has the public health response to hepatitis C been so muted?" In his testimony Dr. Koop recalled the rapid response of governmental agencies to HIV/AIDS and stated that "…we in the public health community have done practically nothing about [Hepatitis C] to date."[328]

Initially issued in March 1998, then later withdrawn, the FDA reissued a *Guidance for Industry* in September 1998 recommending HCV lookback for donations made in and after January 1988. The guidance included recommendations regarding the quarantine, disposition, and supplemental testing of anti-HCV+ donations.[329]

In October 1998, the House Committee on Government Reform and Oversight released, "Hepatitis C: Silent Epidemic, Mute Public Health Response." The report began, "Called 'the silent epidemic' the spread of hepatitis C Virus infection has evoked a Federal public health response almost as mute." The report stated that Department of Health and Human Services (HHS) lookback attempts had "sputtered, and little has been accomplished," "disease reporting and surveillance is uneven," "research into HCV is uncoordinated," and that "[u]nless confronted more boldly, more directly, and more loudly by the HHS, the threat posed by hepatitis C will only grow more ominous." The report summary closed by stating emphatically that "[t]he time for aggressive implementation is at hand."[330]

In October 1998, nine years after HCV lookback was initially considered, the CDC published the MMWR "*Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease.*" The publication includes a recommendation that blood-collection establishments and transfusion services work with state and local health agencies to coordinate lookback notification.[331]

House Commerce Committee Chairman Thomas Bliley launched an investigation in April of 2000 to review the use of CDC funds earmarked for education and outreach to recipients of blood and blood products potentially infected with HCV. In response, the CDC stated that limited lookback was underway and, in fact, was 90 percent complete. The investigation was dropped in July of 2000.[332] No report or follow-up documentation related to the investigation could be located.

Prevention and Control Efforts

In July of 2000, then Surgeon General Dr. David Satcher drafted a letter to be sent to all households in the United States educating them about HCV infection and encouraging specified individuals to seek testing. Recipients of blood transfusions prior to July 1992 and blood clotting products before 1987 are among those persons encouraged to be tested. Unlike his predecessor, the office of the Surgeon General did not have adequate funding to send the HCV letter. Dr. Satcher thus sent a copy to each member of Congress imploring them to forward it to all of their constituents.[333] As a result of legal challenges related to Congress mailing out a letter from another branch of Government, the letter was never sent.[334] A mail-in campaign organized by The Hepatitis C Outreach Project resulted in Dr. Satcher's office receiving literally thousands of postage stamps from concerned citizens who wanted the letter to be sent. Satcher's office, overwhelmed by the number of letters they were receiving, responded by asking them to please stop sending stamps "because the bags of mail were piled high and they could hardly navigate around them." The advocacy group agreed to halt the campaign when Satcher's office offered to hold a press conference regarding HCV prevention. According to the advocacy group, the press conference never materialized.[335]

A 2000 study focused on determining the effectiveness of HCV lookback programs found that of the 314 identified recipients, 238 of them (76 percent) had died prior to being made aware of their potential exposure to HCV.[336]

The CDC, in partnership with various governmental agencies, released *The Hepatitis C Prevention Strategy* in the Summer of 2001[xxxii]. The strategy was written in response to the 1998 request from the Secretary of the Department of Health and Human Services, Donna Shalala who acknowledged the need to provide lookback notification to persons who may have been exposed to HCV via blood transfusions. Although the plan included many strategies for prevention, HCV lookback was mentioned only twice; once in the Executive Summary as the impetus for the plan and again in one sentence in the Prevention and Control section; "Development and distribution of educational messages for groups of persons at increased risk for infection should include persons transfused prior to July 1992"; no specific mention of how or when lookback should occur was included. The 1998 CDC recommendation for lookback and the results of the limited lookback that were already underway were not mentioned.[337]

Initially proposed in November 2000, HCV lookback was ultimately promulgated by the FDA into the Federal Code of Regulations in 2007; eighteen years after it was initially proposed. The final *Guidance for Industry* regarding HCV lookback was published in August of 2007 and required both on-going prospective HCV lookback and the completion of retrospective HCV lookback by February 19, 2009. Regulations require that retrospective lookback reach back to January 1, 1988, or further as electronic records allow.[338]

Although voluntary lookback was always an option for blood banks and hospitals, one hospital is on record as deciding not to notify patients "because the test at that time often gave false positives and they didn't want to unnecessarily alarm patients."[339]

[xxxii] Details of the prevention strategy are in the next section of this report.

UNITED STATES - HEPATITIS C PREVENTION STRATEGY

> *"[Hepatitis C is] one of the most significant preventable and treatable public health problems facing our nation… a graver threat than the AIDS crisis."*
>
> *~ Former Surgeon General Dr. C. Everett Koop*[340]

The first campaign in California to raise public awareness of HCV was implemented by the San Diego Chapter of the American Liver Foundation in 1995. Six years later, in response to a request by the Secretary of the Department of Health and Human Services, the Centers for Disease Control and Prevention, in partnership with other agencies and departments, published the National hepatitis C Prevention Strategy. The on-going focus of the prevention strategy is to protect public health through the prevention and control of HCV infections, provide credible and current information regarding the disease, its treatment and prevention, and to promote healthy living through partnerships with various national, state, and local organizations.[341]

The goals of the strategy are to:[342]

- Educate health professionals to enhance identification of persons at risk for HCV;
- Educate the public about risk factors in an effort to increase the identification of HCV+ individuals;
- Hold clinical and public health activities targeted at identifying those at risk and those persons already infected;
- Create outreach and community-based programs to aid in prevention activities;
- Enhance surveillance for the monitoring and evaluation of HCV incidence and prevention efforts; and
- Continue to research better ways to improve prevention efforts.

One major goal of the national strategy is the placement of a CDC funded hepatitis C Coordinator in each state and in large metropolitan health departments. However, funding covers only the coordinator salary. Unlike HIV/AIDS, there is no federal funding provided to support the work of the coordinators; states must appropriate their own funds for these purposes.[343] As a means of defining their specific needs, the document encourages states to develop their own strategic plans to identify gaps in surveillance, health care, and prevention programs for HCV.[344]

Since the publication of the National Plan in 2001, three Congresses have considered various versions of the hepatitis C Epidemic Control and Prevention Act (Hepatitis C Prevention Act); with the most recent versions introduced in the Senate and the House in May 2007. If signed into law,

the hepatitis C Prevention Act would "direct the Secretary of Health and Human Services to develop and implement a plan for the prevention, control, and management of hepatitis C virus." If passed, the act would provide $90 million in funding for prevention efforts nationwide in 2008 and $72 million in funding each year in 2009 through 2012.[345]

UNITED STATES DEPARTMENT OF VETERANS AFFAIRS

In 1999, the United States Department of Veteran Affairs established the *Centers of Excellence in Hepatitis C* located at the Miami Veterans Administration Medical Center and the San Francisco Medical Center. The two centers were the beginning of a planned Veterans Health Administration wide comprehensive program of HCV screening, testing, clinical care, and education for at-risk veterans.[346] In 2000, the federal Undersecretary for Health designated an additional $20 million for outreach, testing, counseling, and treating veterans with hepatitis C.[347]

In 2001, the VA expanded the Centers for Excellence in hepatitis C program by fully funding four clinics nationwide for five years. The renamed VA *Hepatitis C Resource Center Program* began in earnest in January of 2002. The four centers, located in West Haven, Connecticut; Minneapolis, Minnesota; Portland, Oregon/Seattle, Washington; and San Francisco, California, are charged with developing programs, products, and services to improve HCV care to Veterans.[348] This same year, the Department of Veterans Affairs established the hepatitis C Case Registry for use in monitoring prevalence, measuring the effectiveness of treatment protocols and outcomes, and as a tool for justifying continued program funding. The Department believes that the registry "will provide hepatitis C program management assessment tools to improve the efficiency and quality of the VA hepatitis C care."[349]

Due to the success of the program, The Department of Veterans Affairs continued the Veterans Affairs hepatitis C Resource Center Program by renewing the funding for an additional five years through September 30, 2011.[350]

DISPARITY IN FEDERAL FUNDING FOR PREVENTION: HIV/AIDS VS. HCV

The first cases of AIDS were reported in 1981 and within two years scientists were able to isolate the cause of the virus, HIV. Once the virus was identified, prevention efforts began in earnest to halt the transmission of the disease. The first cases of HCV, then known only as post-transfusion hepatitis, were discovered in 1943. It was not until 1988, 45 years later, that the causative agent for HCV was discovered. Like HIV/AIDS, once the cause was discovered prevention efforts began. However, the level of effort and funding allocated to HCV prevention has been criticized by many as ineffective. One General Accounting Office report published in 1997 noted that HCV was being handled differently at the public policy level than HIV.[351] One indicator of the disparity of prevention efforts between HIV/AIDS and HCV is the amount of federal funding dedicated to each disease.

As can be seen in the Table 6, although there are currently more HCV+ individuals in the United States than there are HIV+ individuals (4 million vs. 1.2 million respectively), and the death rates are equalizing (10,000 – 12,000 annually for HCV, 17,000 in 2005 for HIV/AIDS), funding for prevention and research is far from equal for the two viruses. One important disparity is the lack of

funding dedicated specifically to HCV. All CDC funding for hepatitis C prevention is taken from a small pool of funds intended for prevention of all forms of viral hepatitis. [352]

The federal government has provided limited funding to the CDC in support of HCV programs since 2001, but advocacy groups state that the level of funding is considerably less that what is actually needed to roll forward with a meaningful plan. To that end, in February 2008, the group *Hepatitis C Advocates United* came forward in support of a letter writing campaign targeted at members of Congress and asking them to support increased funding for HCV in FY 2009. The group states that the current level of funding, $17.6 million, is not adequate to fight a life threatening illness as widespread as HCV. They advocate an increase in funding to $50 million as a good start in beginning a meaningful push towards HCV prevention.[353]

Table 6 – Federal Funding Allocated for HIV/AIDS and Viral Hepatitis by Fiscal Year[354]

Budget Year/Description[1]	HIV/AIDS, Research & Domestic (dollars in thousands)[2, 3]	Viral Hepatitis[4] (dollars in thousands)
FY 1997 Actual	$616,790	
FY 1998 Actual	624,944	
FY 1999 Actual	656,590	
FY 2000 Actual	564,458	
FY 2001 Actual	653,462	$17,930
FY 2002 Actual	689,169	21,930
FY 2003 Actual	699,620	22,781
FY 2004 Actual[5]	667,940	18,065
FY 2005 Actual[5]	662,267	17,912
FY 2006 Actual[6]	651,657	17,578
FY 2007 Actual	695,454	17,354
FY 2008 Enacted	691,860	17,582
FY 2009 Proposed	691,147	17,504

Data Source: United States Centers for Disease Control and Prevention

[1] CRB staff requested funding history for HIV/AIDS (back to 1981) and HCV (back to 1989) from the CDC Financial Management Office. According to CDC staff, the chart above includes all historically available funding data.

[2] FY 1997 – FY 2000 includes international HIV funding; other reported years do not.

[3] In FY 2007, AIDS Clearinghouse activities were permanently moved through a reprogramming from the Health Marketing Line to the HIV/AIDS, Research and Domestic line resulting in a perceived increase in funding.

[4] Funding for Viral Hepatitis prevention is a pool of funding used to fight all forms of viral hepatitis including Hepatitis A, B, C, D, and E.

[5] In FY 2005, CDC's budget structure was changed to reflect the removal of administrative and management costs to create the Business Services Support budget activity as well as the Leadership and Management budget line within the Public Health Improvement and Leadership budget activity. FY 2004 actuals are reflected in the new budget structure to allow for comparison with FY 2005 levels.

[6] Coordinator Center for Infectious Diseases (CCID) reorganized in FY 2006 from a three to a four center structure and the budget structure was changed to four functional areas to reflect the new center structure.

A 2003 article in the Kansas City Star states that "[m]oney problems were a universal complaint" at a national hepatitis conference held that year and notes that most hepatitis C coordinators nationwide were "reduced to sharing computer disks that would allow them to print free hepatitis C posters."[355]

HISTORY OF CALIFORNIA HCV FUNDING AND LEGISLATION

California implemented legislation in 1997 requiring the California Conference of Local Health Officers to establish sterilization, sanitation, and safety standards for persons engaged in the business of tattooing, body piercing, or permanent cosmetics.[356] Recommended standards were submitted to the Department of Health Services on June 30, 1998. According to a CA-DPH memorandum dated June 10, 2008, some county counsels have expressed concern regarding the enforceability of the standards in the absence of a local ordinance. The memorandum notes that there are no barriers to enforcement of the standards at the local level.[357]

In 1998, California enacted the *Hepatitis C Education, Screening, and Treatment Act*. The act required DHS to make available existing NIH and California Legislative Advisory Committee protocols and guidelines for educating physicians and health professionals as well as training community service providers on the most recent scientific and medical information related to HCV. The act did not require the creation of any new protocols and contained no funding.[358]

The 2000-2001 California budget act allocated $2 million to the University of California at San Francisco AIDS Research Institute for an epidemiological investigation of HCV prevalence and incidence in the Department of Corrections and the Department of Youth Authority and to provide treatment to individuals housed in these facilities. The program's funding expired on June 30, 2006.[359]

At the close of the 2000 legislative session, California enacted amendments to the *Hepatitis C Education, Screening, and Treatment Act*. The amendments allocated $2 million to the California Department of Health and Human Services (CA-DHS) for the implementation of a public education and outreach program to raise HCV awareness aimed at high-risk groups, physician's offices, health care workers, and health care facilities. The amendments also required the California Department of Corrections to provide an annual report to the legislature of HCV prevalence in California correctional facilities and to provide voluntary HCV testing to all inmates upon incarceration. No funds were allocated for this purpose. The amendments further require the California Department of Veterans Affairs (CA-VA) to report to the legislature how federal funds allocated to the CA-VA for HCV education, screening, and testing are being utilized. Before signing the bill into law, then Governor Gray Davis reduced the funds allocated to DHS by $500,000. Noting the high rate of HCV among veterans, the Governor ordered half of the allocation to be shifted to the California Department of Veterans Affairs for outreach, education, and testing efforts targeting veterans.[360] All funding appropriated in the act has been spent.[361]

During the 2002 legislative session, California enacted a law adding a negative HCV test to the list of clearances a professional boxer or martial arts fighter must obtain in order to retain their professional fighting status and compete in matches.[362] At this same time, both houses of the California legislature adopted a resolution recommending implementation of various prevention and educational activities to address the HCV health care crisis.[363]

In 2004, both the California Senate and Assembly adopted resolutions encouraging the CA-DHS and local health jurisdictions to take various actions to enhance awareness, prevention, and treatment for HCV. The resolution also encouraged CA-DHS to enhance reporting practices and local jurisdictions to apply for federal funds available for HCV prevention.[364] To assist in the fight against HCV and other blood borne illnesses, California also enacted the *Disease Prevention Demonstration Project*, which approved a pilot project allowing licensed pharmacists, with authorization by a county or city, to sell or furnish 10 or fewer hypodermic needles or syringes to an individual without a prescription. The purpose of the program is to evaluate the "long-term desirability of allowing licensed pharmacists to furnish or sell nonprescription hypodermic needles or syringes" to prevent the spread of blood-borne viruses such as HIV and HCV among IV drug users. The program commenced on January 1, 2005 and is scheduled to end on December 31, 2020.[365]

During the 2005 session, in response to the high rate of prisoners believed to be HCV+, California enacted a law requiring the California Department of Corrections and Rehabilitation to make confidential HCV screening available to all inmates at no charge upon intake or during general examinations.[366]

Although not limited to HCV, in 2006 California enacted a law requiring the Department of Alcohol and Drug Programs to implement a statewide public information methamphetamine prevention campaign targeting, among others, communities or populations at high risk for contracting HCV.[367] During this same session, California also enacted a law adding HCV and Hepatitis B to the list of confidential tests which specified law enforcement employees or inmates may request after coming in contact with the bodily fluids of an inmate or other specified persons in a correctional facility.[368]

On May 7, 2008, Assemblymember Mervin Dymally introduced Assembly Bill 184, requiring the California Department of Public Health to consult with outside experts and advocacy groups and develop a budget plan for FY 2009-2010 that will provide funding for the control of viral hepatitis and the prevention of liver cancer and other liver related diseases. As of the publication of this report, the bill remains pending.[369]

In order to enable the continuation of HCV testing at HIV clinics throughout the state, the California Department of Health Services Office of AIDS has diverted $427,519 of their budget to provide HCV testing for IV drug users in 54 local health jurisdictions throughout the state. At this time, this is the only pool of funding available for HCV prevention in California.[370]

CALIFORNIA - THE HEPATITIS C STRATEGIC PLAN

Recognizing the need for a comprehensive approach to HCV prevention, and in response to CDC recommendations, the California Department of Health Services in collaboration with local health officials convened a Strategic Plan Working Group. The working group, together with other key stakeholders, met during the winter and spring of 2000 to prepare a three-year strategic plan for hepatitis C.[371]

The completed California hepatitis C Strategic Plan was published in the Spring of 2001. The mission of the strategic plan is to "outline a coordinated, comprehensive, culturally appropriate and

systematic approach that will prevent the spread of hepatitis C infection in California, limit the progression and complications of hepatitis C-related liver disease, and advocate for hepatitis C policies and resources."[372] According to the CDC, California is one of only 18 states with a published HCV strategic plan.[373]

Many individuals associated with the creation of the California Strategic Plan have been working to implement various provisions within the recommendations. Unfortunately no survey of their independent efforts and the extent to which the goals of the plan are being met is available.[374]

The five stated goals of the plan are to:[375]

1. Significantly decrease the number of people newly infected with HCV using the most effective primary prevention strategies;

2. Establish a statewide system to identify as many HCV-infected persons as possible and offer effective, accessible and affordable case management and treatment services to prevent or limit the progression and complications of HCV infection;

3. Provide education and training in HCV for health care professionals, policymakers, at-risk populations, HCV-infected people, and the general public;

4. Compile accurate, comprehensive and useful data on HCV that will direct and support primary and secondary prevention, education and training, and long-term medical management and rehabilitation; and

5. Slow the progression of HCV, engage the patient and his or her family in disease management and rehabilitation improve effective long-term management of HCV, and improve the affected individual's quality of life.

California's HVC coordinator provides outreach and support to local governments and advocacy groups. While initially these efforts were supported using the appropriation in the *Hepatitis C Education, Screening, and Treatment Act,* the funds have been spent and no additional funding has been appropriated.

Using funding provided by the CDC, California appointed its first HCV Coordinator in 2001. The coordinator provides outreach and support to local government and advocacy groups. While initially this was funded using the appropriation in the *Hepatitis C Education, Screening, and Treatment Act*, as previously stated, those funds have been spent and no additional funding has been allocated.[376] As a follow-up to the three-year strategic plan published in the Spring of 2001, in 2008 the California HCV Coordinator, in collaboration with other health department staff, began the process of developing a five-year California Adult Viral Hepatitis Strategic Plan.[377]

CALIFORNIA DEPARTMENT OF VETERANS AFFAIRS

Using funds from the [California] hepatitis C Education, Screening, and Treatment Act, the California Department of Veterans Affairs hired an HCV coordinator and implemented an outreach program for FY 2001-02. Funding for the program was not renewed and the position and program were eliminated in FY 2002-03.[378]

OTHER FORMS OF PREVENTION OUTREACH

COUNTY TASK FORCES, CLINICS, AND LOCAL ADVOCACY

The California Department of Health Services maintains a list of County hepatitis C Task Forces in California that provide localized HCV outreach. Last updated in January of 2006, the list includes contact information for groups who sponsor outreach and prevention activities in 16 of California's 58 counties.[379] Hepatitis C support groups targeted at sufferers and their caregivers are also offered on a local level in many communities by advocacy groups, hospital associations, and volunteer organizations.[380]

PHARMACEUTICAL COMPANIES

Along with community outreach by non-profits, some pharmaceutical companies have also funded disease prevention efforts by sponsoring outreach groups and public service messages targeted at HCV. For example, Roche Pharmaceuticals supports a non-profit HCV outreach advocacy group that maintains an informational website (HepCSource.com) and publishes the *Hep C Action Newsletter*. The group also places outreach advertisements in local and national newspapers and magazines. Images used during a campaign initiated in July of 2005 are reprinted in Figure 9.[381] Targeted at specific racial groups, the ads encourage individuals who are already aware that they are HCV+ to be evaluated for treatment.

Figure 9 – Examples of Outreach Advertisements by Roche

Image Source: Roche Pharmaceuticals (reprinted with permission)

The main headline in the add reads, "If hep c was attacking your face instead of your liver, you'd do something about it. Ready to fight back?" The subscript below states,

> You'll never be stronger than you are today to stop the damage hep C is doing to your liver. Talk to your doctor now about prescription treatment. Patients in clinical studies overall had a better than 50% chance of reducing the hep C virus to undetectable levels. Response to treatment may vary based on individual factors. So log on or call, then talk to your doctor to find out if treatment is right for you. And help put hep C behind you.

Other public service announcements encouraging individuals who have been potentially exposed to HCV should also be considered. However, although public service announcements are an important means of disseminating information to the public, encouraging individuals who received blood transfusions to be tested may not be enough. As journalist Karen Dillon notes in a 2003 article on hepatitis C, "[S]ome Americans don't even know whether they received blood during surgery."[382]

WORKERS COMPENSATION AND PRESUMPTIVE INFECTION

To receive worker's compensation benefits for lost wages and health care expenses related to HCV employees must prove that they contracted the virus through work place injuries. While twelve states[383] have enacted laws that presume public safety and health care workers who develop HCV while employed contracted the infection at work, unless the employer can prove otherwise. Individuals infected at work outside of these fields have no such protection. Yet even in states with presumptive infection laws, specified workers are finding it difficult to collect benefits as employers fight to disprove workplace infection. This is especially true of workers infected prior to the inception of occupational exposure reporting guidelines.[384]

There are no California laws providing for HCV presumptive infection of exposed workers.

WORKER PROTECTION REGULATIONS AND GUIDANCE DOCUMENTS

Worker protection guidance documents and regulations related to exposure to bloodborne pathogens exist at both the federal and State levels.

In 1991, the Occupational Safety and Health Administration (OSHA) issued the Bloodborne Pathogens Standard contained in Title 29 Code of Federal Regulations, section 1910.1030, setting the guidelines for reducing the risk of occupational exposure to all bloodborne pathogens. The standard was revised in 2001 to address requirements of the Needlestick Safety and Prevention Act of 2000.

The Bloodborne Pathogens Standard for the protection of workers from accidental exposure to infectious diseases and requires or includes:

- The creation of an exposure control plan by specified employers;
- The observance of universal precautions to prevent contact with blood or other potentially infectious materials;
- The use of engineering and work practice controls to reduce exposure (i.e. needle safety devices, hand washing policies, sharps handling guidelines, and use of personal protective equipment);
- Specific waste and laundry containment and disposal/washing practices;
- Specific criteria for the protection of laboratory and production facility workers;
- That employers make hepatitis B vaccinations and post-exposure evaluations available to all at risk employees;
- Hazard communication protocols for making employees aware of their risk;
- Employers to establish record keeping and management protocols for medical and training records of affected employees; and
- Employers to create and maintain a sharps injury log.

In an effort to keep track of occupational exposures, the CDC implemented the National Surveillance System for Health Care Workers (NaSH). Reporting of occupational exposures and follow-up regarding the results of those exposures to NaSH is voluntary and follow-up information is often suboptimal, or completely lacking. Furthermore, NaSH participants represent only a small fraction of United States hospitals and are not representative of all facilities. According to CDC staff, NaSH data on occupational exposures to HCV provide neither the actual number of annual occupational exposures nor the number of occupationally acquired HCV cases.[385]

The National Institute for Occupational Safety and Health (NIOSH) website[xxxiii] contains links to the OSHA Bloodborne Pathogens Standard, various CDC publications related to workplace exposure (i.e., employer issues and regulations, employee[xxxiv] and patient exposure), a State by State overview of needle safety laws and regulations, and various links to resource websites related to specific diseases such as HCV and HIV. The website also contains links to other federal agency guidance regarding workplace exposure, including the CDC, OSHA, and the FDA sites.

Six months after the Federal Bloodborne Pathogens Standard were published, California amended the State's existing Bloodborne Pathogen Standard to comply with the new federal standard, becoming the first State in the nation to enact a regulation to protect healthcare workers from exposure to bloodborne pathogens. The California Bloodborne Pathogens Standard is virtually identical to the federal standard and can be found in the California Code of Regulations, Title 8, Section 5193, *Bloodborne Pathogens*.

In an effort to further protect healthcare workers the then California Department of Health Services implemented the Sharps Injury Control Program[xxxv] in 1997 as a means of providing educational materials and training on how to reduce sharps injuries in the workplace for healthcare employers and employees. There is also a California Department of Health Services fact sheet targeted toward workers at risk for exposure to HCV titled, *Workplace Exposure to Hepatitis C.*[386]

One final work force implication relates to the issue of access to continuity of care for employees. Individuals who are forced to leave work as a result of complications related to HCV lose their health employer sponsored health care benefits soon after permanently separating from their workplace. Ensuring they experience continuity of care while they transition from their employer sponsored policy to another health care insurance provider is key to providing them continued and consistent disease management. Unfortunately, after an individual is diagnosed with hepatitis C, or has reached end stage liver disease, the likelihood they could find a health care insurer willing to write them an affordable health care policy is unlikely.

[xxxiii] The NIOSH website is located at http://www.cdc.gov/niosh/topics/bbp .

[xxxiv] The publication "Exposure to Blood: What Healthcare Personnel Need to Know" is available from the CDC at: http://www.cdc.gov/ncidod/dhqp/pdf/bbp/Exp_to_Blood.pdf .

[xxxv] The term Sharps refers to needles, scalpels, and other sharp objects commonly used by healthcare professionals.

ACCESS TO CARE AND INSURANCE

OPEN ACCESS AND CONTINUITY OF CARE IS ESSENTIAL

The successful treatment and management of HCV is dependent upon continuous access to health care resources. People with health insurance are more likely to have continuous access to health care.[387] Continuous access to health care has been shown to result in more positive health outcomes for patients and better management of chronic illnesses. [388] While having insurance of some type provides a higher level of access to care than being uninsured, just being insured does not guarantee access; the type of insurance that a beneficiary has plays a major factor in access to care. [389]

> *"People who suffer from these diseases, but do not have the health insurance coverage or other resources at their disposal to access health care services, are underdiagnosed and undertreated."*
>
> *~Robert Sandler et al, The Burden of Selected Digestive Diseases in the United States*[390]

Children who have employer-based insurance coverage are in far better health than either the uninsured or children with Medi-Cal or Healthy Families coverages.[391] Adults with private health care policies or employer-based insurance also experience a higher level of access to care than Medicare or Medicaid patients. In California, less than half of all Medi-Cal recipients report having a regular source of care and 26.1 percent of all Medi-Cal recipients reported having problems gaining access to specialists for the monitoring of chronic conditions, versus 17.3 percent of persons with privately held or employer-based health insurance.[392]

Continuity of insurance coverage also increases access to care. Periods of uninsurance, either continuous or intermittent, have been shown to seriously impact health care access.[393] Furthermore, studies have shown that the uninsured have poorer access to health care providers, procedures, and medications then their insured counterparts. They also have a lower satisfaction with their quality of care and poorer health outcomes. [394]

With regard to HCV, one 2006 study shows that uninsured individuals who do not qualify for Medicaid or Medicare are 50% less likely to be treated than privately insured patients. The same study notes that even patients who do qualify are less likely to undergo treatment.[395]

Recent reports state that the employer-based insurance system is on the decline with fewer employers offering insurance plans and an increasing number of employed workers and their dependants losing their eligibility for coverage or being priced out of the system each year. [396] In 2003, 3.6 million employed Californians did not have access to employer sponsored coverage through their own jobs and for those who did, worker contributions for worker-only premiums increased by 65.2 percent, and worker contributions for dependant coverage premiums rose by 79.1

percent.[397] With more than half of all insured Californians covered through employer-based insurance policies, these declines in coverage are especially concerning.[398]

Even privately owned and employer-based policies have their limitations. Some insurance policies have maximum pay out levels insufficient to cover HCV treatment costs. For example, it was reported in 2002 that the insurance policy offered to New York City police officers has a $5,000 per year maximum payout for medications, making obtaining medications for the current treatment regimens used to battle HCV too costly to qualify for coverage.[399] Likewise a 2006 study notes that Medicare recipients whose prescription drug benefits were capped were less likely to complete long-term drug therapies.[400] As previously discussed, for individuals with HCV undergoing a prescribed treatment program, compliance with the complex regimen is of paramount importance to achieving a sustained response and clearing the virus from their system. For these individuals, guaranteed access to care to is essential.

Finally, even when patients do have insurance that guarantees on-going access to care, there are other challenges, including a lack of care procedures. As previously mentioned, there are a limited number of qualified hepatologists in the United States and in some areas it can take several months just to get an initial appointment with a physician for an HCV assessment.[401]

Diagnosis and management of HCV requires not only access to care, but continued access to care over a long period of time. Ensuring continued access to *adequate* care and coverage for HCV+ individuals is key not only halting the progression of the disease, but to reducing the financial burden of the disease on society.

CHALLENGES WITH PRIVATE INSURANCE

Few state and federal legal protections exist for purchasers of individual insurance policies, especially if they have been uninsured for more than 30 days or did not have insurance for at least 18 months prior to applying for an individual policy. Individuals who are older or who have pre-existing conditions will have an especially difficult time finding an individual policy under these circumstances and even if they do find an insurer willing to underwrite a policy, it will likely have high premiums and offer limited benefits. More often than not, however, they will just be denied coverage. According to the California Health Care Foundation, since the inception of statutory limits on pre-existing conditions California insurers deny more policies to individuals with chronic conditions and charge higher rates on the low-risk policies they underwrite.[402]

Non-employer based health, life, and disability insurance coverage is difficult, if not impossible, for HCV+ individuals to acquire.[403] Employer-based programs are prohibited from excluding employees due to pre-existing medical conditions but private insurance policies have no such restrictions. Most insurance companies will not accept anyone with a history of HCV, making maintaining an insurance policy, once it has been obtained, of utmost importance to HCV + individuals.[404]

Unfortunately, already having an individual coverage policy does not guarantee affordability of coverage as renewals can include rate increases as long as they are applied equally to all persons in the same *class* (i.e., same age, health status, family size, or other criteria). Furthermore, as more affordable or effective policies are created, individuals with pre-existing conditions will often find it

difficult to upgrade to a better insurance product as they will once again be subject to the same underwriting processes as obtaining new insurance, including submitting their current health status information.[405]

Although the age group most likely to become infected (30 to 49 year olds) are also the most likely to be covered by employer-based insurance, this does not necessarily guarantee continued access to care.[406] Some of these HCV+ individuals will experience disease progression. As they reach advanced disease states and become unable to work, they will lose their employer-based coverage. Although there is a safety net program available, the Consolidated Omnibus Budget Reconciliation Act (COBRA), the high cost of the premiums may be unaffordable for a chronically ill individual unable to work. At a time when need is the highest, these individuals are suddenly without coverage, or, if they are fortunate to have access to one, are forced to change to a new health plan. These individuals lose the continuity and access to care they enjoyed under their previous policy and may suddenly find themselves with no affordable options for coverage other than Medicare.

Many experts agree that employer-based care is the "foundation of California's health insurance system," with one report noting the foundation is a crumbling one in need of reinforcement.[407] Some California state legislators have attempted in recent years to expand the Healthy Families program to include the parents of insured children, mandate individual coverage for all Californians, enhance the employer-based system, and/or provide a more universal approach to health care coverage through a single-payor system. Unfortunately, while the federal Government has supported an expansion of the Healthy Families program, so far there has been no funding set aside in the California budget to do so. Attempts at mandating individual coverage in California, enhancing the employer-based system, and providing universal or single payor coverage have either failed to enroll, been overturned by the electorate, or been vetoed.[408]

SELECTED ACTIONS BY OTHER STATES

In early 2006, Massachusetts took the lead on providing universal coverage by enacting a law requiring all residents to purchase some form of health insurance. The legislation uses a combination of penalties for non-compliance and financial incentives to ensure expansion of coverage over the next three years to all uninsured residents of Massachusetts. Although there are no new taxes imposed by the law, employers who do not offer health insurance are required to pay a $295 annual fee per employee.[409]

Review articles published in early 2008 tracking the progress of the program note that there have been many challenges implementing the program, including delays enrolling contributing employers.[410] Also noted is the negative impact of high enrollment numbers on the cost of the program, an outcome attributed largely to state officials underestimating the number of uninsured residents. One February 2008 article notes that initial program estimates anticipated a total of 215,000 enrollees at a cost of roughly $725 million annually. As of early 2008, actual figures show 169,000 enrollees with an expected cost of $618 million in the current FY; as a result officials in Massachusetts have begun seeking additional federal funding. While this increase in enrollment and costs is daunting, the article notes that some policymakers and advocacy groups aren't giving up hope yet. Robert Seifert, a senior associate at the Center for Health Law and Economics at the University of Massachusetts Medical School states, "[i]t's challenging, but if it's a priority for the administration, then I think it's doable. There are benefits [such as healthier residents] that don't

appear in the budget numbers."[411] At this time, many are taking a *wait and see* approach before determining whether the health care experiment in Massachusetts is a success.[412]

Maine enacted the Dirigo Health program in 2003. It is a voluntary program that provides individuals, the self-employed, and businesses with 50 or fewer employees an affordable, high-quality option for access to health care. Discounts and deductibles are calculated based on family size and income with some discounts reaching 100 percent of the total cost.[413] According to a press release issued by the office of Governor John E. Baldacci on August 8, 2006, a recent court decision confirmed the findings of the Superintendent of Insurance and notes that that Dirigo Health "saved $43 million in the health care system its first year and that the Savings Offset Payment [made by employers] is both constitutional and 'not a tax.' ".[414]

FEDERAL, STATE, AND LOCAL GOVERNMENT PROGRAMS

FEDERAL: HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA)

Enacted in 1996, HIPAA provides certain rights and protections to workers covered under employer-based insurance to ensure continuity and availability of continued coverage should they shift jobs or become unemployed. HIPAA also sets specific standards and guidelines for ensuring and maintaining privacy of individual health records.

HIPPA requires insurers to offer eligible individuals their two most popular products, yet it places no restrictions on the rates they may charge consumers.[415] Many insurers began doubling their rates for individuals seeking coverage under HIPPA. In response, California lawmakers enacted legislation limiting the rate increases for PPO providers to the same level paid by California's Major Risk Medical Insurance Program[xxxvi] recipients. The legislation also limits HMO HIPPA offered products to 170 percent of the amount charged for similar coverage for others in the same class (i.e.: age, family size, health status) as the insured.

Specifically, HIPPA[416]:

- Provides continuity of care for individuals when switching jobs or insurance plans by limiting pre-existing condition exclusions to 12 months or less and in some cases eliminating them entirely, thus ensuring continued treatment for chronic conditions;
- Ensures access to care by allowing new employees to sign up for available health insurance programs outside of the standard open enrollment periods once they become eligible for coverage;
- Guarantees insurance to all eligible employees regardless of their past medical histories by limiting the ability of insurers to deny coverage to group policy holders; and
- Allows for a smooth transition to an individual plan for persons who have held a group policy for greater than 18 months if they have exhausted COBRA, are ineligible for Medicare

[xxxvi] The MRMIP program is described in detail in a later section of this report.

or Medicaid, have no other health insurance, and apply for coverage within 63 days of losing their previous policy.

FEDERAL: STATE CHILDREN'S HEALTH INSURANCE PROGRAM (SCHIP)

The State Children's Health Insurance Program (SCHIP) is a federal/State partnership program targeted specifically at children. Each state establishes their programs eligibility criteria, benefits, premium levels, and administrative processes.[417]

FEDERAL: VETERANS AFFAIRS PROGRAM

Veterans have access to care via the VA system Centers for Excellence hepatitis C Resource Center Program. The VA is currently the largest provider of HCV care in the nation and offers comprehensive patient screening, care and treatment, expanded access to clinical trials, and the benefit of proactive on-going research to veterans nationwide.

FEDERAL: MEDICAID/MEDICARE

Created by Congress in 1965, the purpose of these programs is to ensure access to health care for the elderly, the disabled, children, and low-income individuals.

Medicare provides health care access to people age 65 and older, people under 65 with specific disabilities, and people of all ages with end-stage kidney disease. Medicare is a three part program:

- Part A: A premium free program covering inpatient hospital care, hospice care, and some home health care;
- Part B: This program covers doctors' visits and outpatient care as well as the services of other health care practitioners such as occupational or speech therapists when medically necessary. Most members pay a monthly premium for Medicare Part B;
- Prescription Drug Benefits: Beginning on January 1, 2006 the new Medicare prescription drug program benefit was made available to all Medicare recipients. Most members pay a monthly premium for the coverage, which is underwritten by private insurers. Failure to accept this benefit upon eligibility may result in the insured having to pay a cash penalty should they decide to enroll later.

Medicaid provides health care access to eligible low-income individuals, Supplemental Security Income (SSI) recipients and families through a Federal/State partnership. Eligibility for coverage is based on income, the value of owned assets, disability status, and residency; each state determines their own eligibility criteria and available services. In California the Medicaid program is known as Medi-Cal.

FEDERAL: CONSOLIDATED OMNIBUS BUDGET RECONCILIATION ACT (COBRA)

Originally mandated in 1986, COBRA provides for the continuation of employer-based group health coverage for certain employees after they have terminated their employment. While on

COBRA, 100 percent of the policy premiums plus up to a two percent administration fee, are paid by the person being covered. The maximum coverage extension is 18 months. However, if the qualifying member was found to be disabled within 60 days of activating COBRA, they may qualify for an additional 11 to 18 months of coverage. This extended coverage can cost up to 150 percent of the original COBRA coverage amount. Specific conditions for continuation must be met to guarantee continued access to coverage. In the event an employer with former employees covered by COBRA decides to cancel their employer-based group health policies, the COBRA policies offered to former employees would also terminate. COBRA only covers health plans maintained by employers with 20 or more employees.[418]

California has its own version of COBRA. Cal-COBRA has similar qualifications and coverage provisions to the federal program, but it extends the reach of the program to individuals who work at businesses with only 2 to 19 employees and those individuals who have exhausted Federal COBRA in less than 36 months.[419]

CALIFORNIA: CORRECTIONAL FACILITIES

California correctional facilities offer on-going health care access to all inmates while they are incarcerated. Because the monitoring and distribution of health care benefits within the California Correctional System is in federal receivership, all treatment protocols must adhere to federal guidelines.

CALIFORNIA: MAJOR RISK MEDICAL INSURANCE PROGRAM (MRMIP)

In existence since 1991, MRMIP offers a last chance opportunity for individuals without access to health insurance to purchase coverage through California's high-risk pool. Premiums are subsidized by Proposition 99 tobacco taxes so the insured pays roughly 53 percent of the premiums out of their own pocket. However, in spite of the seemingly heavy subsidies, high-risk pool rates are significantly higher that those paid by their non-high-risk counterparts. Fortunately, those costs are capped and may not exceed 37.5 percent above non-high-risk market rates. Individuals are limited to 36 months of coverage under MRMIP. While current law requires all insurers in California to offer a policy with benefits equal to MRMIP to individuals who continue to require coverage past the 36 months allowed, the insurer is able, at their discretion, to increase the insured's premium for the new policy by as much as 10 percent.[420]

CALIFORNIA: MEDI-CAL

As previously noted, Medi-Cal is California's enactment of the federal Medicaid program. Funding for the program is shared equally between the federal and state governments. The California Health Care Foundation reports that eligibility for the program is a patchwork of more than 165 codes so complex that they contribute "to confusion for everyone involved—from families applying for coverage, to county workers who determine eligibility, to federal and state officials who set policies."[421] Persons enrolled in SSI/SSP, CalWorks, Refugee Assistance Programs, Foster Care or Adoption Assistance Programs, and In-Home Supportive Services are eligible to receive Medi Cal. Also eligible are individuals over the age of 65, persons who are blind or otherwise disabled, persons

under 21, pregnant, in a skilled nursing facility or immediate care home, and individuals caring for children under 21 if the child parent is deceased, incapacitated, or under/unemployed.[422]

CALIFORNIA: STATE CHILDREN'S HEALTH INSURANCE PROGRAM (SCHIP)

In California the SCHIP program is known as Healthy Families. Medi-Cal and Healthy Families combined provide access to health care to 15.5 percent of all health plan covered California residents. Eligible individuals include children living in California who are 18 years old and younger that were not covered by an employer-sponsored health insurance program in the last three months and who are not eligible for or enrolled in no-cost Medi-Cal and who meet stated citizenship or immigration rules. Also covered are children born to mothers enrolled in the Access for Infants and Mothers (AIM) Program and children in families with incomes within the Healthy Families Guidelines.[423]

LOCAL GOVERNMENT: HEALTH PROGRAMS

California counties offer access to California residents to indigent health care, public health care, mental health care, and county drug and alcohol programs. The programs vary by county with regard to funding, resources, and available services. As county providers do not report specific program information regarding their scope of service, eligibility requirements, or provider reimbursement methods, details regarding the various county programs are not readily available.[424]

Indigent health care services are provided for low-income residents (mostly adults with no children), undocumented residents, and children without access to health care. Services are provided through local county hospitals and free-standing health clinics, while in some cases counties contract with local providers for services. Some counties run hybrid systems that contract with private hospitals but offer some services via free-standing health clinics. Many counties offer services through the County Medical Services Program (CMSP), a program similar to Medi-Cal, but with fewer benefits.[425]

Public health care services exist in 61 local health jurisdictions located in the 58 California counties and the cities of Berkeley, Long Beach, and Pasadena. Each jurisdiction is staffed with a physician health officer who oversees all aspects of the public health program. Program services include maternal and child health services, children's medical services, environmental health services, and communicable disease control.[426] County mental health services provide treatment for mental disorders and mental health problems for low-income people on Medi-Cal and for those without access to other public or private health care access.[427]

Local health programs for the discovery, care, and treatment of HCV are limited. Although services are available throughout California, according to the CDC, nationwide "…less than 50 percent of state and local public health laboratories have the capacity to perform any kind of HCV testing."[428] Furthermore, most state and local health departments, including those in California, do not have the resources to provide the necessary follow up testing to differentiate between the acute and chronic forms of the virus, false positives, and retests of previously reported cases.[429] One survey showed that nationwide, "local health departments may be unprepared for the growing need for public HCV services."[430]

APPENDIX A – HEPATITIS C PREVENTION TIMELINE

1943

Physicians returning from World War II pioneer blood transfusions among private citizens. A study noting a high rate of post-transfusion hepatitis (PTH) is published predicting high transmission rates of PTH as blood and plasma transfusions increase.[431]

Late 1940's Early 1950's

PTH is clearly established as a complication of blood transfusions.[432]

1955-1959

Research suggests a link between elevated, alanine aminotransferase (ALT) levels in donated blood and PTH.[433]

1964

A retrospective study shows that PTH is more common when blood from paid donors is transfused.[434]

1969

Researchers identify a potential marker for the cause of PTH, the Australia Antigen, also known as the Hepatitis-Associated Antigen (HAA). Discussions ensue regarding use of the HAA marker as a potential blood screening tool.[435]

1970

Blood banks in Germany and Austria begin screening donated blood for elevated ALT levels.[436]

Blood banks voluntarily begin to move toward an all volunteer blood donation system.[437]

Research suggests that screening blood donations for the HAA will lower the incidence of PTH by ~25 percent. A statement released by a National Academy of Sciences, National Research Council panel reports that the current sensitivity level of screening tools for HAA will eliminate "only about one-fourth of the cases of viral hepatitis." The panel calls for additional research to discover more reliable testing.[438]

1970 – Continued

Three National Institutes of Health (NIH) researchers, in their private capacity, publish an article taking issue with the National Research Council statement. Estimating that there are in excess of 150,000 incidence of PTH annually, they note that the 25 percent reduction in PTH that would be achieved with HAA screening would prevent more than 40,000 cases of PTH annually. They advocate immediate implementation of routine screening for HAA at all laboratories nationwide equipped to perform the test.[439]

1971

Most experts agree there is an association between PTH and paid blood donations.[440]

The NIH issues a proposed regulation requiring all blood donations to be tested for the HAA. Public comments are to be received within 30 days of the proposed rules publication.[441]

1972

NIH promulgates a final rule requiring all blood donations to be tested for HAA and restricting the use of HAA positive (HAA+) donations. The regulation also details labeling requirements and requires permanent donor deferral of HAA+ donors.[442]

Regulatory authority for biological products, including blood and blood products, is transferred from NIH to the Food and Drug Administration (FDA).[443]

Seven states, including California, install blood banking regulatory programs.[444]

With 70 percent of all blood banking still unregulated, the National Health and Lung Institute recommend federal centralized regulation of all blood banking within a single agency and the establishment of a donor registry.[445]

California and Illinois consider legislation eliminating paid blood donations. Illinois enacts the first law eliminating paid donations on October 1, 1972.[446]

An NIH study comparing the rates of PTH from paid blood donations versus volunteer blood donations reveals a 70 percent reduction in PTH when only volunteer blood donations are transfused. This same study reveals a 25 percent reduction in PTH when HAA[xxxvii] donors are excluded noting that 69 percent of all transfusions testing positive for HAA result in PTH.[447]

[xxxvii] The study refers to HAA by its modern nomenclature, Hepatitis B Surface Antigen (HBsAG).

1973

Non-A, non-B hepatitis is determined to be the cause of 90 percent of all PTH cases.[448]

The incidence of PTH is determined to be as high as 21 percent.[449]

1975

A study is published implicating non-A, non-B hepatitis in 15 cases of acute liver failure over half of which resulted in death.[450]

FDA issues a proposed rule requiring labels distinguishing volunteer blood donations from paid blood donations and noting that paid donations are associated with a higher risk for developing PTH. The intent of the regulation is to allow for easy identification and quarantine of paid donations as a means of decreasing their use and thereby also decreasing PTH. Comments to the proposed rule are to be received no later than January 13, 1976.[451]

1976

At the request of industry, FDA invites interested parties to participate in determining the definitions of paid donors and volunteer donors. The definitions are to be determined based on the type of incentives offered and the potential cash value of the incentives.[452]

1977

Studies are published identifying non-A, non-B hepatitis as a chronic viral condition, often without clinical signs or symptoms, that can result in chronic liver disease including cirrhosis. One NIH study revealed that 20 percent of patients progress to cirrhosis over the course of 10-20 years.[453]

FDA published a re-proposed rule requiring that all blood donations have labels distinguishing volunteer blood donations from paid blood donations and noting that paid donations are associated with a higher for developing PTH.[454]

1978

The U.S. Food and Drug Administration (FDA) promulgates a regulation requiring that all units of whole blood and blood components intended for transfusion be labeled either "paid donation" or "volunteer donation" as applicable and noting that paid donations are associated with a higher risk for developing PTH. The intent of the regulation is to allow for easy identification and quarantine of paid donations as a means of decreasing their use and thereby also decreasing PTH. [455]

1978 – Continued

Preliminary findings from the Transfusion Transmitted Viruses (TTV) study begun in 1974 indicate that use of the ALT test to screen donated blood could significantly reduce cases of post-transfusion hepatitis. James W. Mosley, the principal investigator, encourages skeptical blood banks to use the ALT test.[456]

After voluntary exclusion of paid donors, PTH rates drop from 21 percent to 10 percent.[457]

1980

Studies continue to be published confirming non-A, non-B hepatitis as an asymptomatic chronic illness that leads to end-stage liver disease and in some patients "cirrhosis may develop slowly and in a clinically [u]napparent fashion."[458]

1981

January 9, 1981: A group of blood experts are invited by the American Red Cross (ARC) to meet in Washington D.C. to discuss the use of the ALT test for screening blood donations. Attendees include representatives from the American Red Cross, the Council of Community Blood Centers, the American Association of Blood Banks (AABB), the Bureau of Biologics (an FDA bureau), and the NIH. Evidence reviewed include the TTV Study begun in 1974 suggesting a 40 percent reduction in non-A non-B hepatitis and an in process NIH study with preliminary findings suggesting a 42 percent reduction in transfusion related transmission. The group concludes that the data presented is solid and "could not be questioned." They estimate that there may be as many as 300,000 cases of post-transfusion hepatitis annually. It is decided that in light of the evidence further controlled studies on the effects of the exclusion of donor blood with elevated ALTs would be unethical. It is agreed that the introduction of ALT testing would reduce the incidence of post-transfusion non-A non-B hepatitis. It is decided to send notice to all member blood banks to prepare for ALT testing.[459]

January 14, 1981: The ARC releases an official message to blood bank directors stating that elevated ALT levels have been "solidly established" as being associated with non-A/non-B Hepatitis. Blood bank directors are put on notice to begin preparations for ALT testing all blood donations. The memo notes that implementation planning will take place during Fiscal Year (FY) 1981-82.[460]

January 15, 1981: In a letter to Louise J. Keating M.D. Director of ARC Blood Services Northern Ohio Region, Alfred J. Katz M.D., Director of ARC Blood Services Connecticut Region, expresses his unease with some of the discussion at the January 9th meeting. In his letter he notes that many present "were talking about preventing a disease that we in fact help[ed] create through blood transfusion." He noted that the group "evaluated the scientific evidence and judged it good, but there were those whose opinions were heavily influenced by legal and public relations considerations.".[461]

1981 – Continued

April 1981: Aach et al publish the final results of the TTV study which suggest that using the ALT test for blood screening purposes will reduce transfusion related hepatitis by 40 percent.[462]

July 1981: The ARC July 1981 Newsletter reports on a June 15, 1981 meeting of the Ad Hoc Advisory Committee on ALT. "The Committee concluded that the available data are insufficient for a decision on introduction of routine ALT testing of blood donors at this time."[463]

August 1981: In a Trip Report detailing a visit with Dr. Roger Dodd, Head of Transmissible Diseases and Immunology Laboratory for the American Red Cross on July 1, 1981, Dr. J.B. Derrick and Barbara K. Buchner of the Canadian Red Cross discuss the reluctance of the ARC to implement ALT testing. The memo states that "It was again observed that as long as a test is not part of the standard operating procedures, the ARC can not be held legally responsible for any illness resulting from the transfusion of blood with elevated ALT levels." The memo reports that results from the TTV study reviewed in January are now being called into question and that the ARC now believes it may be premature to begin ALT testing. It is noted that ALT levels can be impacted by many variables including age, gender, ethnicity, and alcohol intake. It is mentioned that several manufacturers are ready to develop an easy to use and read pre-donation ALT test once it is determined there is a market for it. A retrospective study of ALT testing is planned to begin in September 1981 at five ARC blood centers. It is believed this study may encourage manufacturers to begin development of the pre-donation ALT test. The decision whether to screen using an ALT test will be made at a "consensus meeting" to be scheduled for late 1981 or early 1982. The memo also includes details of an Interagency Working Group meeting on Blood and its Substitutes held the next day at the ARC covering similar topics including the concerns of some attendees that although the upcoming study is called retrospective, some ARC centers are already testing . The memo reports that many attendees believe that until ALT testing is mandated none of the centers should test on a routine basis "since all blood centers would then be obligated to test."[464]

The NIH publishes a study confirming the association between elevated ALT levels and the development of non-A, non-B PTH in transfusion recipients. The study suggests that ALT screening of donor blood will reduce PTH by 29 percent.[465]

1982

In a memo written March 31, 1982, Dr. Dodd recommends not implementing donor ALT testing. He acknowledges that PTH is perceived as a significant problem that may lead to progressive liver disease and that ALT screening could decrease PTH by as much as 30 percent. But notes that the lack of controlled studies *proving* the effectiveness of screening combined with the challenges of implementing ALT testing in clinics warrant a "full analysis of all advantages and disadvantages" of ALT testing before any decisions can be made.[466]

The focus on PTH is "temporarily put on hold" when a new threat to the blood supply, HIV, is discovered. Within two years tests for the new virus that can effectively screen HIV out of the blood supply are developed and implemented.[467]

1983

The FDA Blood Products Advisory Committee invites "[i]ndividuals with experience with ALT testing or other nonspecific screening tests that may aid in the prevention of post-transfusion hepatitis" to participate in a discussion of "infections from blood products, non-A, non-B hepatitis, alanine aminotransferase testing (ALT) and hepatitis B core-Antibody (anti-HBc) testing."[468]

1984

Using data from the TTV study, Stevens et al show a correlation between the occurrence of non-A/non-B hepatitis and recipients of blood products testing positive for anti-HBc.[469]

1985

The FDA Blood Products Advisory Committee meets in April for an open committee discussion on, among other things, ALT testing of source plasma donations and donor deferrals related to transfusion associated hepatitis.[470]

1986

A study published by an NIH research group shows that testing donors for anti-HBc, in combination with ALT testing could eliminate 30-50 percent of all PTH.[471]

1987

The FDA sponsors a two-day public workshop in January to discuss the usefulness of anti-HBc and ALT tests as surrogate tests for non-A, non-B hepatitis. It was determined that although the data was imperfect, testing for both ALT and anti-HBc would significantly reduce the incidence of PTH; specifically non-A, non-B hepatitis.[472]

In response to the 1981, 1984 and 1986 ALT and anti-HBc screening studies and the histologic studies documenting progression of non-A, non-B hepatitis to end-stage liver disease, cirrhosis, and death, American blood banks begin voluntarily screening blood donations for ALT and anti-HBc. As a result, incidence of PTH dropped from 10 percent to 2-3 percent.[473]

1988

HCV is formally identified.[474]

1989

At an October 1989 FDA Blood Products Advisory Committee meeting, the notion of performing a targeted lookback program to notify individuals at risk for developing HCV as a result of having received a potentially infected blood transfusion is discussed for the first time.[475]

1989 – Continued

New blood screening tools are developed that test specifically for HCV antibodies (anti-HCV). Research studies support the use of these tests as effective blood screening tools.[476]

1990

May: The first tests detecting anti-HCV are licensed by the FDA in the United States.[477]

November: FDA releases a memorandum to all registered blood establishments making them aware of the recently licensed anti-HCV test and recommending that all blood donations intended for transfusion be screened for anti-HCV. Also included are instructions regarding appropriate labeling, quarantine, and disposition of donations testing anti-HCV +. Plasma donations are excluded from testing requirements. A targeted lookback program to notify *recipients* of donations testing anti-HCV + and retrieve the unused contaminated blood is considered but not recommended. It is recommended however, that *donors* be notified when their donations test positive for anti-HCV.[478]

1991

The CDC, FDA, and the NIH all recommend routine blood donor screening using newly developed anti-HCV screening tools. They also support notification of donors who test anti-HCV+. A targeted lookback program to notify recipients of donations testing anti-HCV + is discussed and not recommended.[479]

In response to blood establishments implementing voluntary ALT and anti-HBV testing, the FDA Blood Products Advisory Committee meets on November 18, 1988 and recommends that FDA regulate the anti-HBc kits. On September 19, 1991 FDA issues a memorandum to all registered blood establishments recommending the use of the anti-HBc test as a tool for screening non-A, non-B hepatitis.[480]

The first generation of blood screening tools decreases post-transfusion hepatitis by 70 percent reducing the rate of PTH infections to 1.5 percent.[481]

1992

March: The second generation of screening tools is introduced, all but eliminating PTH.[482]

April 23: FDA publishes two memorandum to all registered blood establishments.[483]

The first memo revises the November 29, 1990 memo guidance and adds source plasma and leukocytes to the list of donations recommended for anti-HCV screening. It includes recommendations to notify donors of their anti-HCV status, permanently restrict them from donating in the future, and instructions on appropriate labeling, quarantine and disposition of anti-HCV + donations. A recipient lookback and notification program is considered but not recommended.

1992 – Continued

The second memo announces FDAs intention to lift the restriction on donors deferred from donating whole blood or source plasma because they have a history of viral hepatitis infection prior to their eleventh birthday.

1993

June: FDA licenses a supplemental HCV test intended to reduce false positive results.[484]

August 5: FDA issues a memorandum to all registered blood establishments revising the recommendations issued on April 23, 1992 to allow the reentry of donors who had previously been permanently restricted from making donations if they meet certain testing criteria.[485]

August 19: FDA issues a memorandum revising recommendations issued on August 5, 1993 and clarifies how to notify donors tested with unlicensed tests prior to August 5, 1993 and that "only licensed supplemental tests should be used for attempting donor reentry" from this date forward.[486]

December: The Food and Drug Administration issues an interim rule regarding human tissue intended for transplantation requiring infectious disease testing, donor screening and recordkeeping to help prevent the transmission of the human immunodeficiency virus (HIV), hepatitis B, and hepatitis C through human tissue transplantation.[487]

December 22: FDA issues a memorandum augmenting the April 23, 1992 memorandum and clarifies donor suitability criteria.[488]

1995

The first campaign to raise public awareness of HCV is launched by the San Diego Chapter of the American Liver Foundation (ALF).[489]

October: In response to an Institutes of Medicine (IOM) report regarding protecting the nations blood supply from infectious disease, at a House Government Reform and Oversight Committee hearing, Health and Human Services Secretary, Donna Shalala and Assistant Secretary for Health, Philip Lee, commit to accepting all of the IOM recommendations, with the exception of one supporting the creation of a prospective compensation program similar to the National Vaccine Injury Compensation Program. They also announce the creation of an HHS Blood Safety [Council] and they commit to Subcommittee Chairman Shays that HCV notification will be the first issue considered by the new council.[490]

1996

May: FDA issues a memorandum supplementing memorandums released on April 23, 1992, August 5 and 19, 1993 by providing additional recommendations regarding specific tests to be used for screening blood donations for anti-HCV.[491]

1996 – Continued

July: FDA issues a memorandum announcing a December 3, 1993 unanimous recommendation by the Blood Products Advisory Committee (BPAC) that all prior donations from donors testing positive for anti-HCV be quarantined. The committee also marginally endorsed the notification of blood recipients stating that the public health benefits were unclear and that the issue warranted additional discussion.[492]

August: A Committee on Government Reform and Oversight (GRO) report acknowledges that the safety of blood products has increased substantially and is "safer than it has ever been" but that lessons learned from HIV and HCV clearly "illustrate the need for continued vigilance regarding new threats to the blood supply." The report notes a "lack of leadership on the part of the FDA, CDC, NIH and the blood collection and plasma fractionation industries" and chastises them for a "pattern of decision-making [sic] characterized by adoption of the most limited public health responses." Regarding lookback the report points out that in 1990 when the first screening tests first became available "an estimated 300,000 persons were still alive who had been infected through blood products and were unaware of their infection." It notes that treatment options are available and that in spite of FDA's BPAC having considered lookback on several occasions between 1989 and 1994 "the BPAC has not taken action on this issue." The report recommends immediate notification of potentially infected recipients "so they might seek diagnosis and treatment."[493]

In response to the GRO report, the American Liver Foundation runs ads in USA Today and other publications encouraging recipients of blood transfusions prior to 1990 to get tested for HCV.[494]

California enacts legislation mandating a three-year pilot sharps injury surveillance study. The purpose of the study is to determine the usefulness of an on-going "sharps injury log" at health care facilities that can be used as a tool for evaluating needle stick injuries and needle safety devices across institutions as a means of reducing needle stick injuries and transmission of bloodborne viruses to California health care workers.[495]

1997

A General Accounting Office report and subsequent subcommittee testimony, recommend that FDA require notifying recipients of their potential exposure to PTH. They state that not doing so is a public health hazard and unfair to the recipients who will not know to seek treatment, will not learn that lifestyle choices (such as drinking alcohol) are directly related to disease progression, and will not be educated on ways to avoid transmitting the disease to others. The report and testimony highlight that HCV is being treated differently from HIV. The three key differences are: 1) donor notification is recommended for HIV but not HCV, 2) blood quarantine is *required* in cases of HIV+ blood donations, yet only recommended for HCV+ blood donations, and 3) recipient notification is *required* in cases of HIV+ blood donations yet notification of recipients of HCV+ blood has yet to be even recommended.[496]

1997 Continued

Two years after committing to Chairman Shays that making HCV notification will be a priority for the then newly created HHS Blood Safety Council the issue of recipient notification is introduced to the council for the first time in April and revisited again in August. At the August meeting a limited lookback, focusing on individuals potentially infected after the second generation screening test was implemented in 1992, is recommended. Some on the council feel it is unethical to draw the line at 1992.[497]

"NIH consensus panel recommends a widespread program of education, prevention, and screening of high-risk individuals after determining that 70 -75 percent of persons with HCV are undiagnosed."[498]The Food and Drug Administration issues a final rule regarding human tissue intended for transplantation requiring infectious disease testing, donor screening and recordkeeping to help prevent the transmission of the HIV, hepatitis B, and hepatitis C through human tissue transplantation. The final rule is scheduled to take effect on January 26, 1998.[499]

A memo to John M. Eisenberg M.D. Acting Assistant Secretary for Health regarding policy options for HCV blood screening and lookback closes by noting that, "Those who were exposed to these potentially contaminated donations are now demanding equivalent treatment. It seems unlikely, based on the actions of the many other countries which have already conducted a hepatitis C lookback and our own political philosophy that this demand will not ultimately prevail."[500]

1998

At a March 5, 1998 hearing of the GRO regarding HCV, Committee Chair Christopher Shays and former Surgeon General C. Everett Koop discuss the slow response of the Federal government to HCV prevention. Stating his frustration regarding the slow response of HHS Secretary Shalala to act on her 1995 promise to notify recipients of blood potentially infected with HCV and noting the lack of governmental response to the 1996 Committee report, in his testimony Representative and committee Chair Shays asks "Why has the public health response to hepatitis C been so muted?" In his testimony Dr. Koop recalls the rapid response of governmental agencies to HIV/AIDS and states that "…we in the public health community have done practically nothing about [hepatitis C] to date."[501]

The Secretary of the HHS calls for the development of a comprehensive HCV prevention and control plan that includes lookback notification of recipients of blood and blood products potentially infected with HCV.[502]

March: FDA releases a *Guidance for Industry* supplementing a July 1996 memorandum regarding lookback. The guidance recommends that transfusion centers (consignees) of specified blood components collected since January 1, 1988 be notified when donors test positive anti-HCV so they can notify recipients. Then Surgeon General Satcher announces that the HHS plan, focused on notifying recipients infected after 1992 screening was implemented, is "a comprehensive plan to address this significant public health problem. It is our intention to reach effectively as many people at risk as we can."[503]

1998 Continued

CDC presents a comprehensive plan for HCV public education to the HHS Blood Safety Council. HHS declines to include the plan in the FY 1999 budget request and decides against seeking supplemental mid-year funding to implement the program.[504]

September 8: FDA announces that the March Guidance has been withdrawn and that a revised guidance will be published in the near future.[505]

September: FDA issues a *Guidance for Industry* which supersedes sections of the July 19, 1996 memorandum and replaces the withdrawn March 1998 guidance. The new guidance recommends HCV lookback to 1988, and includes recommendations regarding the quarantine, disposition, and supplemental testing of anti-HCV+ donations.[506]

The first National Hepatitis Summit is convened by the American Liver Foundation, the National Minority AIDS Council, the National Coalition of Hispanic Health and Human Services Organization, the National Council on Aging, and the Association of Asian-Pacific Community Health Organizations. C. Everett Kopp predicts that HCV deaths would triple within 20 years if prevention programs are not expanded.[507]

The 1998/1999 California budget act allocates $325,000 for the treatment and related testing of inmates housed within the California Department of Corrections who are infected with HCV.[508]

California enacts the "Hepatitis C Education, Screening, and Treatment Act." The act requires California Department of Health and Human Services (CA-DHS) to make available existing NIH and California Legislative Advisory Committee protocols and guidelines for educating physicians and health professionals as well as training community service providers on the most recent scientific and medical information related to HCV. The act does not require the creation of any new protocols and contains no funding.[509]

The House Committee on Government Reform and Oversight releases their seventh report, "Hepatitis C: Silent Epidemic, Mute Public Health Response." The report begins, "Called 'the silent epidemic' the spread of hepatitis C Virus [HCV] infection has evoked a Federal public health response almost as mute." The report states that HHS lookback attempts have "sputtered, and little has been accomplished," "disease reporting and surveillance is uneven," "research into HCV is uncoordinated," and that "Unless confronted more boldly, more directly, and more loudly by the Department of Health and Human Services [HHS], the threat posed by hepatitis C will only grow more ominous." The report summary closes by stating emphatically that "The time for aggressive implementation is at hand."[510]

October: Ten years after the virus causing HCV was discovered, the CDC publishes MMWR "*Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease.*"[511]

1999

The United States Department of Veterans Affairs establishes two Centers of Excellence in hepatitis C located at Miami Veterans Administration Medical Center and San Francisco Medical Center. The two centers are the beginning of a planned Veterans Health Administration (VHA) wide comprehensive program of HCV screening, testing, clinical care, and education for at-risk veterans.[512]

June 17: FDA releases a *Draft Guidance for Industry* that supersedes sections of the July 19, 1996 memorandum issued to all registered blood and plasma establishments and replaces the guidance issued on September 23, 1998. The draft guidance outlines potential recommendations regarding lookback, quarantine, disposition of anti-HCV+ donations, and supplemental testing. All comments must be received no later than August 23, 1999.[513]

August: FDA issues a proposed rule that would amend existing regulations to include HCV in the list of mandatory testing requirements for blood donations. A related proposed rule requiring notification of donors testing positive for HCV and other viruses is also issued. Written comments to both proposed rules are to be received no later than November 17, 1999.[514]

2000

The Federal Undersecretary for Health designates an additional $20 million for outreach, testing, counseling, and treating veterans with hepatitis C.[515]

The CA-DHS appoints the hepatitis C Working Group. They meet with other key stakeholders during the winter and spring of 2000 to prepare a three-year strategic plan for hepatitis C.[516]

The 2000/2001 California budget act allocates $2,000,000 to the University of California at San Francisco AIDS Research Institute for an epidemiological investigation of HCV prevalence and incidence in the Department of Corrections and the Department of Youth Authority and to provide treatment to individuals housed in these facilities. The funding is set to expire in June 30, 2006.[517]

Then Surgeon General Satcher announces the release of a "Dear Citizen" letter to raise HCV awareness and encourage testing of individuals at risk. Because his office does not have a funding source to send the letters out, the text is forwarded to Congress with a recommendation that all members send the letters out to their constituents. Due to a restriction on the ability of Congressional members to mail out letters originating from a different branch of government, the letters are never sent.[518]

A 2000 study focused on determining the effectiveness of HCV lookback programs found that of the 314 identified recipients, 238 of them (76 percent) had died prior to being notified.[519]

California enacts amendments to the "hepatitis C Education, Screening, and Treatment Act." The amendments allocate $2,000,000 to the CA-DHS for implementation of a public education and outreach program to raise HCV awareness aimed at high-risk groups, *(continued next page)*

2000 Continued

physician's offices, health care workers, and health care facilities. The amendments also require the California Department of Corrections to provide an annual report to the legislature of HCV prevalence in California correctional facilities and to provide voluntary HCV testing to all inmates upon incarceration; no funds are allocated for this purpose. The amendments further require the California Veterans Affairs office to report to the legislature how federal funds allocated to the California VA for HCV education, screening, and testing are being utilized. Before signing the bill into law, then Governor Gray Davis reduces the funds allocated to CA-DHS by $500,000 and, noting the high rate of HCV among veterans, orders half of the remaining allocation to be shifted to the California Veterans Administration for outreach, education, and testing efforts targeted at veterans[520]

November: FDA issues a proposed rule requiring specified procedures to be followed when blood and blood components are found to be anti-HCV+. The regulation details procedures for quarantine, supplemental testing, and recipient notification. The proposed rule would also extend the record retention period to 10 years "to create opportunities for disease prevention many years after recipient exposure…" Written comments to the proposed rule are to be received no later than February 14, 2001.[521]

Two years after committing to making HCV notification a priority for the then newly created HHS Blood Safety Council the issue of recipient notification is introduced to the council for the first time in April and revisited again in August. At the August meeting a limited lookback, focusing on individuals potentially infected after the second generation screening test was implemented in 1992, is recommended. Some on the council feel it is unethical to draw the line at 1992.[522]

"NIH consensus panel recommends a widespread program of education, prevention, and screening of high-risk individuals after determining that 70 -75 percent of persons with HCV are undiagnosed."[523] The Food and Drug Administration issues a final rule regarding human tissue intended for transplantation requiring infectious disease testing, donor screening and recordkeeping to help prevent the transmission of the HIV, hepatitis B, and hepatitis C through human tissue transplantation. The final rule is scheduled to take effect on January 26, 1998.[524]

A memo to John M. Eisenberg M.D. Acting Assistant Secretary for Health regarding policy options for HCV blood screening and lookback closes by noting that, "Those who were exposed to these potentially contaminated donations are now demanding equivalent treatment. It seems unlikely, based on the actions of the many other countries which have already conducted a hepatitis C lookback and our own political philosophy that this demand will not ultimately prevail."[525]

2001

In response to the 1998 decree by the DHHS Secretary, California Department of Corrections (CDC) along with NIH, the Health Care Financing Administration (now the Centers for Medicare and Medicaid) and the Health Resources and Services Administration release the *National Hepatitis C Prevention strategy*.[526]

2001 Continued

June: FDA promulgates a section of the proposed rule issued on August 19, 1999. The final rule, effective December 10, 2001 requires that HCV be added to the list of mandatory screening and supplemental screening tests for blood and blood components.[527]

June: FDA promulgates a section of the proposed rule issued on August 19, 1999. The final rule, effective December 10, 2001, requires the notification of donors who test positive for communicable diseases including HCV.[528]

CA-DHS hires a hepatitis C Coordinator; Annual salary costs are covered a CDC grant.[529]

California Department of Veterans Affairs hires an HCV coordinator and implements an outreach program for FY 2001-02. Funding for the program is not renewed and the position and program are eliminated in FY 2002-03.[530]

September: FDA licenses the first source plasma screening tool for HCV. The tool is specifically planned for use in screening pooled samples.[531]

California releases The hepatitis C Strategic Plan: A Collaborative Approach to the Emerging Epidemic in California. [532]

December: FDA issues a *Draft Guidance for Industry* announcing the newly licensed source plasma screening test for HCV and stating that the FDA expects the test will be available "after establishments submit biological license application (BLA) supplements providing for the use of an approved nucleic acid test, and after we have approved such supplements." The draft guidance encourages establishments to apply for the pre-approval supplements by June 1, 2002. Comments on the draft guidance are to be received no later than May 1, 2002.[533]

2002

The Department of Veterans Affairs expands the Centers for Excellence in hepatitis C program by fully funding four clinics nationwide for five years, beginning in January 2002, as the Veterans Affairs hepatitis C Resource Center Program. The four centers, located in West Haven, Connecticut; Minneapolis, Minnesota; Portland, Oregon/Seattle, Washington; and San Francisco, California, are charged with developing programs, products, and services to improve HCV care to Veterans.[534]

February: FDA licenses a second HCV screening test for plasma. This test is specified for use on both individual and pooled plasma samples.[535]

March: FDA releases a *Draft Guidance for Industry* intended to inform all blood establishments of the licensure of the second test for screening HCV from plasma donations. Comments on the draft guidance are to be received no later than July 8, 2002.[536]

The United States Department of Veterans Affairs establishes the hepatitis C Case Registry for use in monitoring prevalence, measuring the effectiveness of treatment *(continued on next page)*

2002 Continued

protocols and outcomes, and as a tool for justifying continued program funding. The Department believes that the registry "will provide hepatitis C program management assessment tools to improve the efficiency and quality of the VHA hepatitis C care." [537]

December: FDA licenses a third HCV screening test for plasma samples from individual and pooled samples. This new test is also "intended for use in screening organ donors when specimens are obtained while the donor's heart is still beating."[538]

California enacts a law adding a negative HCV test to the list of clearances a professional boxer or martial arts fighter must obtain in order to retain their professional fighting status and compete in matches.[539]

Both houses of the California legislature adopt a resolution recommending implementation of various prevention and educational activities to address the HCV health care crisis.[540]

2003

The Hepatitis C Epidemic Control and Prevention Act is introduced in both houses on Congress. The Act would amend the Public Health Service Act directing the Secretary of Health and Human Services to among other things "develop and implement a plan for the prevention, control, and management of hepatitis C virus (HCV), which shall include strategies for education and training, surveillance and early detection, and research." The bill also requires a biennial assessment of the plan by the Secretary. Both bills die in committee.[541]

2004

October: FDA issues a final *Guidance for Industry* combining two draft guidance's issued in December 2001 and March 2002. The final guidance informs blood establishments three HCV screening tools licensed in 2001/2002 and their ability to detect infection at a significantly earlier stage than previously approved tests. FDA recommends full implementation within six months.[542]

Both houses of the California legislature adopt a resolution encouraging the CA-DHS and local health jurisdictions to take various actions to enhance awareness, prevention, and treatment for HCV. The resolution also encourages CA-DHS to enhance reporting practices and local jurisdictions to apply for federal funds available for HCV prevention.[543]

California enacts the Disease Prevention Demonstration Project, legislation approving a pilot project allowing licensed pharmacists, with authorization by a county or city, to sell or furnish 10 or fewer hypodermic needles or syringes to an individual without a prescription. The purpose of the program is to evaluate the "long-term desirability of allowing licensed pharmacists to furnish or sell nonprescription hypodermic needles or syringes" to prevent the spread of blood-borne viruses such as HIV and HCV among IV drug users. The program is scheduled to commence on January 1, 2005 and end on December 31, 2020.[544]

2005

The hepatitis C Epidemic Control and Prevention Act is re-introduced in both houses on Congress. Both bills die in committee.[545]

July: FDA issues a "Draft Guidance of Industry" intended to supersede the recommendations in Memorandum to Blood Establishments dated April 23, 1992, August 5, 1993 and August 8, 1995 (related to HIV). The draft guidance is intended to "encourage more effective testing of whole blood and blood components samples, and improved product and donor management" using the newly licensed tests announced to industry in October 2004. Comments on the draft guidance are to be received no later than October 25, 2005.[546]

California enacts a law requiring the newly organized California Department of Corrections and Rehabilitation to make confidential hepatitis C screening available to all inmates at no charge upon intake or during general examinations.[547]

2006

California enacts a law requiring the Department of Alcohol and Drug Programs to implement a statewide public information methamphetamine prevention campaign in California targeting, among others, communities or populations at high risk for contracting HCV.[548]

California enacts a law adding HCV and hepatitis B to the list of confidential tests which specified law enforcement employees or inmates may request after coming in contact with the bodily fluids of an inmate or other specified persons in a correctional facility.[549]

2007

The hepatitis C Epidemic Control and Prevention Act is re-introduced in both houses of Congress. Both bills were referred to their respective health committee/subcommittee in May of 2007. As of the publication of this report no formal committee action has been recorded for either bill. [550]

The United States Department of Veterans Affairs continues the Veterans Affairs hepatitis C Resource Center Program by renewing the funding for an additional five years through September 30, 2011.[551]

August: FDA issues a *Final Guidance for Industry* which supersedes the HCV sections of the Memorandum issued on July 19, 1996 and the *Guidance for Industry* issued in September 1998. It also finalizes and promulgates the *Draft Guidance for Industry* issued in June 1999. The final guidance describes newly codified changes to Title 21 Part 610.47 and 610.48 of the Federal Code of Regulations requiring prospective and retrospective HCV lookback respectively. The guidance provides frameworks for product quarantine, consignee notification, testing, product disposition, and recipient notification. The final rule becomes effective February 20, 2008.[552]

2008

On May 7, 2008, Assemblymember Mervin Dymally introduced Assembly Bill 184, requiring the California Department of Public Health to consult with outside experts and advocacy groups and develop a budget plan for FY 2009-2010 that will provide funding for the control of viral hepatitis and the prevention of liver cancer and other liver related diseases. As of the publication of this report, the bill remains pending.[553]

APPENDIX B – HEPATITIS C RESOURCES

American Association for the Study of Liver Diseases
1001 North Fairfax, Suite 400
Alexandria, VA 22314
(703) 299-9766
http://www.aasld.org

American Liver Foundation
75 Maiden Lane, Suite 603
New York, NY 10038
(212) 668-1000
http://www.liverfoundation.org

California Hepatitis Alliance
1330 21 Street, Suite 100
Sacramento, CA 95811
(916)930-9200
http://www.calhep.org

California Hepatitis C Task Force
Ken Morgan, Treasurer
1527 Tamoshanter Drive
South Lake Tahoe, CA 96150
http://www.californiahcvtaskforce.org/

Harm Reduction Coalition (West Coast Office)
1440 Broadway, Suite 510
Oakland, CA 94612
(510) 444-6969
http://www.harmreduction.org

The Hepatitis C Outreach Project
P.O. Box 248
Vancouver, WA 98666
http://www.hcop.org

Hepatitis Research Foundation
553 Salt Point Turnpike
Poughkeepsie, NY 12601
(845) 483-7899
Fax: (845) 471-2253
http://www.heprf.org/hrfhomepage.htm

Hepatitis Foundation International
504 Blick Drive
Silver Spring, MD 20904
(800) 891-0707
http://www.hepfi.org

Hep C Connection
1325 South Colorado Boulevard
Building B, Suite 302
Denver, CO 80222
1-800-522-HEPC (4372, resource line)
http://www.hepc-connection.org

Hepatitis C Support Project/ HCV Advocate
PO Box 427037
San Francisco, CA 94142
http://hcvadvocate.org

Latino Organization for Liver Awareness (LOLA)
P.O. Box 842
Throggs Neck Station
Bronx, NY 10465
(718) 892-8697
(888) 367-LOLA (5652)
http://www.lola-national.org

National Association of Hepatitis Task Forces
Miller Depot
P.O. Box 66
Miller, NB 68858
(308) 457-2641
http://www.nahtf.org/index.html

National Institutes of Health
9000 Rockville Pike
Bethesda, MD 20892
http://www.nlm.nih.gov/medlineplus/hepatitisc.html

United States Centers for Disease Control and Prevention
1600 Clifton Rd,
Atlanta, GA 30333
(888) 443-7232
http://www.cdc.gov/hepatitis

United States Veterans Affairs National Hepatitis C Program
810 Vermont Avenue, NW
Washington, D.C., 20420
(800) 827-1000
http://www.hepatitis.va.gov

APPENDIX C – HEPATITIS C CASE DEFINITIONS[554]

HEPATITIS C VIRUS INFECTION, ACUTE, 2007 CASE DEFINITION

Clinical case definition

An acute illness with a discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g., anorexia, abdominal discomfort, nausea, vomiting), and either a) jaundice, or b) serum alanine aminotransferase (ALT) levels >400 IU/L.

Laboratory criteria for diagnosis

One or more of the following three criteria:

1. Antibodies to hepatitis C virus (anti-HCV) screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay as defined by CDC. (URL for the signal to cut-off ratios: http://www.cdc.gov/ncidod/diseases/hepatitis/c/sc_ratios.htm), or
2. Hepatitis C Virus Recombinant Immunoblot Assay (HCV RIBA) positive, or
3. Nucleic Acid Test (NAT) for HCV RNA positive

AND, meets the following two criteria:

1. IgM antibody to hepatitis A virus (IgM anti-HAV) negative, and
2. IgM antibody to hepatitis B core antigen (IgM anti-HBc) negative

Case classification:

Confirmed: a case that meets the clinical case definition, is laboratory confirmed, and is not known to have chronic hepatitis C.

HEPATITIS C VIRUS INFECTION, PAST OR PRESENT, 2005 CASE DEFINITION

Clinical description

Most HCV-infected persons are asymptomatic. However, many have chronic liver disease, which can range from mild to severe including cirrhosis and liver cancer.

Laboratory criteria for diagnosis

- Anti-HCV + (repeat reactive) by EIA, verified by an additional more specific assay (e.g. RIBA for anti-HCV or nucleic acid testing for HCV RNA),

Or

- HCV RIBA positive,

Or

- Nucleic acid test for HCV RNA positive,

Or

- Report of HCV genotype

Or

- Anti-HCV screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay (e.g., ≥3.8 for the enzyme immunoassays) as determined and posted by CDC.

Case classification

Probable: a case that is anti-HCV + (repeat reactive) by EIA and has alanine aminotranferase (ALT or SGPT) values above the upper limit of normal, but the anti-HCV EIA result has not been verified by an additional more specific assay or the signal to cutoff ratio is unknown.

Confirmed: a case that is laboratory confirmed and that does not meet the case definition for acute hepatitis C.

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