Hepatitis C Summit
October 3, 2012

Hepatitis C Burden in the Central California Valley

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Chief of Gastroenterology & Hepatology, UCSF Fresno
Goals

• Current prevalence and future projections of chronic liver disease in the US
• Barriers for HCV prevention and therapy
• Risk factors for transmission
• The data from the local studies looking at HCV burden in the Valley
• Current issues and future strategies
Chronic Hepatitis C

5.2 Million (2%)* (70% Genotype 1)
Include homeless, prisoners, veterans, institutionalized

After exposure 85% develop chronic infection; 20% will develop cirrhosis in 20 yrs.

Reduces life expectancy by 8-12 years

Kills 12,000 every year

Annual medical cost 30 Billion

2-3 X in African Americans

Two-thirds age 46-64 years

~70% still undiagnosed

Less than 1/4th receive treatment

#1 cause for cirrhosis, liver cancer & liver transplant

~70% still undiagnosed

*Chak E, et al. Hepatitis C virus infection in USA: an estimate of true prevalence. Liver International 2011; 1478-3223; 1090
Hospital Discharges Coded to Cirrhosis is Increasing

*ICD-9-CM diagnosis codes 571.2, 571.5, 571.6; all listed diagnoses.
HCV-Decompensated Cirrhosis and HCC is Expected to Rise During This Decade

Projection for new diagnosis of HCV cirrhosis

New players adding burden to the community along with HCV

US Population
~25% NAFLD
3-6% NASH

Normal Liver

NAFLD/NASH 9-20%

Cirrhosis 3-5% per year

HCC
The US Government Has Ignored the Threat of HCV While Allocating Funds in 2011

Hepatitis C infection is at least five times more prevalent as HIV infection in the United States, yet funding lags far behind.

Edlin BR. Nature 2011;474;s18
Barriers to HCV Treatment

Prior to HCV diagnosis
- Asymptomatic disease
- Poor awareness
- Lack of medical coverage
- MD failure to screen/test

After Diagnosis
- Patient non-adherence
- MD failure to identify need for referral
- Limited specialist availability

Treatment Initiation
- Patient fear
- Stigmatization
- Substance abuse
- Psychiatric & other comorbidities
- Payer barriers
- Transportation
- Communication difficulties with physician

Adopted from Liver International 2012
92% of patients with a HCV risk factor were not tested for HCV in the primary care setting

Of the 578 individuals who acknowledged having a HCV risk factor via the questionnaire, only 8% (46/578) were tested for HCV within 2 months of their initial visit

Journal of Viral Hepatitis, 2012, 19, e163–e169
# HCV Treatment Rates in Clinical Practice

<table>
<thead>
<tr>
<th>Author</th>
<th>Cohort/Setting</th>
<th># Patients</th>
<th>Treatment Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gregbely (2009)</td>
<td>Community-based</td>
<td>1,360</td>
<td>1.1</td>
</tr>
<tr>
<td>Butt (2010)</td>
<td>VA National database</td>
<td>134,934</td>
<td>11.9</td>
</tr>
<tr>
<td>Cawthorne (2002)</td>
<td>St. Louis VA</td>
<td>557</td>
<td>13.8</td>
</tr>
<tr>
<td>Rocca (2004)</td>
<td>Olmstead County</td>
<td>366</td>
<td>15.0</td>
</tr>
<tr>
<td>Bini (2005)</td>
<td>24 VA Medical Centers</td>
<td>4,084</td>
<td>17.7</td>
</tr>
<tr>
<td>Groom (2008)</td>
<td>Minneapolis VA</td>
<td>520</td>
<td>23.8</td>
</tr>
<tr>
<td>Evon (2007)</td>
<td>Academic Medical Center</td>
<td>433</td>
<td>25.2</td>
</tr>
<tr>
<td>Morrill (2005)</td>
<td>Primary Care Clinic</td>
<td>208</td>
<td>27.4</td>
</tr>
<tr>
<td>Flack-Ytter (2002)</td>
<td>Teaching County Hospital</td>
<td>293</td>
<td>28.3</td>
</tr>
<tr>
<td>Butt (2005)</td>
<td>Pittsburg VA</td>
<td>354</td>
<td>29.4</td>
</tr>
<tr>
<td>Rowan (2004)</td>
<td>Houston VA</td>
<td>580</td>
<td>30.0</td>
</tr>
</tbody>
</table>

Liver International 2012
Current Triple Therapy for HCV: Genotype 1

SVR increased from 40 to 70%

Reduced SVR
- Viral load > 800,000 IU/ml
- Advanced fibrosis/cirrhosis
- Adverse IL28B genotype (CT/TT)
- Prior treatment failure
- Age > 40
- BMI > 30
- Ethnic origin (black vs. non-black)
- Type 2 DM
Current Challenges in HCV Treatment

- Drug Resistance
- Drug interactions
- Side Effects
- Cost
Future therapy appears to be a combination of 2-3 oral drug regimen with minimum side effects.
Current Iceberg of HCV

- Undiagnosed
- Diagnosed with HCV
- See a physician
- Treated
- Undiagnosed
Risk factors for transmission
Risk Factors for HCV Infection

Reported Risk Factors for HCV Infection in the United States, 2001-2004

- Injection drug use (39%)
- Transfusions (2%)
- No identified risk (33%)
- Occupation (4%)
- Sex with known anti-HCV Ab+ partner (10%)
- Sex with >2 partners in past 6 mos (6%)
- Household (3%)
- Aggregate risk factor (4%)*

➤ HCV is the most common blood-borne infection in the US

*Patient is shown a list of risk factors, admits to having one, but does not specify which one.

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Prospective study of risk factors for hepatitis C virus acquisition by Caucasian, Hispanic, and Asian American patients

E. Y. Ho,¹ N. B. Ha,² A. Ahmed,² W. Ayoub,² T. Daugherty,² G. Garcia,² A. Cooper,² E. B. Keefe² and M. H. Nguyen² ¹Department of Medicine, Stanford University Medical Center, Palo Alto, CA, USA; and ²Gastroenterology and Hepatology, Stanford University Medical Center, Palo Alto, CA, USA

Received January 2011; accepted for publication July 2011
Risk Factors For HCV Transmission

Total 494 patients 2001-2008

*Blood transfusion 63% (P = 0.07)
*Injection drug use 56% (P < 0.0001)
*Intranasal cocaine use 55% (P < 0.0001)
*Body tattoo 40% (P < 0.0001)
*Acupuncture 22% (P < 0.0001)

Caucasian (n = 270)
Hispanic (n = 101)
Asian (n = 123)
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>White</td>
<td>52.2%</td>
<td>63.4%</td>
</tr>
<tr>
<td>Hispanics</td>
<td>31.9%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Asian</td>
<td>7.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>African American</td>
<td>4.7%</td>
<td>13.1%</td>
</tr>
<tr>
<td>Others</td>
<td>3.9%</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2010 Census, *Approximate parentages
The Data From the Studies Looking at HCV Burden in the Valley
HCV Prevalence Among Blood Donors in the Central Valley

• Data from Central California Blood Center (CCBC) from 2006-2010
• 217,738 healthy voluntary blood donors were identified as follows:
  – 36,795 first-time donors
  – 180,943 second-time donors

*Sheikh MY, Atla PR, Ameer A, Sadiq H, Sadler P. Seroprevalence of Hepatitis B and C infections among healthy volunteer blood donors in the Central California Valley. Accepted for publication to ‘Gut and Liver’ on June 9, 2012
HCV Prevalence in the Valley Among First-Time Blood Donors

Results:

<table>
<thead>
<tr>
<th>Category</th>
<th>Prevalence (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total donors</td>
<td>0.52 (0.45-0.6)</td>
</tr>
<tr>
<td>Males</td>
<td>0.62 (0.52-0.75)</td>
</tr>
<tr>
<td>Females</td>
<td>0.42 (0.33-0.53)</td>
</tr>
<tr>
<td>Caucasians</td>
<td>0.59 (0.47-0.72)</td>
</tr>
<tr>
<td>AA</td>
<td>0.38 (0.12-0.89)</td>
</tr>
<tr>
<td>Hispanics</td>
<td>0.45 (0.35-0.57)</td>
</tr>
<tr>
<td>Asians</td>
<td>0.2 (0.07-0.47)</td>
</tr>
<tr>
<td>Native Am</td>
<td>2.77 (1.39-4.9)</td>
</tr>
</tbody>
</table>

Prevalence in other similar US studies was 0.23%
HCV prevalence trends across age groups among first-time donors

Sheikh MY, Atla PR, Ameer A, Sadiq H, Sadler P. Seroprevalence of Hepatitis B and C infections among healthy volunteer blood donors in the Central California Valley. Accepted for publication to ‘Gut and Liver’ on June 9, 2012
HCV Prevalence in the Valley Among First-time Blood Donors

Conclusions:

• Ethnic disparities persist in the prevalence of HCV in the Central Valley.
• This prevalence may be an underestimate as our study enrolled healthy volunteer blood donors only.

Sheikh MY, Atla PR, Ameer A, Sadiq H, Sadler P. Seroprevalence of Hepatitis B and C infections among healthy volunteer blood donors in the Central California Valley. Accepted for publication to ‘Gut and Liver ’on June 9, 2012
### HCV Prevalence in Santé Health System

**Quest Diagnostics Data: 2008-8/2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Sante HMO Population</th>
<th>Patients with HCV</th>
<th>Prevalence of HCV in Sante Population</th>
<th>Males Total (HCV+)</th>
<th>Females Total (HCV+)</th>
<th>Mean Age Santé (HCV +)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>107,844</td>
<td>4,521</td>
<td>4.2%</td>
<td>52,246 (2795)</td>
<td>55,598 (1726)</td>
<td>33 (51)</td>
</tr>
<tr>
<td>2009</td>
<td>111,490</td>
<td>3,971</td>
<td>3.6%</td>
<td>53,925 (2491)</td>
<td>57,565 (1480)</td>
<td>32 (51)</td>
</tr>
<tr>
<td>2011</td>
<td>97,679</td>
<td>3,464</td>
<td>3.5%</td>
<td>46,651 (1581)</td>
<td>51,028 (1183)</td>
<td>35 (54)</td>
</tr>
<tr>
<td>2012 (8 M)</td>
<td>100,861</td>
<td>2,533</td>
<td>2.5%</td>
<td>47,983 (1196)</td>
<td>52,878 (1319)</td>
<td>38 (58)</td>
</tr>
</tbody>
</table>

Sheikh MY, et al. Unpublished data
Survival of the Liver Cancer Patients in the Central Valley

About half of the liver cancers in US are caused by hepatitis C

Figure 1. Racial distribution of the study patients

- A retrospective review of 160 HCC patients
- 62% HCV, 44% ETOH, 10% HBV
- Males: 80%
- Mean AFP 399
- Almost all had decompensated cirrhosis
- Patients were followed up to 5 years
- Survival of valley patients was compared with California Cancer Registry-a participant in the Survival Epidemiology and End Results (SEER) program of NCI

Survival of the Liver Cancer Patients in the Central Valley

## Survival of HCC in the Central Valley

<table>
<thead>
<tr>
<th>Treatment class</th>
<th>N (%)</th>
<th>Median survival (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transplantation</td>
<td>9 (5.6%)</td>
<td>69</td>
</tr>
<tr>
<td>Non-surgical</td>
<td>55 (34.4)</td>
<td>9</td>
</tr>
<tr>
<td>Palliative</td>
<td>96 (60%)</td>
<td>3</td>
</tr>
</tbody>
</table>

HCC survival in the Central Valley

Conclusions:

• Outcome of patients with HCC in the Valley is poorer compared to the general California population
• Higher Hispanic representation coupled with late diagnosis could have contributed to overall poor HCC survival
• There is presently a dire need to improve HCC surveillance in the Valley

Current Issues

- Actual HCV prevalence is largely unknown in the Valley and hence it remains a persistent public health problem
- Diverse ethnic population:
  - Risk factors for transmission?
  - Barriers for screening and treatment?
- Inadequate health care providers
- Economic issues
- Lack of funding and resources for research and mounting an effective campaign for HCV
PLAN OF ACTION
Confronting the epidemic

• Raise Awareness

• Preventive Strategies:
  – Provide needle-exchange facilities
  – Community-based outreach and education
  – Community-based services for testing and counseling

• Develop effective surveillance program based on current guidelines
PLAN OF ACTION
Confronting the epidemic

• Develop strategies to treat subgroups of those with the highest prevalence of HCV:
PLAN OF ACTION
Confronting the epidemic

• Develop multidisciplinary program for HCV treatment (PCP, specialists, pharmacist, educators, social workers, etc.) through funding (May utilize Project ECHO like program pioneered by Dr Sanjeev Arora at the University of NM, Albuquerque)

• Research
  – Epidemiology
  – Prevention: HCV & comorbidities (ETOH/obesity)