Societal Benefits of HCV Treatment

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September 12, 2016
Changing Landscape of HCV

- **Launch of DAAs**
  - Old treatment
  - PEG + RBV
  - Duration: 24–48 weeks
  - Efficacy: < 50%

- **2011 onwards**
  - 1st generation PIs + PEG + RBV
  - Duration: 24–48 weeks
  - Efficacy: 50–80%

- **2014-15**
  - Combinations of DAAs with and without PEG + RBV
  - Duration: 12–24 weeks
  - Efficacy: > 90%

- **2015 onwards**
  - All-oral Combinations of DAAs
  - Duration: 8–12 weeks
  - Efficacy: > 95%

- DAAs: Direct-acting antivirals—new treatments
Rising Concern: HCV Incidence in the United States

Source: CDC (estimated incidence of HCV based on the reported acute HCV cases)
Changing HCV Prevalence in the Era of DAAs

- 2.4 million people viremic in 2010
- 2 million people viremic in 2015
- Less than 1 million people viremic in 2020

Chhatwal et al. 2016 Hepatology (in press)
How will HCV Awareness Change?

- 900,000 people unaware (48%)
- 550,000 people unaware (70%)

Chhatwal et al. 2016 Hepatology (in press)
People Cured of HCV

Chhatwal et al. 2016 Hepatology (in press)
What are the Benefits of HCV Treatment?

• **Individual level**
  – Hepatic benefits
  – Extra-hepatic benefits

• **Community level**
  – Reduction in HCV transmission

• **Societal level**
  – Reduction in HCV-associated disease burden
  – Economic benefits (perhaps)
Benefits at Individual Level
F0 = no fibrosis  
F1 = portal fibrosis without septa  
F2 = portal fibrosis with few septa  
F3 = numerous septa without cirrhosis  
F4 = cirrhosis  
HCC = hepatocellular carcinoma  
DC = Decompensated cirrhosis  
LT = liver transplant  
SVR = sustained virologic response
Benefits of SVR: Liver Failure

An international, multicenter follow-up study of 530 patients with chronic HCV

van der Meer 2012 JAMA
Benefits of SVR: Hepatocellular Carcinoma

An international, multicenter follow-up study of 530 patients with chronic HCV

van der Meer 2012 JAMA
Benefits of SVR: Liver-Related Mortality

An international, multicenter follow-up study of 530 patients with chronic HCV

van der Meer 2012 JAMA
Benefits of SVR: All-Cause Mortality

An international, multicenter follow-up study of 530 patients with chronic HCV

van der Meer 2012 JAMA
Five-year Mortality: SVR vs Non-SVR (Systematic Review)

HCV Treatment in Decompensated Cirrhosis and Liver Transplant Candidates

Manns et al. 2015 Lancet Inf Dis.; Charlton et al. Gastroenterology; Gane et al. AALSD 2015
HCV Treatment in Decompensated Cirrhosis and Liver Transplant Candidates

Mengs et al. 2015 Lancet Inf Dis.; Charlton et al. Gastroenterology; Gane et al. AALSD 2015
Extra-hepatic Benefits of HCV Treatment

• 40–75% of chronic HCV patients develop at least one extra-hepatic manifestation

• HCV treatment could reduce some of these extra-hepatic outcomes
  – Mixed cyroglobulinemia
  – Insulin resistance and diabetes
  – Malignancies
    • Non-Hodgkin B-cell lymphoma
    • Prostate cancer
  – Cardiovascular outcomes
  – Neuropsychiatric symptoms

Gill et al. Heptol Int 2016; Sise et al. 2016 Hepatology; Negro et al. 2015 Gastroenterology
Benefits at Community Level
Community: Injection Drug Users and Prions

- Population in Prisons
- Population in Community

Incarceration

Natural History of HCV Disease

- Acute HCV
- F0
- F1
- F2
- F3
- F4
- HCC
- DC
- LT
- LRD

HCV patient
Healthy person
Injection drug user
Movement
Disease transmission
HCV Screening in Prisons Can Reduce Transmission and Disease Burden

He et al. 2016 *Annals of Internal Med*
Scaling-up HCV Treatment (Injection Drug Users in Vancouver)

Martin et al. 2013 *Hepatology*
Benefits at Societal Level
Liver-Related Deaths in the Era of DAAs

Hepatocellular Carcinoma in the Era of DAAs

![Graph showing prevalence of Hepatocellular Carcinoma over time with different treatment eras: No Treatment, Pre-DAA Era, DAA Era.](image)
Decompensated Cirrhosis in the Era of DAAs

![Graph showing the prevalence of decompensated cirrhosis over time in different treatment eras.](graph.png)
Benefits to Liver Transplant Candidates

• Systematic HCV screening and treatment could spare 10,500 liver transplants to HCV-infected patients from 2015 to 2035
  – An estimated 70% of transplants would accrue to patients without HCV
  – 30% of transplants to those with uncured HCV
  – providing approximately 52,700 and 22,800 additional life-years
HCV-Associated Disease Burden (2015–2050)

- Liver-related Death: 767,000
- HCC: 407,000
- Decomp. Cirrhosis: 651,000
- Liver Transplants: 63,000

Chhatwal et al. AASLD 2015 Abstract 104
HCV-Associated Disease Burden (2015–2050)

20–30% reduction in HCV-associated disease burden

Chhatwal et al. AASLD 2015 Abstract 104
HCV-Associated Disease Burden (2015–2050)

50–70% reduction in HCV-associated disease burden

Chhatwal et al. AASLD 2015 Abstract 104
Impact of Treatment ‘Capacity’

*Eligibility*: Patients are aware of their infection and have health insurance

Annually, 280,000 patients needed treatment.

Patient prioritization needed until 2018

Impact of Treatment ‘Capacity’

*Eligibility:* Patients are aware of their infection and have health insurance

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**Annual Treatment Penetration = 400,000**

*Patient prioritization needed until 2016*

Reduction in Disease Burden by Increasing the Treatment Capacity (2015–2050)

DC, decompensated cirrhosis; HCC, hepatocellular carcinoma; LRD, liver-related deaths; LT, liver transplants
What about Economic Benefits?
The Elephant in the Room...

$1,000
Is $1000-a-pill Price Justified?

$1,000 Pill For Hepatitis C Spurs Debate Over Drug Prices
by RICHARD KNOX
December 30, 2013 3:22 AM

Listen to the Story
Morning Edition

CMAJ Medical knowledge that matters

NEWS
February 18, 2014
Screening urged for Hepatitis C but drug costs are prohibitive

Gilead is not the original developer of Sovaldi, its new Hepatitis C medication that will cost $84,000 for a 12-week course of treatment; instead, it bought the drug developer, rival company Pharmasset, for $11 billion cash in 2011. Gilead now seeks a bon

January 29, 2014
Is HCV Treatment Cost-Effective?

• Cost-effective ≠ cost savings
• Cost-effective ≠ affordable
• “Cost-effective” implies that we are willing to spend additional money to gain additional health benefits
• “Cost-saving” implies that we will gain health benefits by implementing the intervention, and we will save money as well
HCV Treatment Costs Have Decreased
Is HCV Treatment Cost-Effective? Systematic Review of 89 Cost-Effectiveness Results

At $60,000 price, 93% of the analyses found DAAs to be cost-effective / cost-saving

Chhatwal et al. 2016. CGH (in press)
Can We Do Better?
HCV-Associated Disease Burden (2015–2050)

We are not done!

![Bar Chart]

- **Liver-related Death**: 317,000
- **HCC**: 154,000
- ** Decomp. Cirrhosis**: 198,000
- **Liver Transplants**: 31,000

Disease Burden (2015–2050)

Chhatwal et al. Abstract 104
Can We Further Reduce HCV Burden?

- **Screening of HCV**
- **Linkage to care**
- **HCC surveillance**

![Graph showing the reduction of HCV burden over years with areas labeled for different interventions.](image-url)
Summary: Benefits of HCV Treatment

• Benefits to individuals
  – Reduced mortality
  – Better quality of life

• Benefits at community / societal level
  – Reduction in HCV transmission
  – Reduction in overall disease burden

• Economic benefits
  – Cost savings (but initial investment needed)

Undiagnosed HCV is an opportunity missed!
Acknowledgments

• National Center for Advancing Translational Sciences of the National Institutes of Health (award number KL2TR000146)
• Gilead Sciences
• Research collaborators
  – Massachusetts General Hospital
    • Ray Chung, Qiushi Chen, Chin Hur, Arthur Kim
  – MD Anderson
    • Kan Li
  – Michael E. DeBakey VA Medical Center, Houston
    • Fasiha Kanwal
  – Georgia Institute of Technology
    • Turgay Ayer, Jane Wang
  – University of Pittsburgh
    • Michael Dunn, Mark Roberts, Alison Jazwinski, Mina Kabiri, Andrew Schaefer
  – Emory University
    • Anne Spaulding