



Survey: Anticipation High for Telaprevir and Boceprevir Cost and Reimbursement are Important Factors

Companies

Vertex Pharmaceuticals (VRTX)
Merck (MRK)
Roche (OTC: RHHBY)
Johnson & Johnson (JNJ)

Products

Telaprevir (NDA submission in progress, Vertex and Johnson & Johnson)
Boceprevir (phase III, Merck)
Pegasys (marketed, Roche)
Pegintron (marketed, Merck)

- *inThought* and ImpactRx surveyed 78 U.S. physicians to gauge anticipation for Vertex's (VRTX) telaprevir and Merck's (MRK) boceprevir for the treatment of hepatitis C virus infection (HCV).
- Expected use of telaprevir was greater than that of boceprevir, but not by as much as we had anticipated. Respondents expect to prescribe telaprevir 44% of newly diagnosed patients compared to 26% for boceprevir.
- Based on the results of the survey, we are shifting some patients in our model from telaprevir to boceprevir. 2017 worldwide sales estimates of telaprevir decline to \$2.3 billion from \$2.7 billion and for boceprevir increase to \$0.9 billion from \$0.7 billion. Pegasys (Roche) and Peg-Intron (Merck) estimates adjust in tandem to telaprevir and boceprevir, respectively.
- **Patient warehousing:** Respondents indicate that an average of 30% of their HCV patients is currently deferring treatment. The most common reason was "waiting for better therapies."
- Cost was frequently cited as factor in choice of HCV drugs now and likely in the future. Pricing of telaprevir and boceprevir will be addressed by an *inThought* panel of managed care experts at Bloomberg's offices at 4:30pm on November 9th.

Survey Methodology

ImpactRx (www.impactrx.com) fielded an internet-based survey written by inThought, with responses from 78 practicing U.S. physicians who each see at least 10 HCV patients per month. 78% of respondents were gastroenterologists or hepatologists. 22% were internists or family practice doctors. Physicians polled see an average of 380 patients per month. Most (72%) work in a private group practice setting.

Respondents indicate that 74% of their patients completed their course of interferon therapy.

Boceprevir and Telaprevir

Boceprevir and Telaprevir are add-on anti-viral therapies to the current standard of care (SOC) that significantly boost the likelihood of a patient achieving a sustained viral response (SVR). Boceprevir's treatment regimen is typically 48 weeks and a common adverse event is anemia. Boceprevir has been studied mainly in combination with Peg-Intron. Telaprevir's treatment regimen is typically 24 weeks and the most concerning adverse event is rash. Telaprevir is being studied with the leading interferon, Pegasys.

The primary purpose of the physician survey was to gauge anticipation for telaprevir and boceprevir, and to better estimate the percentage of HCV patients that will be treated with these two agents. We also asked about practical considerations for using new therapies, current physician and patient behavior, and anticipation for new therapies.

inThought expects both telaprevir and boceprevir to be approved in late 2011 or 2012. The inThought Approvability Index (IAI) score of telaprevir is 87%(B) for both refractory and treatment naïve subpopulations. Vertex has begun submitting an NDA for FDA approval of telaprevir. Boceprevir's IAI scores are 74%(B) for refractory patients and 80%(A) for treatment-naïve patients. Boceprevir's phase III trials are complete.

Current Treatment

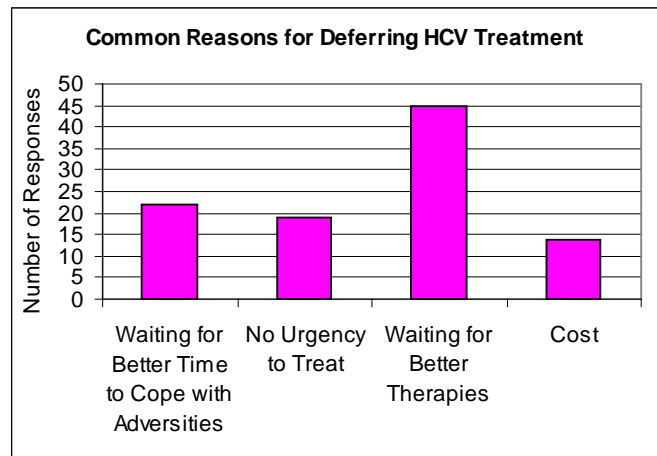
Respondents indicate that 51% of their HCV patients are treated with drugs within the first six months of diagnosis. The proportion of their HCV patients that are currently using a pharmacologic agent was 53%.

Asked about choice of therapeutic agents, the physicians use Pegasys in 53% of patients compared to Peg-Intron in 39%, a narrower advantage to

Pegasys than would be expected by their relative prescription numbers. When asked what influenced the decision of Pegasys vs. PegIntron, cost / reimbursement was the most frequent answer: 25 physicians cited cost/insurance and coverage/formulary coverage as a major deciding factor, compared to 12 favoring Pegays' convenient pen dosing, and 9 favoring weight-based dosing. The percentage of patients using an interferon that completed a course of therapy was 74%, and was somewhat lower in those with larger practices.

Launch of telaprevir and boceprevir could be aggressive because HCV patients are waiting for these drugs before beginning therapy, a phenomenon known as "patient warehousing." In our sample, physicians estimated that an average of 30% of their HCV patients was currently deferring drug treatment. Reasons for deferring treatment were grouped into the categories in Figure 1. Waiting for better therapies was the most common response for deferring treatment.

Figure 1



Source: ImpactRx

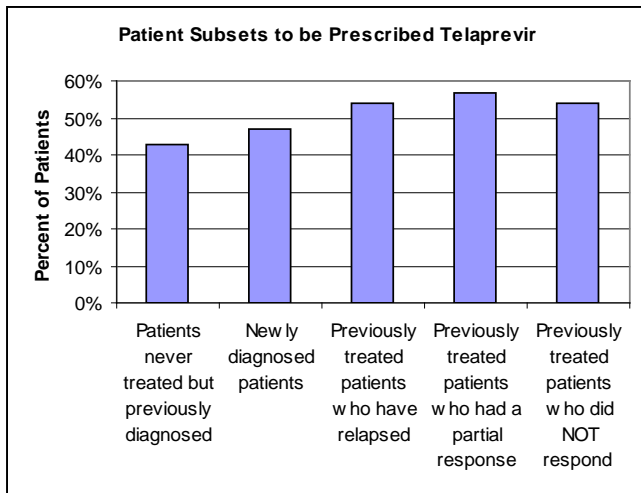
Anticipation for Telaprevir and Boceprevir

Most physicians polled are "somewhat familiar" with telaprevir and / or boceprevir. When asked to rate their level of familiarity on a scale of 1 to 5, 1 being "never heard of it" and 5 being "very familiar," the average response to telaprevir was 3.0 overall. The average response for boceprevir was 2.7. Respondents do not see differences in

efficacy between telaprevir and boceprevir, with the average response of 2.8 when asked to rate efficacy on a 5-point scale where one indicated telaprevir is likely more efficacious and five favored boceprevir.

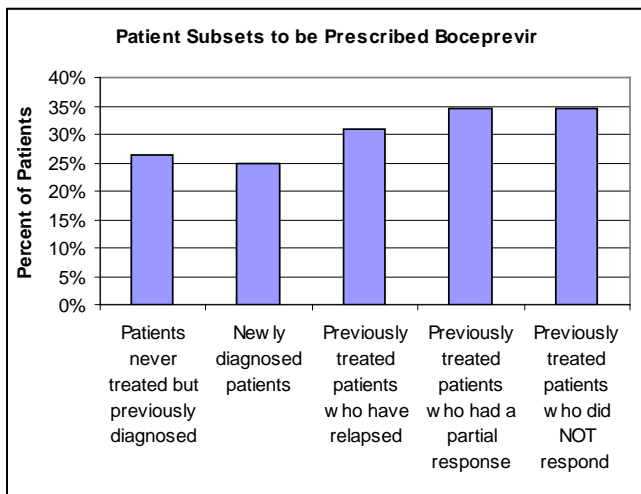
Figures 2 and 3 outline expectations for prescription of telaprevir and boceprevir in various HCV patient populations.

Figure 2: Expectations for Telaprevir Use



Source: ImpactRx

Figure 3: Expectations for Boceprevir Use



Source: ImpactRx

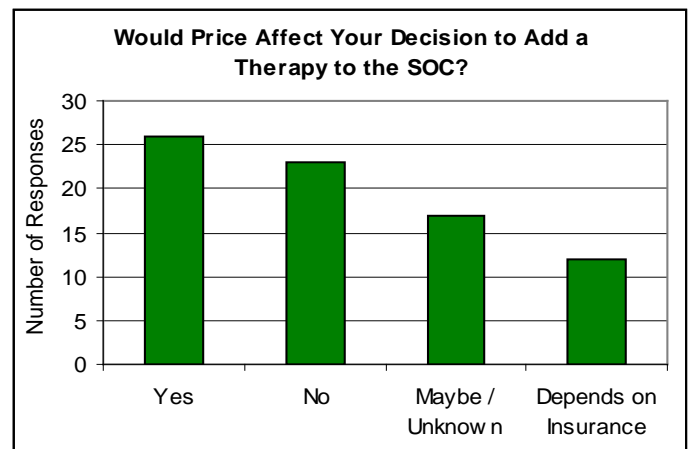
Only one physician said that s/he was not likely to prescribe telaprevir at all, citing cost as the most likely factor. Eight respondents do not expect to prescribe boceprevir. Four indicated that telaprevir would be used instead, one indicated that s/he would not use boceprevir because s/he does not use Peg-Intron, one mentioned cost, one is concerned about boceprevir's adversity profile, and one is not familiar with boceprevir.

Respondents were asked, "For a new agent to be used in the majority of my HCV patients, it would have to prove: (% SVR compared to standard of care)." The average response was 59% SVR. Both telaprevir and boceprevir meet this requirement, demonstrating a greater than 65% SVR on average for telaprevir and boceprevir in phase II and III trials in genotype 1, treatment naïve patients.

Pricing and Reimbursement

Our survey suggests that pricing and reimbursement of telaprevir and boceprevir will be critical to the success of these agents. In respondents' choice to prescribe new HCV therapies, 26 of 78 respondents said that price would affect their decision to add a therapy to the standard treatment regimen for HCV, with another 12 noting that reimbursement would be a factor (Figure 4).

Figure 4



Source: ImpactRx

Physicians were also split on the impact the cost of new therapies would have on their practices:

- *“Depends entirely on insurance coverage; very few people could afford to pay cash for therapy even before the price doubles (!) with protease inhibitors.”*
- *“The economics are very burdensome because the majority of our hep C patients are on Medicaid.”*
- *“60% fully insured, 20% under insured; 20% self pay.”*
- *“These patients have problem getting decent health insurance.”*
- *“The cost of treatment will go up, but I am not sure if the insurance companies will cover it.”*
- *“Cost is usually not a factor; these meds would not, I believe, change that.”*
- *“Insurance covers the great majority of my patients.”*

Overall, anticipation for telaprevir and boceprevir was high:

- *“These will completely supplant use of C-IFN [interferon] for nonresponders. I believe that the protease inhibitors will become the new standard of care.”*
- *“Both are potentially welcome additions to HCV therapy. Telaprevir has an advantage because of its short duration of therapy.”*
- *“Telaprevir has excellent potential to be a first line drug.”*
- *“I think telaprevir will be more effective and will be out first.”*
- *“Telaprevir will likely eclipse boceprevir.”*
- *“Both have similar potential to offer patients with previous failure a chance for eradication.”*

- *The potential of telaprevir and boceprevir are “excellent based on SVR, poor based on price.”*
- *“Great if economically feasible.”*
- *“Potential is there, but [I am] not willing to jump through hurdles [such as] prior authorization [and] precertification.”*
- *“I think they will significantly improve and replace the SOC but will soon be replaced by 2nd generation protease inhibitors.”*

Beyond Telaprevir and Boceprevir

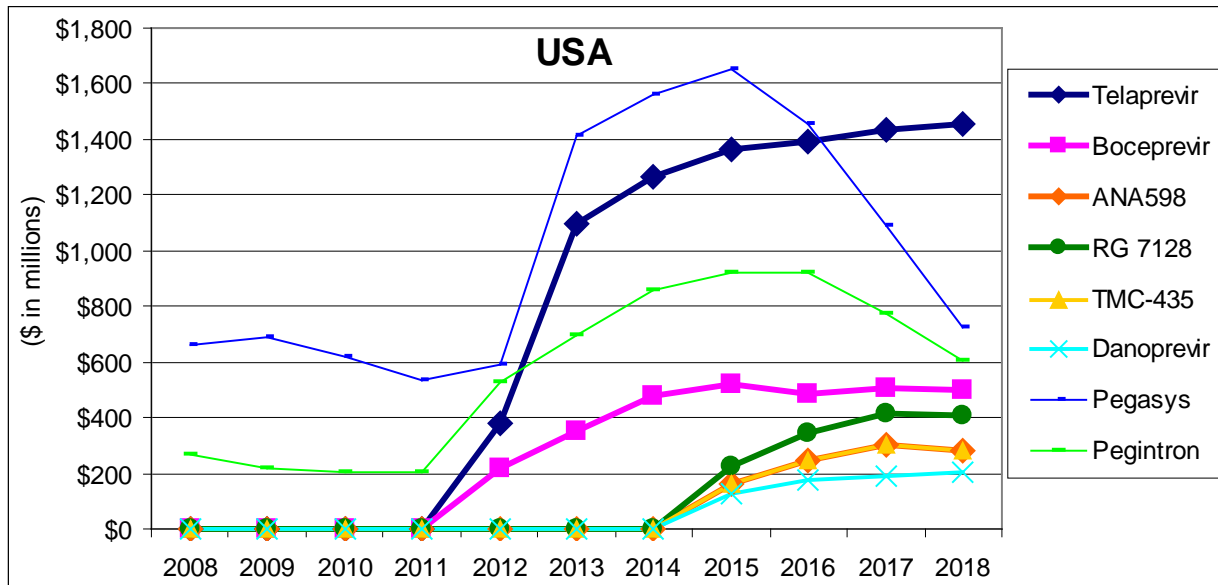
When asked what agents beyond telaprevir and boceprevir look the most promising, most physicians indicated that other protease inhibitors as well as polymerase inhibitors are the most promising developmental agents. Specific therapies were not named. One response indicated the HCV vaccine as the most promising and another response indicated developmental interferons as the most promising. Several respondents are looking forward to all oral regimens that avoid interferon completely.

Revenue Model Updates

Although the outlook for protease inhibitors was consistent with our expectations, anticipated use of boceprevir was higher among survey respondents than our model had predicted. We are therefore narrowing the gap between patients treated with telaprevir vs. boceprevir in our model. The new ratio of patients using telaprevir to boceprevir in 2017 is approximately 3:1 compared to 6:1 previously. By 2017, we estimate that telaprevir is used by over 150,000 US patients annually and by over 99,000 EU patients.

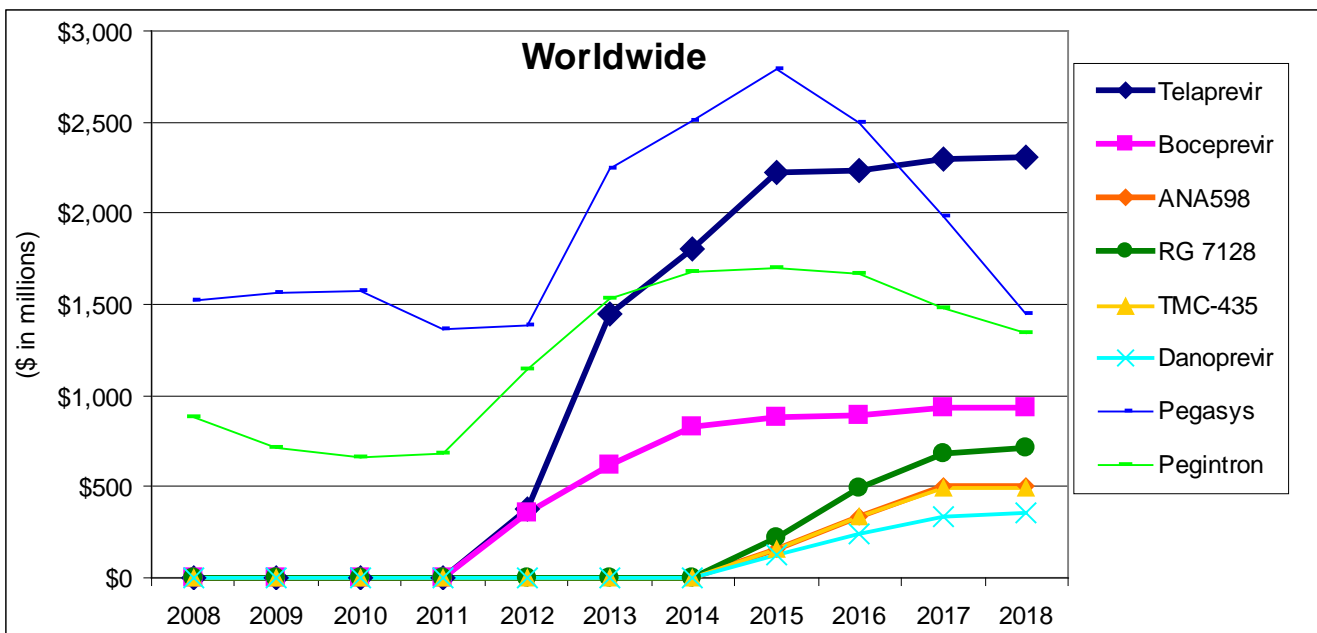
We also adjust the outlook for Pegasys vs. PegIntron in tandem with the expected use of telaprevir and boceprevir since telaprevir is likely to be used primarily with Pegasys and boceprevir primarily with Peg-Intron. Our model assumes that at least one interferon-free regimen is available in the 2016 timeframe.

Figure 5: US Hepatitis C Revenue Forecasts



Source: inThought estimates, company reports.

Figure 6: Worldwide Hepatitis C Revenue



Source: inThought estimates, company reports.

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