HBsAg quantification

"Clinical applications"

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Definitions

AgHBs: Protein, coating the surface of the HBV virion, secreted by the hepatocyte.

Reflects indirectly the number of infected hepatocytes.

cccDNA: Mini-chromosome produce in the nucleus,

Acts as a template for transcription of viral gene.

Required to maintain infection.

Lower cccDNA levels correlate with lower serum HBsAg levels,

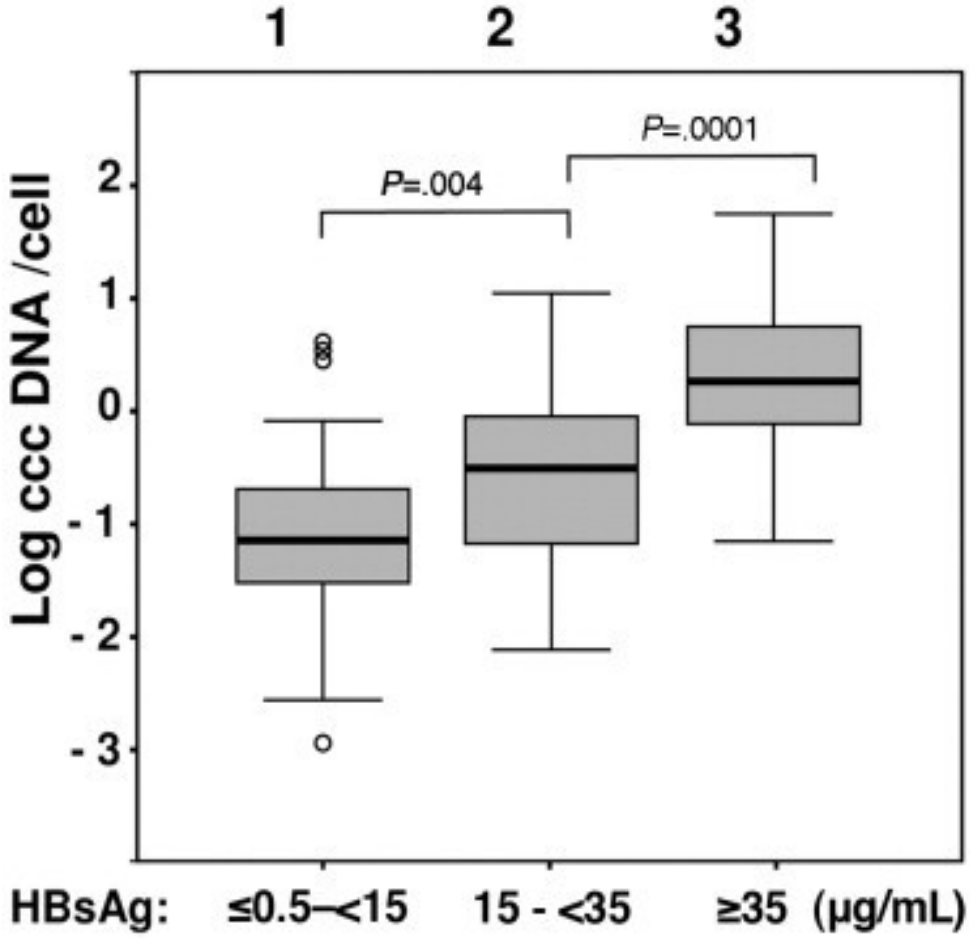
indicating that HBsAg can be used as a surrogate marker of cccDNA.

Volz T et al. Gastroenterolgy 2007;133:843
Thompson AJV et al. Hepatology 2010;51:1933

AgHBs and ADNccc

Serum HBsAg levels reflects cccDNA in infected cells

- cccDNA (matrix necessary for the viral replication) level reflect the number of infected hepatocytes.
- cccDNA levels lower in e-negative than in e-positive patients.
- cccDNA and serum HBsAg titer show a significant correlation.
- Serum HBsAg level is considered as indirect scorer of HBV infected hepatocytes.

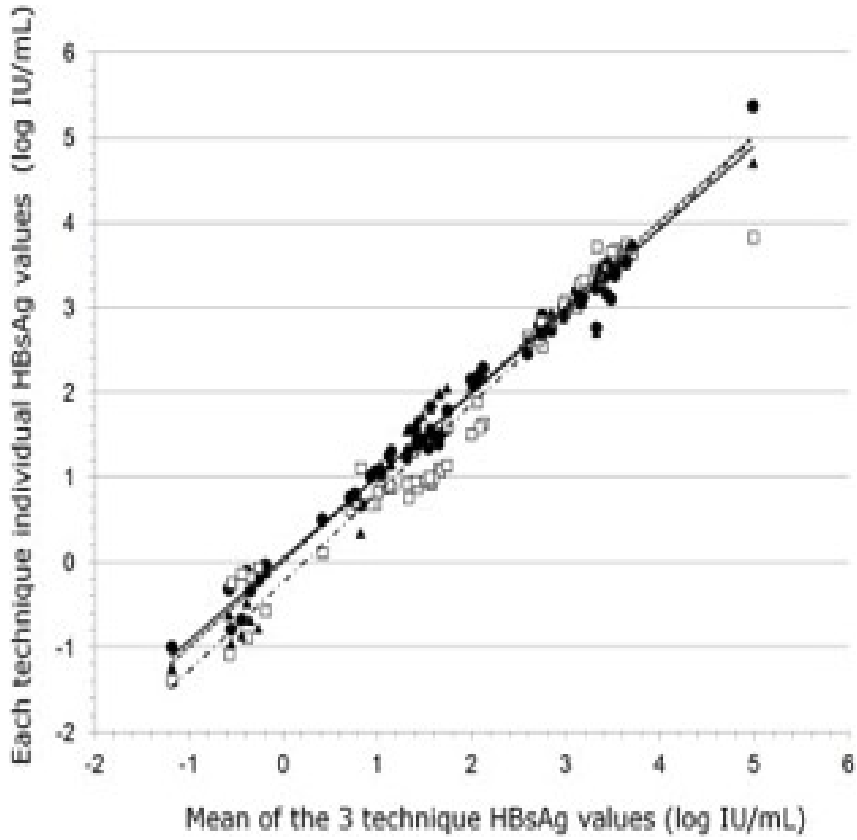


Volz et al. Gastroenterology 2007.

HBsAg quantification

- HBsAg assay automate Architect (Abbott)
- HBsAg II Quant Elecsys or Cobas (Roche)
- Liaison XL HBsAg Quant assay (DiaSorin)

Quantification is not dependent of the presence of AgHBs/antiHBs (5-25%)

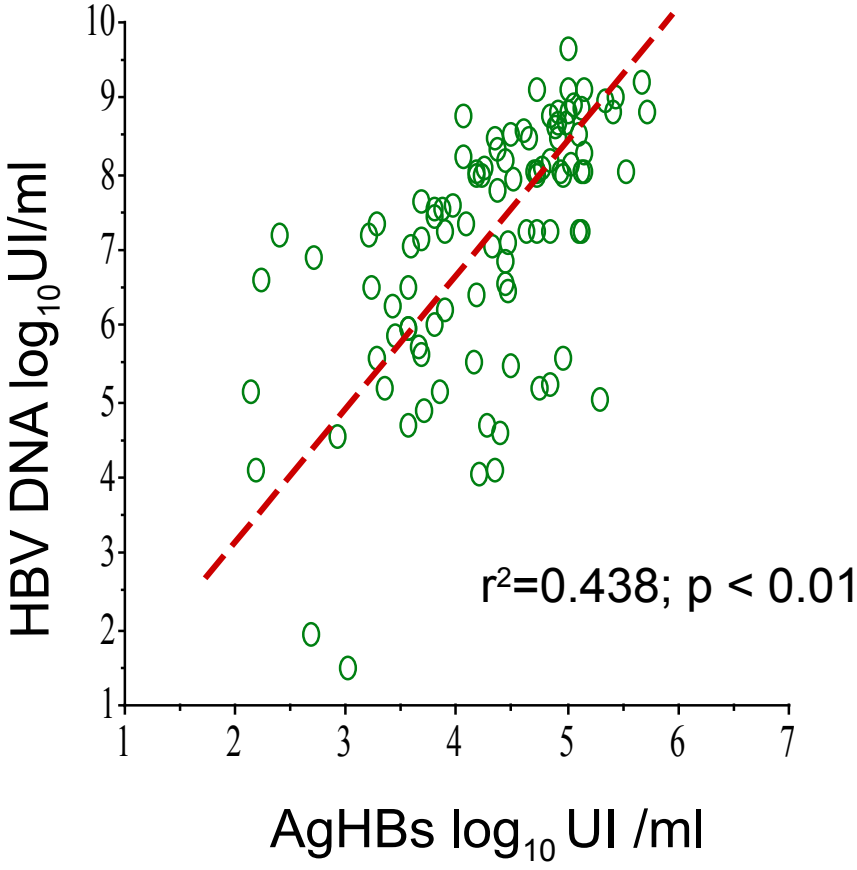


Useful tool in the diagnosis and the follow-up of the patients with chronic hepatitis B

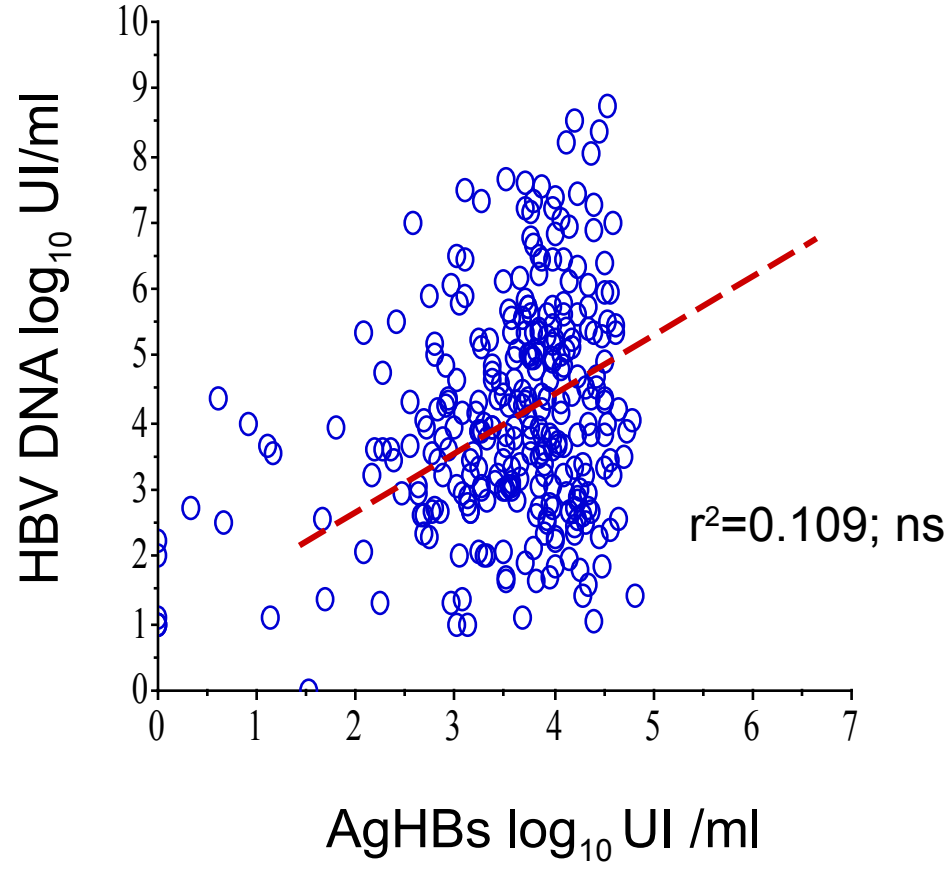
Pancher M, Thibault V, et al. J Clin Virol 2014 on line

Correlation between HBsAg and HBV DNA

HBeAg positive

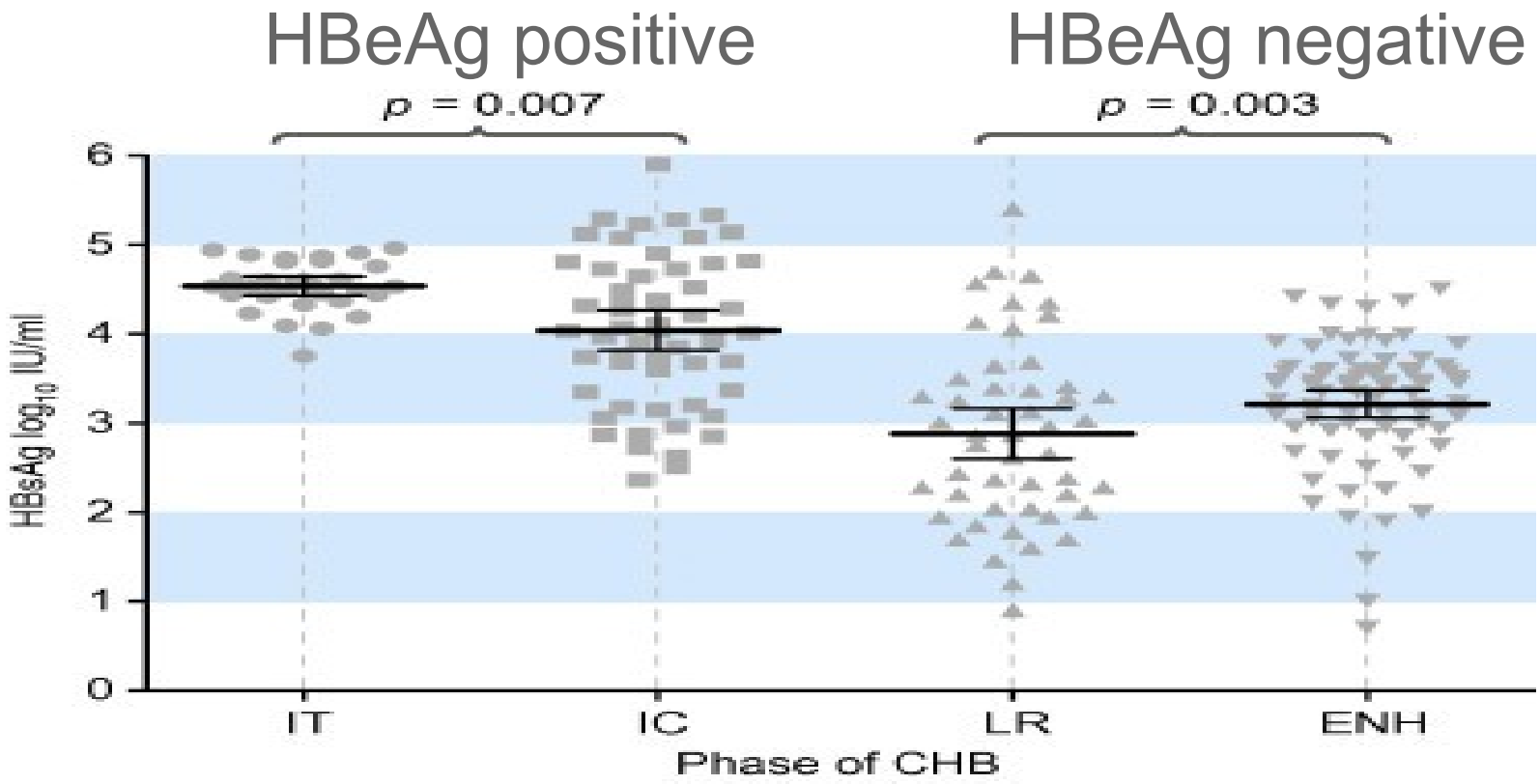


HBeAg negative



Martinot-Peignoux et al. J Hepatol 2013; in Press

HBsAg Natural History

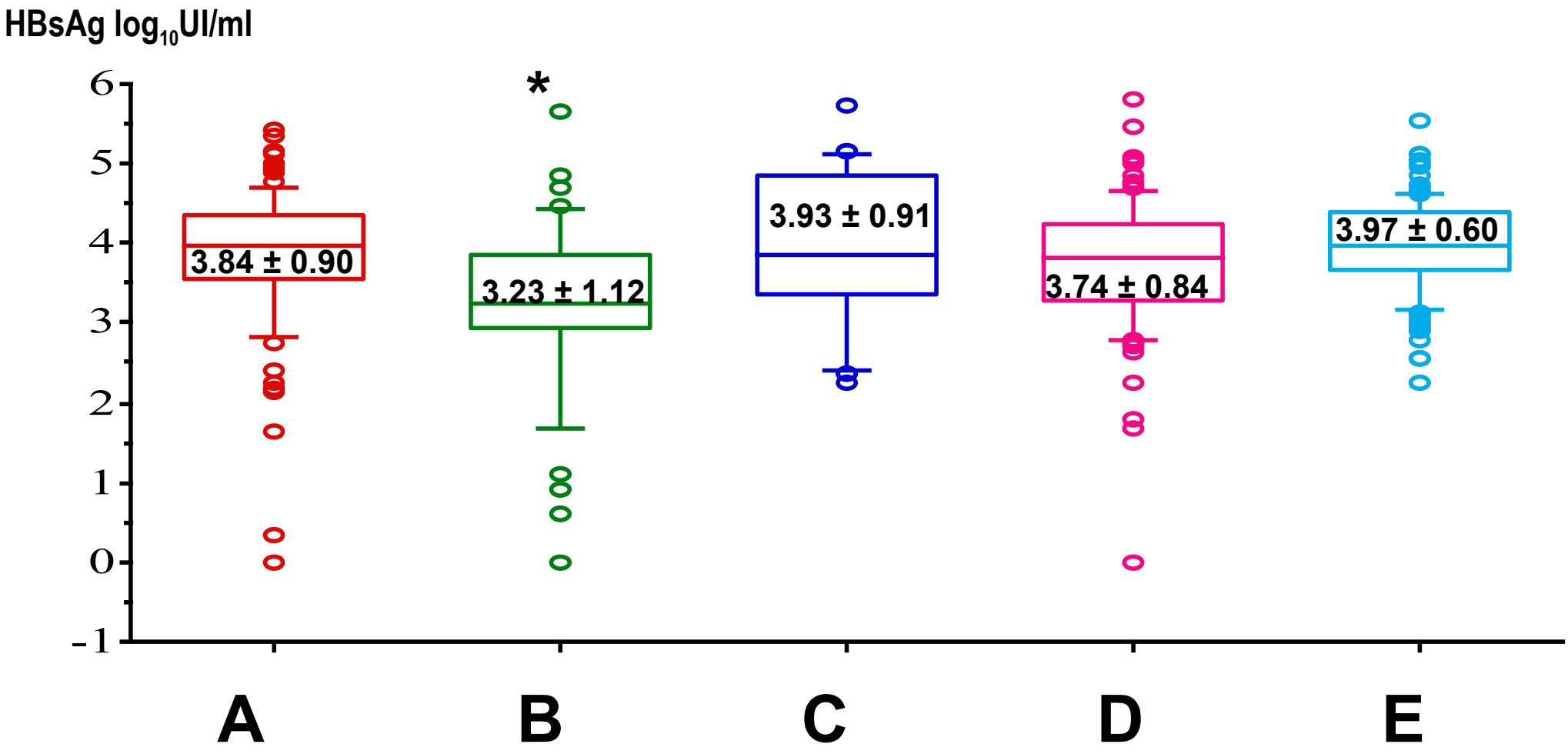


Serum HBsAg levels vary significantly during the different phases of chronic HBV infection and are inversely correlated with the immune control of HBV: the higher control, the lower HBsAg level

Nguyen T. et al. J Hepatol 2010;52;508
Chan et al Hepatology 2010;52:1232

Jaroszewicz. et al. J Hepatol 2010;52;514
Martinot-Peignoux et al. Hepatology 2010;52:992A

Natural History: HBV genotype



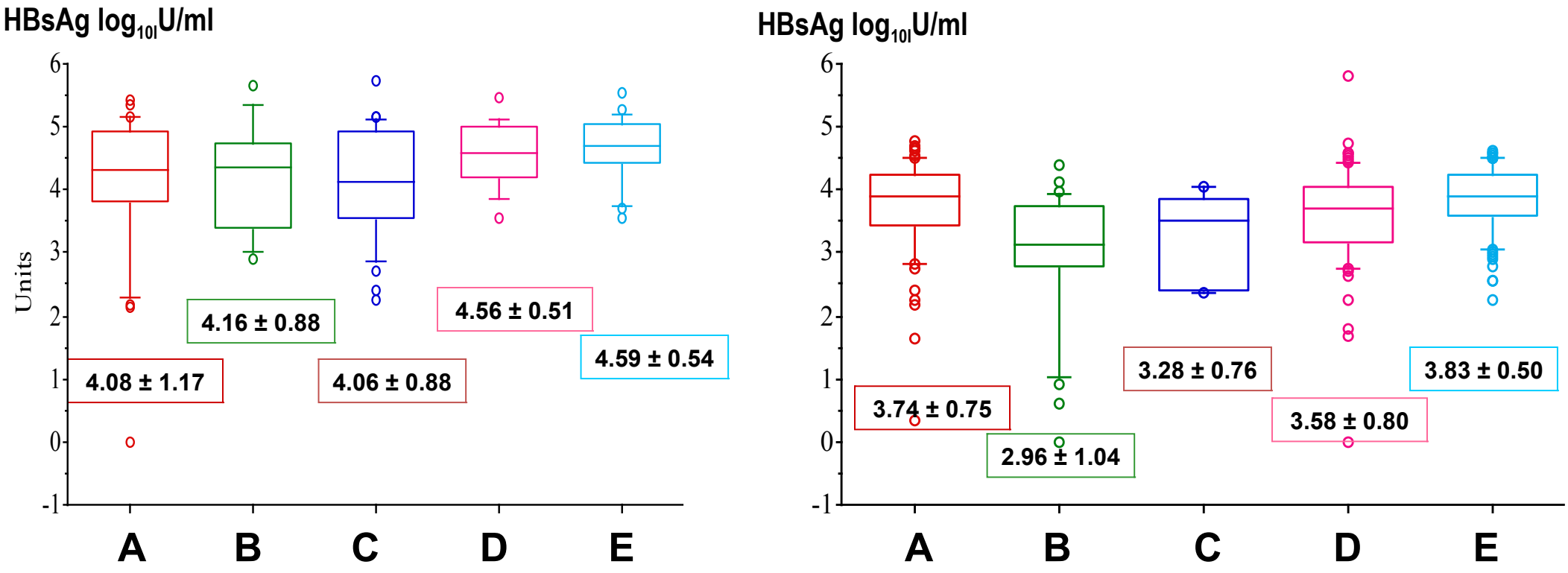
* B versus A, C D and E p<0.0001

Martinot-Peignoux et al. AASLD 2011

Natural History: HBV genotype

HBeAg positive

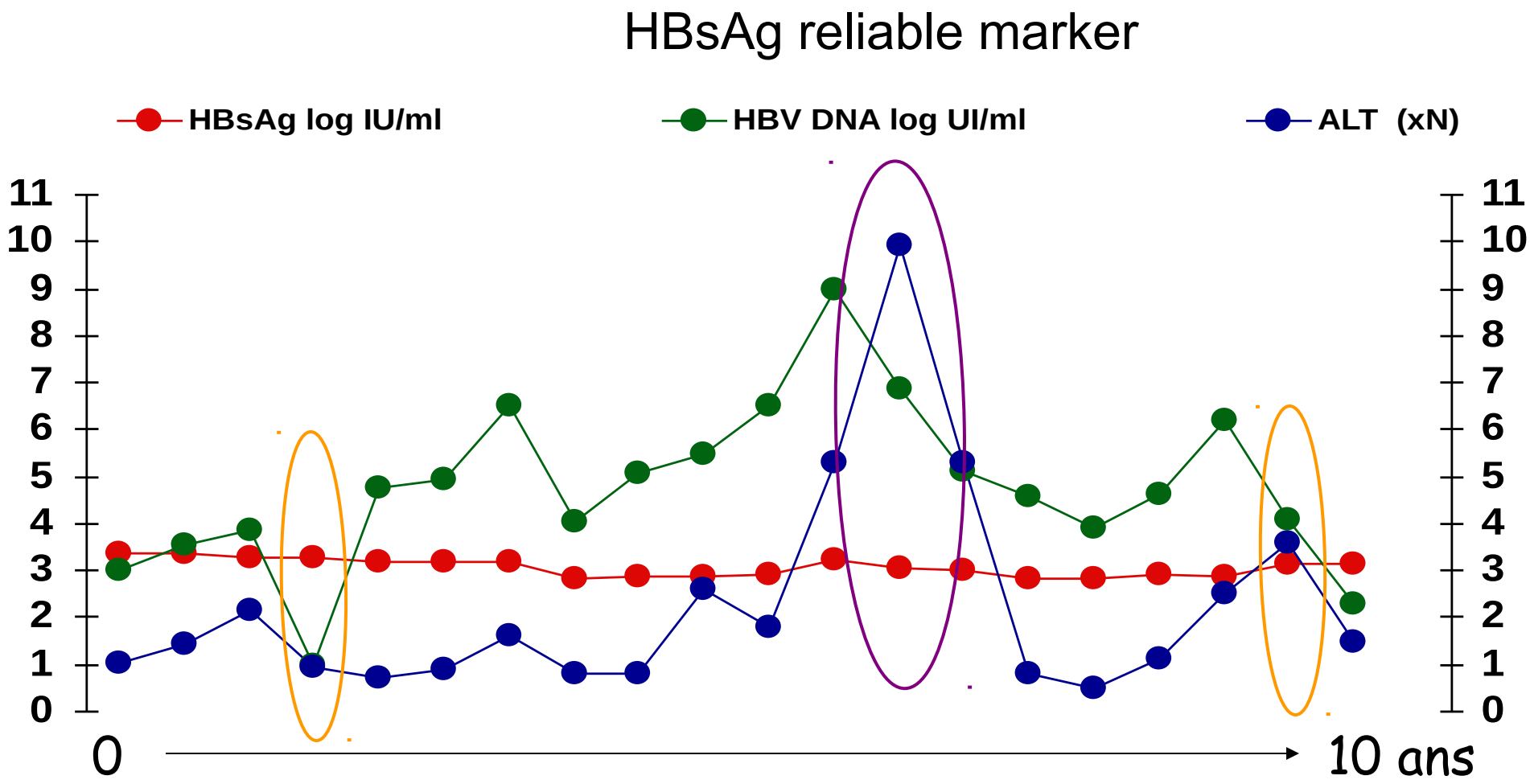
HBeAg negative



HBeAg pos versus HBe Ag neg p< 0.01

Martinot-Peignoux et al.J Hepatol 2013 in Press

Clinical utility

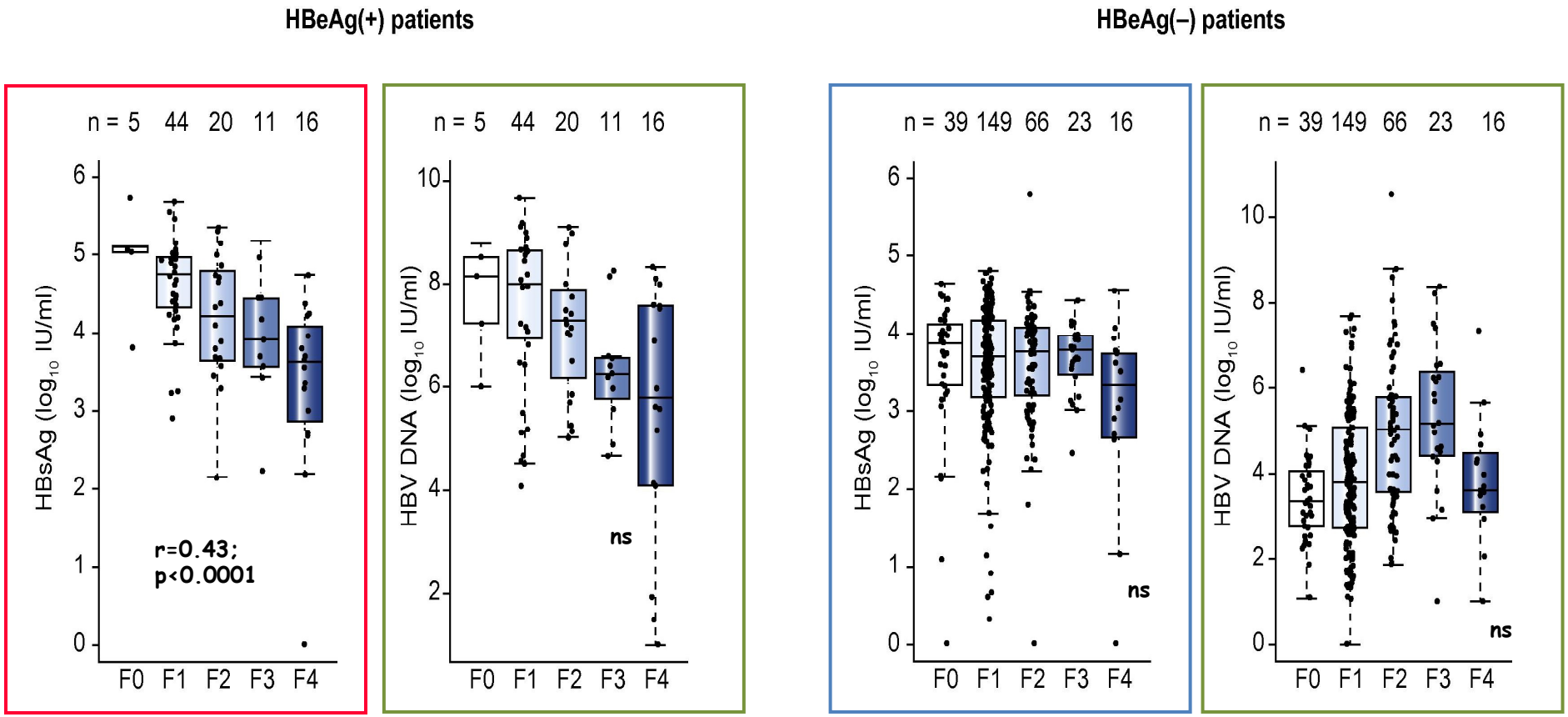


Martinot-Peinoux Liver International 2013:125:132

Martinot-Peignoux et al. J Clin Virol 2013;58:401

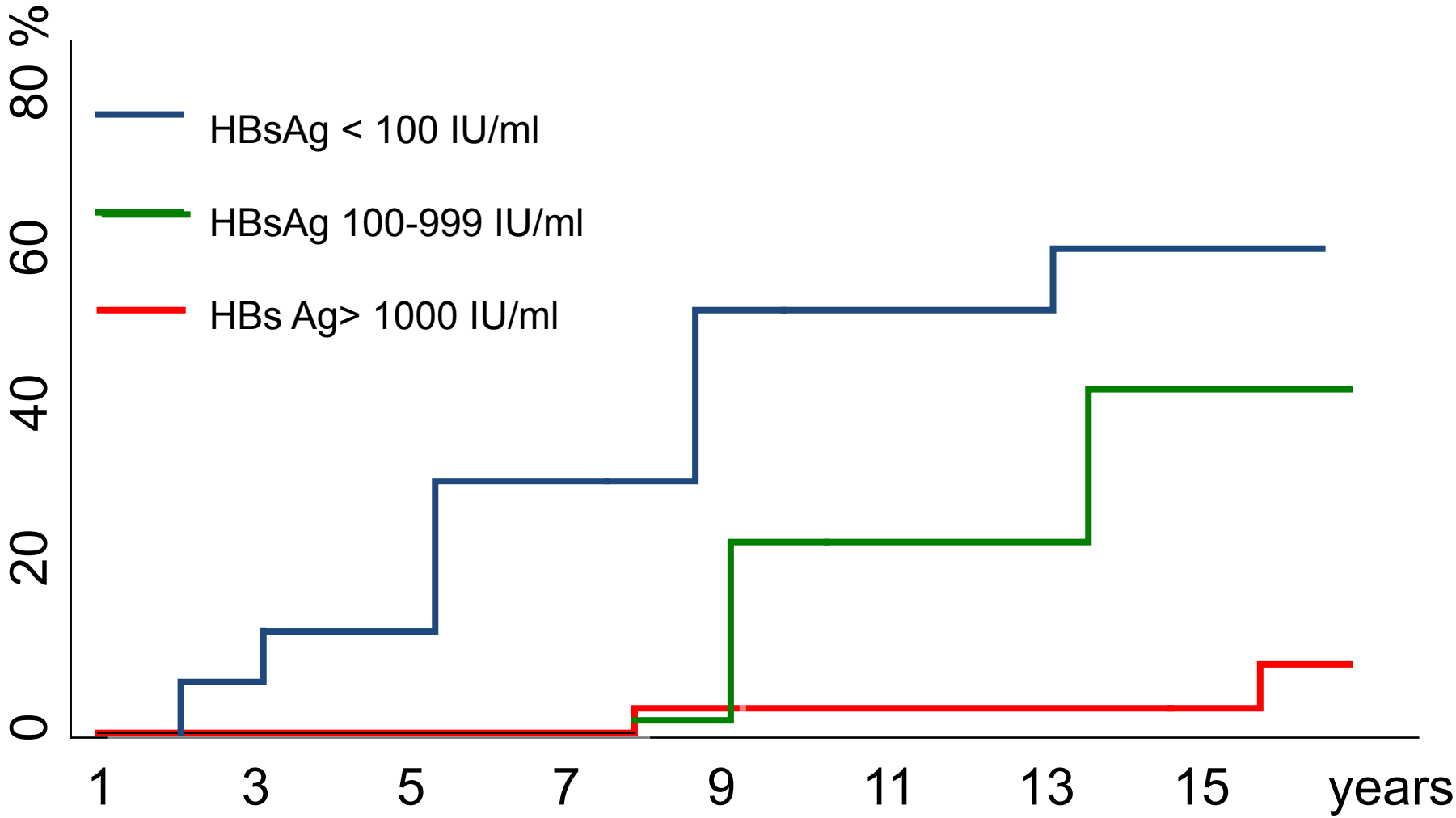
Prediction of severity

406 patients AgHBe positive / negative génotype A à E



Martinot-Peignoux et al. J Hepatol 2013;58:1089

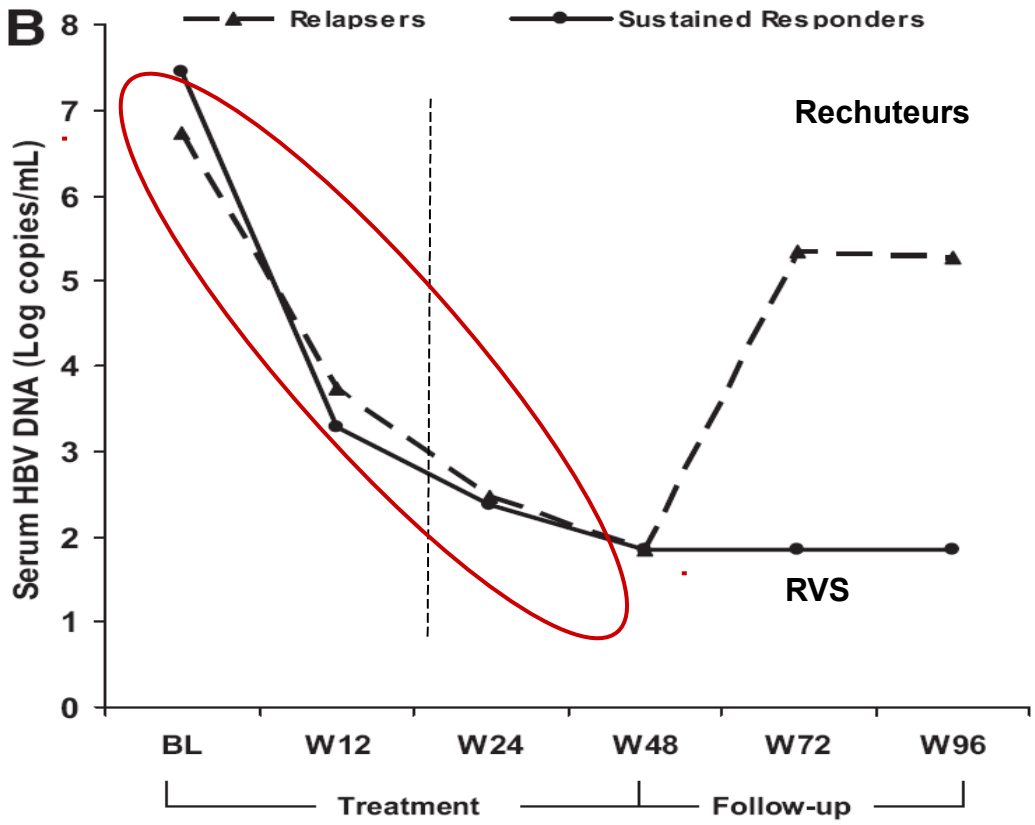
Prediction of HBs loss

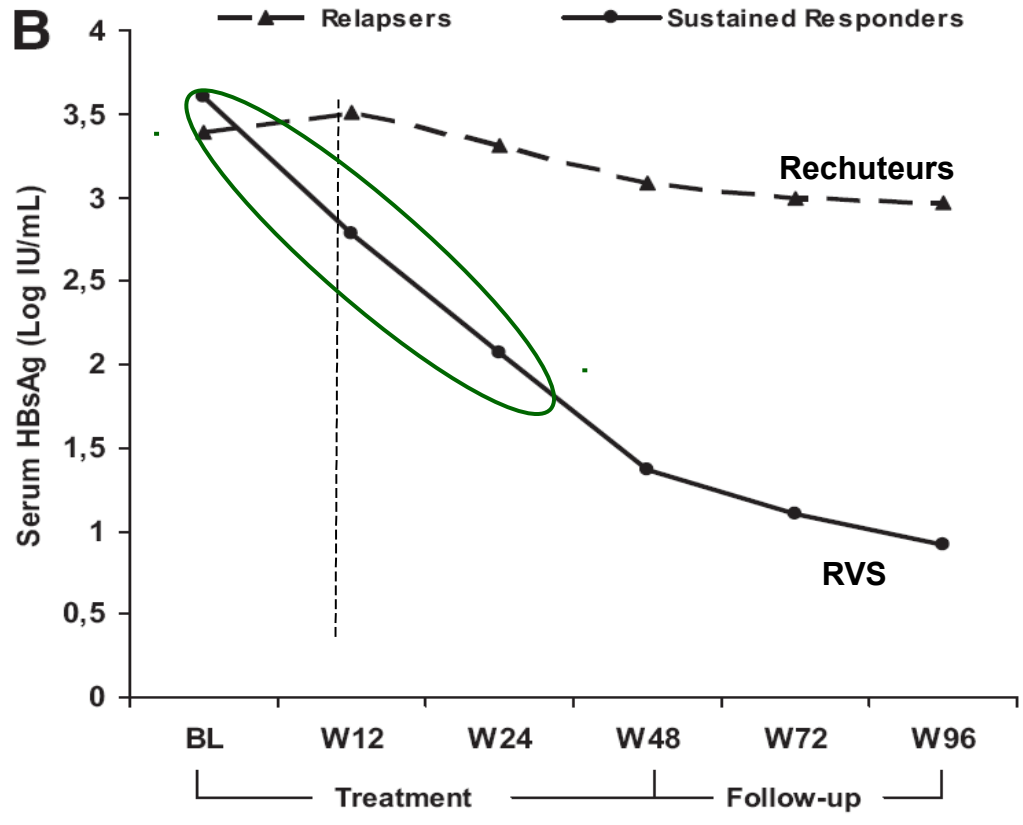


Tseng et al, Gastroenterology 2011

PEG-IFN therapy

HBV DNA and HBsAg kinetics

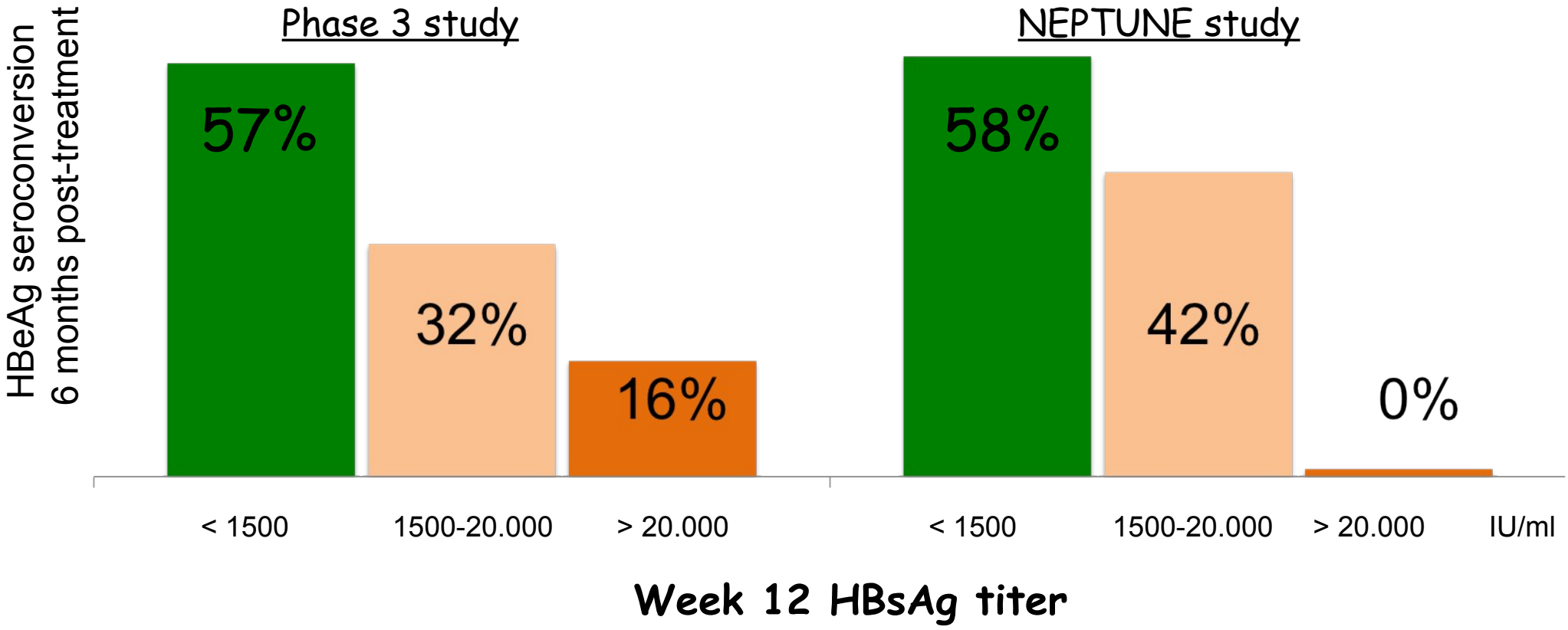




Moucari et al. Hepatology 2009;49:1151 Brunetto et al. Hepatology 2009;49:1141

During therapy

Low on-treatment HBsAg levels associated with higher HBeAg seroconversion rates



Piratvisuth T et al. APASL 2010 Lau G. et al. EASL 2009 Gane E et al. EASL 2011 Liaw et al. Hepatology 2012

When: during therapy (NAs)

Early on treatment HBsAg decrease is predictive:
Sustained virological response and HBsAg loss

	Week 12		Week 24	
HBsAg decrease	PPV	NPV	PPV	NPV
0.5 log IU/ml	5 %	**85%**	0%	**85%**
<1 log IU/ml	35%	**95%**	41%	**97%**

Marcellin P et al N Eng J Med 2008

Marcellin P. et al AASLD 2012.

Conclusion (1)

- Quantifying HBsAg is an important tool for predicting the chronic hepatitis B outcome:

- severity of liver disease,
- cirrhosis and HCC development,
- identification of inactive carriers (<1 000 IU/ml)

- Help to tailor follow-up and treatment management

- Decline during PEG-IFN strong predictor of SVR
- Decline during NAs predictor of HBsAg loss

Volz T et al. Gastroenterolgy 2007;133:843
Thompson AJV et al. Hepatology 2010;51:1933