

# Overview of biomarkers for viral evolution and liver disease progression in hepatitis B and Hepatitis C

Pr Philippe Halfon, MD, PhD  
Hôpital Européen  
Marseille, France

10-11 December 2015



EUROPEAN HIV HEPATITIS CO-INFECTION (EHHC)  
CONFERENCE



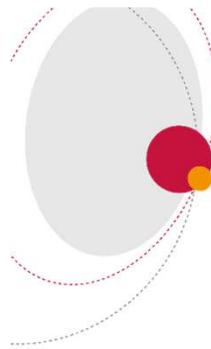
# Dr Philippe Halfon

Hôpital Européen Marseille, France

## **COMPETING INTEREST OF FINANCIAL VALUE $\geq$ £1,000:**

Speaker Name	Statement
Philippe Halfon	Nothing to declare
Date	December 2015



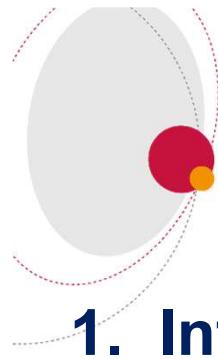


## Disclosures Philippe Halfon

---

- **Speaker** : Merck, Janssen, Gilead, BMS
- **Scientific advisory Board** : Provepharm
- **Shareholders and Founder**: GenosciencePharma
- **Scientific Grant** : Gilead



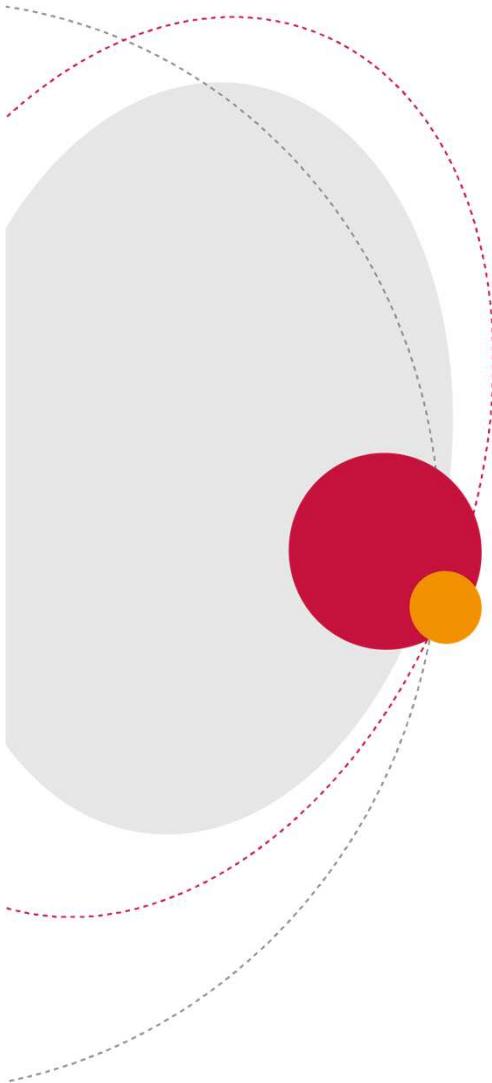


# Overview

---

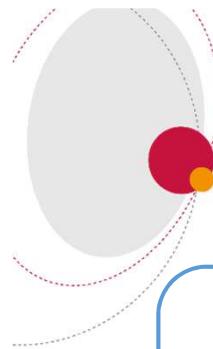
## 1. Introduction

- 2 Biomarkers for viral evolution and liver disease progression in Hepatitis C
- 3 Biomarkers for viral evolution and liver disease progression in Hepatitis B
  - Fibrosis Markers
  - Clinical utility of HBsAg Quantification
- 4 Conclusion

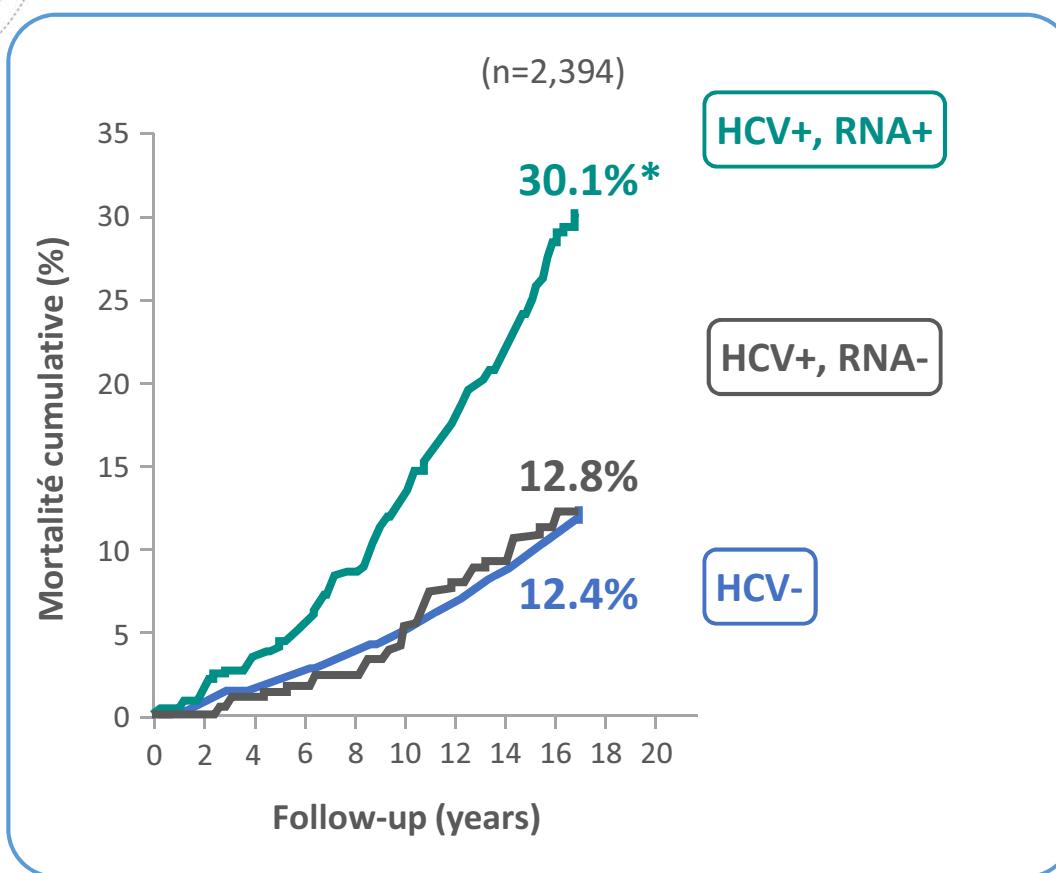


## **Overview of biomarkers for viral evolution and liver disease progression in Hepatitis C**

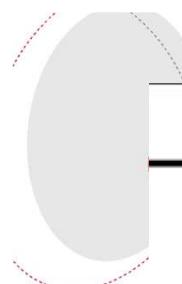




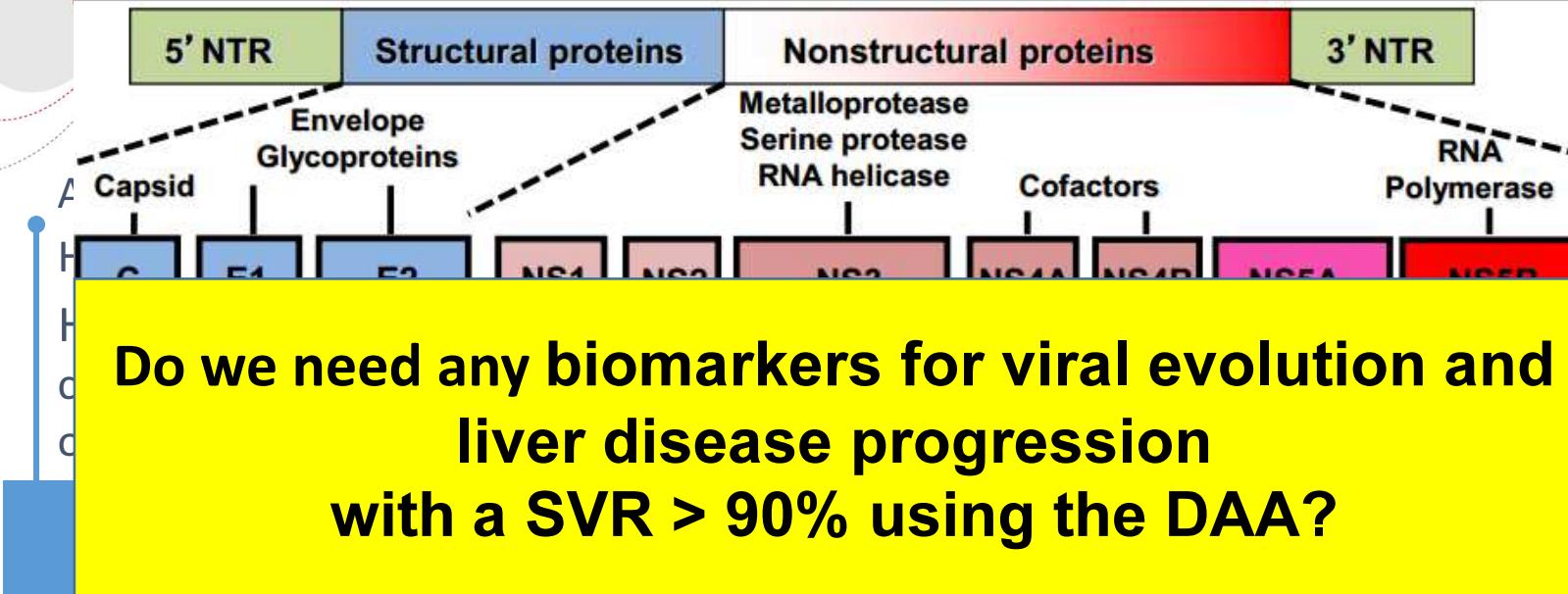
## Chronic HCV infection and all-causes of mortality



- 23 820 adults, Taiwan
- 1095 anti-HCV positive
- 760 (69%) detectable Viral RNA



## Direct-acting antivirals (DAAs)



### Protease Inhibitors

- Telaprevir
- Boceprevir
- Simeprevir
- Faldaprevir
- Asunaprevir
- ABT-450
- MK-5172
- Sovaprevir
- ACH-2684

### NS5A Inhibitors

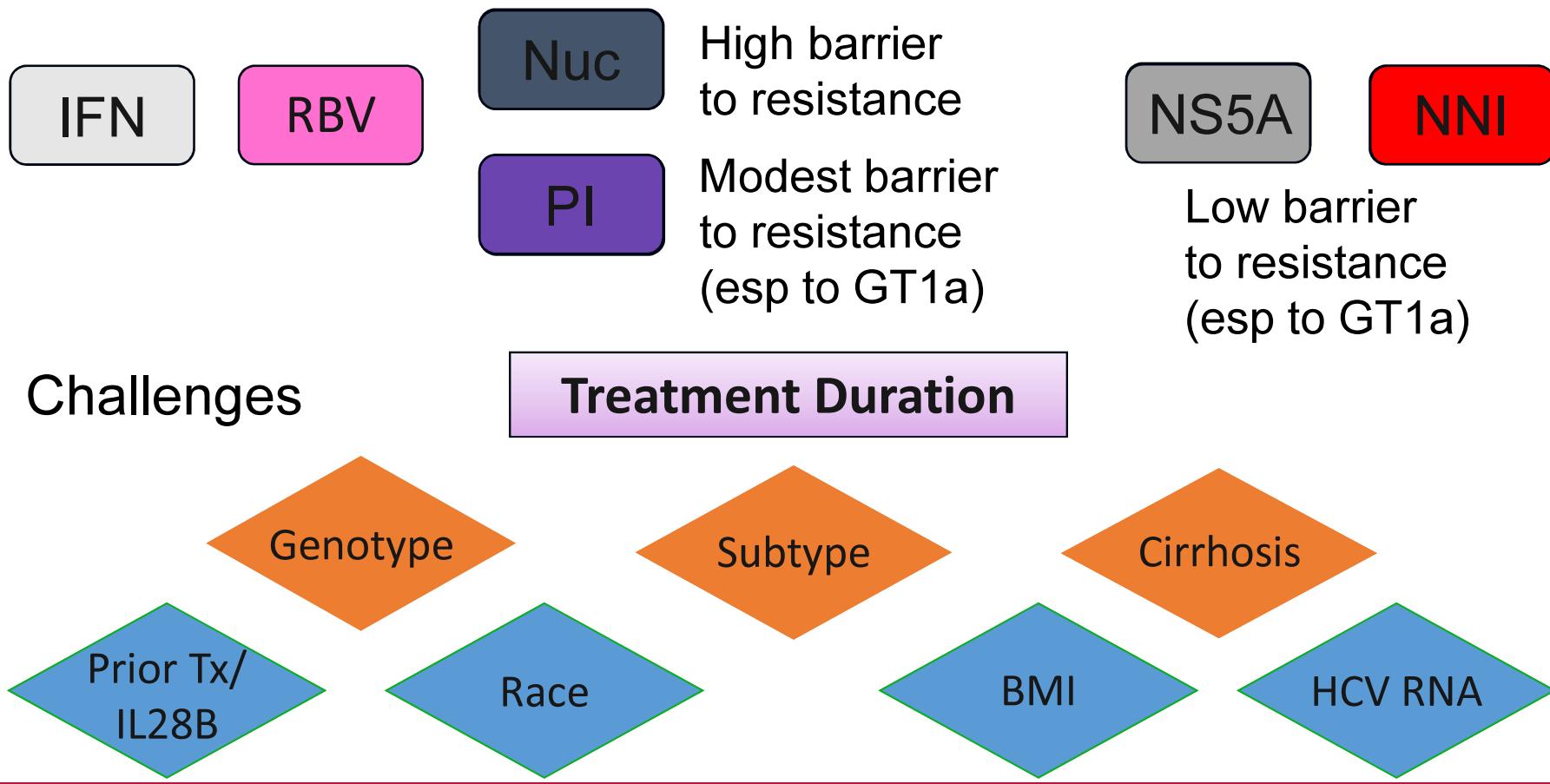
- Daclatasvir
- Ledipasvir
- ABT-267
- GS-5816
- ACH-3102
- PPI-668
- GSK-2336805
- Samatasvir
- MK-8742

### Polymerase Inhibitors

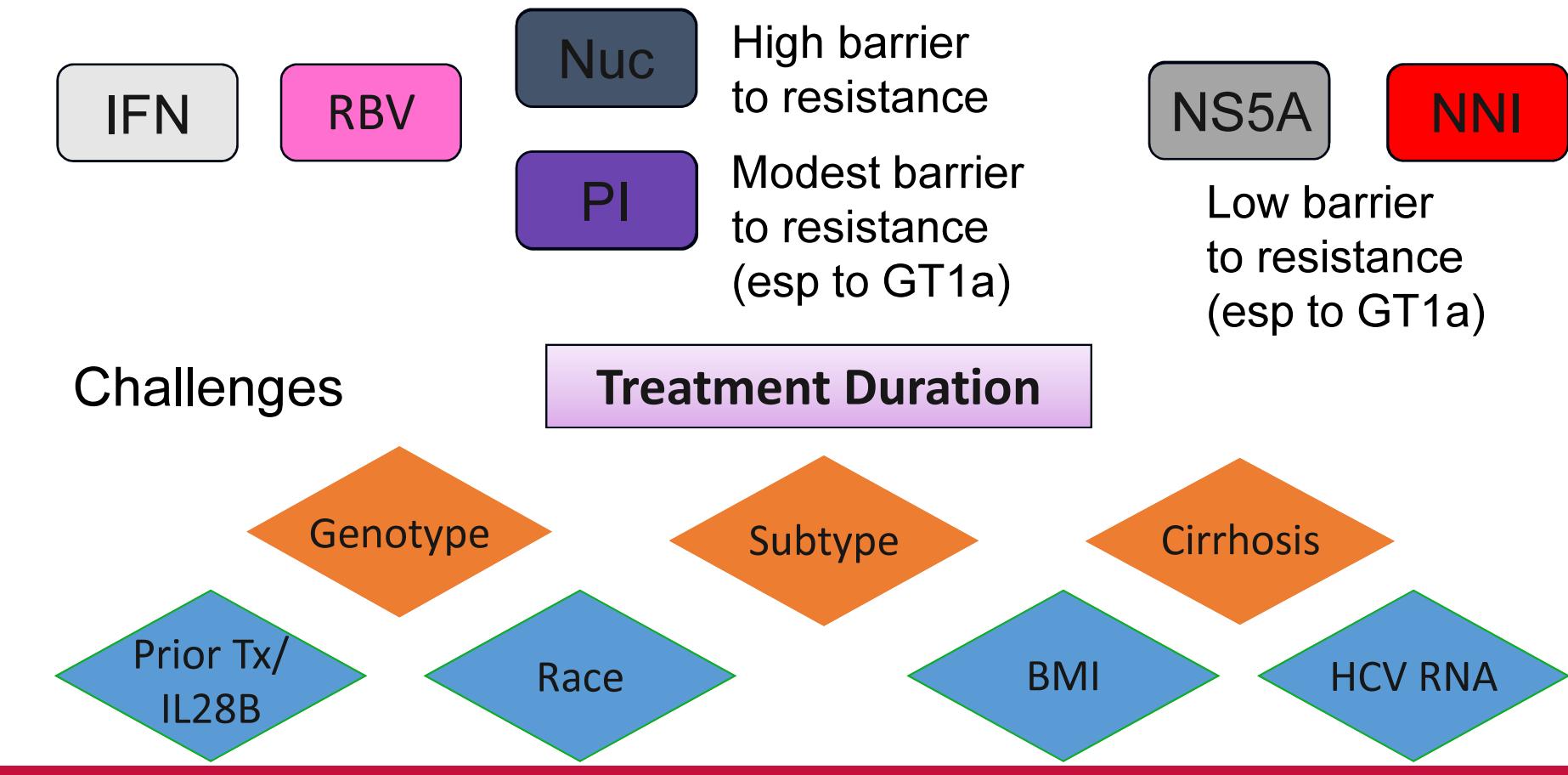
- |            |            |
|------------|------------|
| Nucs       | Non-Nucs   |
| Sofosbuvir | ABT-333    |
| VX-135     | Deleobuvir |
| IDX-20963  | BMS-791325 |
| ACH-3422   | PPI-383    |
|            | GS-9669    |
|            | TMC-647055 |

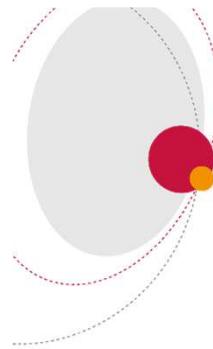
Schinazi R, Halfon P, Marcellin P, Asselah T. Liver International 2014

# The HCV Toolbox : Change of paradigm with the DAA



# The HCV Toolbox





# The HCV Toolbox: Mix and Match

RBV

Nuc

PI

NS5A

NNI

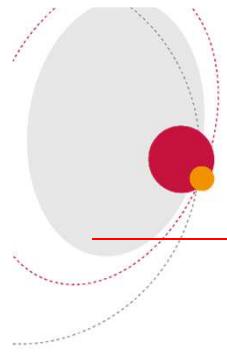
Challenges

Treatment Duration

Genotype

Subtype

Cirrhosis



# Liver fibrosis is the common stage of liver damage from several different causes

## Fibrotic Liver Disease

Viral : HCV, HBV..

Alcohol

**F0**

**F1**

**F2**

**F3**

**F4**

Metabolic

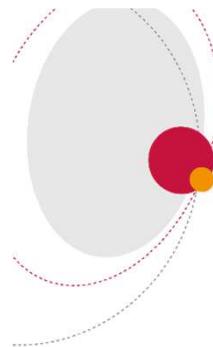
Genetic : HFE, Wilson...

Autoimmune Diseases

**Hemorrhage**

**Liver Failure**

**Cancer**



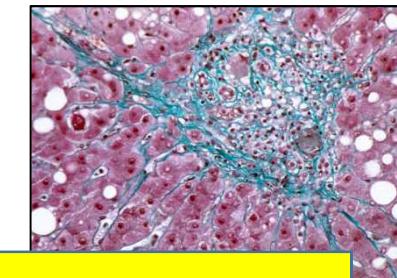
## A progressif mechanism defined by 5 histological stages (METAVIR)

Mild Hepatitis  
F0, F1 : 20 – 30 %

F0 – F1 – F2 – F3 – F4

F0 : Normal Liver

F1 : Periportal Fibrosis



In patients with viral hepatitis (including HIV/HCV), there are two clinically relevant endpoints:

- detection of significant fibrosis
- detection of cirrhosis. +++++

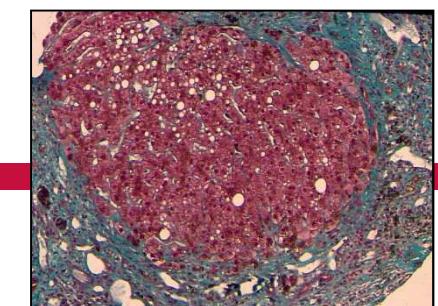
F3 – F4 : 20 – 35%



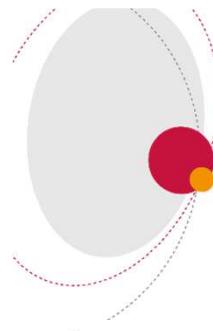
F3 : fibrosis septal with cirrhosis



F4 : Cirrhosis

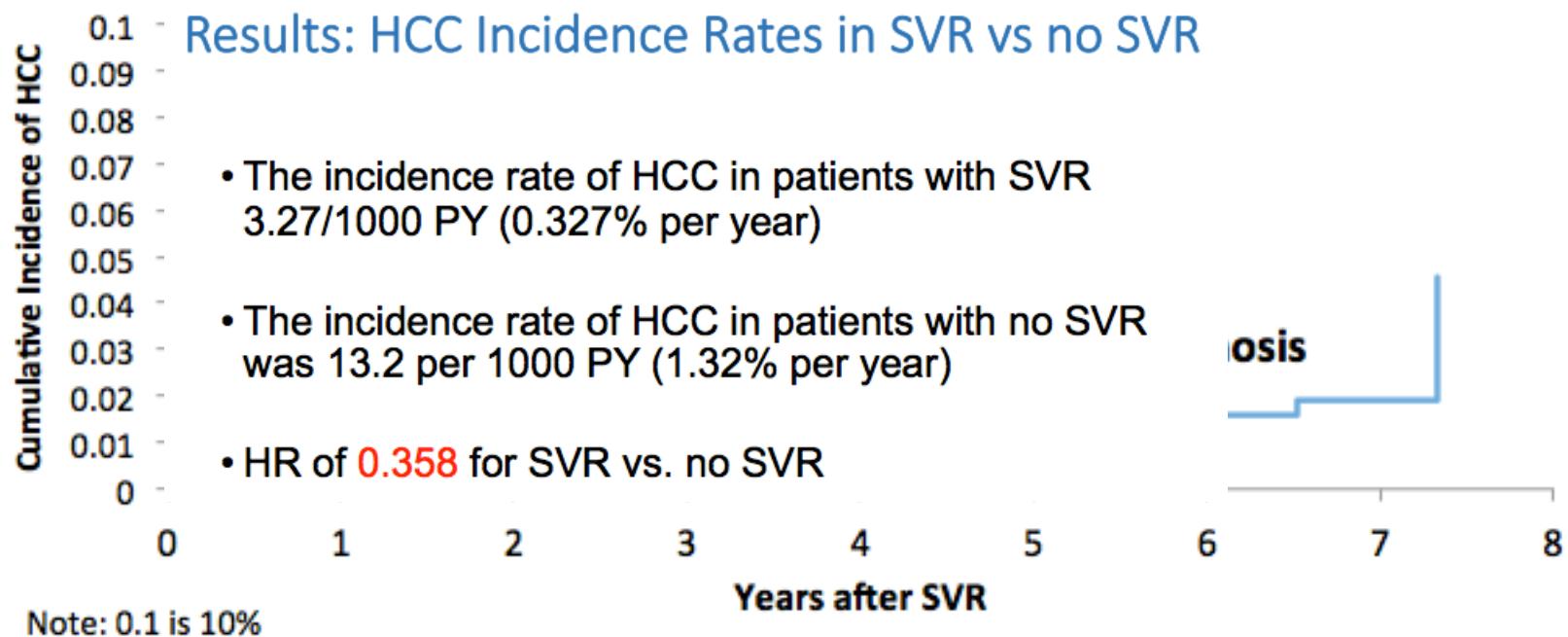


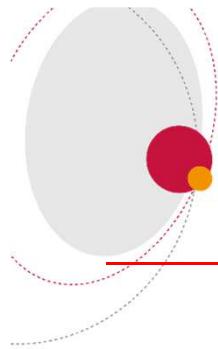
F0 – F4 : 20 to 35 years if progression



## Risk for Liver Cancer even After SVR is Achieved

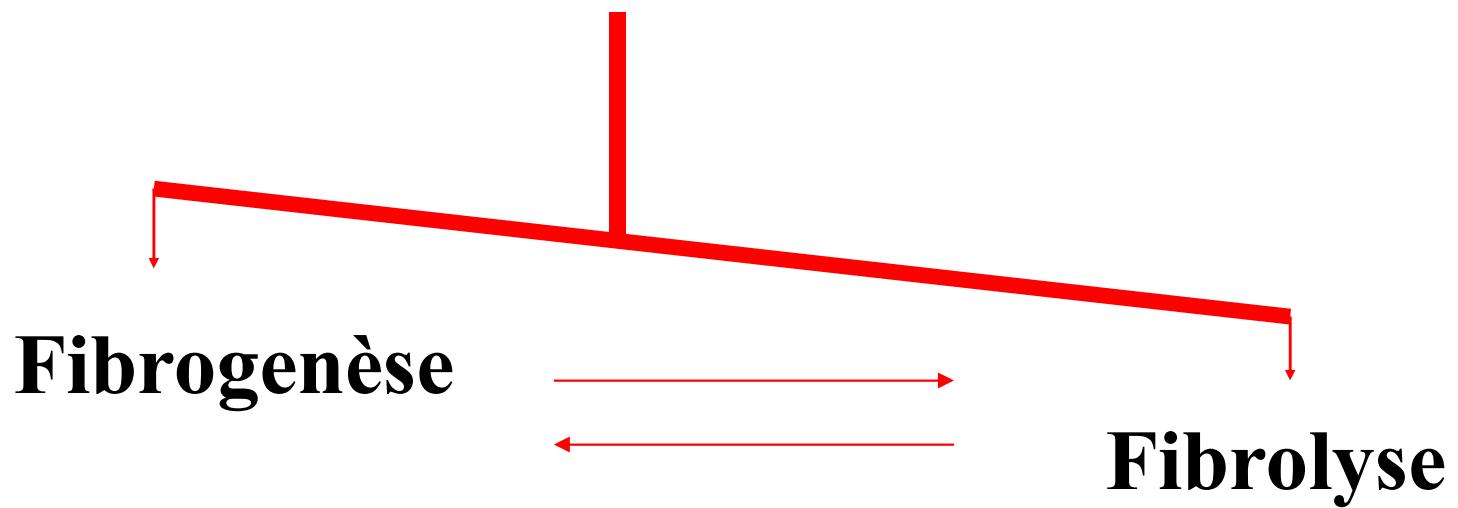
### HCC Incidence Following SVR: by Cirrhosis

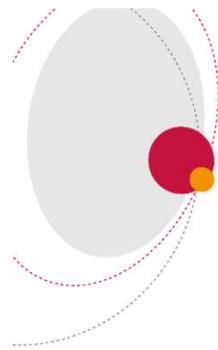




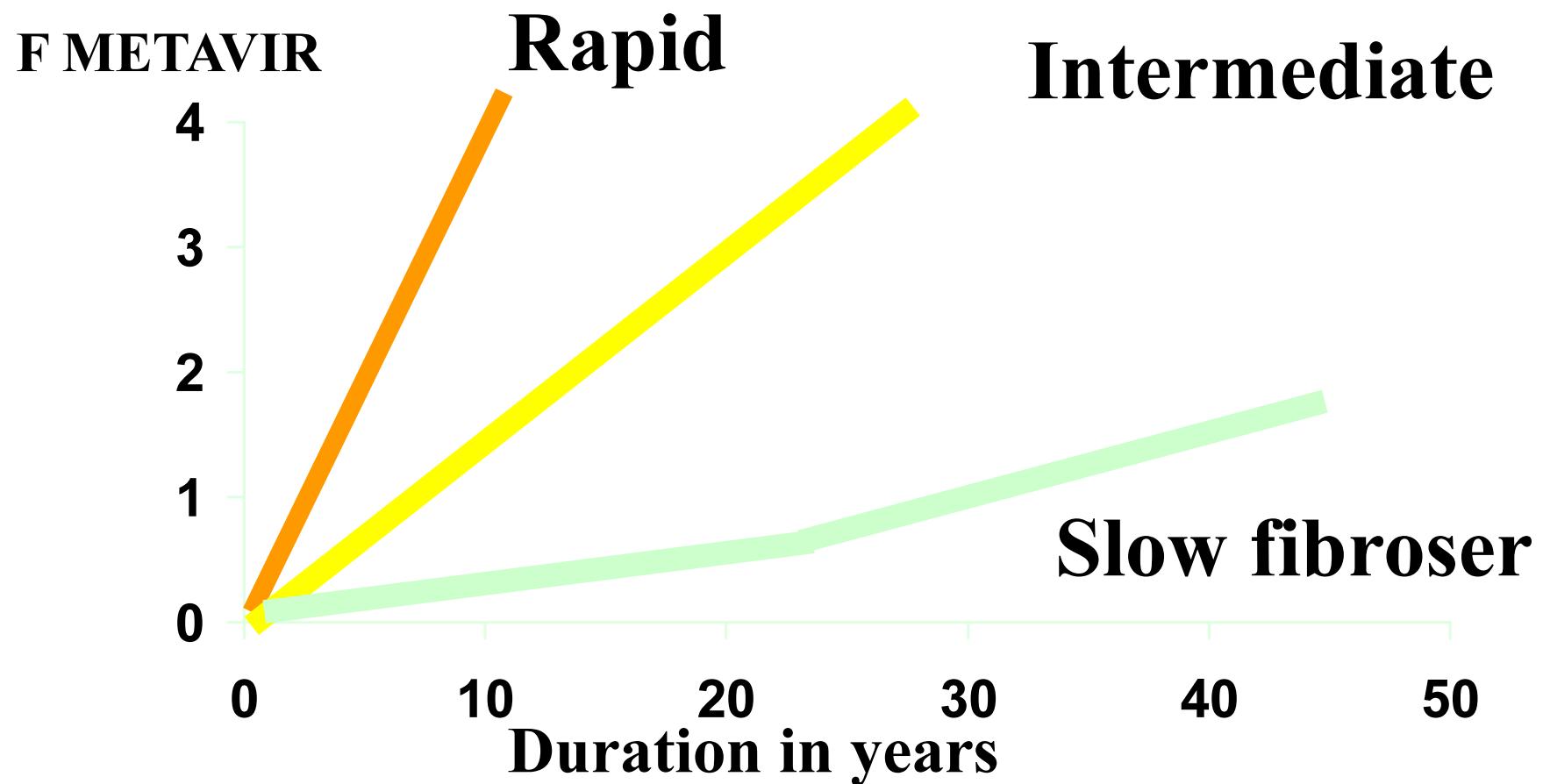
# Fibrosis is a dynamic process

Reversible Process





## Progression of liver fibrosis

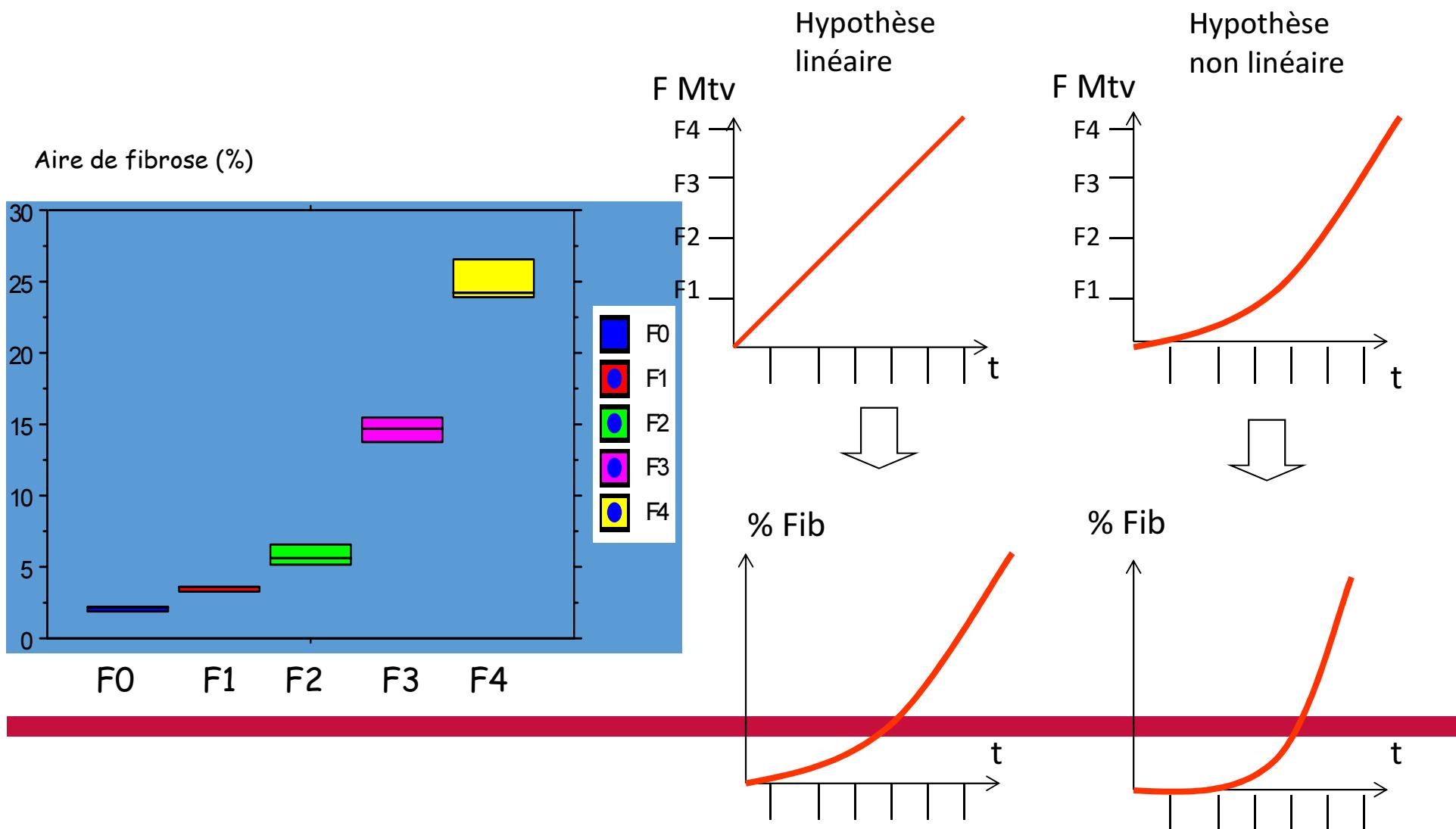


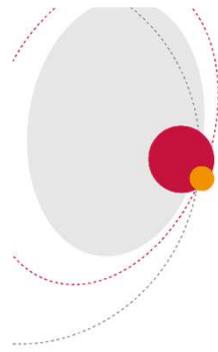
Poynard T et al, *Lancet* 1997; 349: 825

*n=1157*

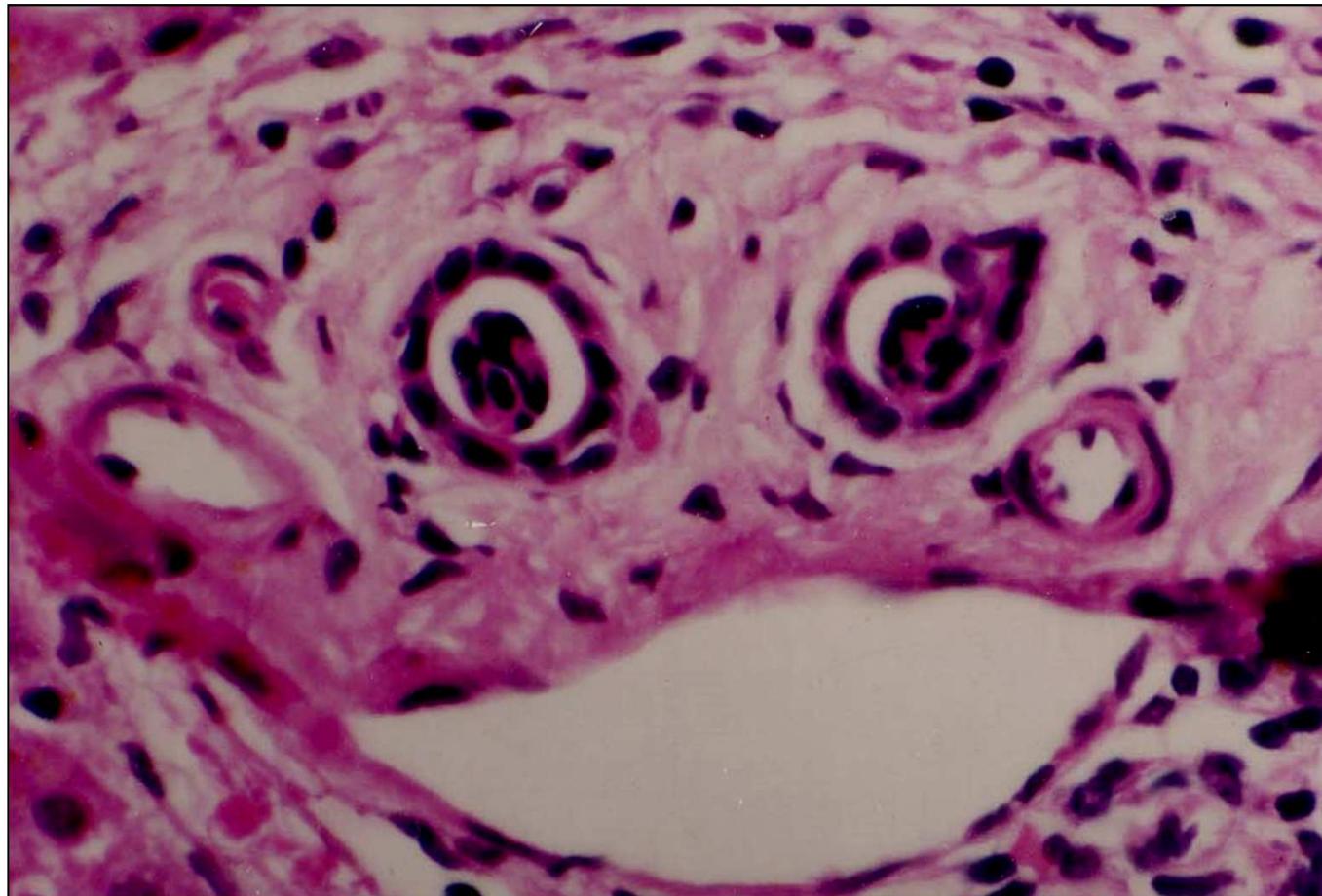
# Dynamique de la Fibrose hépatique

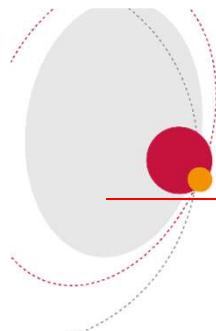
## Progression exponentielle



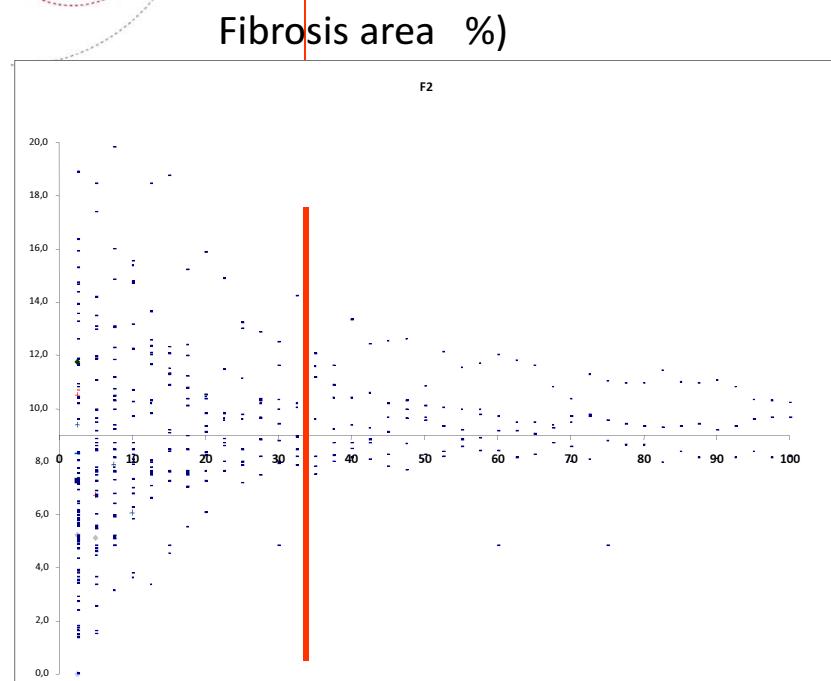


# The relevance of Liver Biopsy in predicting fibrosis progression

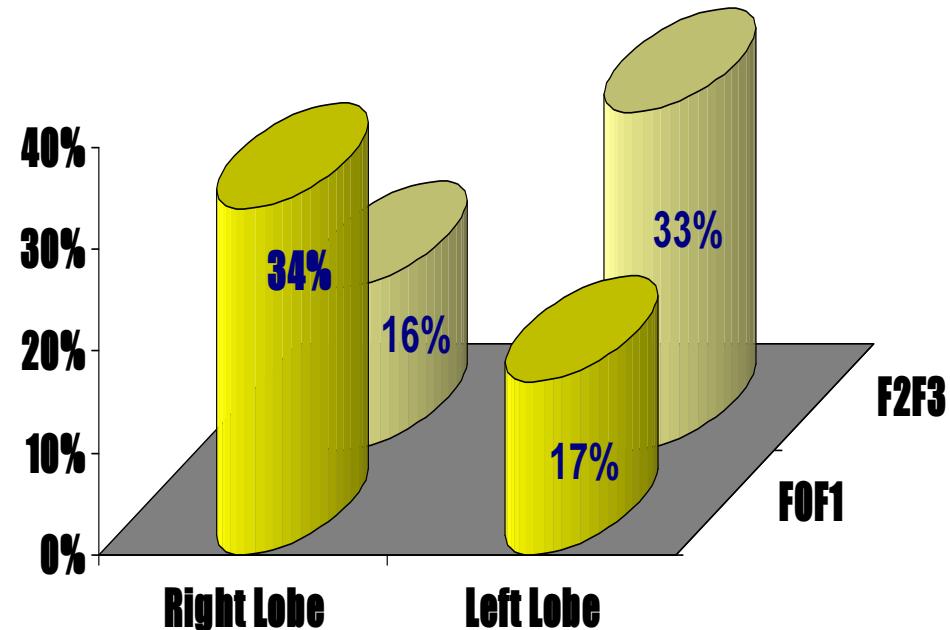




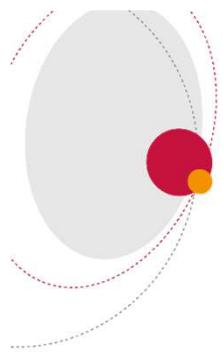
# The limits of liver biopsy



Size of liver biopsy at least 25 mm

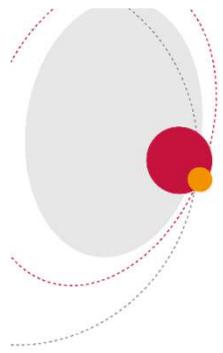


Fibrosis left lobe vs right lobe vs  
124 patients : Discordance 33 %



F1



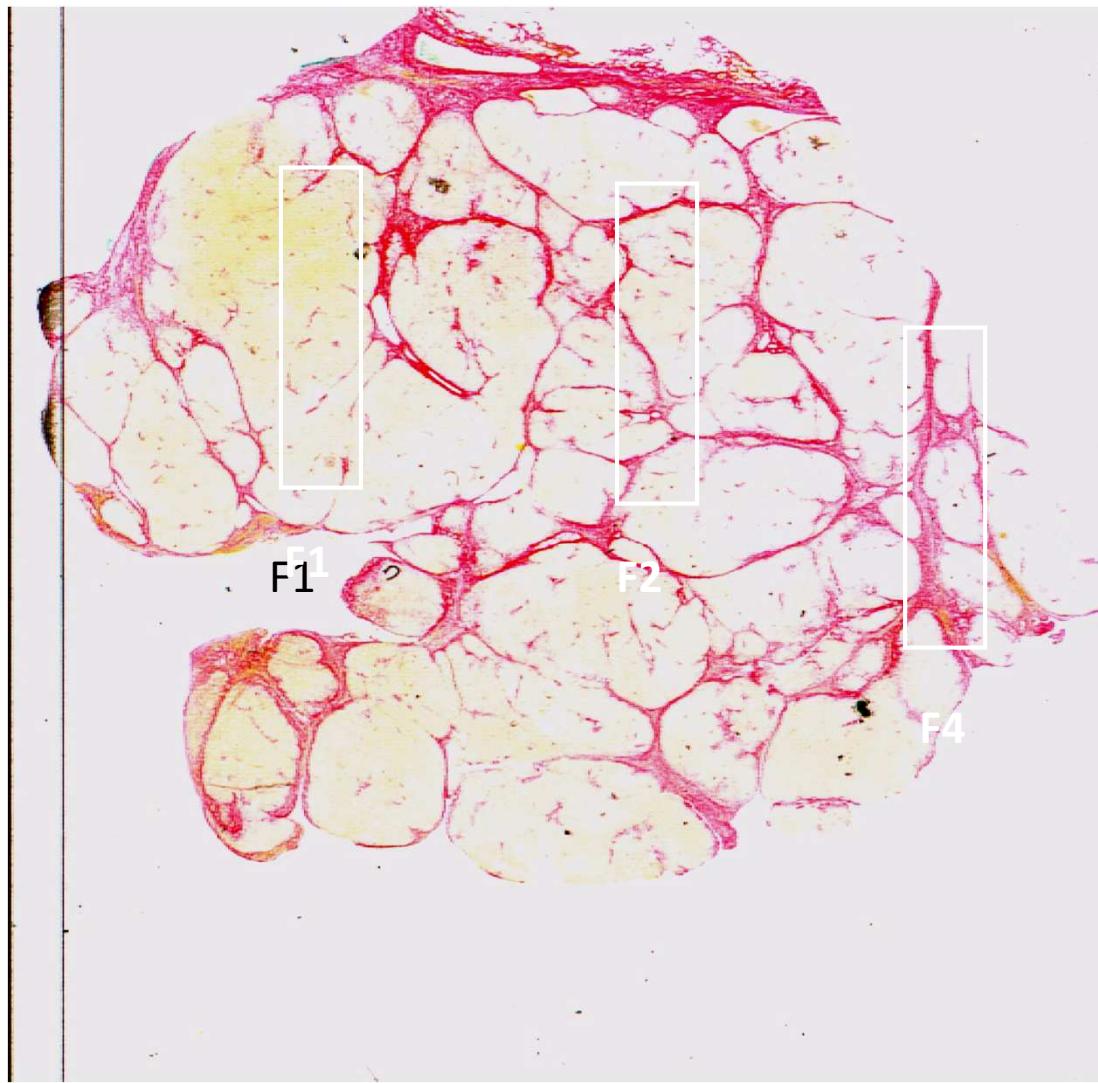
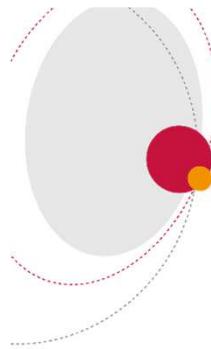


F1



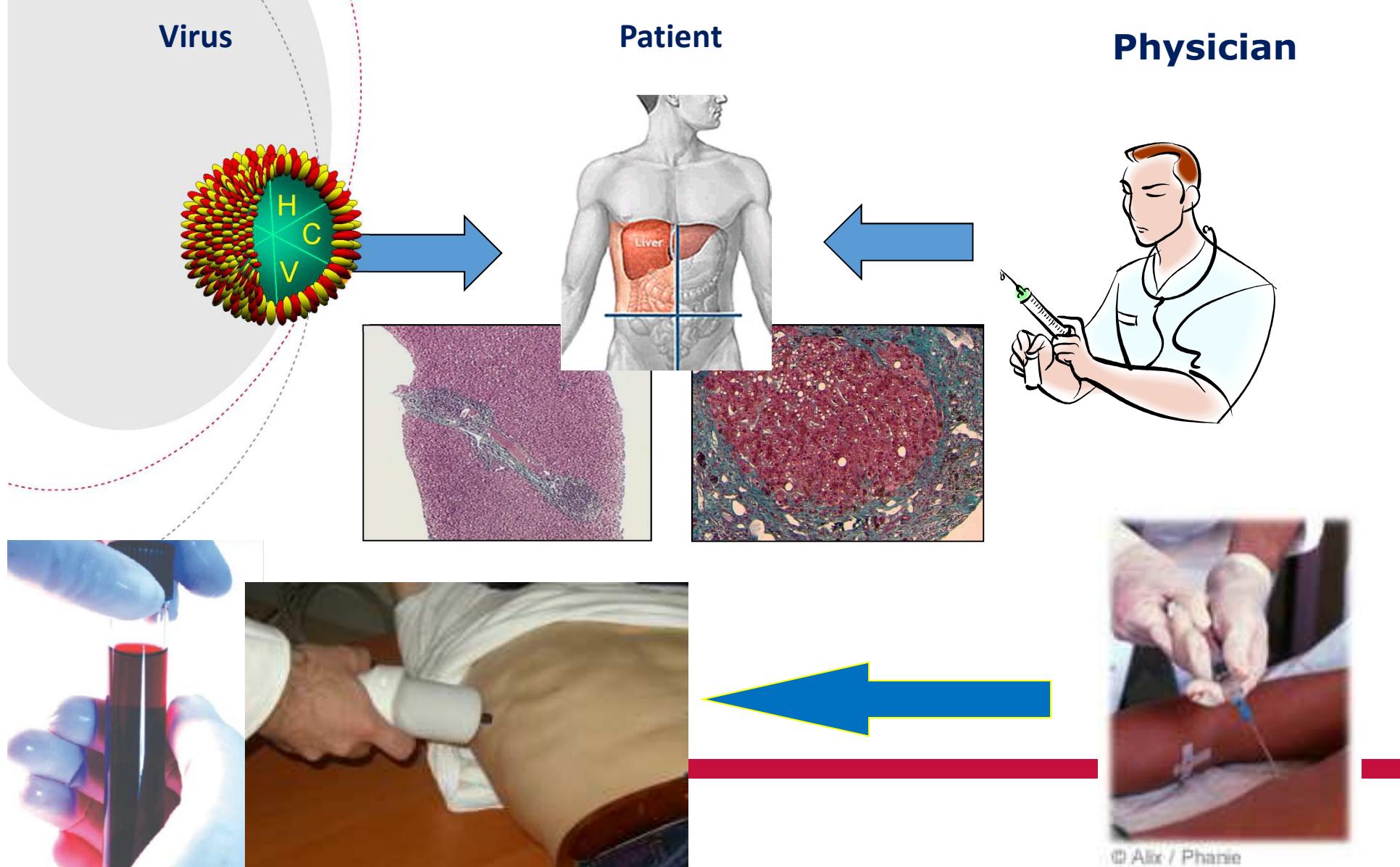
F4

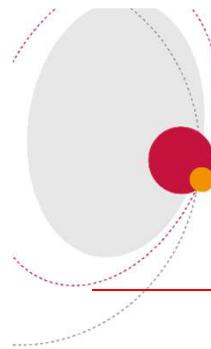




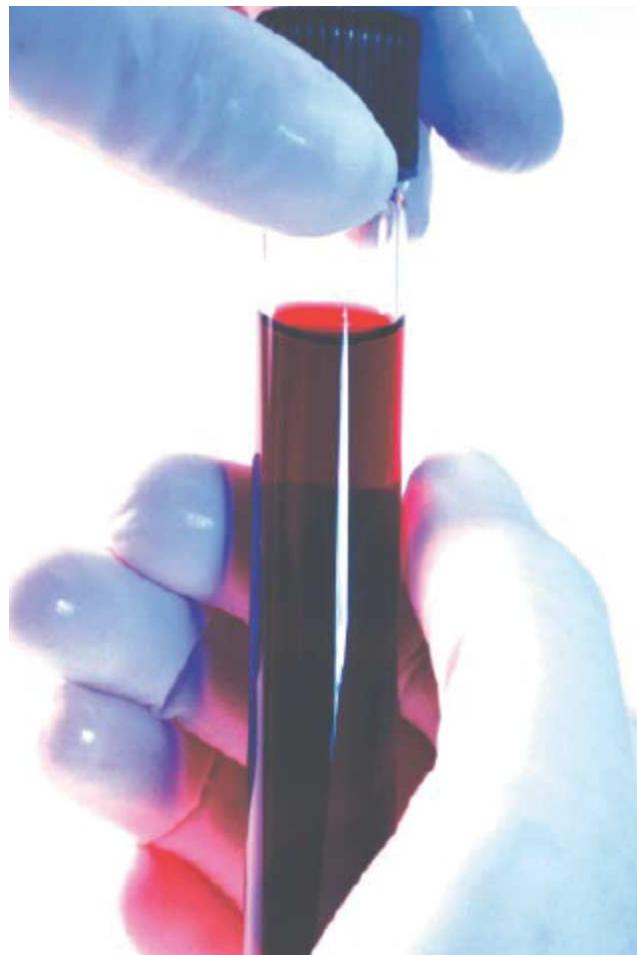
# Liver Histology evaluation

## Switch : From Invasive vs non invasive process





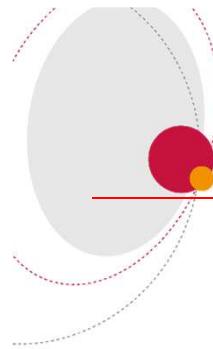
# Non-invasive tests for evaluation of liver disease severity and prognosis



Blood markers



Liver Stiffness Measurement



# Serum BioMarkers of liver injury

## Fibrotic Liver Disease

F0

TIMP 1, PIIINP

F1

Hyaluronate

F2

PT, Bilirubin, Albumin,  
Pugh, MELD, Maddrey

F3

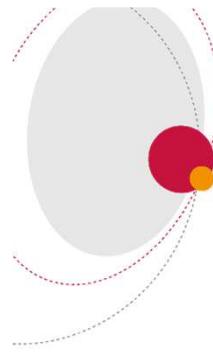
F4

Hemorrhage

Liver Failure

Cancer

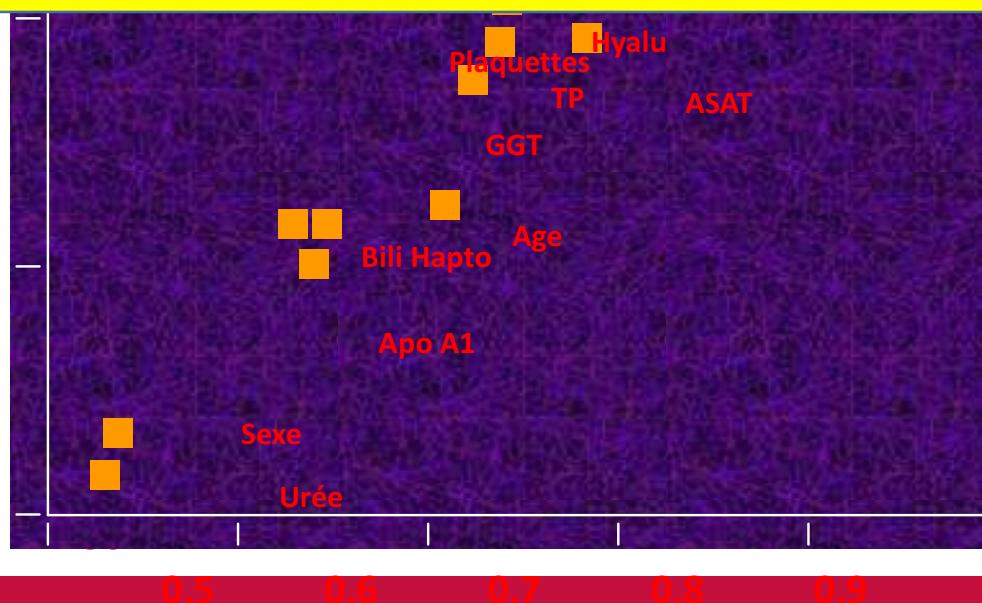
Alfa-Foeto Protein



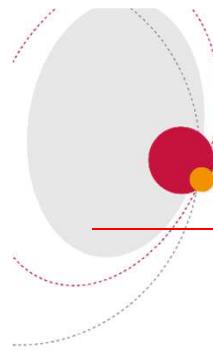
# Performance comparison of tests depends on variables composites

An AUROC >0.90 cannot be achieved for a perfect marker of liver disease

Performance diagnosis



AUROC



# Non invasive Serum markers of liver injury :

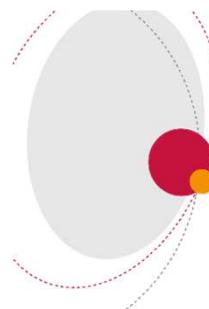
Non HCV specific

- APRI
- Forns
- Fibrotest®
- Fibrospect II ®
- Fibrometre ®
- Hepascore
- ELF ®
- Fib-4



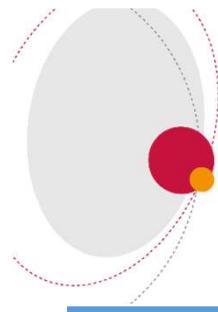
HBV specific

- Hui Score
- Zeng Score



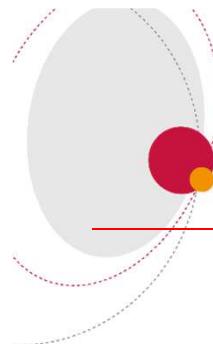
# Diagnostic performance of serum biomarkers of fibrosis for significant fibrosis and cirrhosis in patients with chronic liver disease.

Biomarkers	Etiologies	Year	Patients (n)	F≥2 (%)	F4 (%)	Cut-offs	AUROC	Se (%)	Sp (%)	CC (%)
FibroTest® [21]	HCV	2001	339	80		>0.48	0.87	75	85	46
Forns Index [22]	HCV	2002	476	26		<4.2 >6.9	0.81	30-94	51-95	45
APRI [23]	HCV	2003	270	50		≤0.5 >1.5	0.80	41-91	47-95	44
				17		<1.0 ≥2.0	0.89	57-89	75-93	72
FibroSpectII® [24]	HCV	2004	696	52		>0.36	0.83	77	73	75
MP3 [25]	HCV	2004	194	45		<0.3 >0.4	0.82	35-65	85-96	n.a.
FPI [26]	HCV	2005	302	48		≤0.2 ≥0.8	0.77	42-85	48-98	40-49
Hepascore® [27]	HCV	2005	211	57		≥0.5	0.82	63	89	92
				16		>0.84	0.89	71	89	n.a.
Lok index [28]	HCV	2005	1141		38	<0.2 ≥0.5	0.81	40-98	53-99	52
GUCI [29]	HCV	2005	179		12	>0.1	0.85	80	70	n.a.
ViraHep-C [30]	HCV	2006	398	37		≤0.22 >0.55	0.83	51-90	54-90	52
Fibroindex [31]	HCV	2007	360	50		≤1.25 ≥2.25	0.83	30-40	97-97	35
FIB-4 [32]	HCV	2007	830		17*	<1.45 >3.25	0.85	38-74	81-98	68
HAI T-C model [33]	HCV	2008	512		38	<0.2 >0.5	0.81	47-88	45-92	48
Hui Score [36]	HBV	2005	235	25		≤0.15 >0.5	0.79	37-88	50-88	49
Zeng score [37]	HBV	2005	372	58		<3.0 >8.7	0.77	40-98	28-90	35
SHASTA [38]	HIV-HCV	2005	95	27		<0.3 >0.8	0.87	15-88	72-100	42
FIB-4 [39]	HIV-HCV	2006	832		22*	<1.45 >3.25	0.76	70	97	62
ELF® [34]	Mixed	2004	1021/496**	40		0.102	0.78	87	51	n.a.
		2005			12	n.a.	0.89	n.a.	n.a.	n.a.
Fibrometer® [35]	Mixed	2007	598/503**	56		n.a.	0.89	80	84	82
NFS [40]	NAFLD	2008	733		27*	<-1.455 >0.676	0.82	43-77	97-97	68
BARD score [41]	NAFLD		669		30*	≥2	0.81	n.a.	n.a.	n.a.



# HIV-HCV patients : Non-invasive tests Diagnostic performances

Test	Fibrosis (Metavir)	Cut-off	AUC [95% CI]	PPV	NPV	Référence
FibroTest®	≥ F2	0,49	0.64 [0.58 ;0.70]	83%	35%	{Cacoub, 2008 #12}
	F4	0,75	0.81 [0.76 ;0.85]	32%	97%	{Cacoub, 2008 #12}
FibroMetre®	≥ F2	0,50	0.70 [0.64 ;0.76]	80%	41%	{Cacoub, 2008 #12}
	F4	-	0.84 [0.78 ;0.88]	-	-	{Cacoub, 2008 #12}
Hepascore	≥ F2	0,50	0.69 [0.63 ;0.74]	82%	39%	{Cacoub, 2008 #12}
	F4	0,84	0.83 [0.78 ;0.88]	18%	98%	{Cacoub, 2008 #12}
	≥ F2	4.5 kPa	0.72 [0.60 ;0.84]	64%	63%	{de Ledinghen, 2006 #15}
		5,9 kPa	0.85 [0.75 ;0.95]	91%	74%	{Mialhes, 2011 #13}
		7,0 kPa	0.93 [0.85-1.00]	70%	81%	{Sanchez-Conde, 2010 #14}
FibroScan®		9,4 kPa	0.96 [0.92 ;1.00]	79%	98%	{Mialhes, 2011 #13}
	F4	11,8 kPa	0.97 [0.94 ;1.00]	81%	100%	{de Ledinghen, 2006 #15}.
		14,0 kPa	0.99 [0.97 ;1.00]	57%	100%	{Sanchez-Conde, 2010 #14}
		14,5 kPa	0.97 [0.94 ;1.00]	88%	96%	{de Ledinghen, 2006 #15}



# Measurement of Liver Stiffness

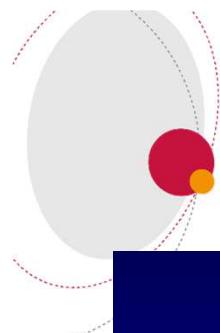


**Fibroscan : Transient Elastography**

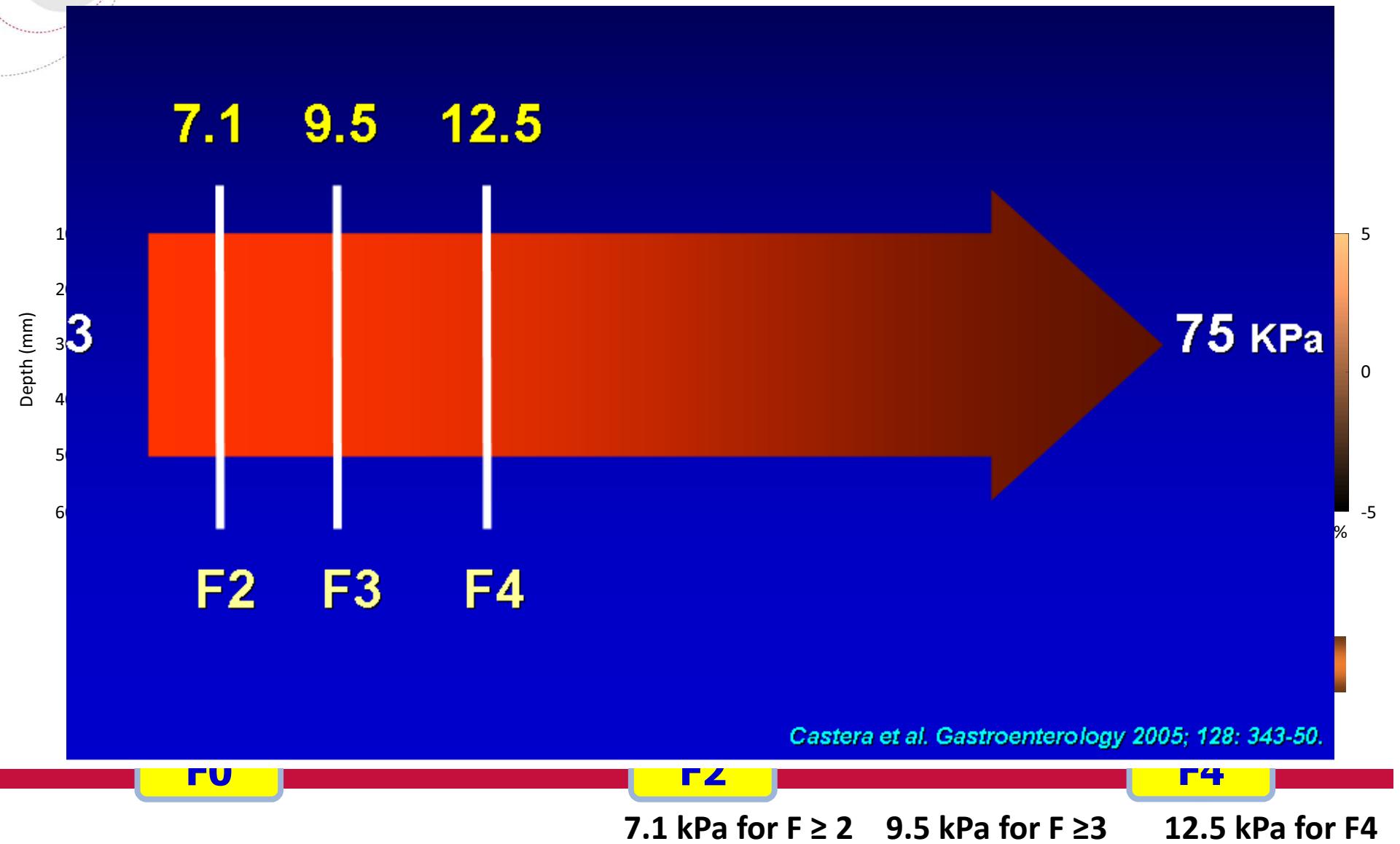
**ARFI :Acoustic Radiation Force Impulse Elastography**

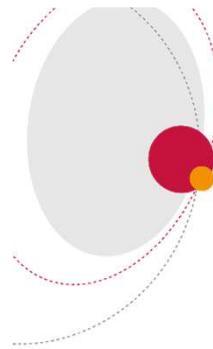
**SWE : Supersonic shear wave imaging**

**MR elastography**



## Fibroscan : Transient Elastography

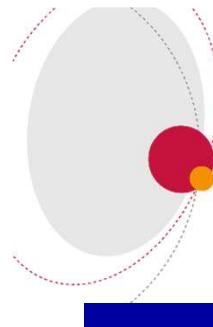




## Correct interpretation of TE results in clinical practice must consider the following parameters

- IQR/ median value (<30%),
- Serum aminotransferases levels (<5 x ULN),
- BMI (use XL probe above 30 kg/m<sup>2</sup> or if skin-to- capsule distance is >25 mm),
- Absence of extra-hepatic cholestasis,
- Absence of right heart failure, or other causes of congestive liver
- Absence of ongoing excessive alcohol intake





## Ends point in Hepatitis B and C

F0      F1

F2

F3

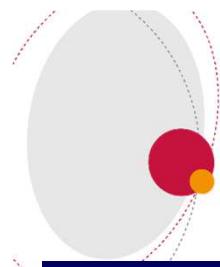
F4



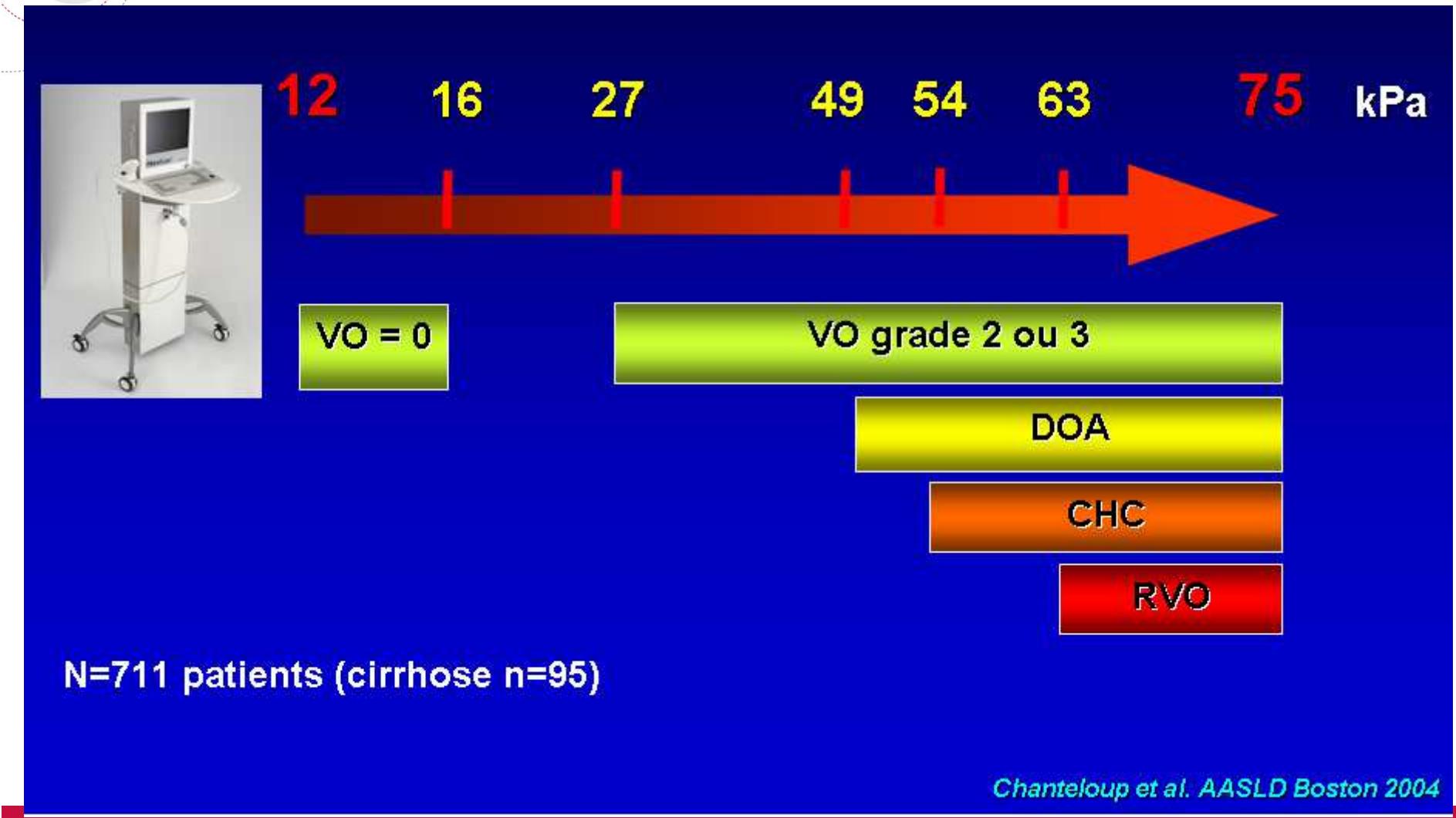
Indication for antiviral treatment

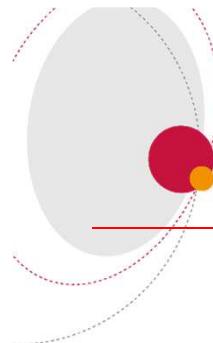
Screening for Eosophageal varices

Screening for Hepatocellular carcinoma

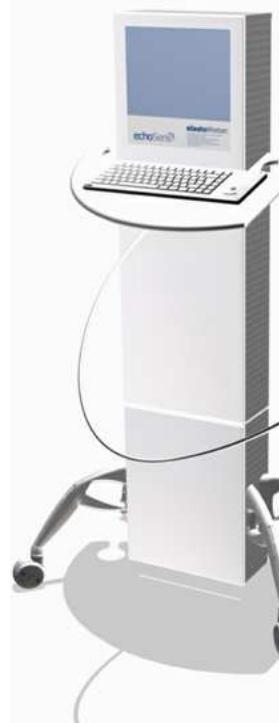


## Cirrhosis Complication





# Measurement of Liver Stiffness

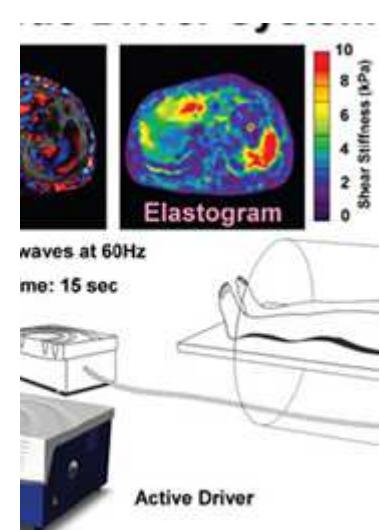


Fibroscan :  
Elastography

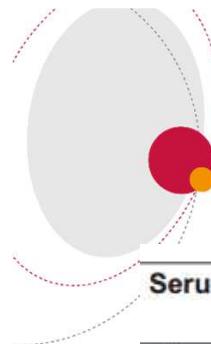
- pSWE/ARFI performs better for detecting cirrhosis than significant fibrosis and is better validated in chronic hepatitis C than for hepatitis B, HIV-HCV coinfection, NAFLD and other liver diseases (**A1**)
- pSWE/ARFI shows equivalent performance to TE for detecting significant fibrosis and cirrhosis (**A1**)
- 2D-SWE is a promising technique that is currently under investigation. It seems to be at least equivalent to TE and pSWE/ARFI for non-invasive staging of liver fibrosis in viral hepatitis (**B1**)
- Comparison between MR elastography and TE has provided conflicting results. Further data are needed (**A1**)

Force Impulse Elastography

shear wave imaging



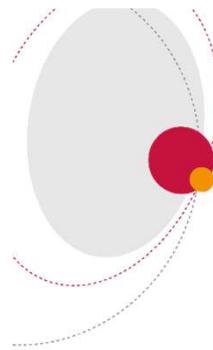
MR elastography



# Respective advantages and disadvantages of currently available non-invasive methods in patients with chronic liver diseases



Serum biomarkers	Measurement of liver stiffness			
	Transient elastography	ARFI (pSWE)	2D-SWE	MR elastography
<b>Advantages</b>				
<ul style="list-style-type: none"><li>• Good reproducibility</li><li>• High applicability (95%)</li><li>• No cost and wide availability (non-patented)</li><li>• Well validated</li><li>• Can be performed in the outpatient clinic</li></ul>	<ul style="list-style-type: none"><li>• Most widely used and validated technique: standard to be beaten</li><li>• User-friendly (performed at bedside; rapid, easy to learn)</li><li>• High range of values (2-75 kPa)</li><li>• Quality criteria well defined</li><li>• Good reproducibility</li><li>• High performance for cirrhosis (AUROC &gt;0.9)</li><li>• Prognostic value in cirrhosis</li></ul>	<ul style="list-style-type: none"><li>• Can be implemented on a regular US machine</li><li>• ROI smaller than TE but location chosen by the operator</li><li>• Higher applicability than TE (ascites and obesity)</li><li>• Performance equivalent to that of TE for significant fibrosis and cirrhosis</li></ul>	<ul style="list-style-type: none"><li>• Can be implemented on a regular US machine</li><li>• ROI can be adjusted in size and location and chosen by the operator</li><li>• Measures liver stiffness in real-time</li><li>• High range of values (2-150 kPa)</li><li>• Good applicability</li><li>• High performance for cirrhosis</li></ul>	<ul style="list-style-type: none"><li>• Can be implemented on a regular MRI machine</li><li>• Examination of the whole liver</li><li>• Higher applicability than TE (ascites and obesity)</li><li>• High performance for cirrhosis</li></ul>
<b>Disadvantages</b>				
<ul style="list-style-type: none"><li>• Non-specific of the liver</li><li>• Unable to discriminate between intermediate stages of fibrosis</li><li>• Performance not as good as TE for cirrhosis</li><li>• Cost and limited availability (proprietary)</li><li>• Limitations (hemolysis, Gilbert syndrome, inflammation...)</li></ul>	<ul style="list-style-type: none"><li>• Requires a dedicated device</li><li>• ROI cannot be chosen</li><li>• Unable to discriminate between intermediate stages of fibrosis</li><li>• Applicability (80%) lower than serum biomarker: (obesity, ascites, operator experience)</li><li>• False positive in case of acute hepatitis, extra-hepatic cholestasis, liver congestion, food intake and excessive alcohol intake</li></ul>	<ul style="list-style-type: none"><li>• Unable to discriminate between intermediate stages of fibrosis</li><li>• Units (m/sec) different from that of TE (kPa)</li><li>• Narrow range of values<ul style="list-style-type: none"><li>• (0.5-4.4 m/sec)</li></ul></li><li>• Quality criteria not well defined</li><li>• Prognostic value in cirrhosis?</li></ul>	<ul style="list-style-type: none"><li>• Further validation warranted</li><li>• Unable to discriminate between intermediate stages of fibrosis</li><li>• Quality criteria not well defined</li><li>• Learning curve?</li><li>• Influence of inflammation?</li></ul>	<ul style="list-style-type: none"><li>• Further validation warranted especially in comparison with TE</li><li>• Not applicable in case of iron overload</li><li>• Requires a MRI facility</li><li>• Time-consuming</li><li>• Costly</li></ul>

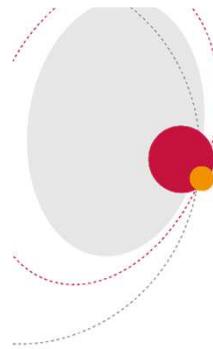


## The lessons from Hepatitis C

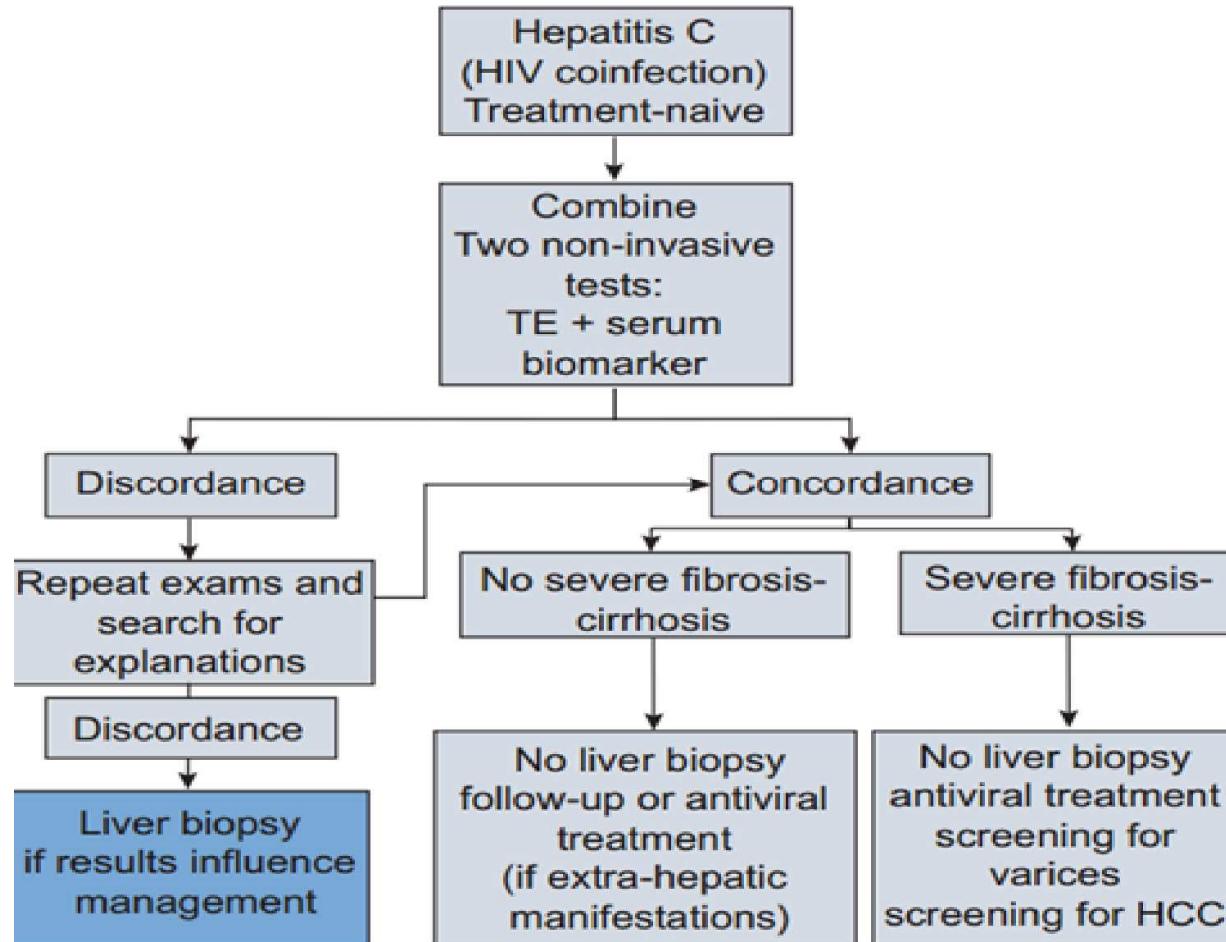
- Fibrosis stage can be assessed by non-invasive methods initially, with liver biopsy reserved for cases where there is uncertainty or potential additional etiologies  
**(recommendation B1)**

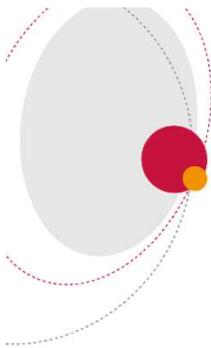


EASL clinical Practices Guidelines 2014



# Proposed algorithm for the use of non-invasive tests in treatment naïve patients with Hepatitis C with or without HIV coinfection





### Recommandations

#### *La maladie hépatique est sévère*

PBH antérieure F3 ou F4	Traitement à court terme
Ou Fibroscan $\geq 9,5 \text{ kPa}$	
Ou FibroTest $\geq 0,59$	
Ou Fibromètre $\geq 0,63$	

Le bénéfice clinique à traiter rapidement le malade est important : diminution du risque de décompensation de la maladie hépatique, diminution du risque de carcinome hépatocellulaire, amélioration de la survie.

#### *La maladie hépatique est peu sévère*

Fibroscan $< 5,6 \text{ kPa}$	Surveillance annuelle. Le traitement à court terme n'est pas nécessaire.
ou FibroTest $< 0,27$	
ou Fibromètre $< 0,33$	

Le bénéfice clinique à traiter le malade dans l'année qui vient n'est pas montré. Cependant, une surveillance annuelle par l'une de ces méthodes est recommandée.

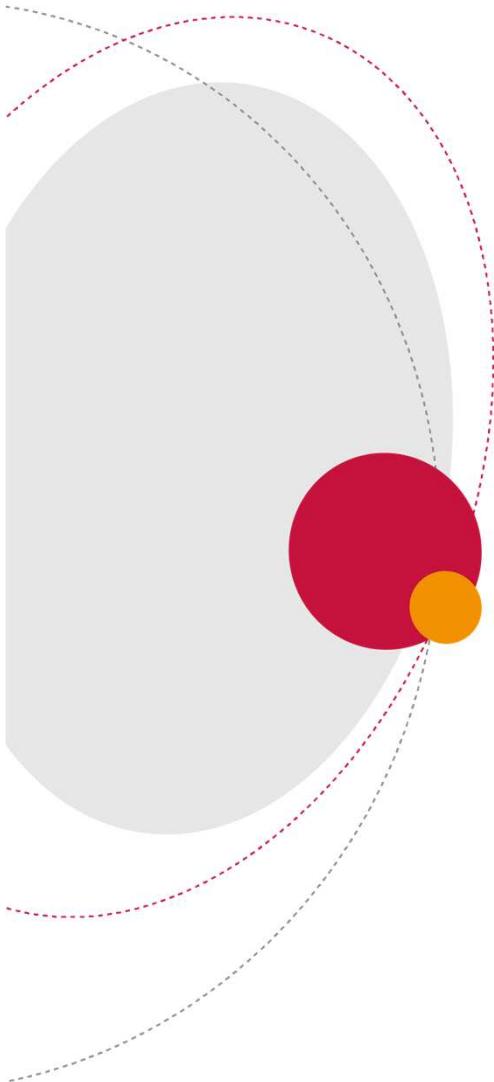
#### *La maladie hépatique est difficile à évaluer*

Fibroscan 5,6 – 9,4 kPa	Faire un deuxième test
ou FibroTest 0,27 – 0,58	
ou Fibromètre 0,33 – 0,62	



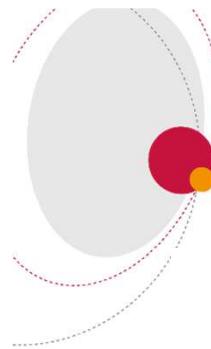
Lorsque deux méthodes sont utilisées successivement, il convient d'associer une mesure de l'élasticité hépatique à un test sanguin (et non deux tests sanguins).

Fibroscan 5,6 – 9,4 kPa et Fibrotest $\geq 0,59$ ou Fibroscan 5,6 – 9,4 kPa et Fibromètre $\geq 0,63$	<b>La maladie hépatique est sévère</b>  <b>Traitement à court terme</b>
FibroTest 0,27 – 0,58 et Fibroscan $\geq 9,5 \text{ kPa}$ ou Fibromètre 0,33 – 0,62 et Fibroscan $\geq 9,5 \text{ kPa}$	<b>La maladie hépatique est peu sévère.</b> <b>Surveillance annuelle. Le traitement à court terme n'est pas nécessaire.</b>
Fibroscan $< 7,1 \text{ kPa}$ et Fibrotest $< 0,48$ ou Fibroscan $< 7,1 \text{ kPa}$ et Fibromètre $< 0,41$	<b>Surveillance à un an et envisager un traitement à moyen terme (2 à 3 ans)</b>
Dans les autres cas	



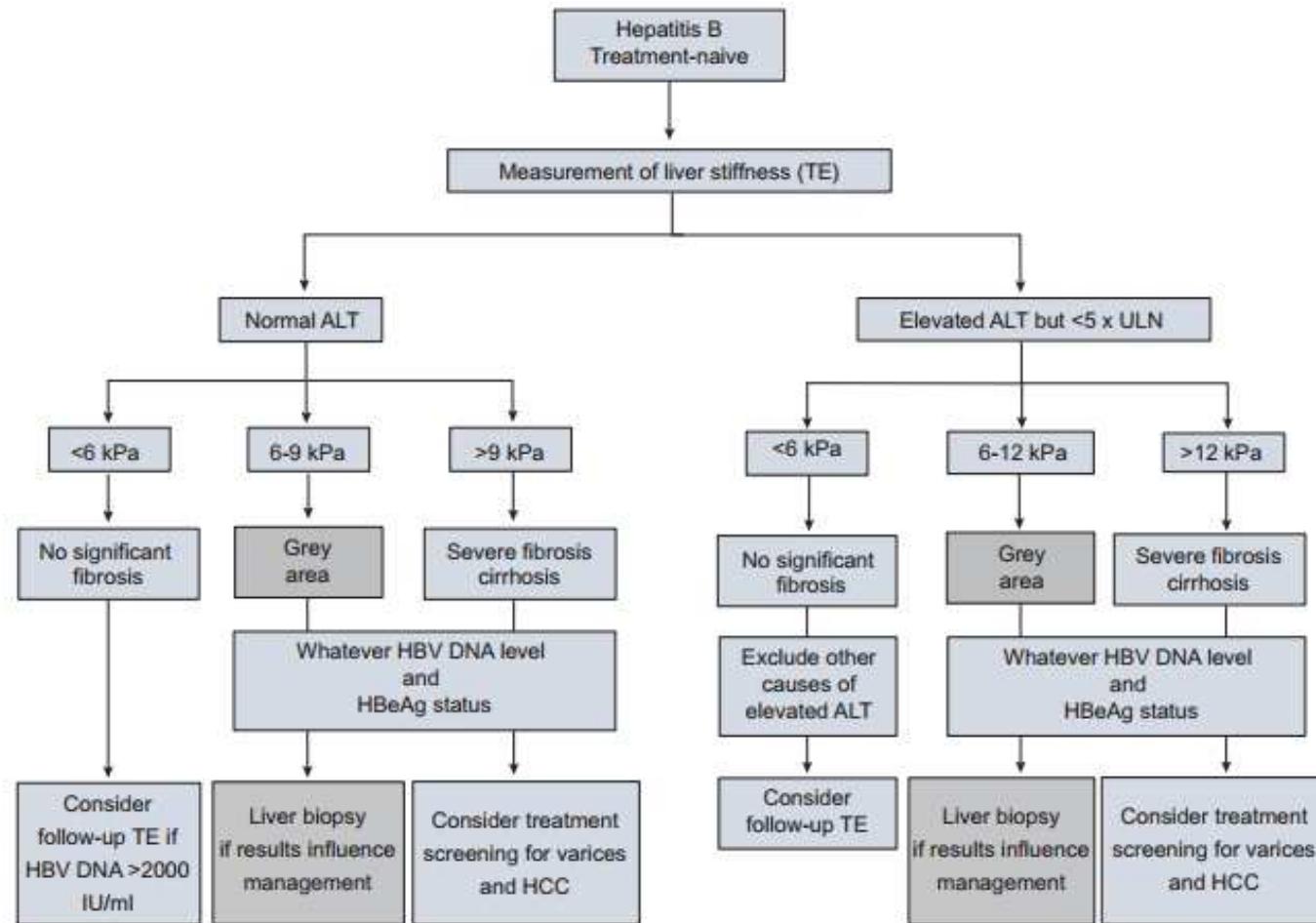
## **Overview of biomarkers for viral evolution and liver disease progression in Hepatitis B**

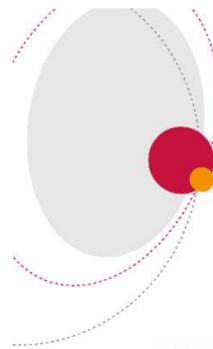




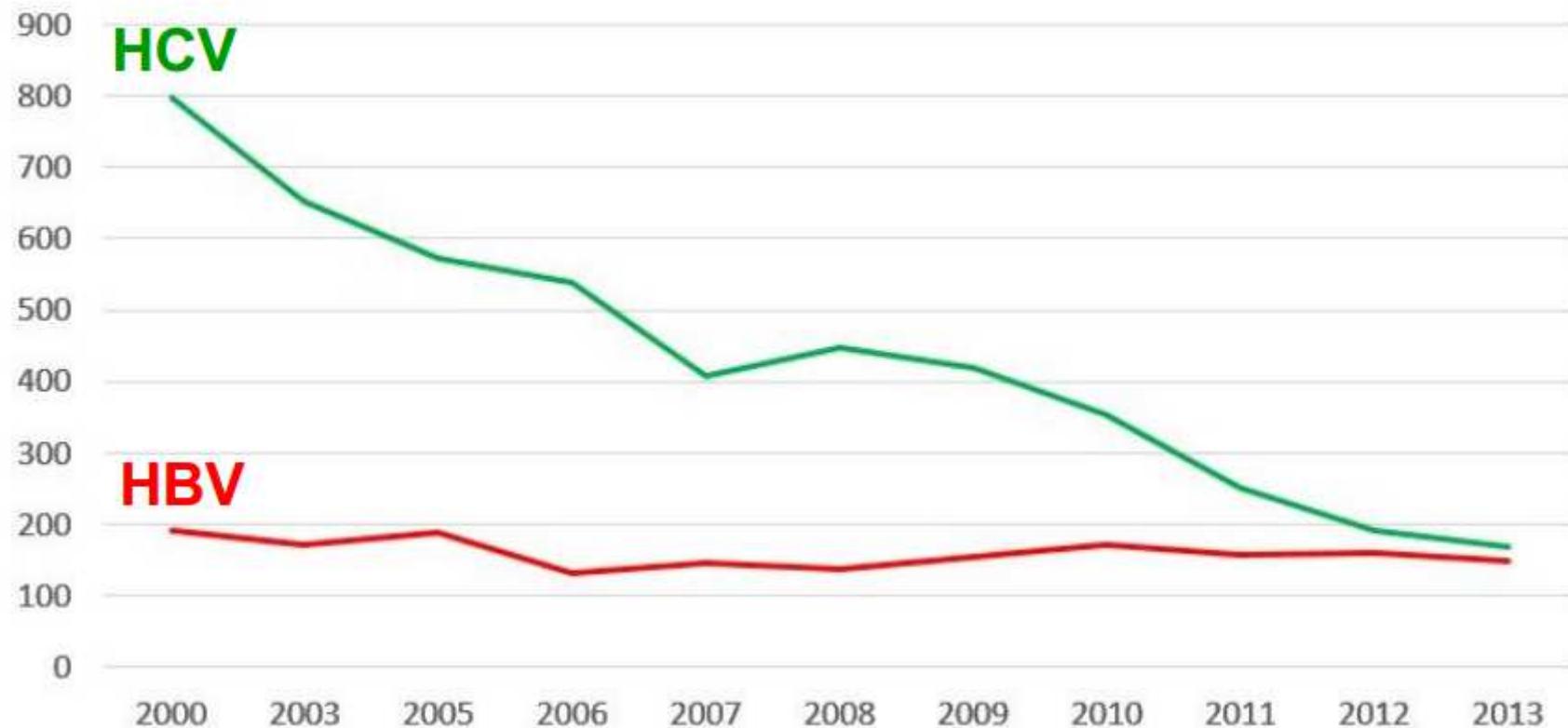
# Proposed algorithm for the use of transient elastography in treatment-naïve patients with Hepatitis B

JOURNAL OF HEPATOLOGY

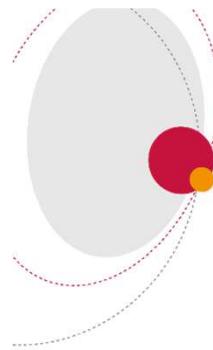




## Trends in Liver Biopsy practice in HCV vs HBV from 2000 -2013

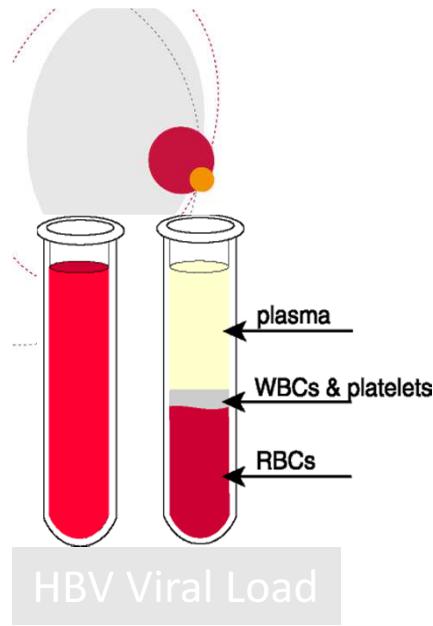


Courtesy Pierre Bedossa



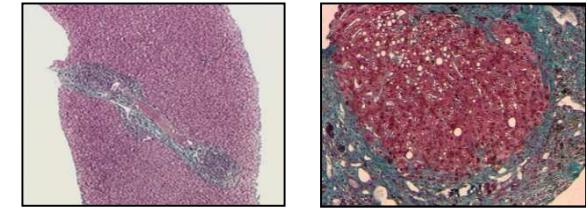
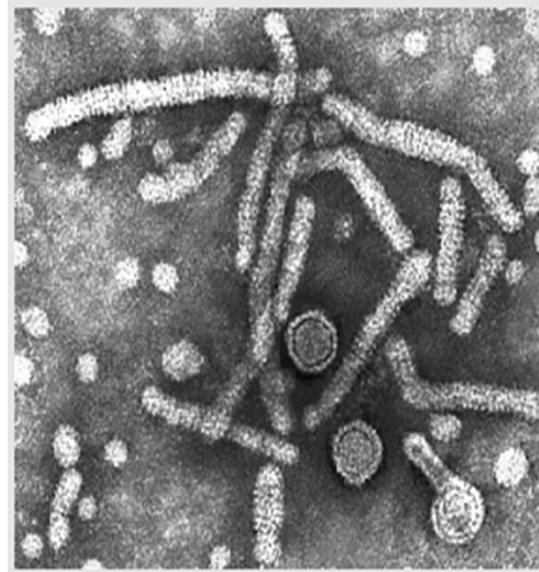
## “Back to the future with Australia Antigen”



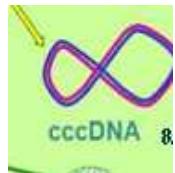


**Plasma HBsAg: Measurement**

<b>Virions</b>	<b>42 nm</b>
<b>Filaments</b>	<b>22 nm</b>
<b>Spherical particles</b>	<b>22nm</b>



Liver Histological assessemnt



cccDNA Correlation

Treatment Indication



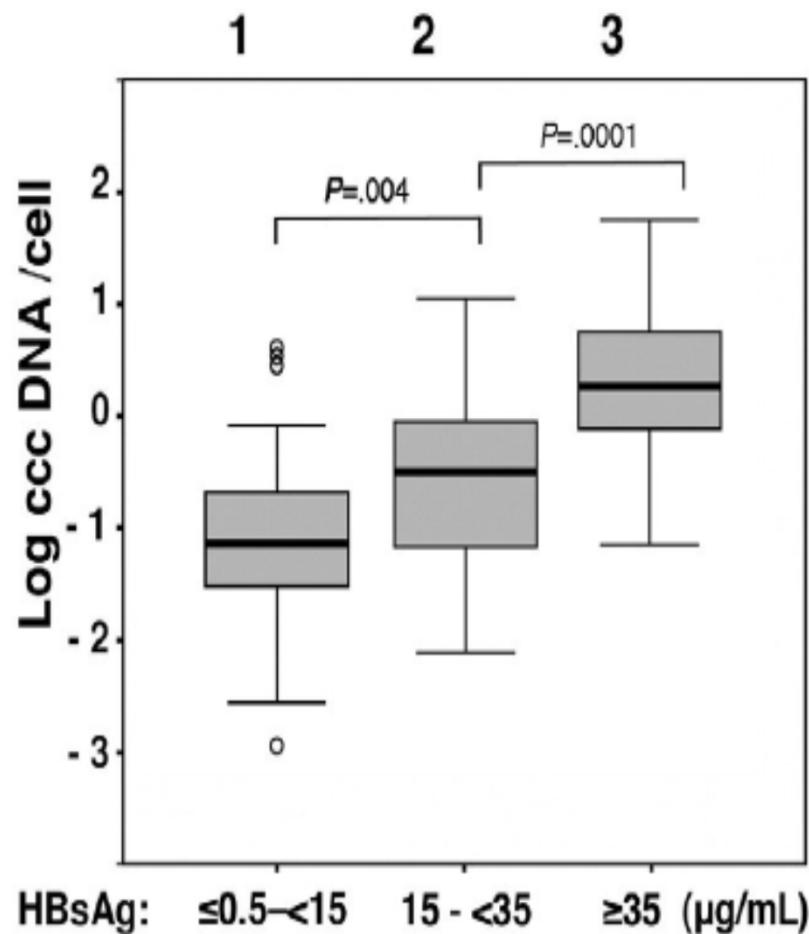
Definition of Response



Monitoring antiviral Therapy

Prediction of Response

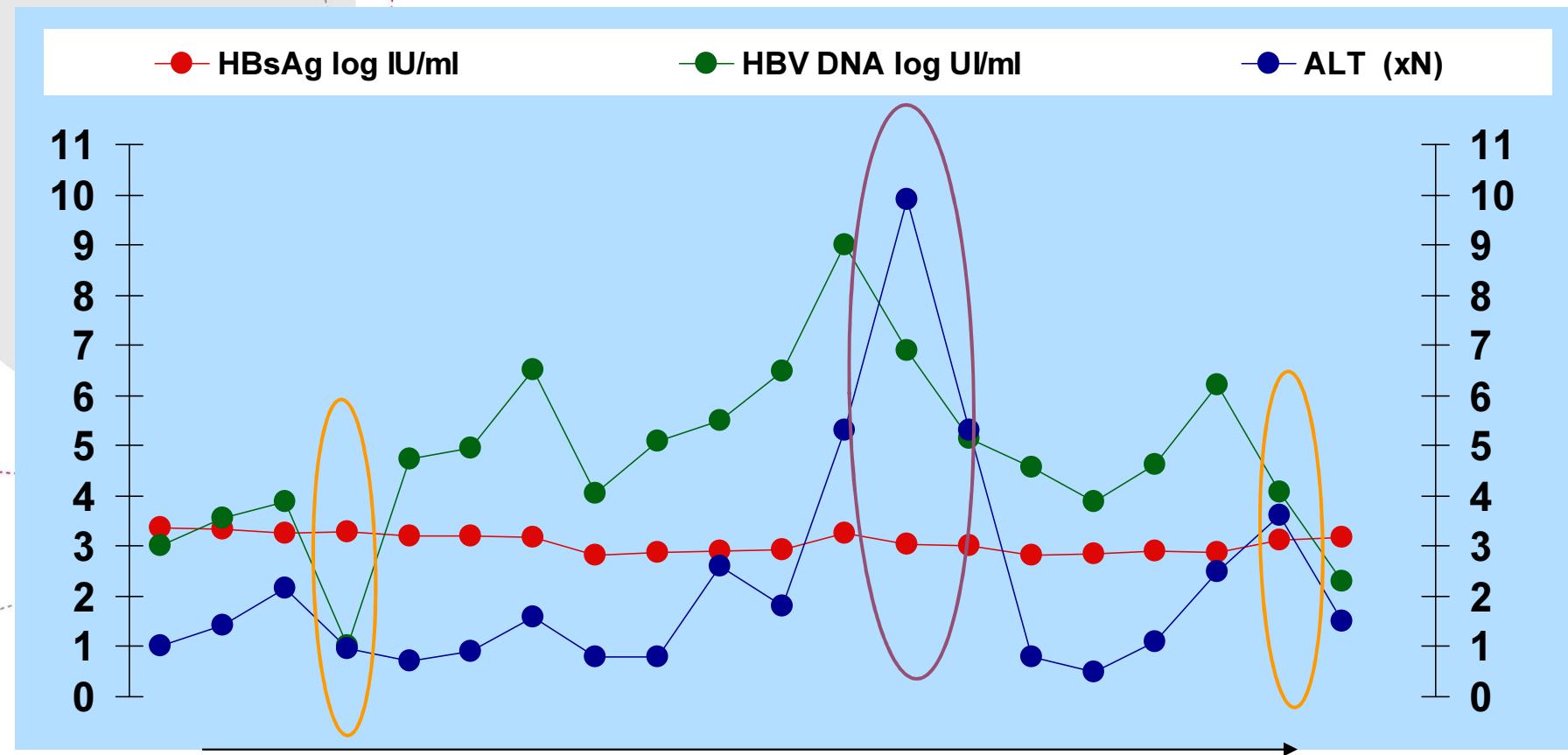
# Impaired Intrahepatic Hepatitis B Virus Productivity Contributes to Low Viremia in Most HBeAg-Negative Patients

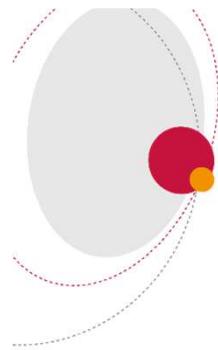


Relationship between HBsAg serum levels (by the Laurell test) and intrahepatic cccDNA amounts (median values 0.07, 0.3 and 1.8 cccDNA copies/cell)

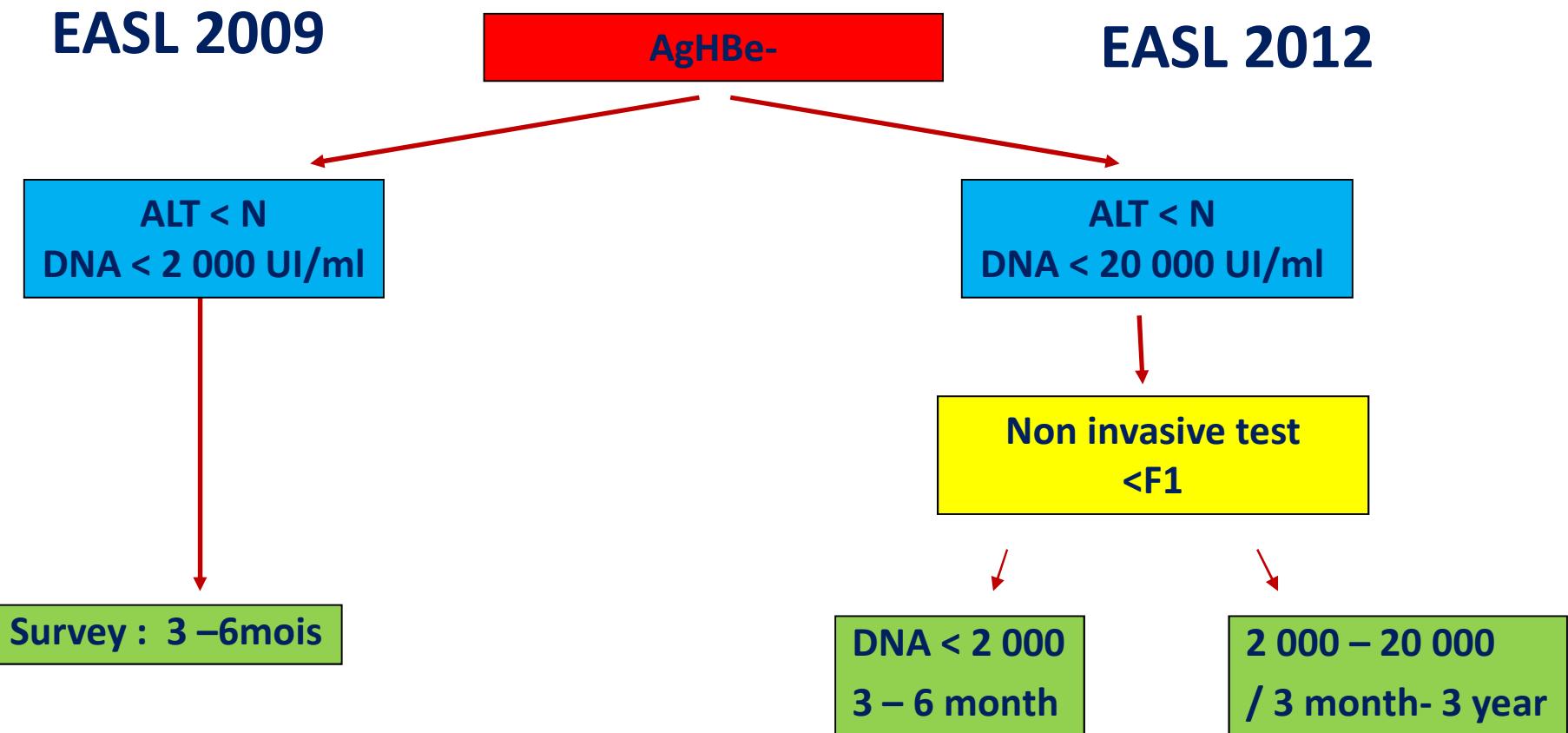
Low levels of serum HbsAg titers are correlated with low quantity of liver cccDNA

# HBsAg is a reliable marker

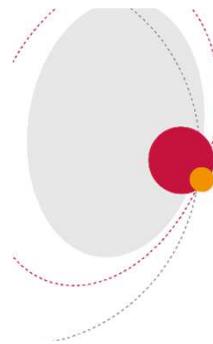




## HBs Inactive carrier definition

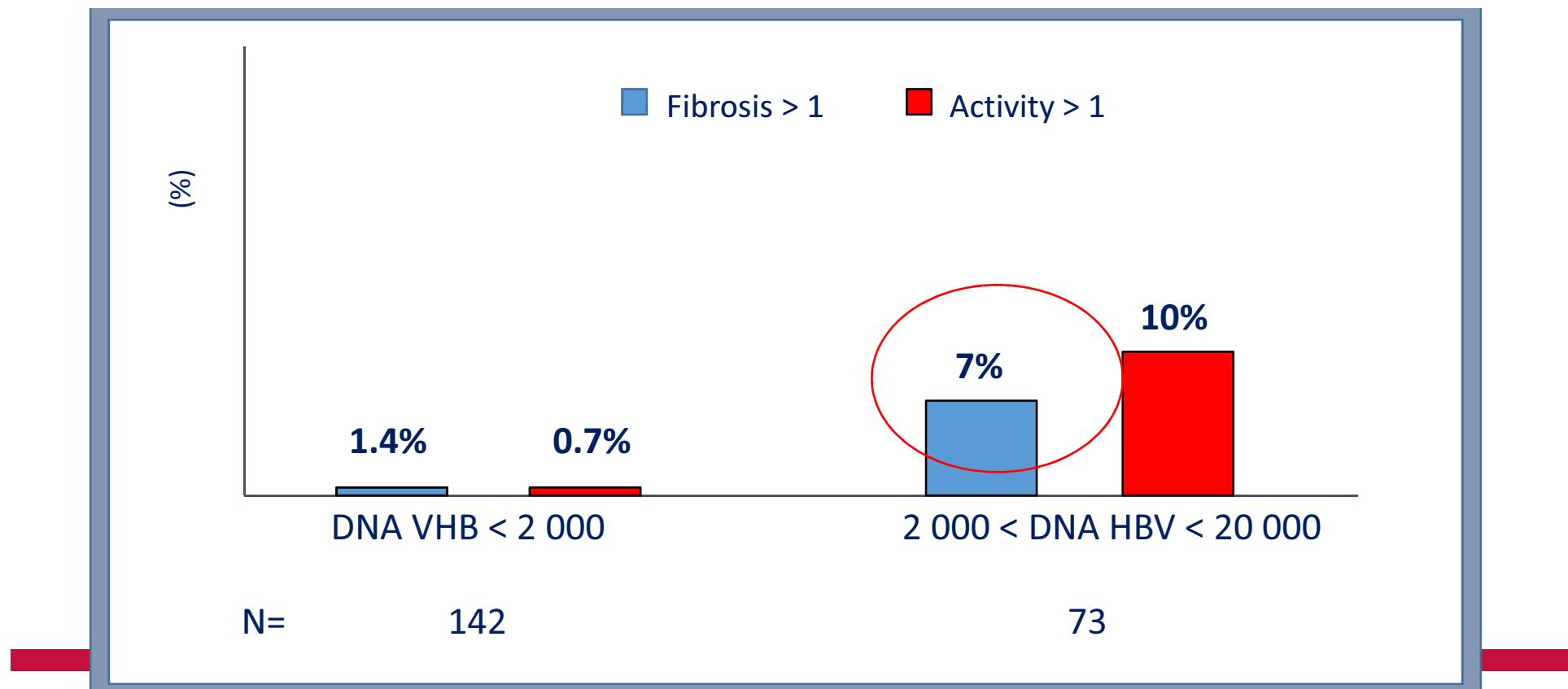


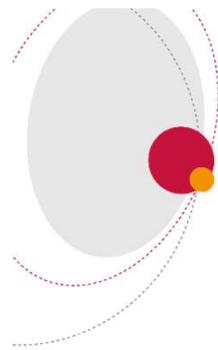
« inactive carriers with  
high viral load »



## Histological lesions risk

➤ Meta-analysis : 6 studies, 335 patients with normal ALT / Liver biopsies

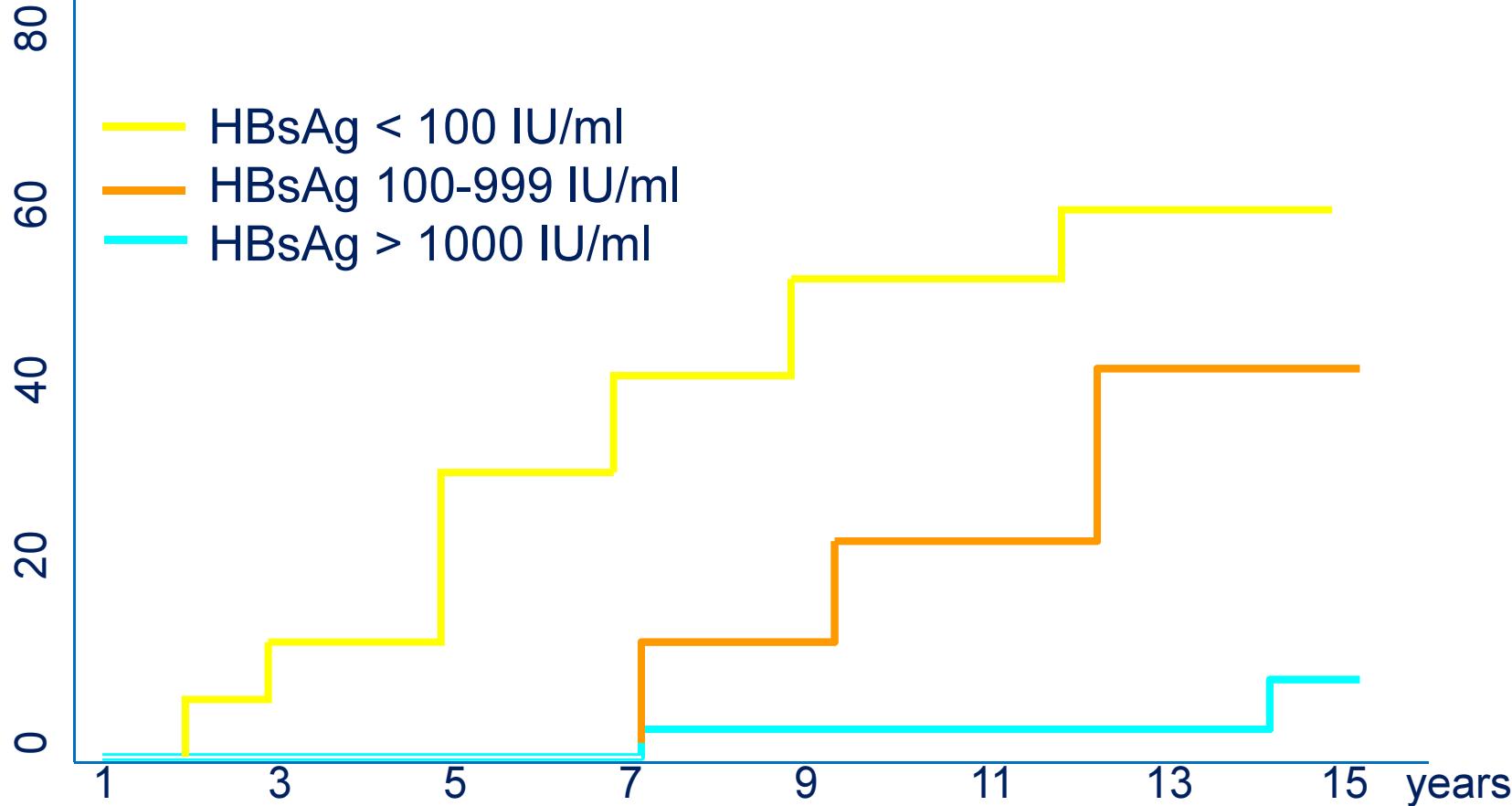


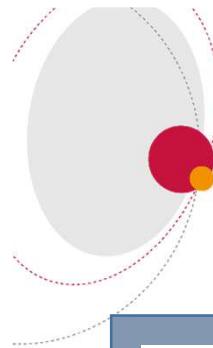


## Inactive Carriers Prognosis

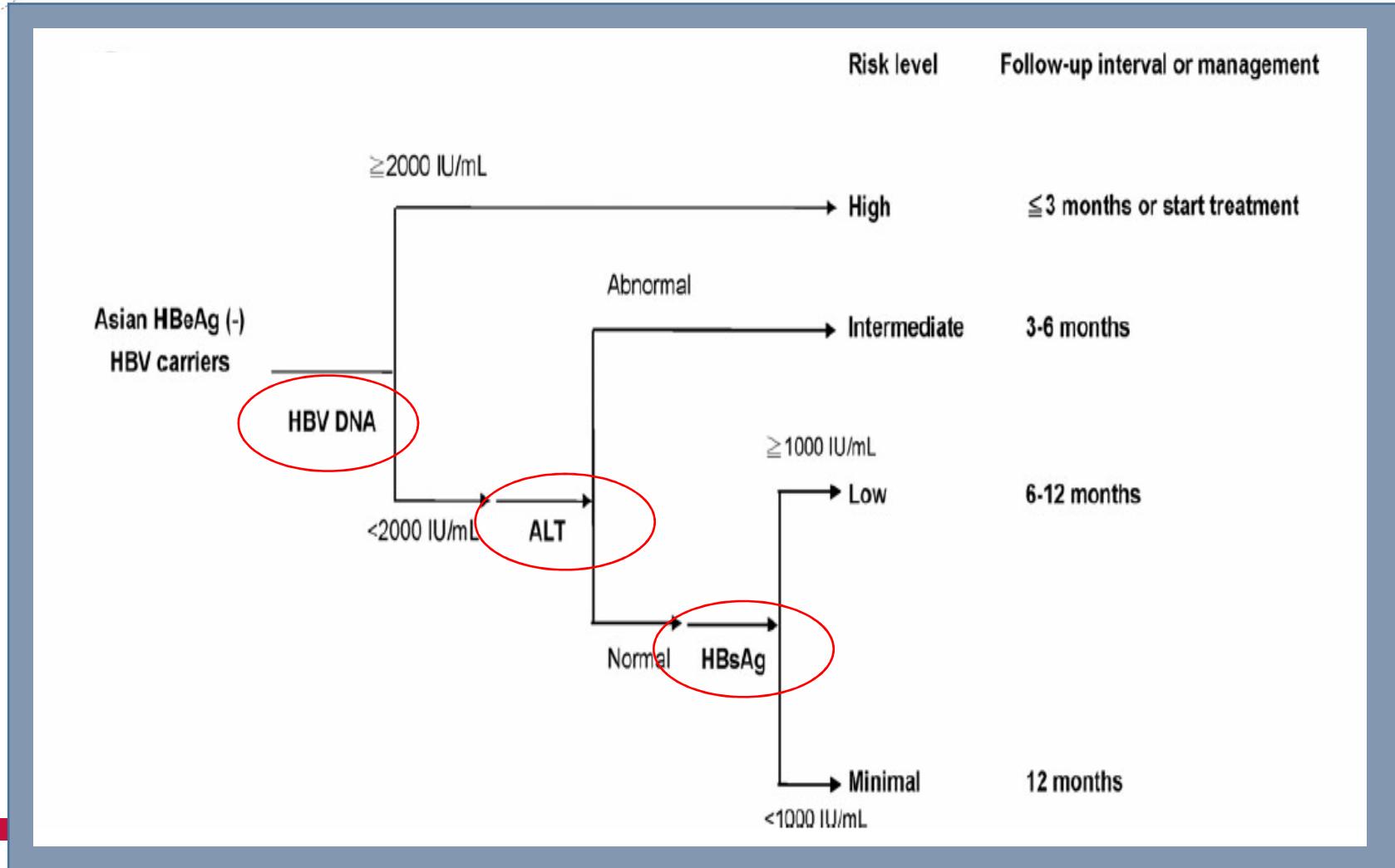
Incidence of HBsAg spontaneous loss

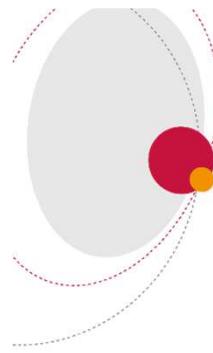
- HBsAg < 100 IU/ml
- HBsAg 100-999 IU/ml
- HBsAg > 1000 IU/ml





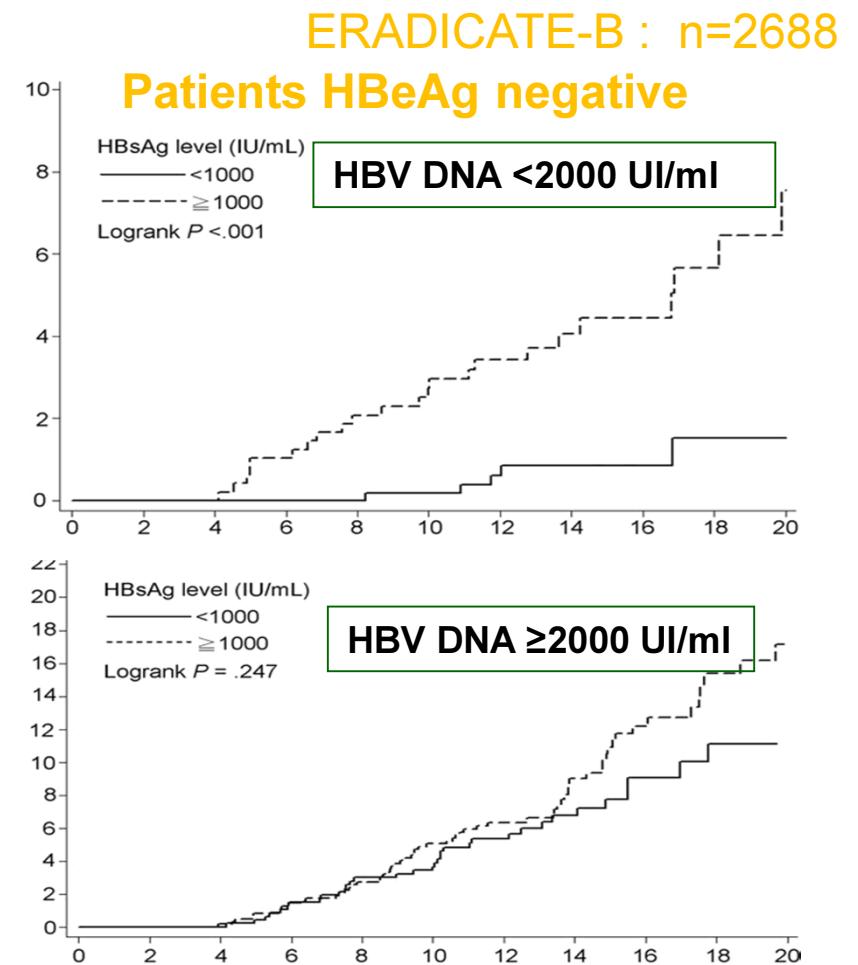
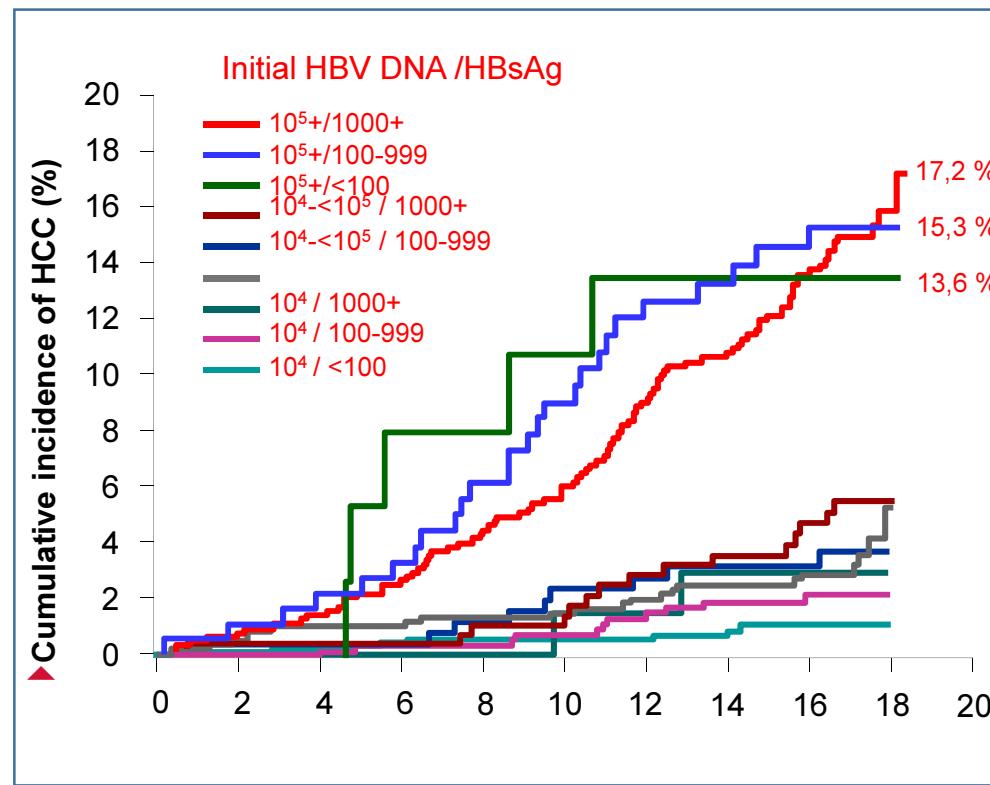
## Tseng Algorithm from REVEAL cohort





# HCC risk Prediction

REVEAL Study : n = 3 411



CHC minimal risk HBsAg <1000 UI/ml and DNA <2000 UI/ml

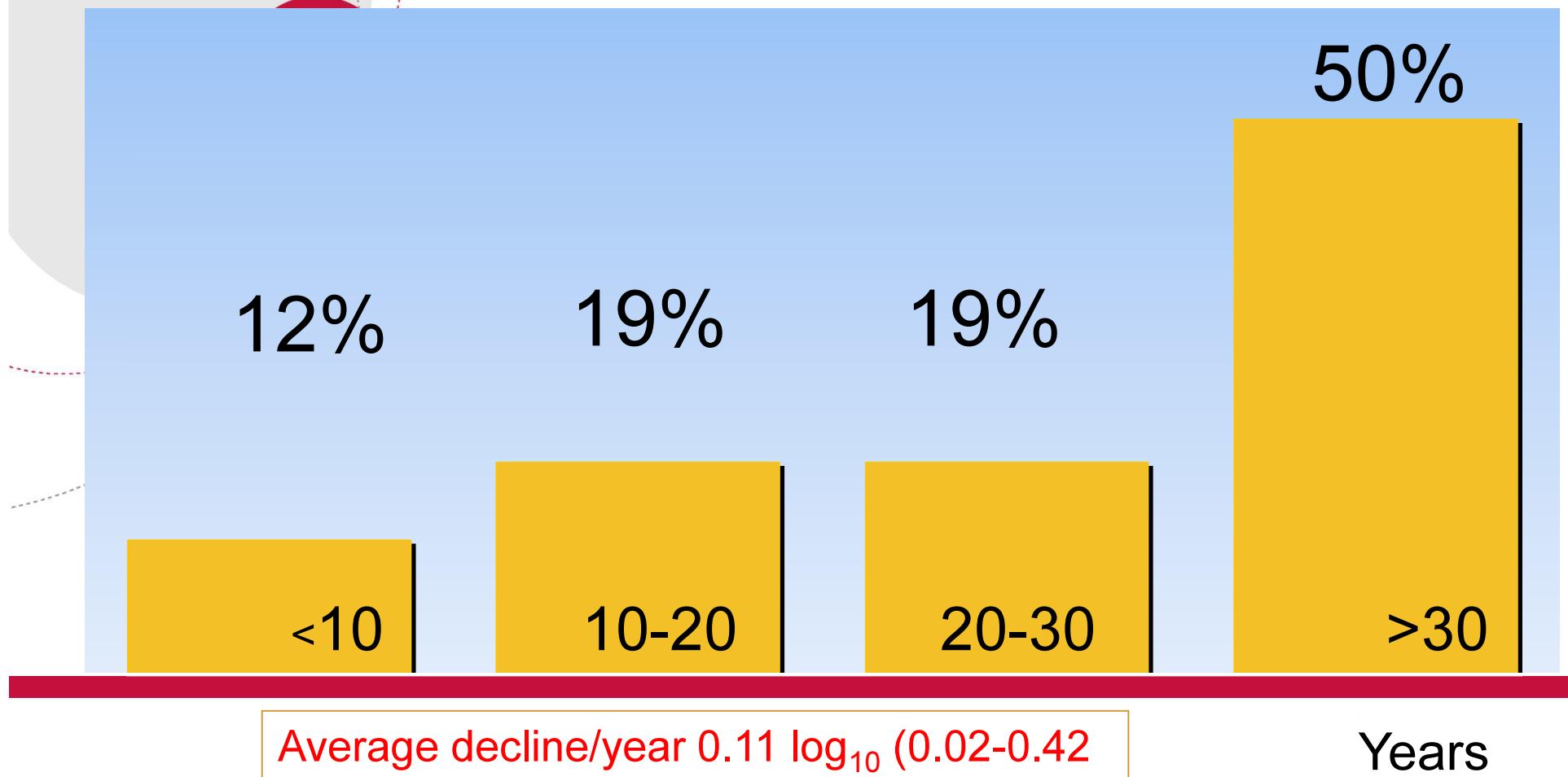


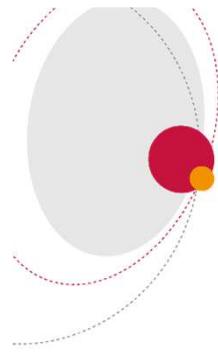
**How find a solution for alternative to indefinite nucleoside analogue therapy in patients chronic HBV infection?**



# Finite treatment duration unlikely

**Patients receiving long-term NUCs therapy  
Prediction of HBs loss after achieving undetectable  
HBV DNA**

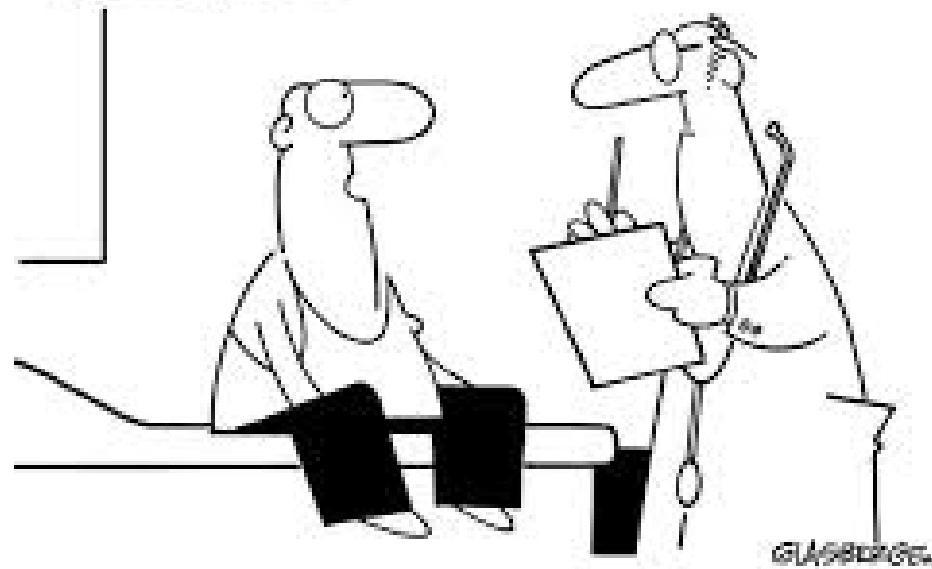


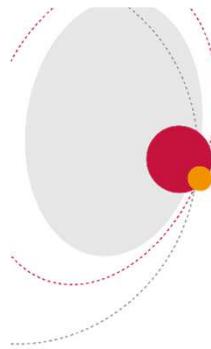


Doctor, for how long should  
I take the pills ?

Well, let's talk in 2064...

© Randy Chapman / glassonpaper.com





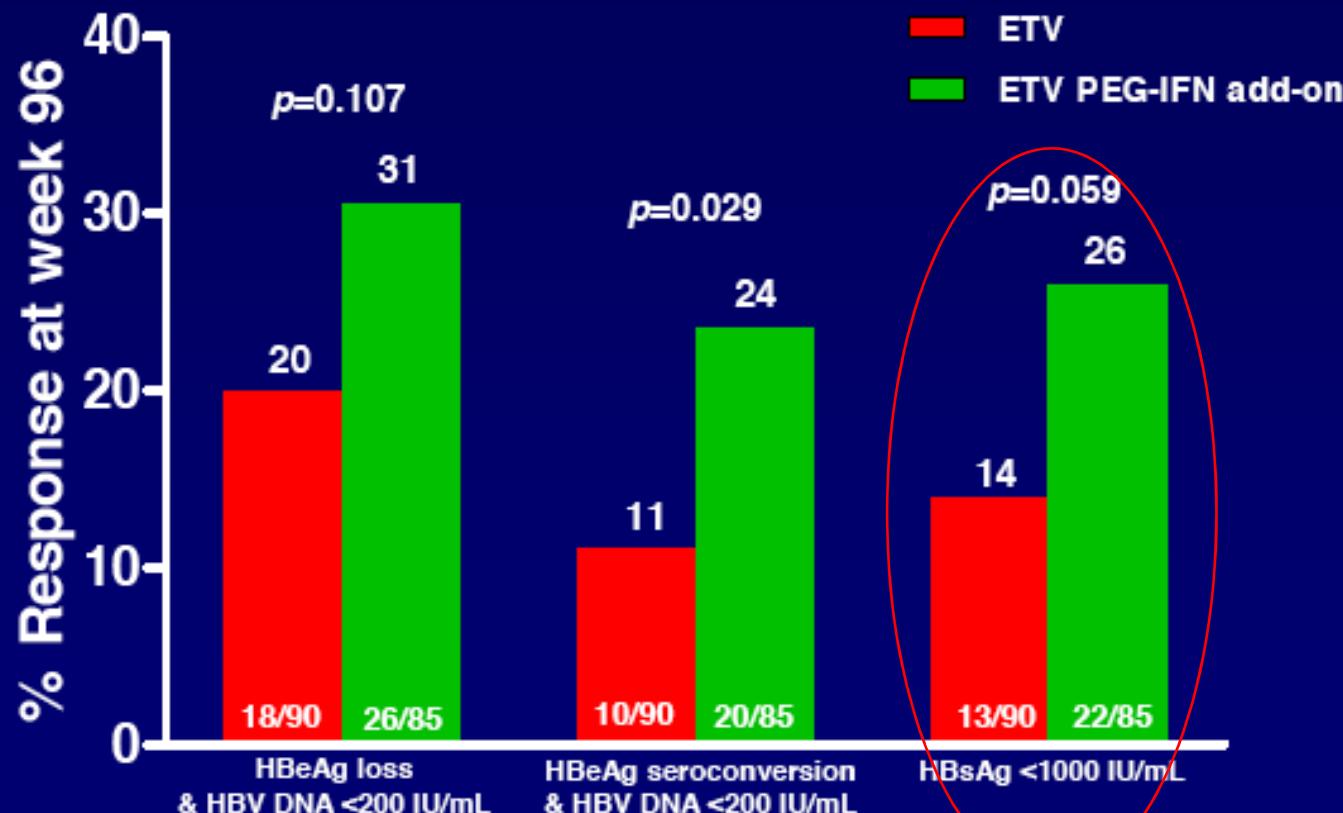
**How find a solution for alternative to indefinite nucleos(t)ide analogue (NA) therapy in patients chronic hepatitis B, two concepts were developed**

- Add-on Therapy
- Switching Therapy



# ADDING PEGINTERFERON TO ENTECAVIR INCREASES RESPONSE RATES IN HBeAg-POSITIVE CHRONIC HEPATITIS B PATIENTS: WEEK 96 RESULTS OF A GLOBAL MULTICENTER RANDOMISED TRIAL (ARES STUDY)

## Week 96: PEG-IFN add-on results in more response



Note: patients with a response at week 48 stopped all treatment at week 72. This is a cross-sectional analysis at week 96

# Add-on of peg interferon to a stable nucleoside regimen



Pegasys 180 µg  
48 weeks

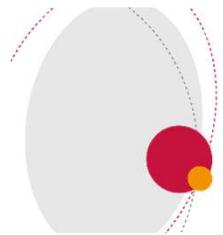
Analogues 48  
weeks

Analogues 96 weeks

NUCs

Analogues 144 weeks





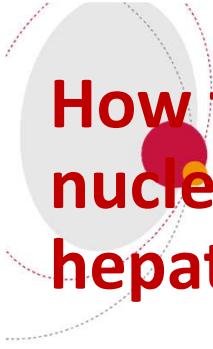
## Add-on of peg interferon to a stable nucleoside regimen



### Loss of HBsAg at W48

	Analogue	PEG-IFN + analogue	p
Loss HBsAg ITT	1/93 (1 %)	7/90 (8 %)	0,0327
Loss HBsAg in patients with complete dosage	1/91 (1 %)	7/82 (9 %)	0,0276

At W 48 : Add-on Peg IFN increase the loss of Hbs Ag specifically in the subgroup of patient with abselie titer < 1000 UI/ml



**How find a solution for alternative to indefinite nucleos(t)ide analogue (NA) therapy in patients chronic hepatitis B, two concepts were developed**

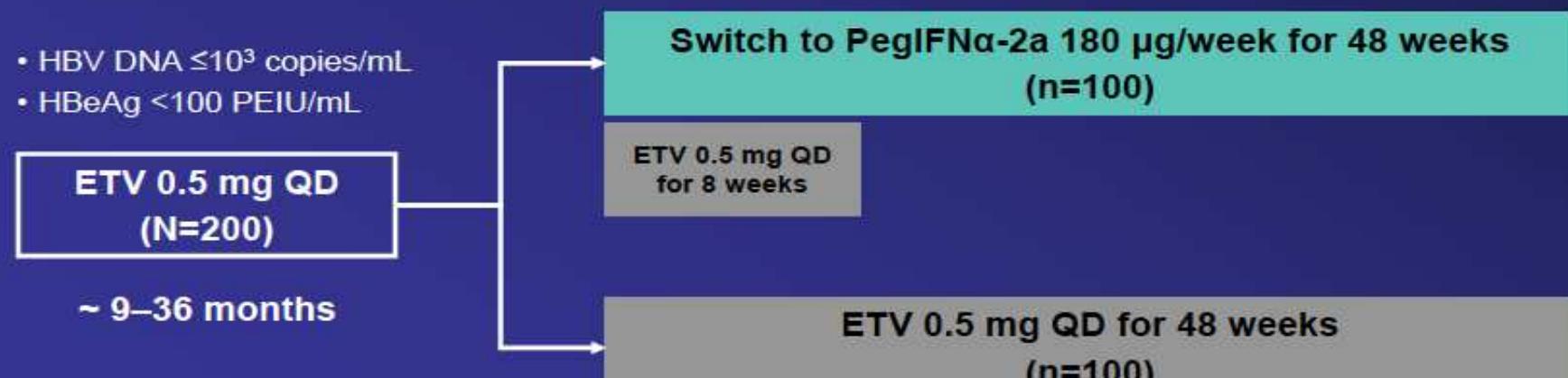
- Add-on Therapy
- Swiching Therapy



## Switching from long-term entecavir to peginterferon alfa-2a (40 kD) induces HBeAg seroconversion/HBsAg loss in patients with HBeAg-positive chronic hepatitis B (The OSST study)

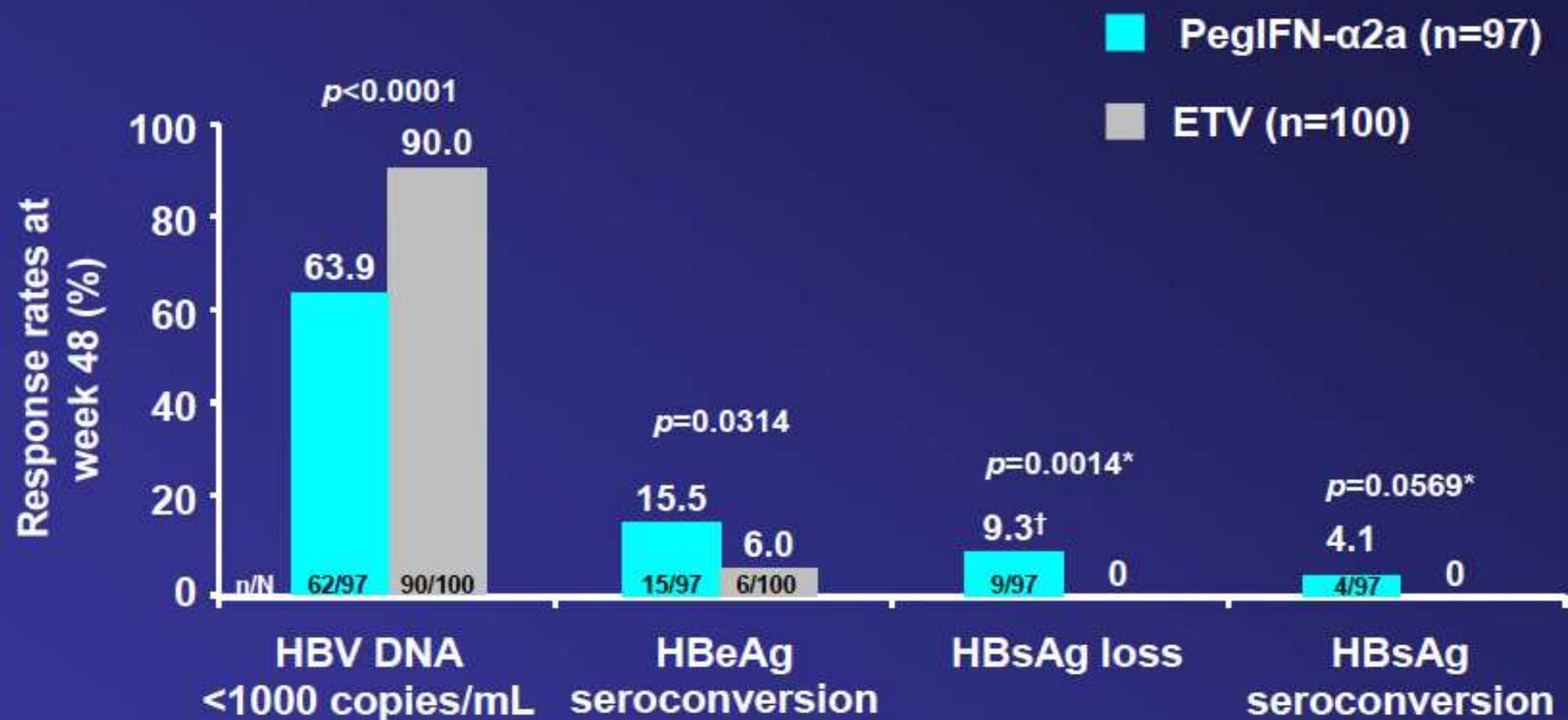
### Study design

- ▶ Randomized, multicenter, open-label study
- ▶ Primary endpoint: HBeAg seroconversion at end of treatment (week 48)
- ▶ Secondary endpoint: HBsAg loss at week 48



QD = once daily; PEIU = validated with in-house reference standards obtained from Paul Ehrlich Institute

# Response rates at week 48 of treatment with PegIFN- $\alpha$ -2a: ITT population

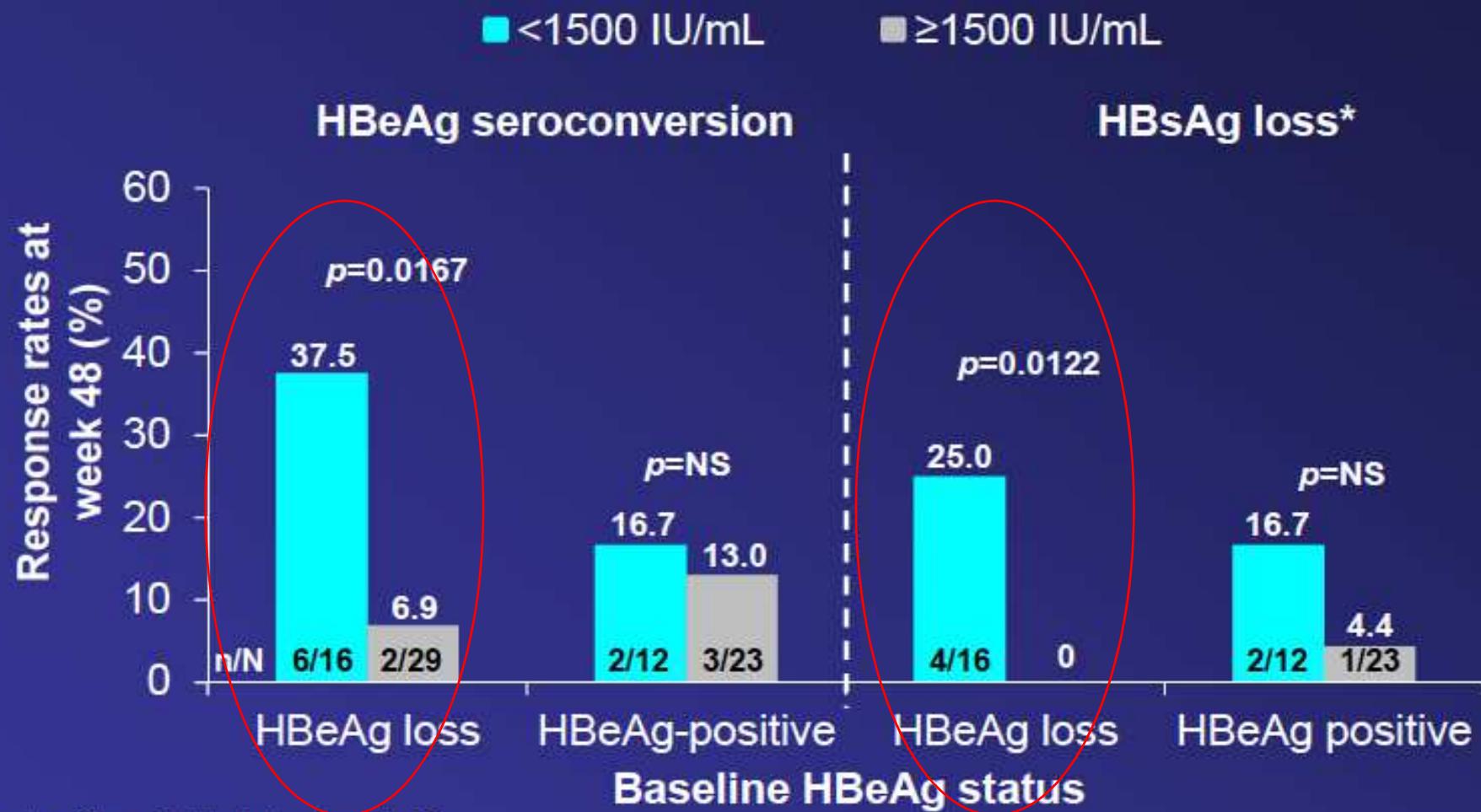


\* Fisher Exact test, other p-values are using Chi-Squared Test

† Updated data from time of abstract submission

ITT = intention-to-treat

HBeAg loss + HBsAg <1500 IU/mL at baseline was associated with HBeAg seroconversion (37.5%) and HBsAg loss (25.0%) at week 48 (PegIFN $\alpha$ -2a arm)

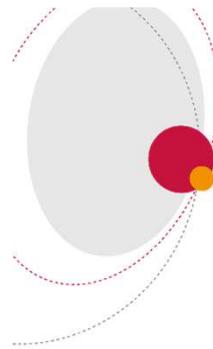


Patients with available data at week 48

\* Two patients with HBsAg loss had missing data at baseline and were excluded from this analysis

HBsAg <1500 IU/mL was determined by ROC analysis as the optimal cut-off in predicting HBsAg loss at week 48

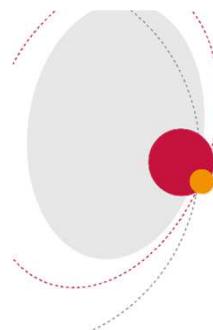
This cut-off is updated from time of abstract submission



**How find a solution for alternative to indefinite nucleos(t)ide analogue (NA) therapy in patients chron hepatitis B, two concepts were developed**

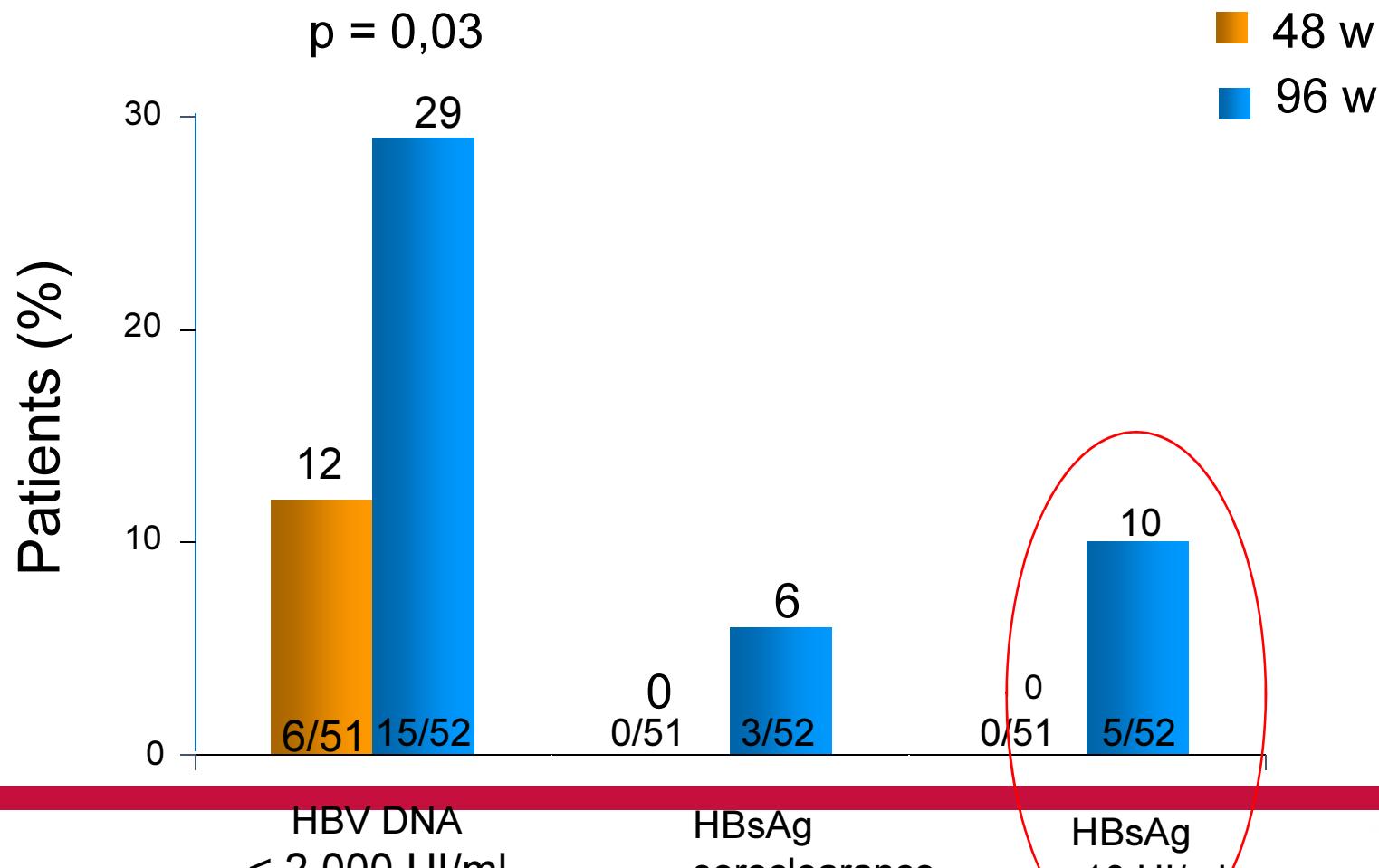
- Add-on Therapy
- Swiching Therapy
- Add-on therapy with Extention of duration based on HBsAg Kinetics



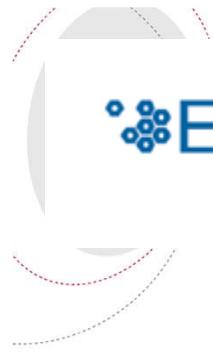


## HBeAg negative :PEG-IFN $\alpha$ -2a : 96 w > 48w

Results 12 month after stopping therapy PEG-IFN $\alpha$ -2a



Lampertico P et al .GUT 2012



**EASL**

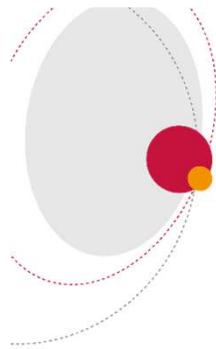
EUROPEAN  
ASSOCIATION  
FOR THE STUDY  
OF THE LIVER

JOURNAL OF  
HEPATOLOGY

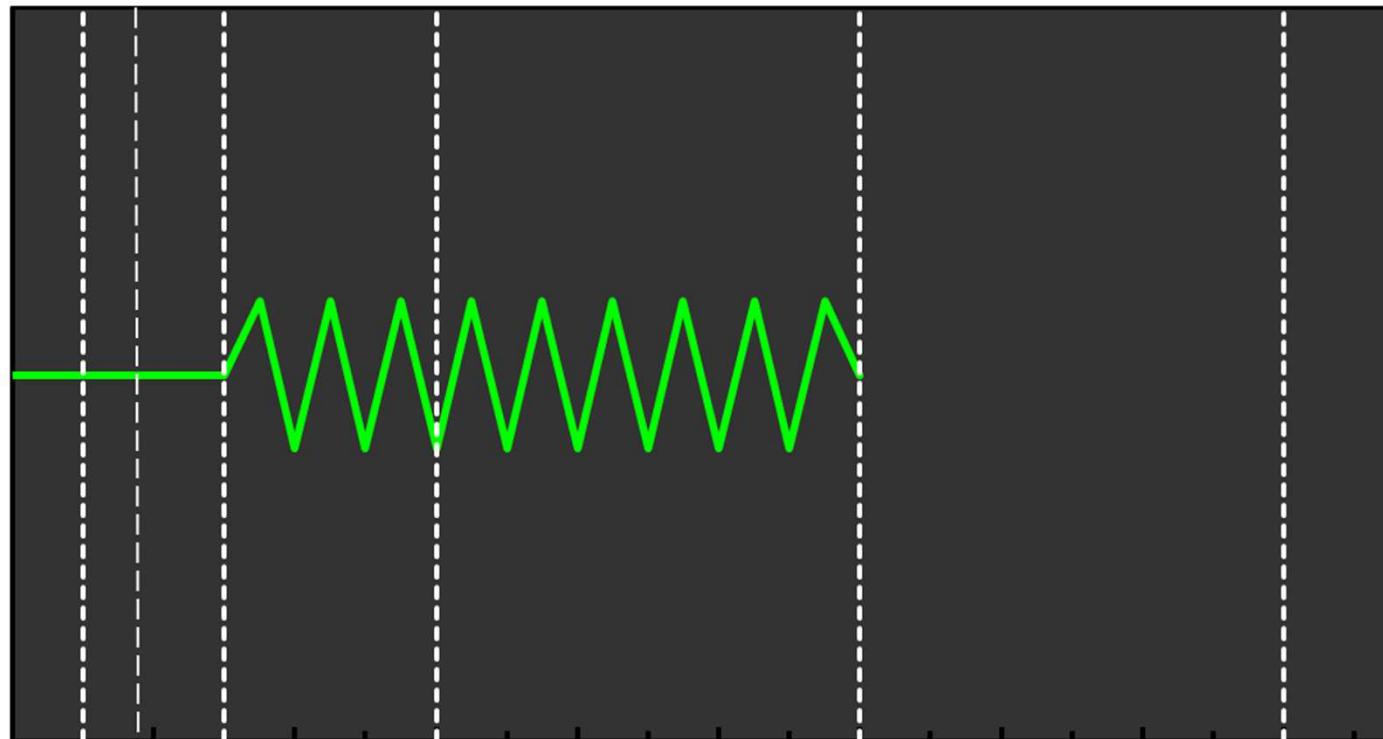
# A RESPONSE-GUIDED APPROACH BASED ON HBSAG KINETICS MAY IDENTIFY PATIENTS WITH THE GREATEST CHANCE OF SUCCESS

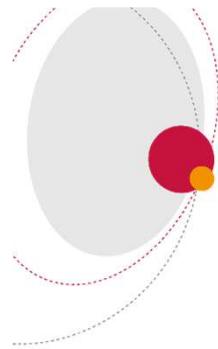
Halfon P. J Hepatol 2014

---

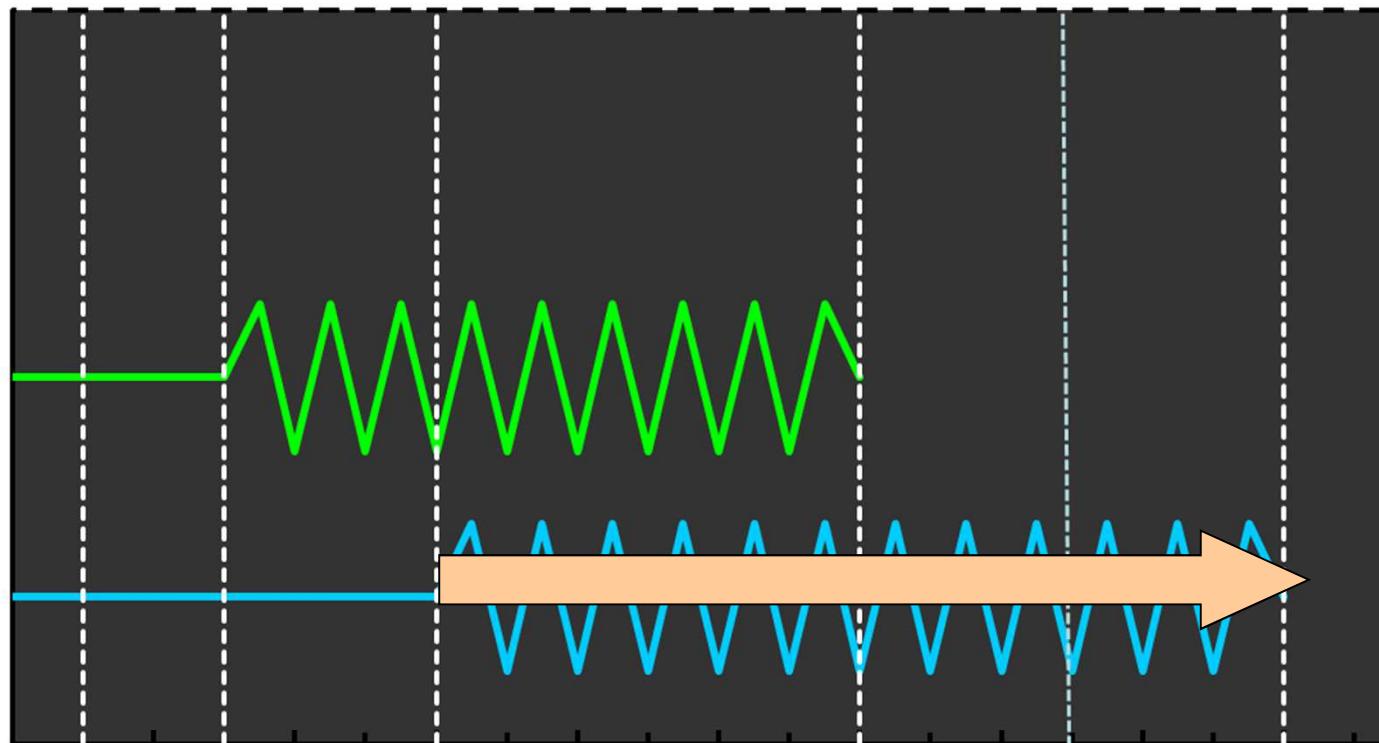


## The concept of “Time-individualized Peg-IFN treatment” according to the evolution of HBsAg titer





## TIME TO BECOME HBsAG NEGATIVE EXTEND DURATION OF TREATMENT:





## Short Communication

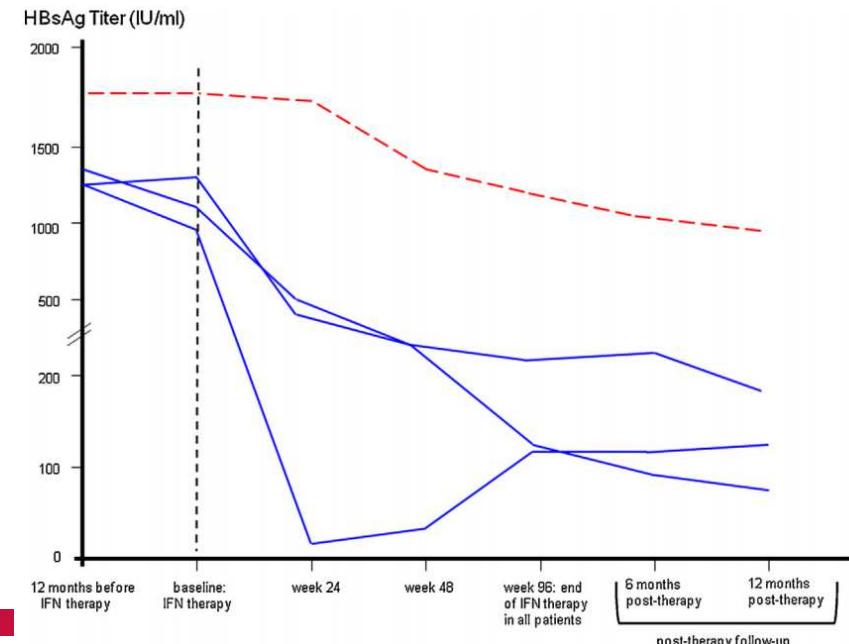
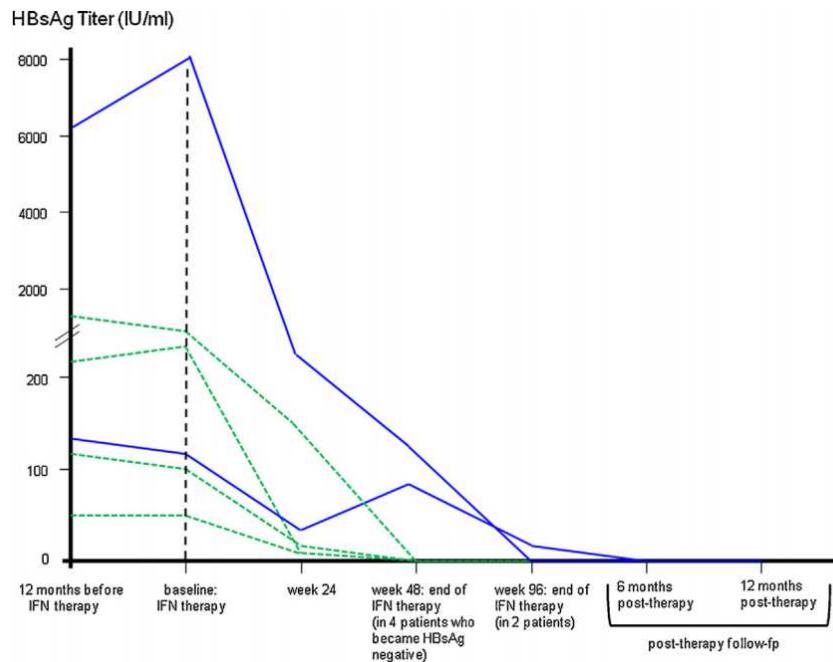
Add-on peg-interferon leads to loss of HBsAg in patients with HBeAg-negative chronic hepatitis and HBV DNA fully suppressed by long-term nucleotide analogs



Denis Ouzan <sup>a,\*\*\*</sup>, Guillaume Pénaranda <sup>b</sup>, Hélène Joly <sup>a</sup>, Hacène Khiri <sup>b</sup>, Antonnella Pironti <sup>a</sup>  
Philippe Halfon <sup>b,c,\*</sup>

HBs Ag levels of 10 HBe Ag negative patients who received additional Peg-interferon alpha2a during 48- 96 weeks to a stable NUCs therapy

All patients were treated with NUCs (3-7yrs) with HBVDNA neg since more than three years

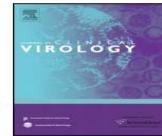




Contents lists available at ScienceDirect

Journal of Clinical Virology

journal homepage: [www.elsevier.com/locate/jcv](http://www.elsevier.com/locate/jcv)



Short Communication

Add-on peg-interferon leads to loss of HBsAg in patients with HBeAg-negative chronic hepatitis and HBV DNA fully suppressed by long-term nucleotide analogs



Denis Ouzan <sup>a,\*\*</sup>, Guillaume Pénaranda <sup>b</sup>, Hélène Joly <sup>a</sup>, Hacène Khiri <sup>b</sup>, Antonnella Pironti <sup>a</sup>, Philippe Halfon <sup>b,c,\*</sup>

HBs Ag levels of 10 HBe Ag negative patients who received additional Peg-interferon alpha2a during 48- 96 weeks to a stable NUCs therapy

All patients were treated with NUCs (3-7yrs) with HBVDNA neg since > than three years

HBsAg Titer (IU/ml)

8000

6000

4000

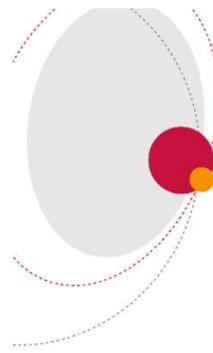
An new add-on IFN treatment strategy based on tailored HBsAg monitoring allowed for the first time :  
• a loss of HBsAg in 60% of patients  
• persistence of loss > 2 years after end of therapy  
• seroconversion in 20%

W48

W96

W120

Follow Up Duration (Weeks)



## HBsAg monitoring during interferon treatment for chronic hepatitis delta in four patients

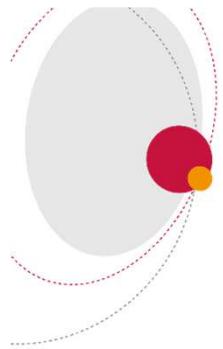
Adapting interferon treatment duration through HBsAg titer monitoring provides a loss of HBs Ag and the cure of chronic HDV

7 Months 1 Year 2 Years 3 Years 4 Years 5 Years

HBsAg titer  
mIU/ml

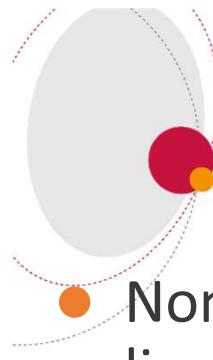
9000  
8000  
7000  
6000

7 Months 1 Year 2 Years 3 Years 4 Years 5 Years



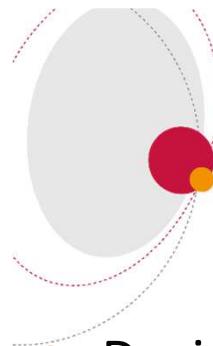
**HBsAg titer decline constitutes a useful tool to predict the loss of HBsAg and the optimal duration of Peg-IFN therapy and add-on therapy**





## Home Messages : Non Invasive tests

- Non-invasive tests should always be interpreted by specialists in liver disease, **according to the clinical context**, considering the results of other tests (biochemical, radiological and endoscopic) and taking into account the recommended quality criteria for each test and its possible pitfalls
- **Serum biomarkers can be used in clinical practice due to their high applicability (>95%) and good interlaboratory reproducibility.** However, they should be preferably obtained in fasting patients (particularly those including hyaluronic acid) and following the manufacturer's recommendations for the patented tests
- **TE is a fast, simple, safe and easy to learn procedure that is widely available.** Its main limitation is the impossibility of obtaining results in case of ascites or morbid obesity and its limited applicability in case of obesity and limited operator experience



## Conclusions : The usefulness of quantitative HBsAg

- Decisional algorithms based on HBsAg and HBV DNA kinetics leading to response guided therapy are needed
- Stopping rules should be defined at a specific time point using an optimal HBsAg cut-off or HBsAg Kinetics
- “Time-individualized Peg-IFN treatment” according to the evolution of HBsAg titer should be validated in large clinical trial
- HBsAg monitoring have to be considered in EASL, APASL and AASLD recommandations



## HCV ELIMINATED FROM PLANET

Deadly bloodborne virus cured. Joins list of unintimidating diseases; polio, consumption, scurvy, cabin fever.

By Rómulo A. Tenés

Voltaire, in his *Dictionnaire Philosophique* said:

"What? A rigorous test is requested to affirm that the surface of a sphere is equal to that of the quadruple of the surface of the circle round its central point..." and yet does it not have to be rigorous, for example, in certifying the whole of Picasso's false work between 1891 and 1897 which was undoubtedly made by his father, José Ruiz Blasco? Or the centenary canvas, 1903 "Dama en Edén Concert" as a true one?

Well, dear investors in art, that is how it is. In insulting arbitrariness, contrary to the most elemental common sense, and to the exclusive benefit of unscrupulous art merchants, science is not used in certifying Picasso's work.

A grotesque example of this is Josep Palau i Fabre, "biographer", whose only merit resides in idealizing Picasso to his own benefit. A clumsy hearing aid to his ear, he pretends to listen, expecting the paintings to speak. He is deaf. Fine.

### Cure Attributed to Stem Cell Research

But, surprise! Concepción, Claude, and Paloma Ruiz-Picasso defend the esoteric, clumsy, and grotesquely irrational system of certifying the work of their father. To their own benefit, and with catastrophic results: thousands of false works, and the subsequent loss of credit.

Would an investor in art allow such an individual to enter his company entrusted with its management, or as an instructor for his children?

Why then does he accept him in his investments in art? why does he not demand modern, rigorous, scientific certificates?

"Dama en Edén Concert", timidly remained silent in the face of the grotesque system of certifying its virginity.

José Ruiz Blasco, 1895. Oil on canvas, attribu-



Photo: Sébastien HATAJIA

"Dama en Edén Concert", oil on canvas, 80x59 cm. Picasso 1903. Signed in the top right-hand corner, with scientific certificates issued by Doctor Marianne Tauber from the Swiss Institute for Art Research, PhD in Chemical Engineering, Francesc Serrera, from Lausanne and Barcelona University; and by Historian and friend of Picasso, Pierre de Champris. Pierre Daix says in his Dictionary that "We owe Champris the best study on Picasso's pictorial sources, written about in his book *Ombres et soleil*, Paris 1960. Analysed by X-Ray, appearing on the sub-layer, is the father of the artist reading. Picasso marked the frame with the numbers "323" and "323".



archy, which is verified in a Calligraphy Report dated 27th December 2002 by the expert calligraphers Ms. Rosa Toméns Boley and Ms. Silvia Tarrago Goarre, from Barcelona, Spain.

**Hepatologists Party  
Like it's 1999.**

This report contains 298 pages and cer-

fies that Picasso had taken over by deceitful means all the works whose author was undoubtedly his father, José Ruiz Blasco in the period between 1892 and 1897. Specifically, the "J" of José Ruiz had been falsified to the "P" of Pablo, and was unlawfully and deceptively assumed by Pablo Ruiz Picasso; this lie was made worse with the fraudulent Picasso donation in 1970 to Barcelona City Council: a donation which contained all the works of José Ruiz between 1892-1897.

What did Concepción Ruiz Walter, Claude, and Paloma Ruiz Gilot know?

This circumstance, would not worry us if it were not for the fact that the researcher was compelled to register the irregularities before the Central Courts of Instruction of Madrid on 10th June 2003 and 15th July 2004 and requested by Law the separation of the work of both artists, father and son. This separation is compulsory by Law.

As a result, the successors of Picasso must lose all their rights regarding the works of their grandfather, José Ruiz Blasco.

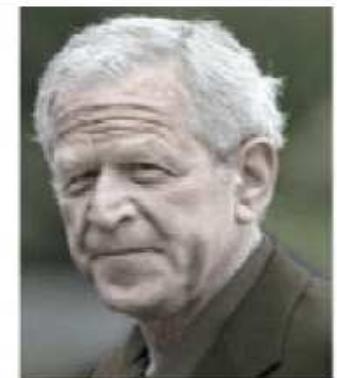
The chief Curator of the Prado Museum of Madrid, Antonio Solano, concerning the present system for valuing Picassos affirmed: "Authentications by the descendants of painters should not be accepted. Some are so discredited, it is embarrassing".

However, we see what has been done by Christian Zervos, 1932, John Richardson, Pierre Daix, Marilyn McCully, Henry Gide, Douglas Cooper, Penrose, Catherine Hulin-Blay, William Rubin, Renata Propper, María Teresa Ocaña, Josep Palau i Fabre and Norman Mailer, 1995, one of the latest writers



archy, which is verified in a Calligraphy Report dated 27th December 2002 by the expert calligraphers Ms. Rosa Toméns Boley and Ms. Silvia Tarrago Goarre, from Barcelona, Spain.

### Former President Bush indicted for War Crimes



Rómulo-Antonio Tenés, Spain, a researcher and artist, is the author of the book *Fraud Picasso*. He takes to Goya's New Caprices Exhibition to prove fraud at the National Library of Spain, L Vanguardia, 11.8.81-. He achieved the removal of a false painting attributed to Dario de Regoyos from the Prado Museum news flash by REUTER and EFE World Press Agency 20.09.1989. He participated in the Homage to Picasso 1981 at Skira A Gallery along with Henry Moore, Chilida, Tapies, Miró, Rafael Alberti, Canogar, Oteiza, Saura, and other famous artists. In La Vanguardia, dated 8-03-1983, he published a study on Picasso's plagiarism of the horse in the Guernica, which was paired by Ricardo Marín, Nuevo Mundo