

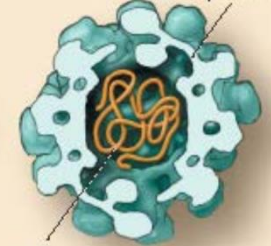
# Hépatite E et transfusion



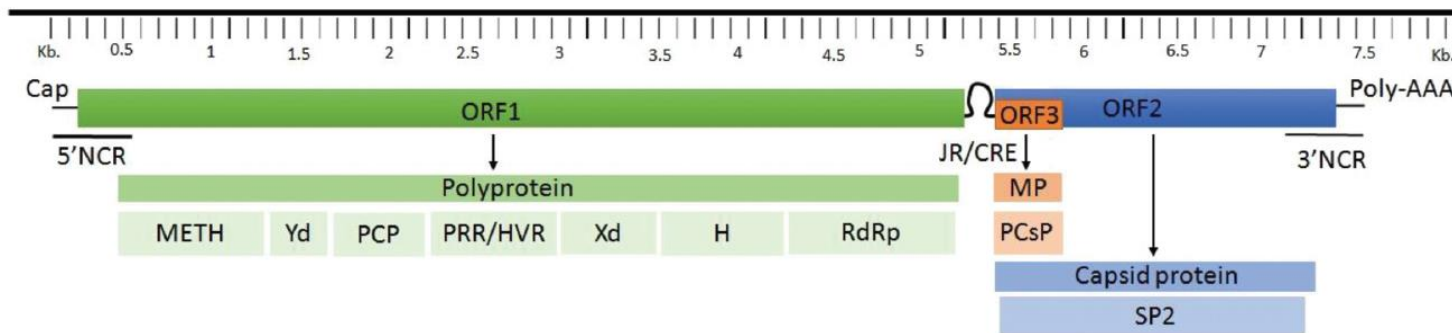
M. Monfort  
CHC Liège

CORATA 26-27 septembre 2019

# Histoire du VHE



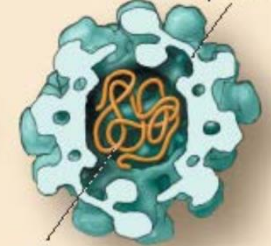
- ” 1981: découverte
- ” 1983: HEV
- ” 1990: séquençage partiel



*Al-Sadeq et al, Journal of Medical Microbiology, 2018*

- ” 1990: prévalence anti-HEV Europe et US: 1-4%
- ” 1997: virus VHE porcin et 1<sup>er</sup> cas autochtone
- ” 2000: persistance infection en cas d'immunosuppression

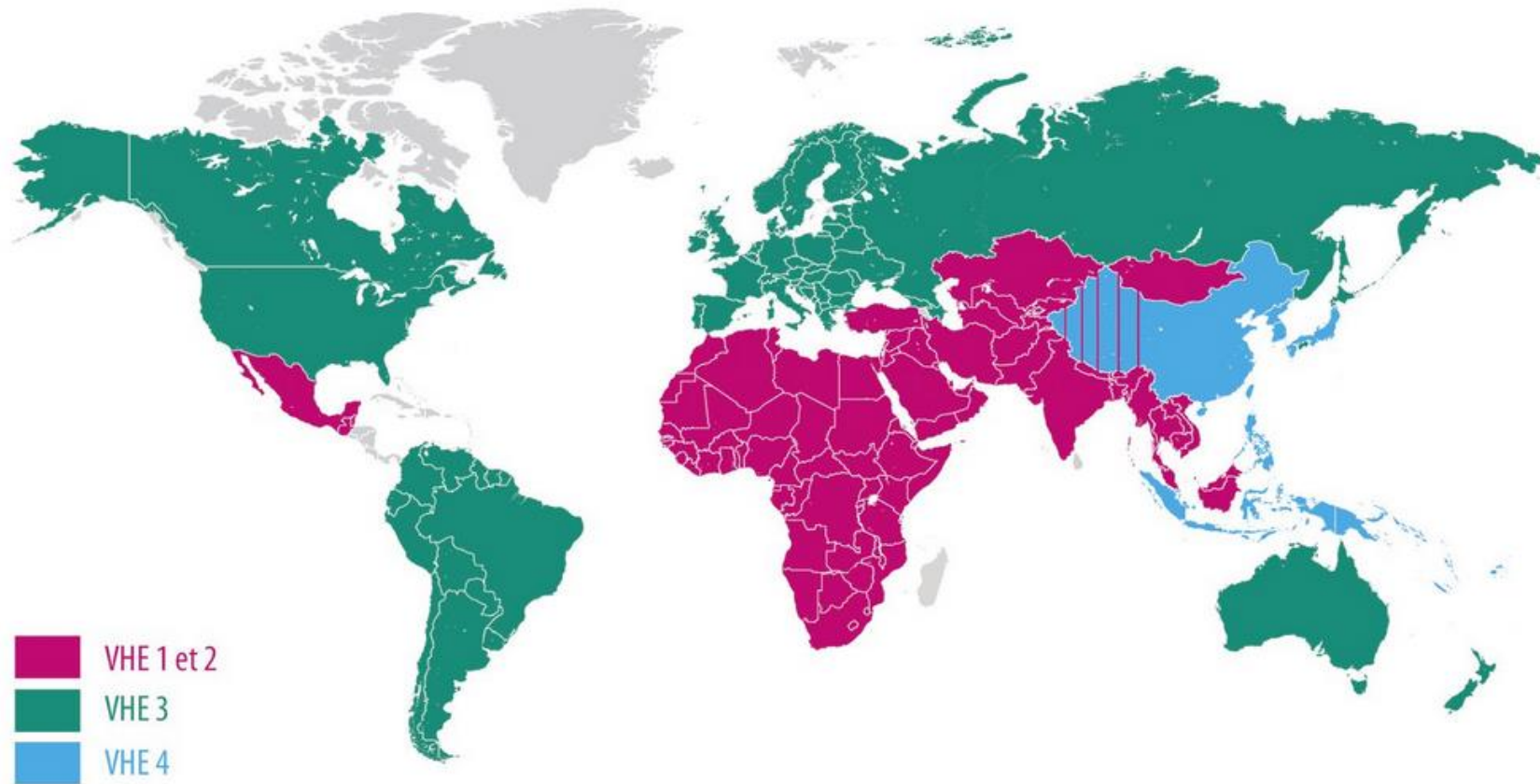
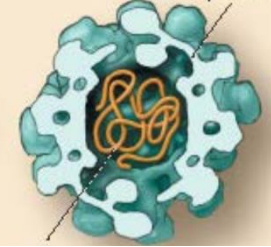
# Caractéristiques virologiques



- ” Famille des *Hepeviridae*
- ” Genre *Orthohepevirus*, espèce A
- ” Particule sphérique de 27 à 50 nm avec capside icosaédrique
- ” ARN simple brin (7.2 kb)
- ” 3 cadres de lecture: ORF-1 (protéine non structurale) , ORF-2 (protéine de capside) et ORF-3 (phosphoprotéine)
- ” Réplication cytoplasmique, pas de forme de latence

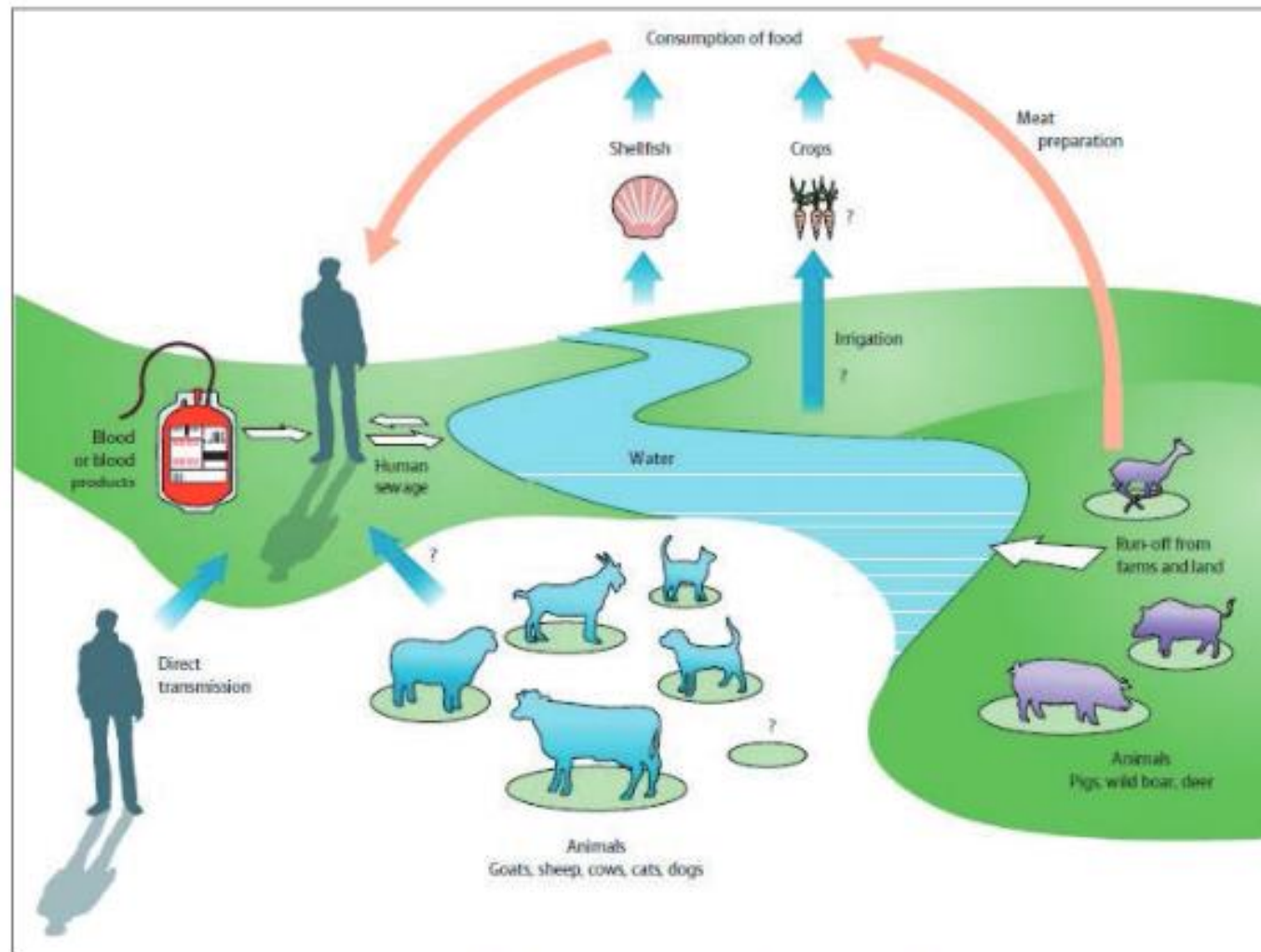


# Distribution géographique

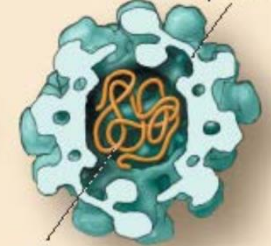


Caractéristiques	HEV 1 et 2	HEV 3 et 4
Réservoir	Strictement humain	Animal (porc, cerf, sanglier, lapin)
Localisation	HEV1: Asie, Afrique HEV2: Amérique centrale, Mexique et Afrique Cas importés dans PD	HEV4: Asie du Sud-Est HEV3: Amérique du Nord, Europe
Distribution	Épidémique et sporadique	Sporadique
Transmission	Féco-orale + transmission verticale PVD (HEV1) (33-100%)	Nourriture contaminée (œufs, porc, moules, fraises, légumes verts), contact direct avec animaux infectés, produits sanguins, transplantation d'organe
Age	Adolescents et jeunes adultes	Adultes
Clinique	Hépatite aiguë parfois sévère Cas sévères chez femmes enceintes	Hépatite symptomatique chez patients âgés et immunodéprimés
Sexe	F=M	M>>F
chronicité	/	Chez patients immunodéprimés
Traitement	/	Ribavirine, peginterféron
Mortalité	0.2 à 4% >20% chez femmes enceintes (pays endémiques)	Elevée chez patients âgés

# Voies de contamination HEV-3/4

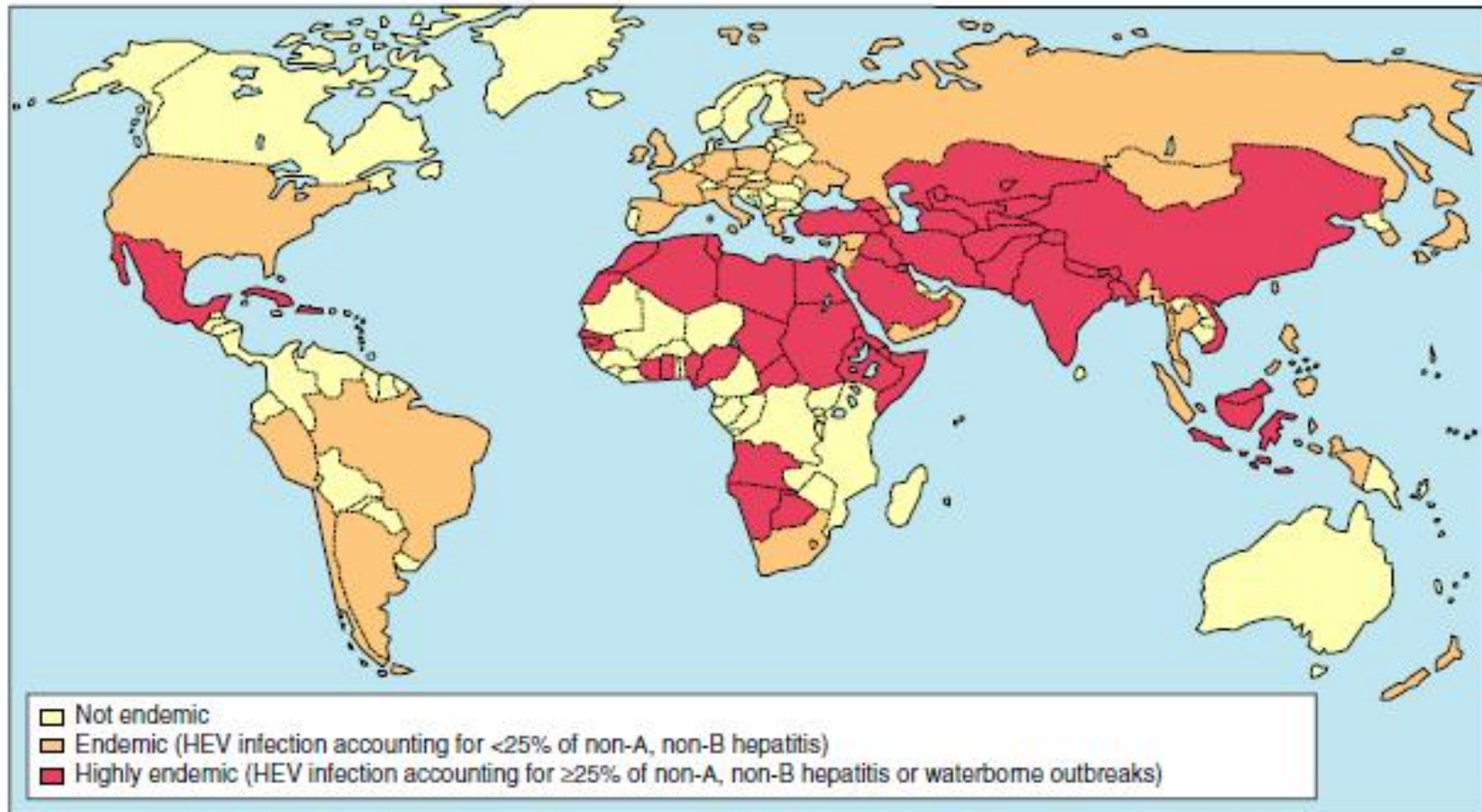
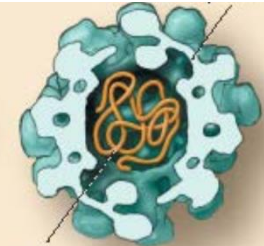


# Prévalence HEV



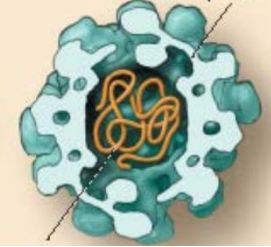
- “ 1<sup>ère</sup> cause d’hépatite aiguë virale dans le monde
- “ 20.000.000 d’individus infectés dans le monde/an
- “ 3.300.000 cas symptomatiques
- “ 44.000 décès (WHO, 2017)
- “ Autres agents viraux (OMS, 2017, nombre d’individus infectés dans le monde):
  - . HBV: 257.000.000
  - . HCV: 71.000.000
  - . HIV: 36.900.000

# Prévalence



*Donnelly et al, 2017*

# Prévalence HEV-3 et 4



## “ Europe:

- . France: 68.000 cas diagnostiqués/an
- . UK: 100.000 cas diagnostiqués/an
- . Allemagne: 300.000 cas diagnostiqués/an

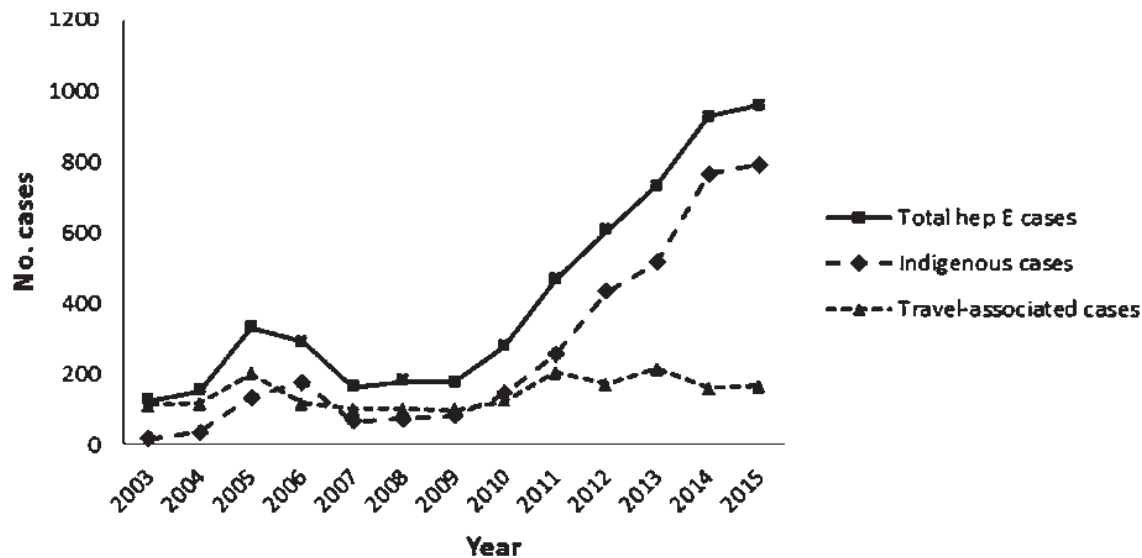
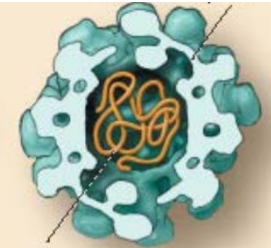


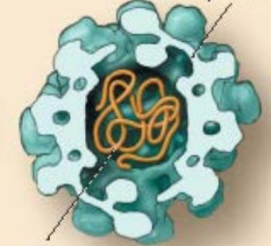
Fig. 1. Reference laboratory-confirmed HEV cases in England & Wales 2003–2015.

# Présentation clinique: HEV-3/4



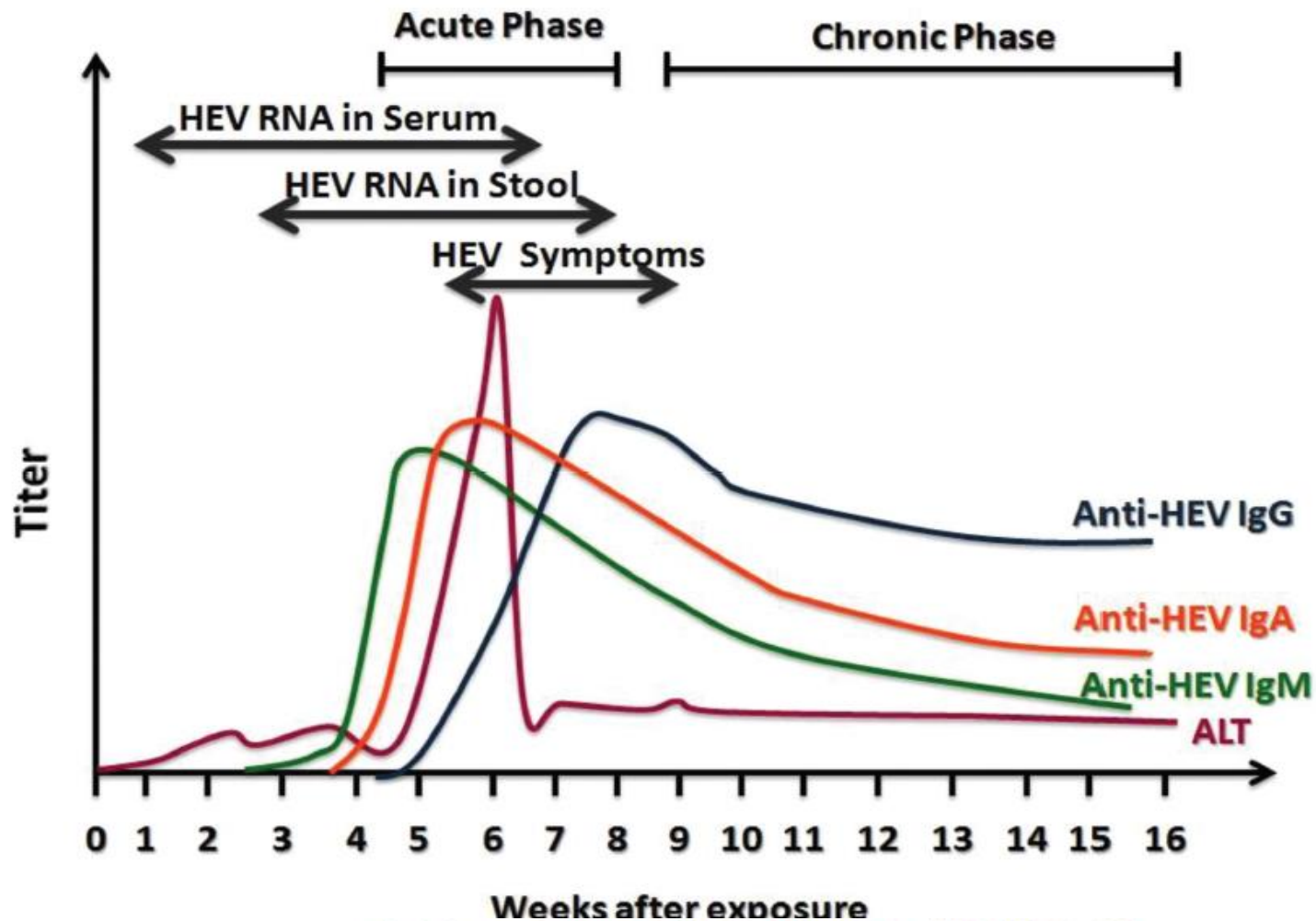
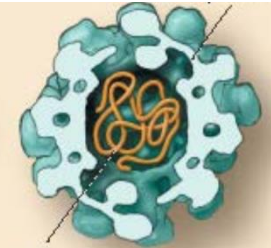
- “ Asymptomatique dans plus de 95% des cas
- “ Symptomatique chez individus entre 50-55 ans (>>>H avec comorbidités et alcoolisme)
- “ HEV-3: morbidité et mortalité importantes chez immunodéprimés, transplantés et en cas de pathologie hépatique sous-jacente (jusqu'à 70% de mortalité)
- “ HEV-4: fréquence moindre mais sévérité accrue
- “ HEV-3: manifestations extra-hépatiques (glomérulonéphrites, troubles hématologiques et pancréatiques) et neurologiques (5 à 10% des cas): Guillain Barré, méningo-encéphalite, myélite aiguë,...

# Chronicité HEV-3/4

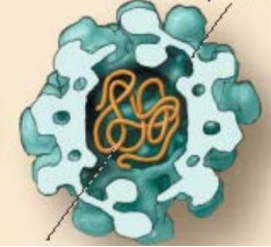


- ” Persistence ARN viral au-delà de 3 à 6 mois
- ” Progression rapide vers fibrose et cirrhose
- ” HEV-3>>HEV-4 (quelques cas avec HEV-7) et principalement en Europe
- ” Asymptomatique dans 70% des cas, cirrhose dans 30% des cas
- ” Observée en cas d’immunodépression (HIV, greffés CSH/moëlle, chimio/immunothérapie, transplantés d’organe solide, corticothérapie)
- ” Transplantés organe solide: chronicité ++++ (60%), 10-15% de cirrhose endéans les 2 ans (*Kamar et al, 2008*)
- ” HSCT: virémie: 2.4%, 63% de chronicité (*Versluis et al, 2013*)
- ” Facteurs de risque: décours proche de la transplantation, épisode récent de rejet, CD4 et CD8 bas, tacrolimus, ciclosporine

# Diagnostic



# Diagnostic



## ” Anticorps anti-HEV

### . Infection aiguë:

” Anti-HEV IgM: J-1 symptômes → 6-9 mois

” Anti-HEV IgG: J+2 symptômes → des années voire à vie

## ” RNA HEV

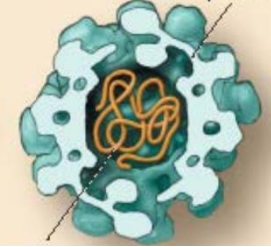
. Virémie: 4 à 6 sem (max. 100j)

. Indispensable chez immunocompromis

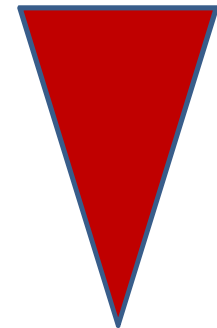
. Détectable dans sang, selles et autres liquides.

. Limite de détection: de 4.7 à 18.6 UI/mL selon kit

# HEV et transfusion



- “ HEV-3>> HEV-4
  
- “ Séroprévalence anti-HEV IgG chez donneurs de sang très variable:
  - . Europe: 0.6 à 52.5% (*Hartl J. et al. Viruses, 2016*)
    - “ US: 6%
    - “ UK: 3-16%
    - “ France: 8-86%, Suisse: 20.4% (*Niederhauser et al, 2018*)
  - . ↑ âge, H>F
  - . Fortement dépendante:
    - “ des zones géographiques
    - “ des habitudes alimentaires et de production
    - “ de la sensibilité des tests utilisés (sérologie, NAT (pools vs unitaire))
    - “ de l'année d'étude
    - “ des populations étudiées (âge, malades vs population générale,...)
    - “ du contact avec les animaux
  
- “ Dons HEV RNA +: 1/14.520 (UK) à 1/157 (Italie)



# A Nationwide Survey of Hepatitis E Viral Infection in French Blood Donors

Jean Michel Mansuy,<sup>1\*</sup> Pierre Gallian,<sup>2,3\*</sup> Chloé Dimeglio,<sup>4,5</sup> Karine Saune,<sup>1,6</sup> Catherine Arnaud,<sup>4,5</sup> Bertrand Pelletier,<sup>2</sup> Pascal Morel,<sup>2</sup> Dominique Legrand,<sup>2</sup> Pierre Tiberghien,<sup>2,7</sup> and Jacques Izopet<sup>1,6</sup>

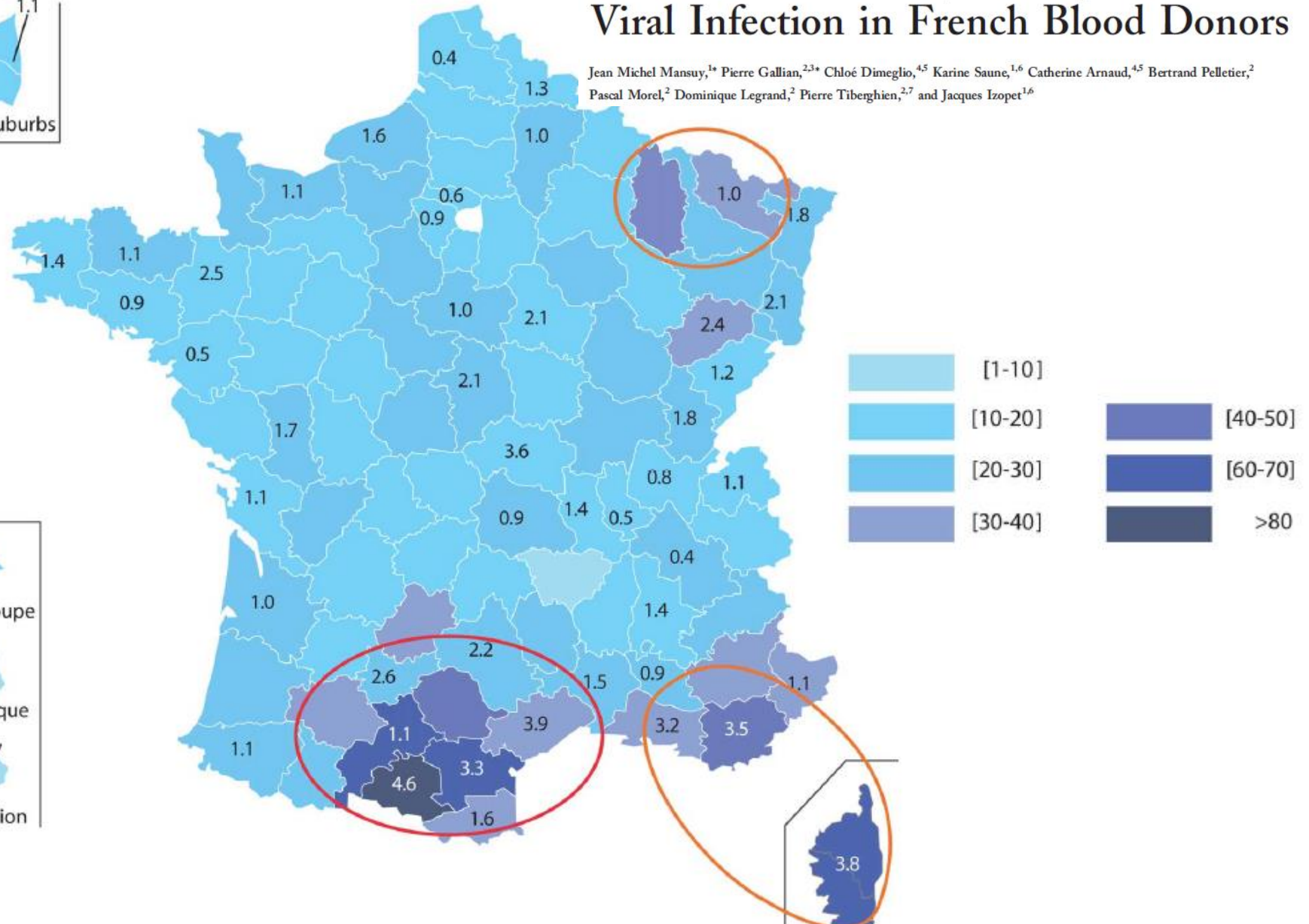
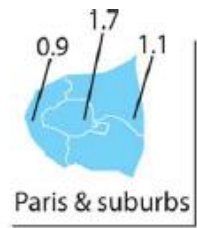
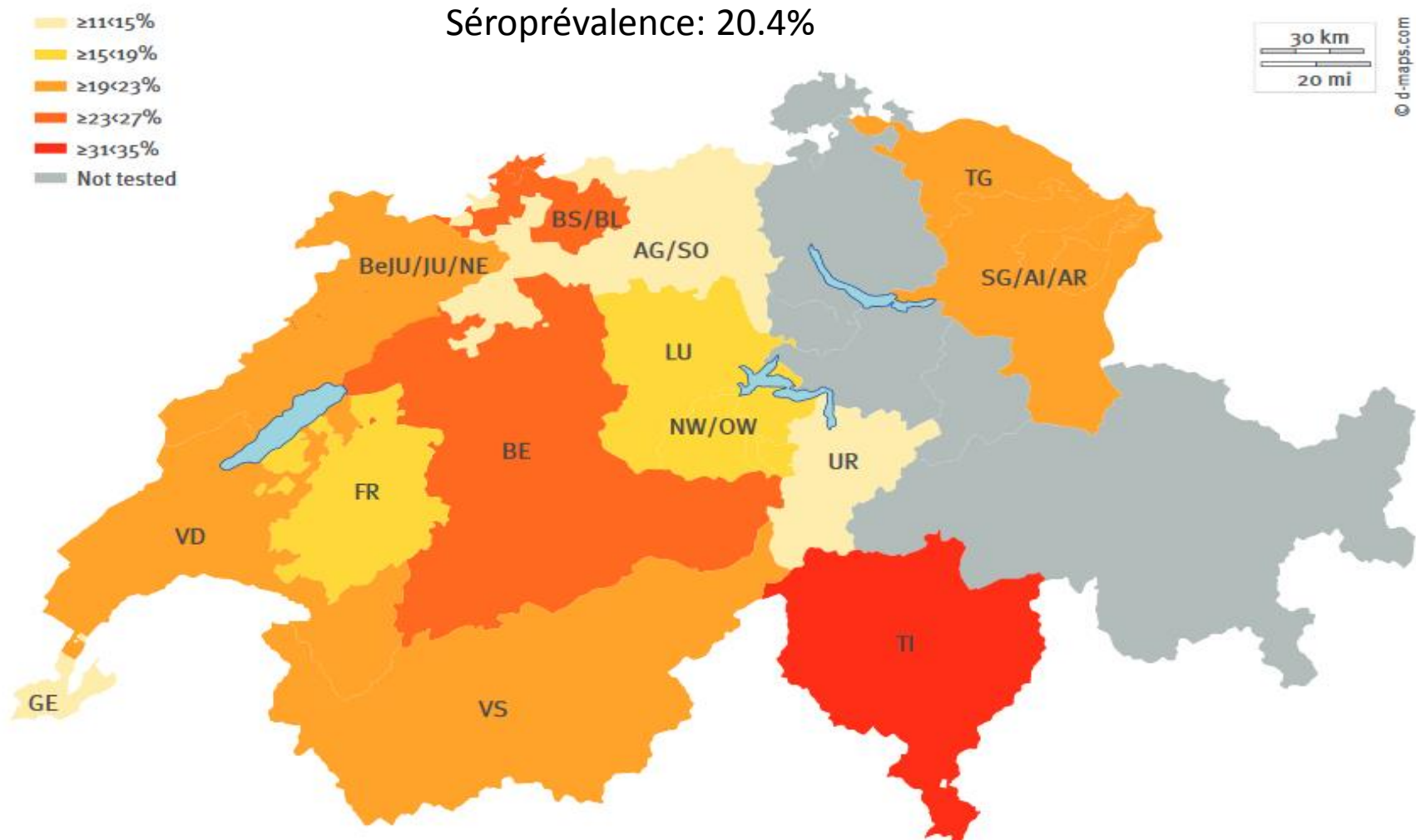


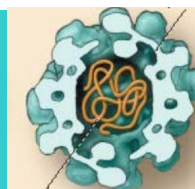
FIG. 1. Prevalence of anti-HEV IgG and IgM: distribution in French administrative areas. A color code describes the anti-HEV IgG seroprevalence classes. Black numbers represent the seroprevalence of anti HEV IgM in each administrative area.

# Current hepatitis E virus seroprevalence in Swiss blood donors and apparent decline from 1997 to 2016

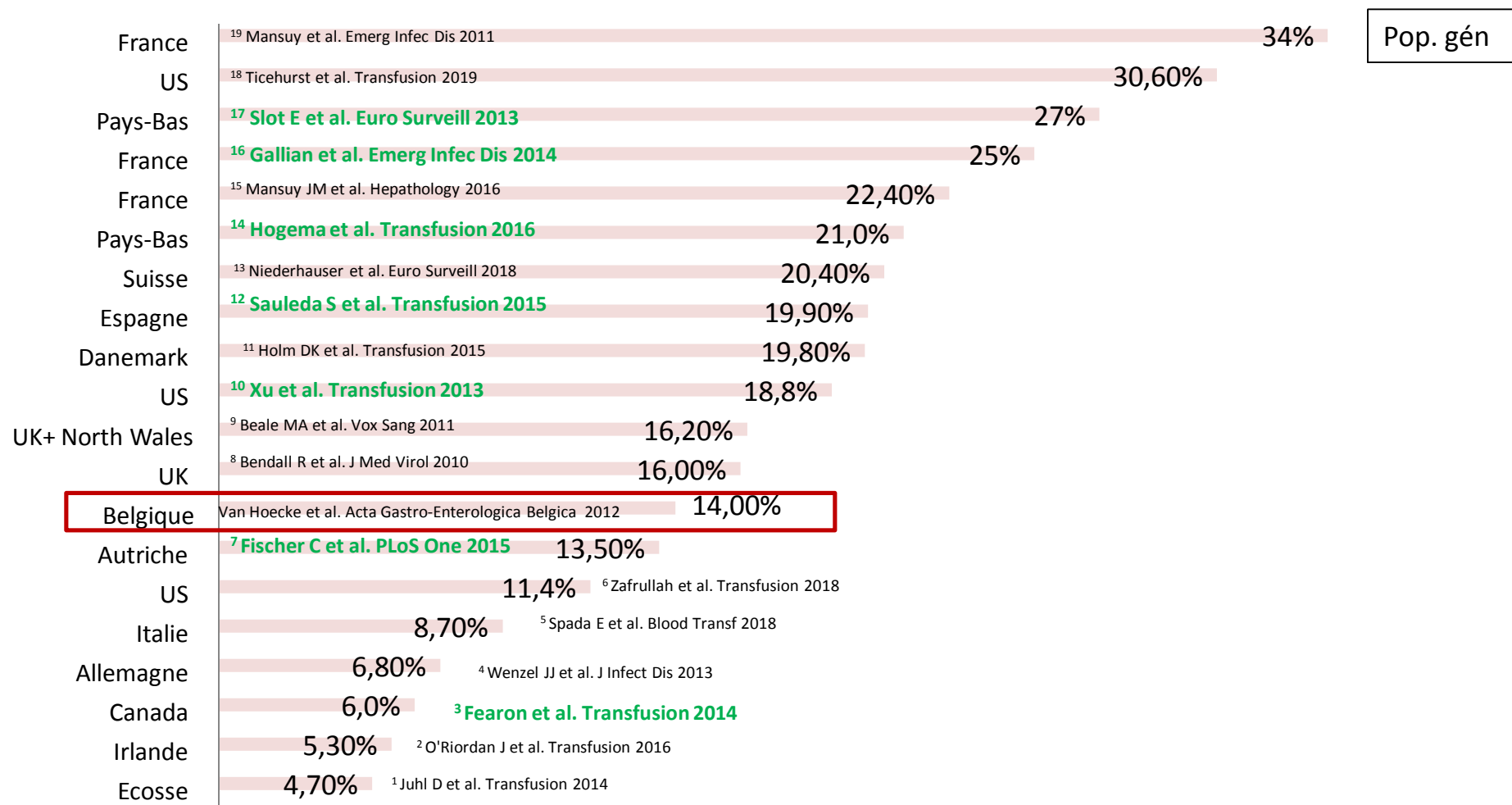
Christoph Niederhauser<sup>1</sup>, Nadja Widmer<sup>1</sup>, Magdalena Hotz<sup>1</sup>, Caroline Tinguely<sup>1</sup>, Stefano Fontana<sup>1,2</sup>, Gabrielle Allemann<sup>3</sup>, Mauro Borri<sup>2</sup>, Laura Infanti<sup>4</sup>, Amira Sarraj<sup>5</sup>, Jörg Sigle<sup>6</sup>, Michèle Stalder<sup>1</sup>, Jutta Thierbach<sup>7</sup>, Sophie Waldvogel<sup>8</sup>, Tina Wiengand<sup>9</sup>, Max Züger<sup>10</sup>, Peter Gowland<sup>1</sup>



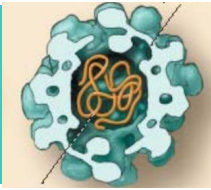
# HEV et transfusion



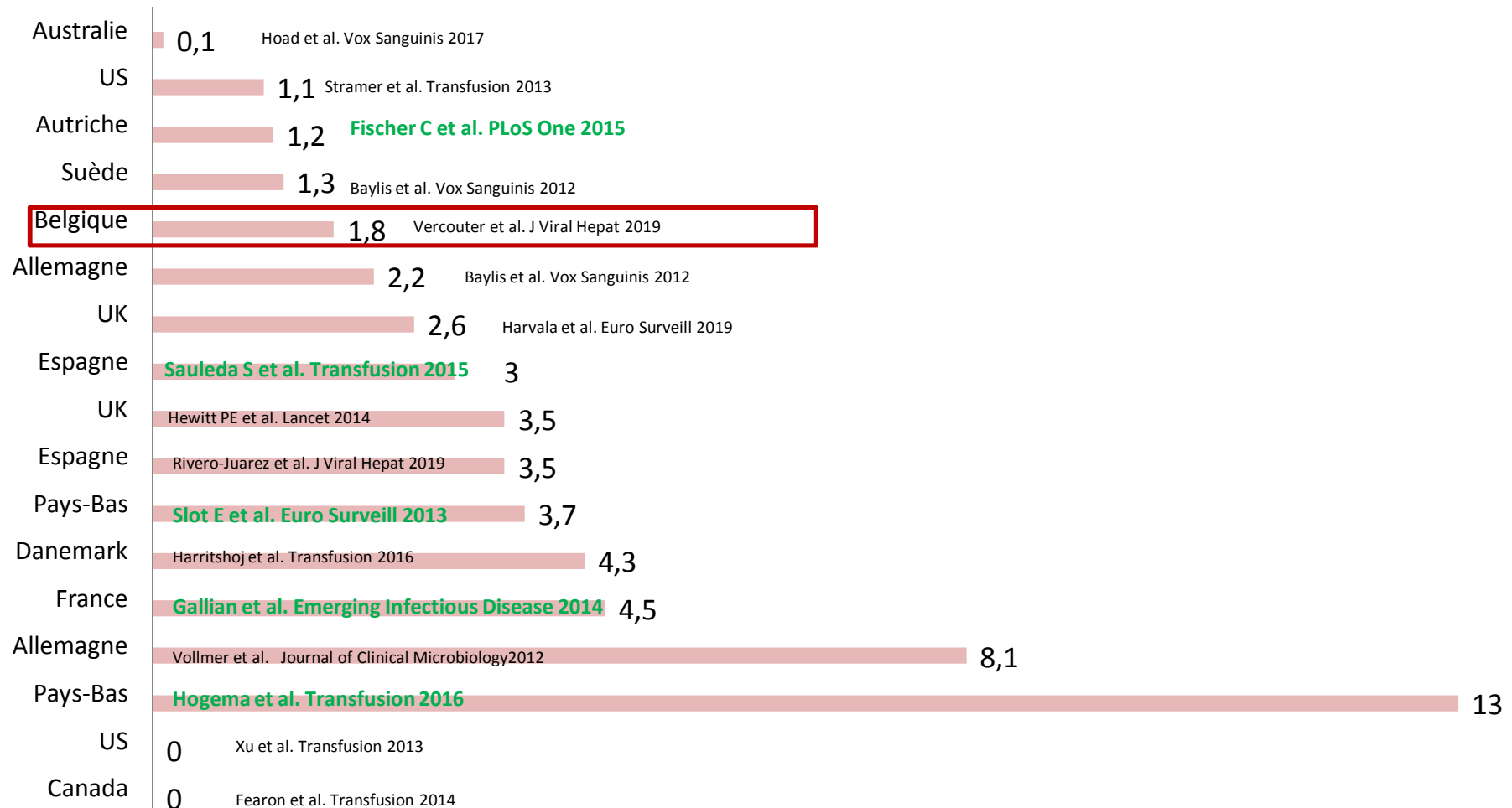
## Séroprévalence anti-HEV IgG chez les donneurs de sang



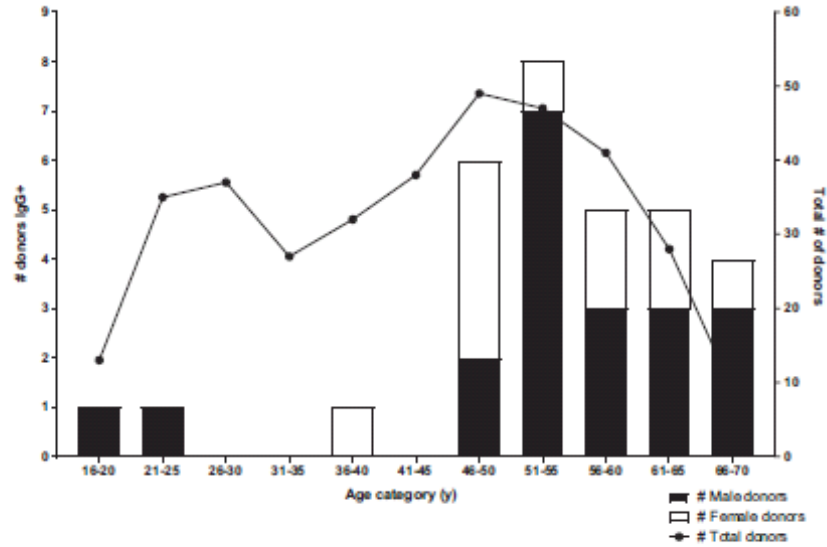
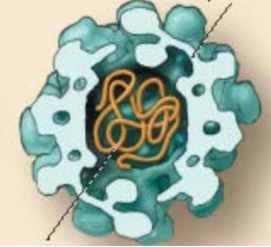
# HEV et transfusion



## Taux de dons HEV RNA positifs (pour 10.000 dons)

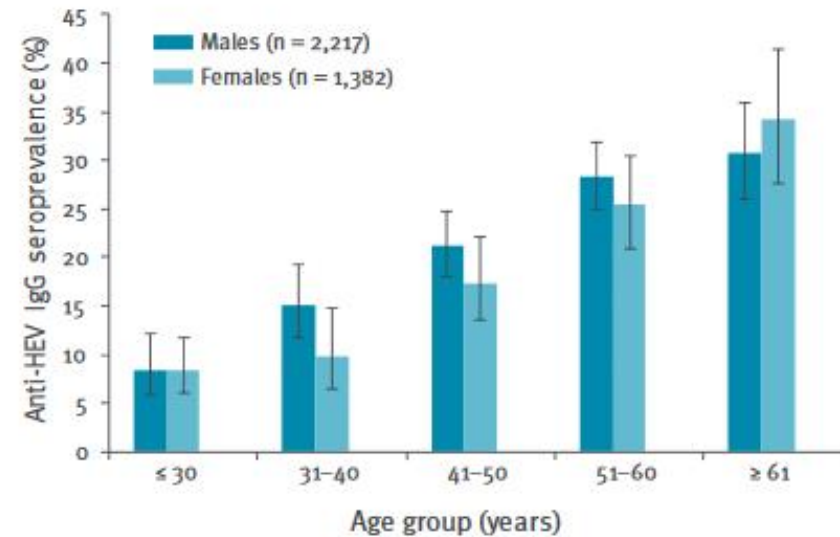


# Prévalence anti-HEV



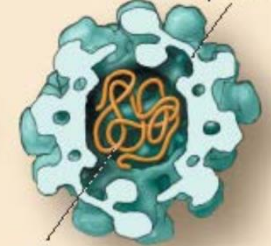
Vercouter et al, J Vir al Hepat 2019

Age and sex distribution of hepatitis E IgG positive blood donors, Switzerland, August 2014–February 2016 (n = 3,599<sup>a</sup>)



Niederhauser et al. Euro Surveill 2018

# Facteurs de risques



## “ Facteurs prédisposants? (Alberts et al. PLoS One, 2018)

- . Donneurs de sang (n= 5239)
- . Végétariens (n= 231)
- . Ethnies diverses (asiatiques, turcs, marocains, africains,... (n= 1198)
- . MSM (100 HIV+ et 100 HIV-)
- . Toxicomanes (100 HIV+ et 100 HIV-)

**Table 1. Anti-HEV immunoglobulin M (IgM) and IgG seroprevalence in various research populations from the Netherlands.**

	Anti-HEV IgM seroprevalence			Anti-HEV IgG seroprevalence			Anti-HEV IgG Seroprevalence (age and gender <sup>a</sup> )		Anti-HEV IgG	
	n	N	%	n	N	%	%	95%CI	aRR <sup>b</sup>	95% CI
Blood donors	429	5,239	8%	1,401	5,239	27%	24%	(23%-25%)	REF	
Vegetarians <sup>c</sup>	1	231	0.43%	17	231	7%	9%	(5%-13%)	<b>0.36</b>	<b>(0.23–0.57)</b>
Dutch	2	200	1%	17	200	9%	16%	(10%-23%)	0.64	(0.40–1.02)
South-Asian Surinamese	0	200	0%	2	200	1%	2%	(0%-5%)	<b>0.07</b>	<b>(0.02–0.29)</b>
African Surinamese	1	199	0.50%	3	199	2%	3%	(0%-7%)	<b>0.11</b>	<b>(0.04–0.34)</b>
Ghanaian	1	199	0.50%	44	199	22%	34%	(27%-41%)	<b>1.53</b>	<b>(1.15–2.03)</b>
Moroccan	1	200	0.50%	20	200	10%	19%	(12%-25%)	0.75	(0.49–1.14)
Turkish	0	200	0%	5	200	3%	5%	(1%-10%)	<b>0.18</b>	<b>(0.08–0.44)</b>
Men who have sex with men	0	197	0%	40	197	20%	24%	(17%-30%)	0.99	(0.76–1.29)
Persons who use drugs	0	200	0%	42	200	21%	28%	(21%-34%)	1.19	(0.90–1.58)

# Dose minimale infectante?

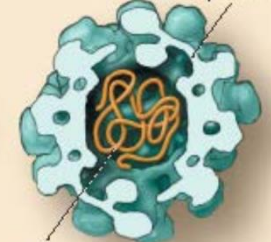


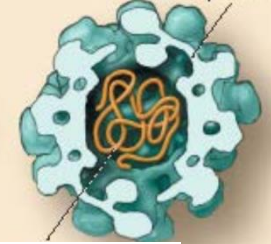
TABLE 2. Overview of different blood products and their plasma content; detection probability of different screening strategies

	RBC	PPC (in additive solution)	APC (in plasma)	FFP
	Volume of blood product			
	310 mL (220–400 mL)	310 mL (260–360 mL)	250 mL (205–295 mL)	290 mL (200–380 mL)
	Plasma proportion			
	10 mL/RBC	0.46 mL/mL (0.40–0.52 mL/mL)	0.8 mL/mL	0.78 mL/mL (0.75–0.82 mL/mL)
	Plasma volumes*			
Blood product specification	10 mL	35.65 ml <sup>†</sup>	200 mL	226 mL
	<del>Infectious dose inevitably resulting in TT-HEV infection (5.0E + 04 IU), corresponding viral load to be identified in donor</del>			
	5000 IU/mL	1403 IU/mL	250 IU/mL	221 IU/mL

Vollmer et al, Transfusion 2019

- “ Dose min infectante: CE:  $3.2 \times 10^4$  UI, CP:  $7.0 \times 10^3$  UI, PFC:  $3.6 \times 10^4$  UI
- “ PFC > CP > CE
- “ Risque de contamination: 40-55% (Hewitt et al., Lancet 2014, Tedder et al., Transfusion 2017) , 100% si dose >  $5 \times 10^4$  UI.
- “ Influence du statut immunitaire receveur??

# Transmission par transfusion



## Probable transmission of hepatitis E virus (HEV) via transfusion in the United States

*Ticehurst et al, Transfusion 2019*

**TABLE 1. Evidence of HEV exposure among 3384 RADAR patients, based on comparison of pre- and posttransfusion results for IgG anti-HEV**

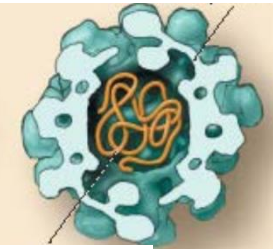
After transfusion		Before transfusion		Pre- to posttransfusion		
IgG anti-HEV result	No.	IgG anti-HEV result	No.	Change	No.	Interpretation
Reactive	1076	Nonreactive	40	Seroconversion	40	Incident exposure
		Reactive	1036	≥ Fourfold increase*	19	Reexposure
				< Fourfold increase	1017	Past exposure (without reexposure)
Nonreactive	2308	Not tested (presumed nonreactive)	2308	None determined	2308	No exposure
<b>Total</b>	<b>3384</b>					

\* A four-fold or greater increase, S/CO value of 1:4 diluted posttransfusion sample greater than or equal to S/CO value of undiluted pretransfusion sample (see Materials and Methods and Table S1).

- “ 12.408 donneurs, 3.575 receveurs
- “ anti-HEV IgG présents chez 30.6% des receveurs avant transfusion
- “ 59 (1.7%) de séroconversion
- “ 5.8% (15/257) donneurs avec HEV RNA pos

→ 1 seul cas de transmission par transfusion confirmé

# Transmission par transfusion



## Unique clinical courses of transfusion-transmitted hepatitis E in patients with immunosuppression

*Satake et al, Transfusion 2017*

**RESULTS:** Twenty established TT-HEV cases were recorded over the past 17 years. A lookback study verified that five of 10 patients transfused with known HEV-contaminated blood components acquired HEV infection. The minimal infectious dose of HEV through

**TABLE 1. Clinical outcome of transfusion with HEV-contaminated components**

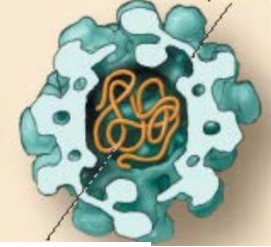
Clinical outcome	Information source			Total
	Voluntary report	Screening NAT- or voluntary report-related lookback*	Plasma NAT-related lookback	
TT-HEV established	8	4	7	19
TT-HEV excluded	0	5	0	5
IgG positive	0	0	3†	3
ALT elevation	0	0	2‡	2
Unknown	0	2	9	11
Patient dead	0	5	9	14

\* Outcome of the transfusion of cocomponents of TT-HEV-related donations and that of HEV-contaminated components verified by retrospective NAT screening are shown.

† Two patients showed positive HEV-specific IgG in their posttransfusion samples but no pretransfusion data were available. One patient showed specific IgG seroconversion but displayed no further evidence indicative of HEV infection.

‡ Two patients showed transient ALT elevation without any test results indicative of HEV infection.

# Transmission par transfusion

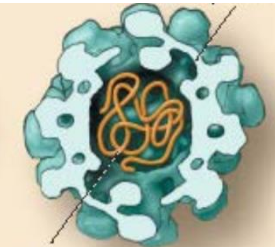


## Unique clinical courses of transfusion-transmitted hepatitis E in patients with immunosuppression

*Satake et al, Transfusion 2017*

- “ Analyse rétrospective HEV RNA dons suspects : 2/19 anti-HEV IgG pos
- “ 17/19 échantillons post-transfusion RNA pos, 2 probable TT-HEV (RNA post-transfusion neg, anti-HEV IgG pos, exclusion autre source de contamination)
- “ 8 receveurs ID, 8 avec maladies systémiques, 3 chirurgies
- “ 10 RBC, 6 CP, 3 PFC
- “ Taux moyen ALAT chez receveurs: 486 U/L (39-1665). Pas de différence immunodéprimés et immunocompétents
- “ 4 hépatites chroniques (Lymphome de Burkitt, lymphome, greffés hépatiques)

# Transmission par transfusion



## Serological and molecular evidence of a plausible transmission of hepatitis E virus through pooled plasma

Andonov et al, Vox Sang 2014

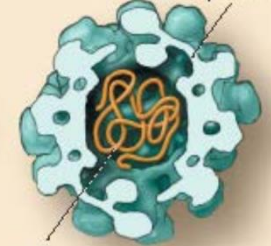
- “ 38 patients: 33 PTT/ 5 SHU
- “ Echanges plasmatiques: 20 – 40 L (17 SD et 19 cryo)
- “ 4 HEV +

Table 1 Serological screening performed with MP Diagnostics (MPD) and WANTAI (W) EIA and HEV RNA by PCR; test results given in months after treatment

Patient ID	Type of plasma exchange (SDP or CSP)		Anti-HEV IgG			Anti-HEV IgM			HEV RNA			Evidence for Possible Transmission
			Months post-treatment									
			0	1	6	0	1	6	0	1	6	
2021	SDP	MPD	(-)	(-)	(+)	(-)	(-)	(-)	(-)	(-)	(-)	
		W	(+) 8.21*	(+) 3.8*	(+) 16.9*	(-)	(-)	(-)	(-)	(-)	(-)	
2026	SDP	MPD	(-)	(-)	(+)	(-)	(-)	(+)	(-)	(+)	(-)	YES
		W	(-)	(+) 2.6*	(+) 15.1*	(-)	(-)	(+)	(-)	(+)	(-)	
2030	SDP	MPD	(-)	(-)	(+)	(-)	(-)	(-)	(-)	(-)	(-)	?
		W	(+) 1.1	(+) 1.5*	(+) 16.8*	(-)	(-)	(-)	(-)	(-)	(-)	
2049	SDP	MPD	(-)	(-)	(+)	(-)	(-)	(+)	(-)	(+)	(-)	YES
		W	(-)	(+) 2.0*	(+) 11.4*	(-)	(-)	(+)	(-)	(+)	(-)	
2036	SDP	MPD	(-)	(-)	(-)	(-)	(-)	(-)	ND	ND	ND	?
		W	(+) 3.3*	(+) 5.8*	(+) 16.2*	(-)	(-)	(-)	(-)	(-)	(-)	
2062	CSP	MPD	(-)	(-)	(-)	(-)	(-)	(-)	ND	ND	ND	Anti-HEV IgG passive transfer
		W	(-)	(+) 1.4*	(+) 1.6*	(-)	(-)	(-)	(-)	(-)	(-)	

\*Sample to cut-off ratio of Wantai EIA anti-HEV IgG; values >1.0 are considered positive for anti-HEV.

# Transmission par transfusion



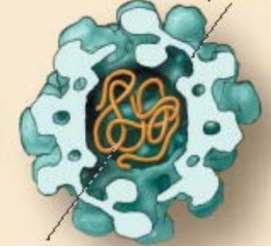
Euro Surveill. 2014 May 29;19(21). pii: 20812.

## **Transfusion-transmitted hepatitis E in Germany, 2013.**

Huzly D<sup>1</sup>, Umhau M, Bettinger D, Cathomen T, Emmerich F, Hasselblatt P, Hengel H, Herzog R, Kappert O, Maassen S, Schorb E, Schulz-Huotari C, Thimme R, Unmüssig R, Wenzel JJ, Panning M.

The reported IgG seroprevalence against hepatitis E virus (HEV) in German blood donations is 6.8%, and HEV RNA detected in 0.08%, but documented evidence for HEV transmission is lacking. We identified two donations from a single donor containing 120 IU HEV RNA/mL plasma and 490 IU/mL. An infectious dose of 7,056 IU HEV RNA was transmitted via apheresis platelets to an immunosuppressed patient who developed chronic HEV. Further, transmission was probable in an immunocompetent child.

# Transmission par transfusion



## Red blood cell transfusion-transmitted acute hepatitis E in an immunocompetent subject in Europe: a case report

*Riveiro-Barciela et al, Transfusion 2017*

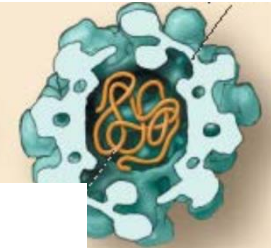
- ” patiente de 61 ans, transfusion de 8 CE (bypass axillofemorale)
- ” jaunisse, fatigue, majoration importante ALAT et ASAT 3 mois après transfusion chez patiente de 61 ans
- ” HEV RNA chez donneur: 75.000 UI/mL

## Hepatitis E Virus Infection after Platelet Transfusion in an Immunocompetent Trauma Patient

Emmanuelle Loyrion, Thibaut Trouve-Buisson,  
Patricia Pouzol, Sylvie Larrat, Thomas Decaens,  
Jean-Francois Payen

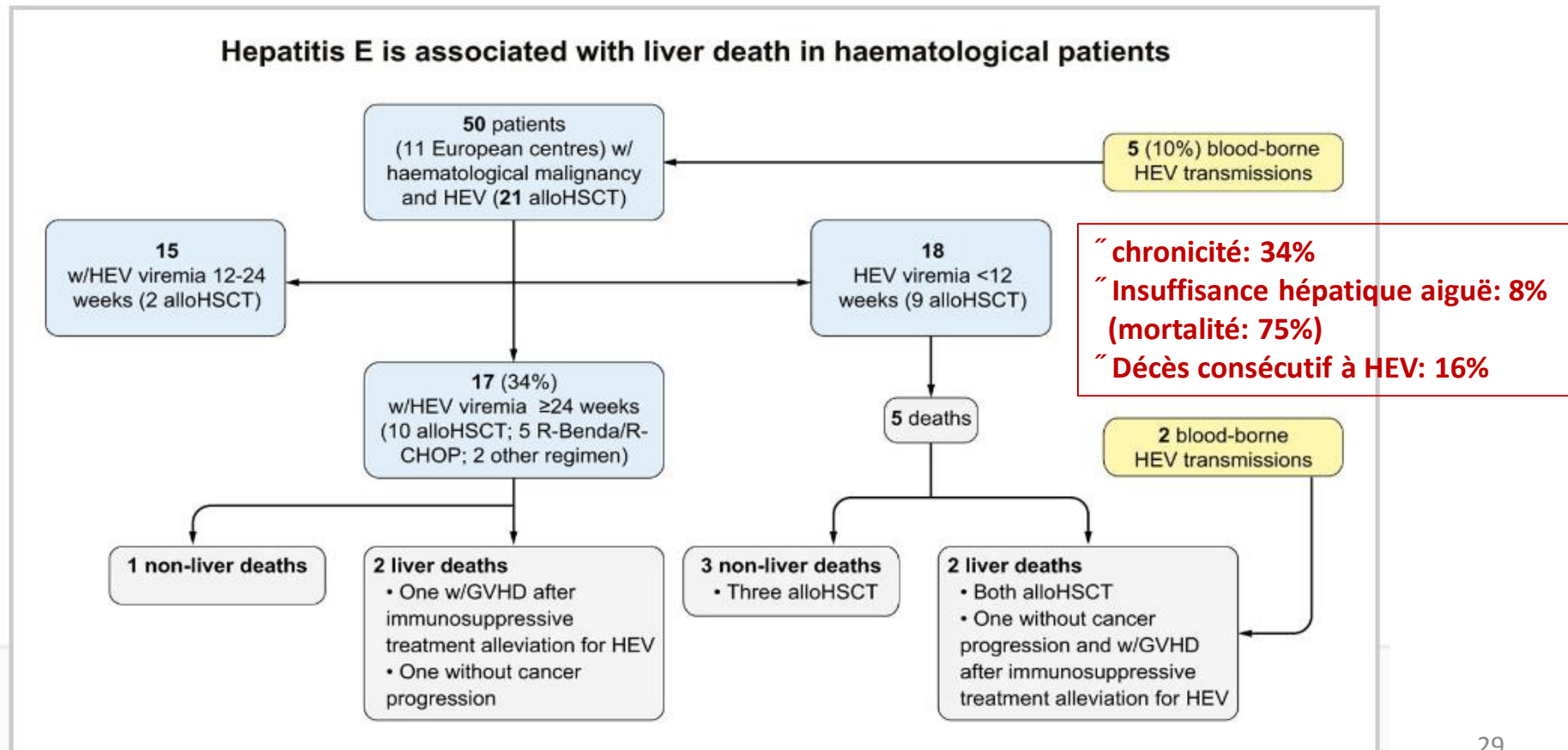
*Emerging Infectious Disease, 2017*

# HEV et immunodépression

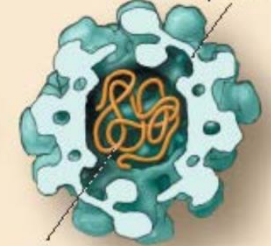


The burden of hepatitis E among patients with haematological malignancies: A retrospective European cohort study

Von Felden et al, Journal of hepatology 2019



# Rapports hémovigilance



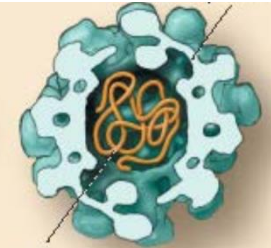
## ” France (données ANSM 2018):

- ” 30 cas décrits depuis 2006
- ” 10 CGR, 3 CPA, 10 MCP, 7 PFC (0 depuis 2014)
- ” Majoritairement chez immunodéprimés
- ” HEV-3
- ” 80% de guérison
- ” Incidence VHE: 0.16/100.000 PSL

## ” Belgique (données AFMPS 2006 - 2016):

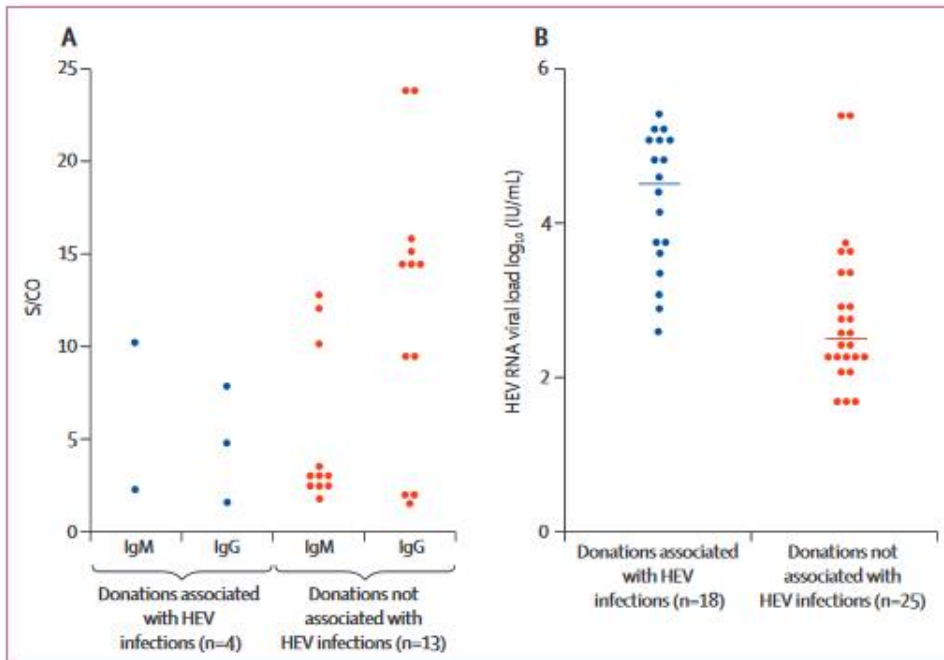
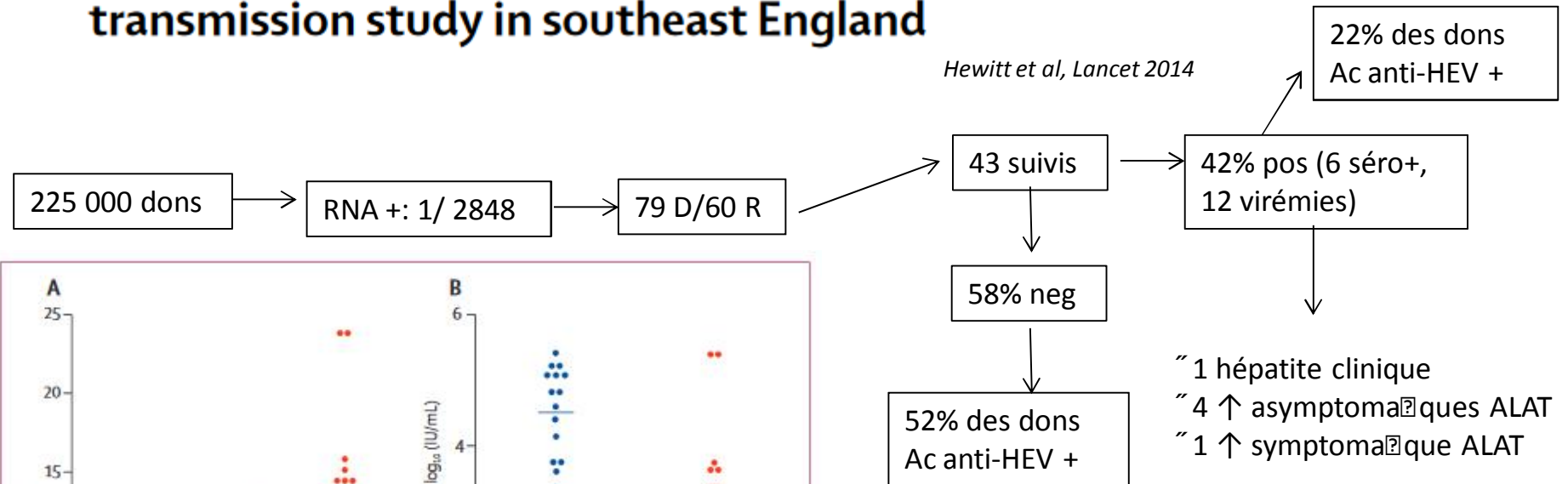
- ” 9 cas décrits tous en 2016

# Risque de transmission



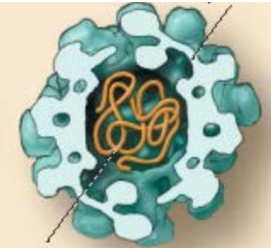
## Hepatitis E virus in blood components: a prevalence and transmission study in southeast England

Hewitt et al, Lancet 2014




- ➔ 1200 PSL contaminés transfusés/an
- ➔ Charge virale donneur 10x < charge virale observée chez patients avec HEV aiguë
- ➔ Risque transfusionnel: 1/3000/PSL

# Evaluation du risque transfusionnel



## Impact of hepatitis E virus testing on the safety of blood components in Germany – results of a simulation study

Christel Kamp,<sup>1</sup>  Johannes Blümel,<sup>1</sup> Sally A. Baylis,<sup>1</sup> Isabelle Bekeredjian-Ding,<sup>1</sup> Michael Chudy,<sup>1</sup> Margarethe Heiden,<sup>1</sup> Olaf Henseler,<sup>1</sup> Brigitte Keller-Stanislawski,<sup>1</sup> Anneke S. de Vos<sup>2</sup> & Markus B. Funk<sup>1</sup>

*Vox Sanguinis* (2018) 113, 811–813

**Table 1** Expected number of transfusion-transmitted HEV infections and subsequent chronic and incurable cases per year in Germany (GER, based on 5 185 194 components in total, cf. Table S1) and the Netherlands (NL, based on 544 831 components in total, data reproduced from [8]) depending on testing scenario

Pool size	Expected HEV transmissions/year		Expected chronic HEV cases/year		Expected incurable cases/year	
	NL	GER	NL	GER	NL	GER
No testing	187	1488	5	93	0.5	10
	100%	100%	100%	100%	100%	100%
96	27	279	0.8	19	0.08	2.0
	14%	19%	16%	20%	16%	20%
48	18	186	0.6	13	0.06	1.4
	9.6%	13%	12%	14%	12%	14%
24	13	139	0.4	10	0.04	1.0
	7.0%	9.3%	8%	11%	8%	10%
1	1.3	14	0.04	1	<0.005	0.1
	0.7%	0.9%	0.8%	1.1%	<1%	1%

Extrapolation à la Belgique (2016):

Nb de PSL transfusés: 544.622 (425.824 CE, 53.297 PFC, 65.501 CP)

Dons HEV RNA +: 1.8/10.000 → 98 dons HEV +

Taux de transmission ≈ 50% → 49 contaminations

30-40% ID (Huzly et al. 2014) : 20 PSL

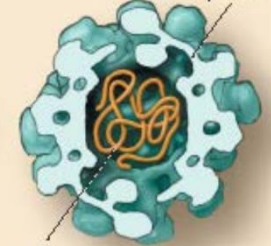
Chronicité: 40-50% → 10 HEV chronique

Succès diminution ttt IS: 30% → 7 HEV chronique

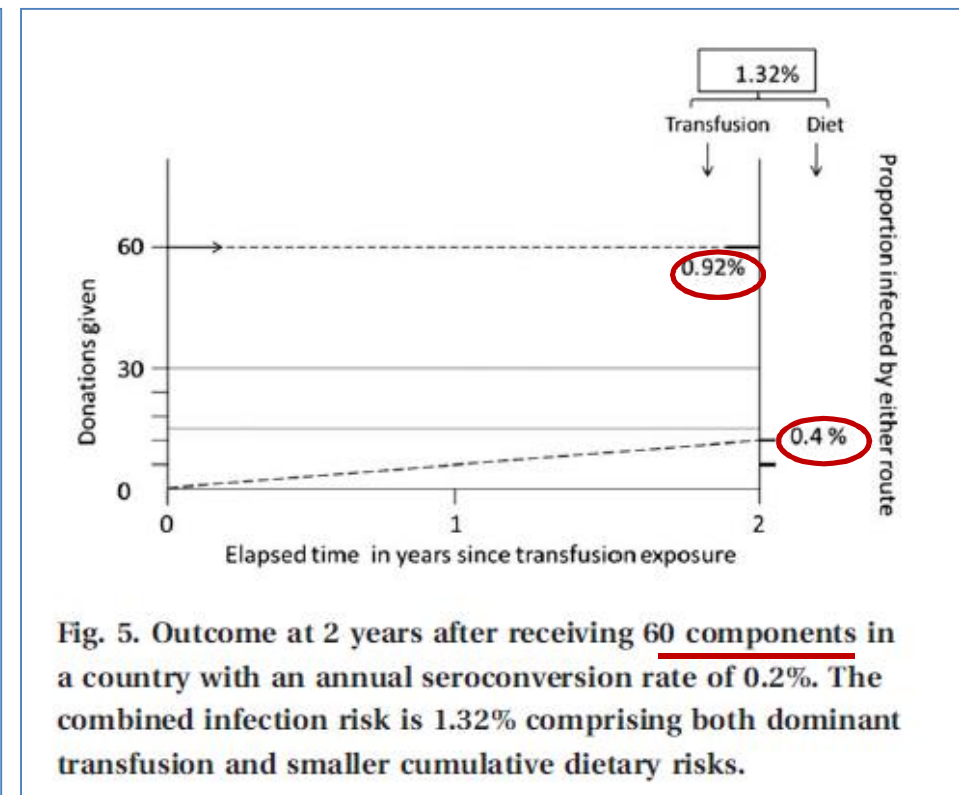
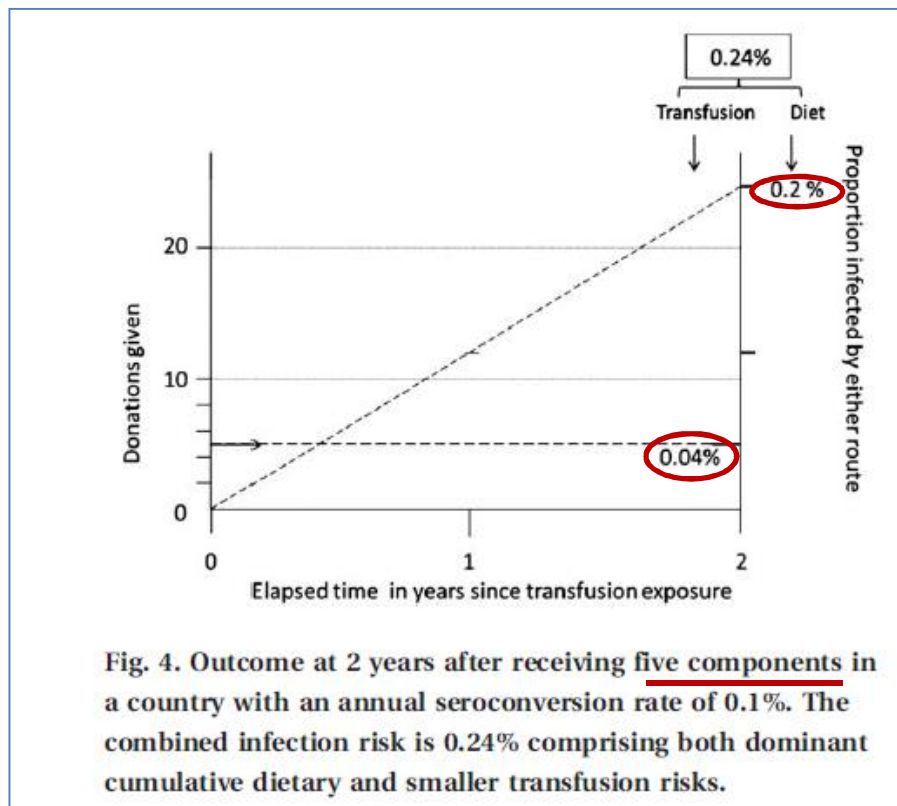
Succès traitement: 80% → 1.4 HEV chronique incurable

→ **HEV incurable: <2 cas/an en l'absence de screening**

# Mais....



” Risque alimentaire: 1/500-1000

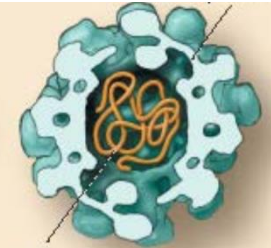


Tedder et al, Transfusion 2017



Risque d'acquérir HEV par transfusion n'est > au risque alimentaire annuel que si >13 transfusions/an

# Pourquoi screening donneurs de sang?

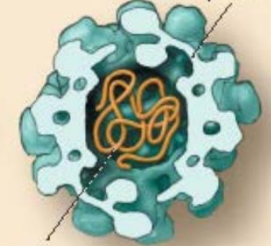


- “ Transmission par transfusion prouvée
- “ Longue phase virémique
- “ Inactivation virale et réduction de pathogènes peu efficaces
- “ Mortalité et morbidité élevées chez immunodéprimés et chez receveurs avec atteinte hépatique



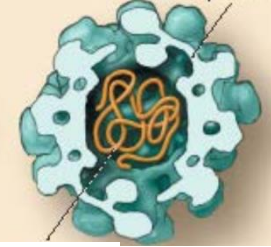
- “ Prévalence HEV RNA relativement faible
- “ Le plus souvent asymptomatique chez sujet immunocompétent
- “ Coût
  - “ 3.57 AUD/produit (pools de 24) → 3.000.000 AUD/an → 15.000.000/EI (1/4.3 ans) (*Hoad et al. Vox sanguinis 2017*)
  - “ Belgique: 1.200.000€/an → infection symptomatique (20%) → 49 x 20% = 10 dons /an → 120.000 €/EI

# Méthodes de screening



- “ Screening universel? Sélectif?
- “ RNA HEV? Anti-HEV? Les 2?
- “ Pools? Unitaire?
- “ Sensibilité de la méthode?
- “ Moyen d'identification des donneurs à risque d'infection HEV?

# Pools vs ID



## Hepatitis E virus blood donor NAT screening: as much as possible or as much as needed?

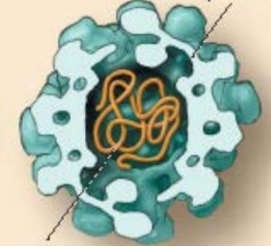
*T. Vollmer, J. Diekmann, C. Knabbe, and J. Dreier*

*Vollmer et al, Transfusion 2019*

assay. This resulted in an incidence of 1:1268 donations (0.079%) for MP-NAT screening and 1:597 donations (0.168%) for ID-NAT screening.

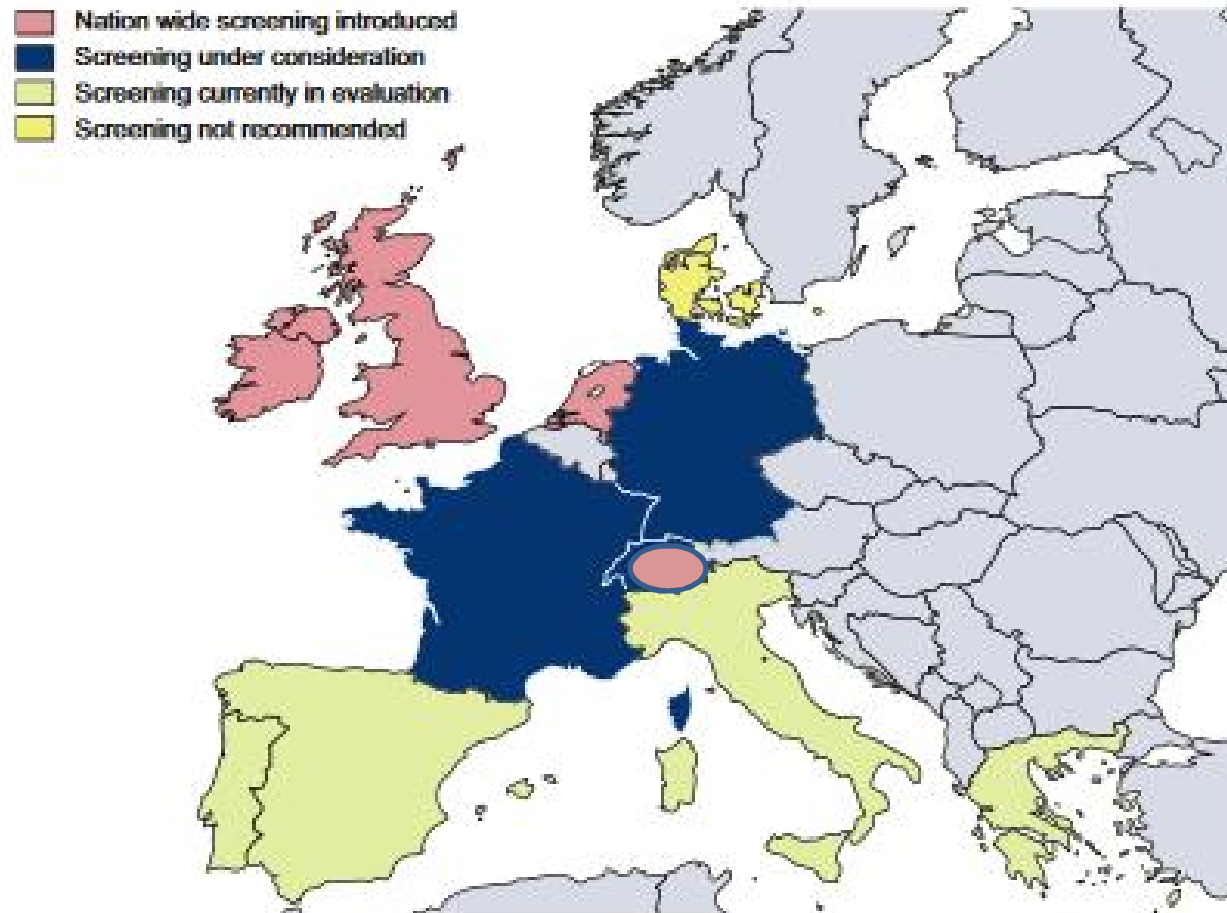
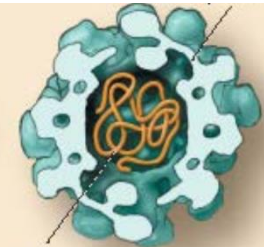
- “ 10.141 dons: 8 MP-NAT et 17 ID-NAT positifs
- “ Charge virale des 9 ID-NAT +/- MP-NAT - <25 UI/mL
- “ Tous les échantillons Anti-IgG et IgM négatifs

# Questions qui restent en suspens



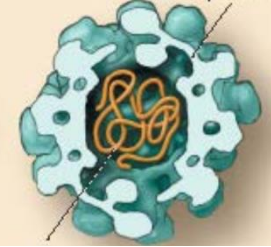
- “ Corrélation taux de transmission et incidence clinique?
- “ Rôle subordonné de la transmission par transfusion/ risque alimentaire?
- “ Dose infectante: volume de plasma transfusé? Charge virale chez donneur?
- “ Rôle des anti-HEV chez receveur?
- “ Facteurs prédisposants?
- “ Différences entre présentation symptomatique et asymptomatique?
- “ Restreindre les dons chez donneurs immunisés?
- “ Eliminer les donneurs virémiques?
- “ Impact économique?
- “ Impact sur la disponibilité des PSL?
- “ Contrôle de la contamination animale?

# Que font nos voisins?



**Fig. 1. The current situation regarding universal blood donor screening in different European countries (adapted from Ref.<sup>7</sup>).** Müllhaupt et al, *Journal of Hepatology*, 2018

# Conclusions



- “ Sub-clinique → sous-estimation diagnostique du VHE → source importante de contamination et infections
- “ La plupart du temps asymptomatique sauf en cas d’immunodépression (transplantés d’organe, VIH, pathologies hématologiques) ou d’hépatopathie sous-jacente
- “ Monitoring des patients à risque indépendamment des transfusions
- “ Risque environnemental >> risque transfusionnel → prévention alimentaire nécessaire

