EPIDEMIOLOGY OF HEPATITIS C VIRUS INFECTION IN EGYPT; OVERT AND OCCULT

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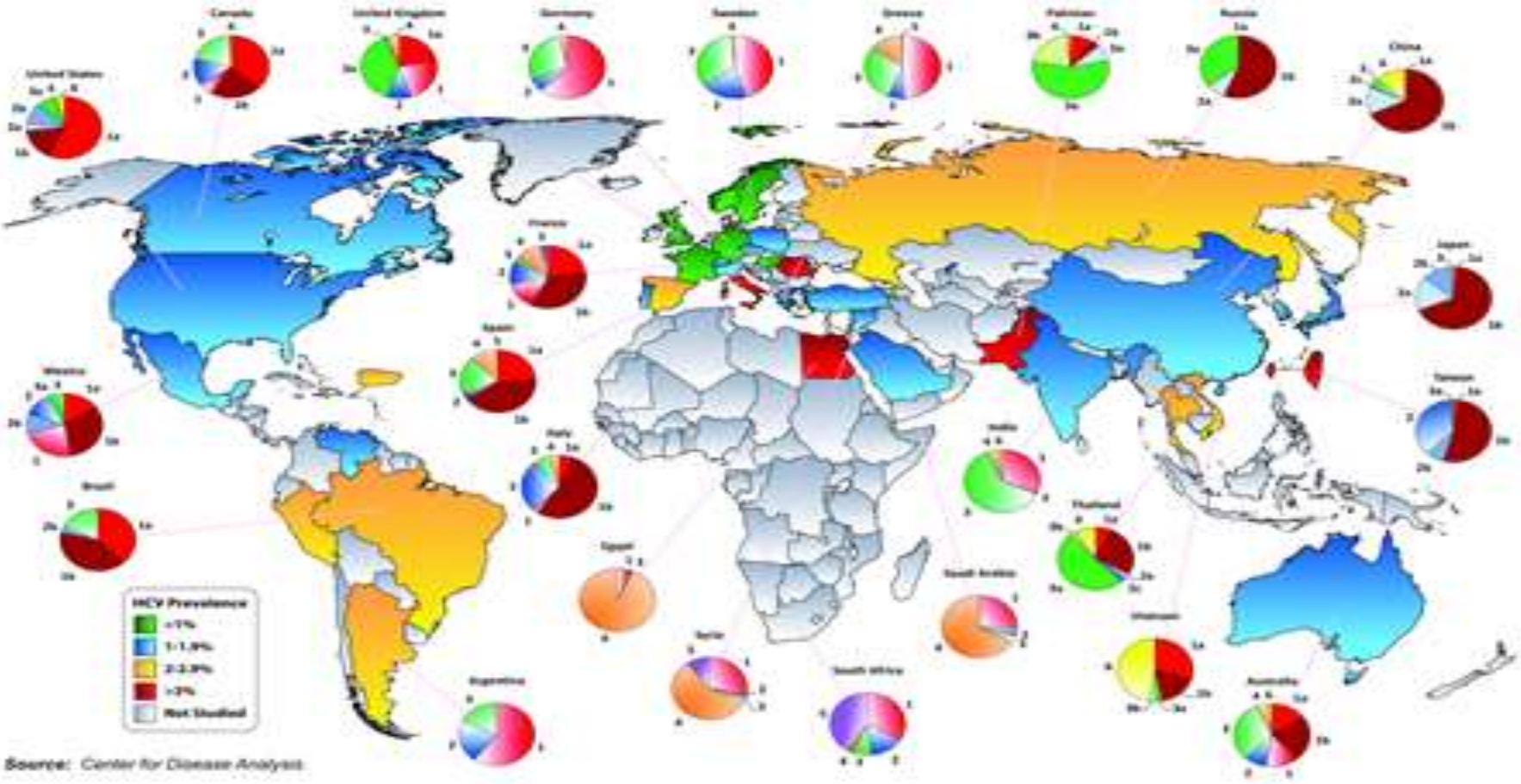
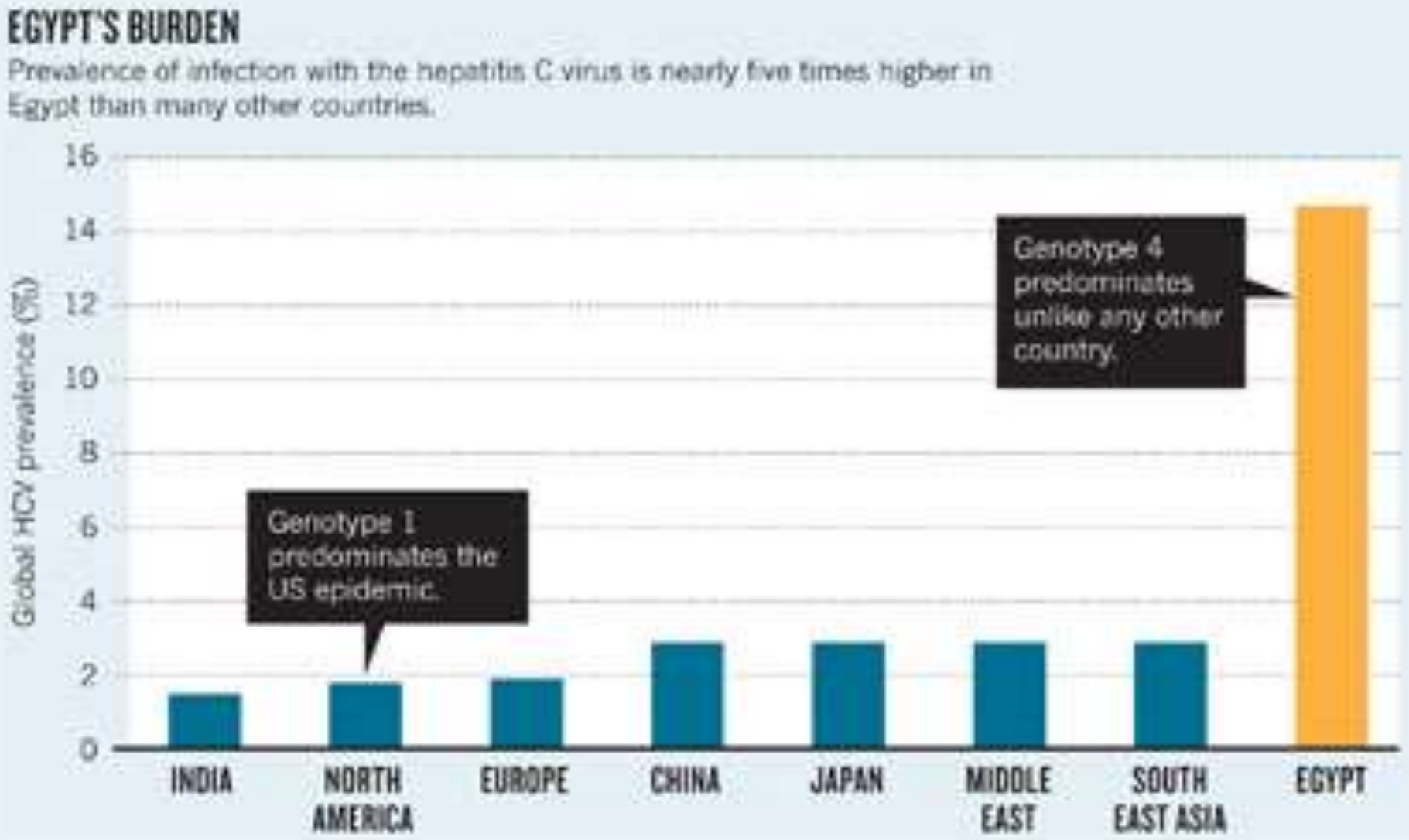
Magnitude of the problem



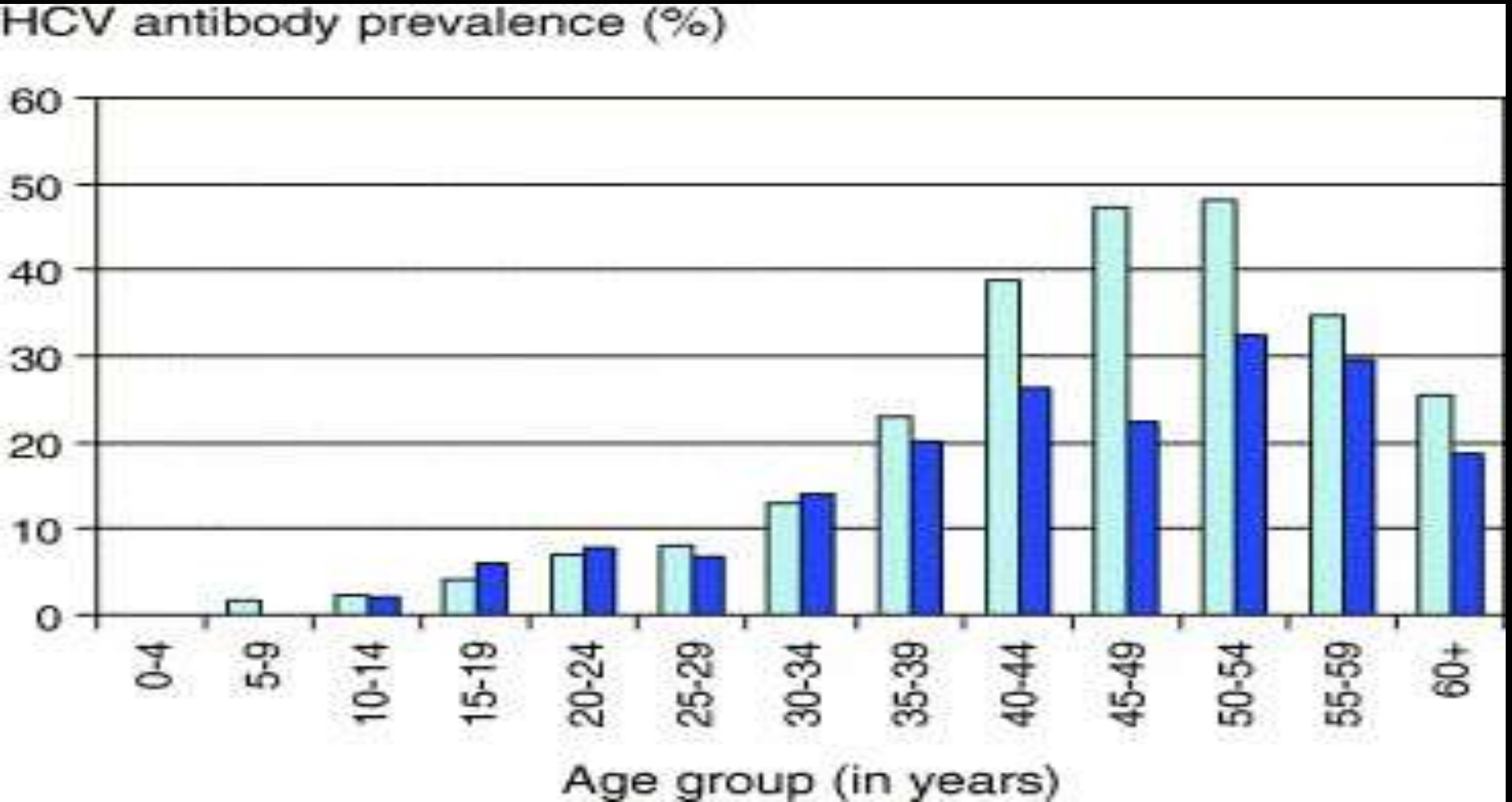
- In 1992, when HCV antibody testing became widely available, the prevalence of HCV in Egypt was reported to be 10.8% among first-time blood donors.

- Since then, many prevalence estimates of HCV have been reported, including the Egyptian Demographic Health Survey (EDHS).

IN GENERAL, ANTI-HCV ANTIBODY PREVALENCE IS 14.7%.

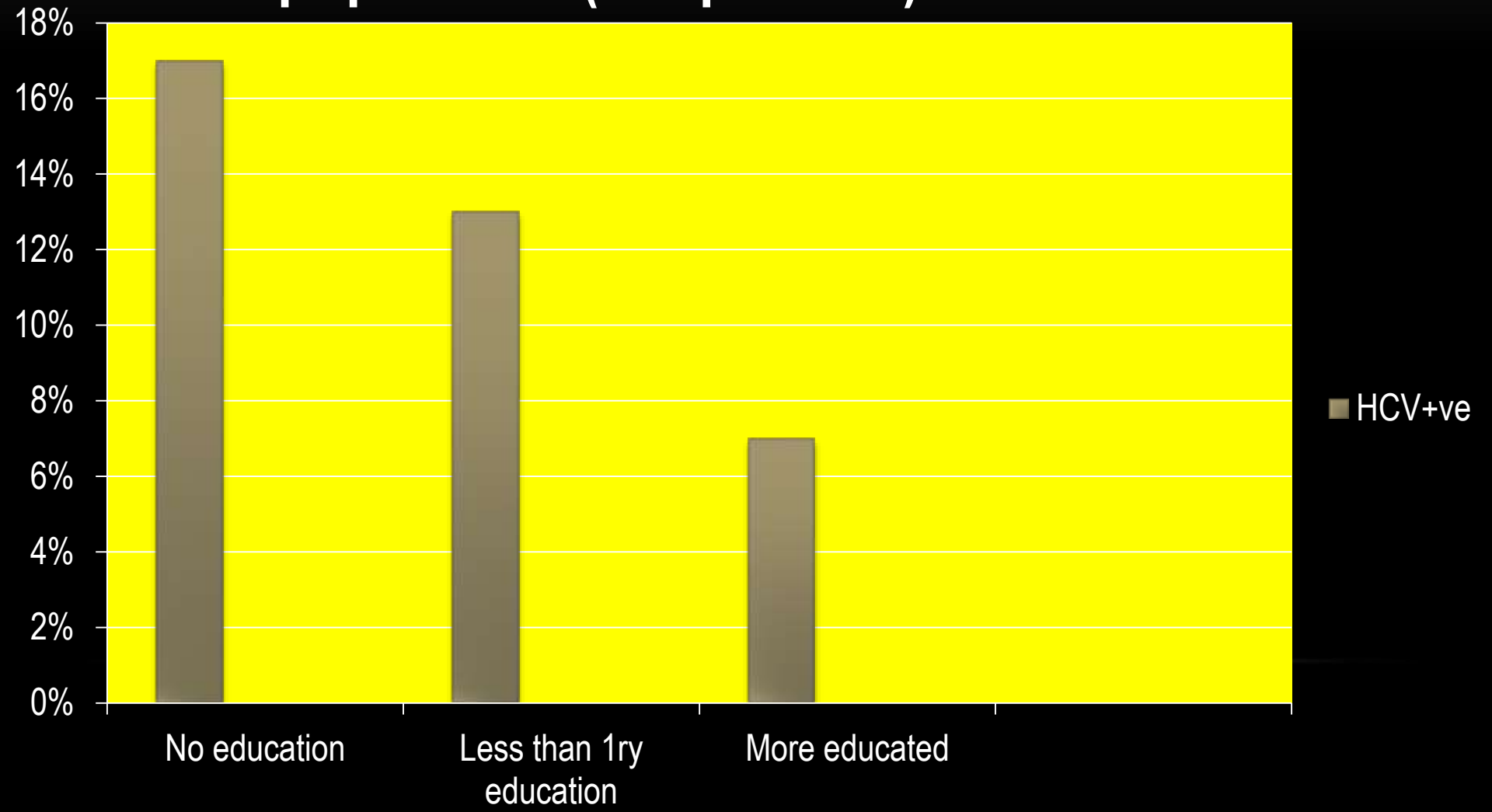


- Most recent studies: 15% of population aged 15-59 had HCV Abs, indicating previous exposure & 10% actively infected.
- Men were more likely to be infected than women.
- Among both women and men, direct proportion between infection and age.

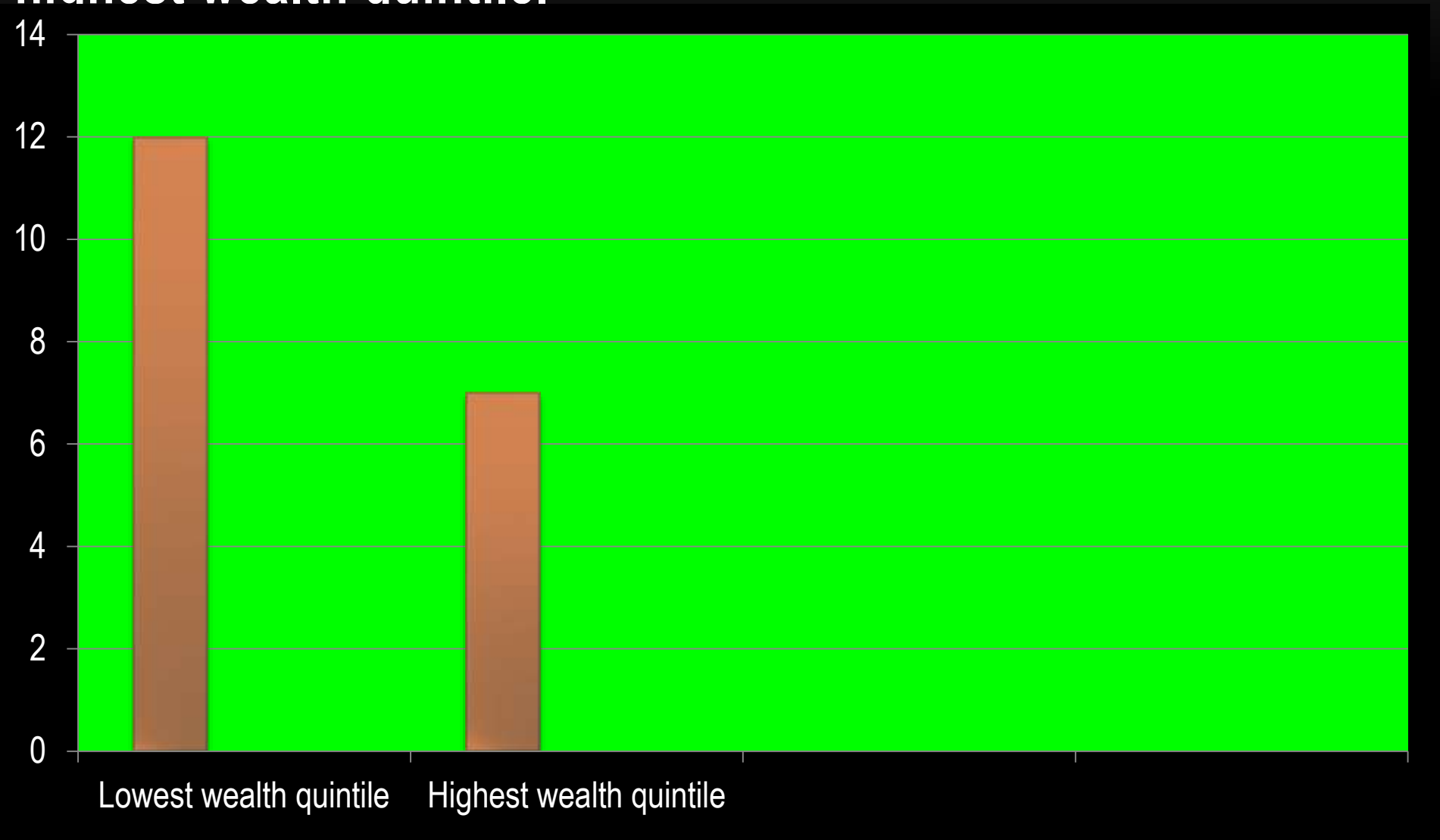


- More among rural residents versus, urban residents.
- Highest in rural Lower and rural Upper Egypt (28.4% & 19.5%), & in the middle rural area (26.5%).
- Lowest in the Frontier Governorates and the Urban Governorates (5.9% & 8.2%).

Individuals with no or less than primary education (17 and 13 percent, respectively) were markedly more likely to be infected with the HCV than the more educated population (7-8 percent).



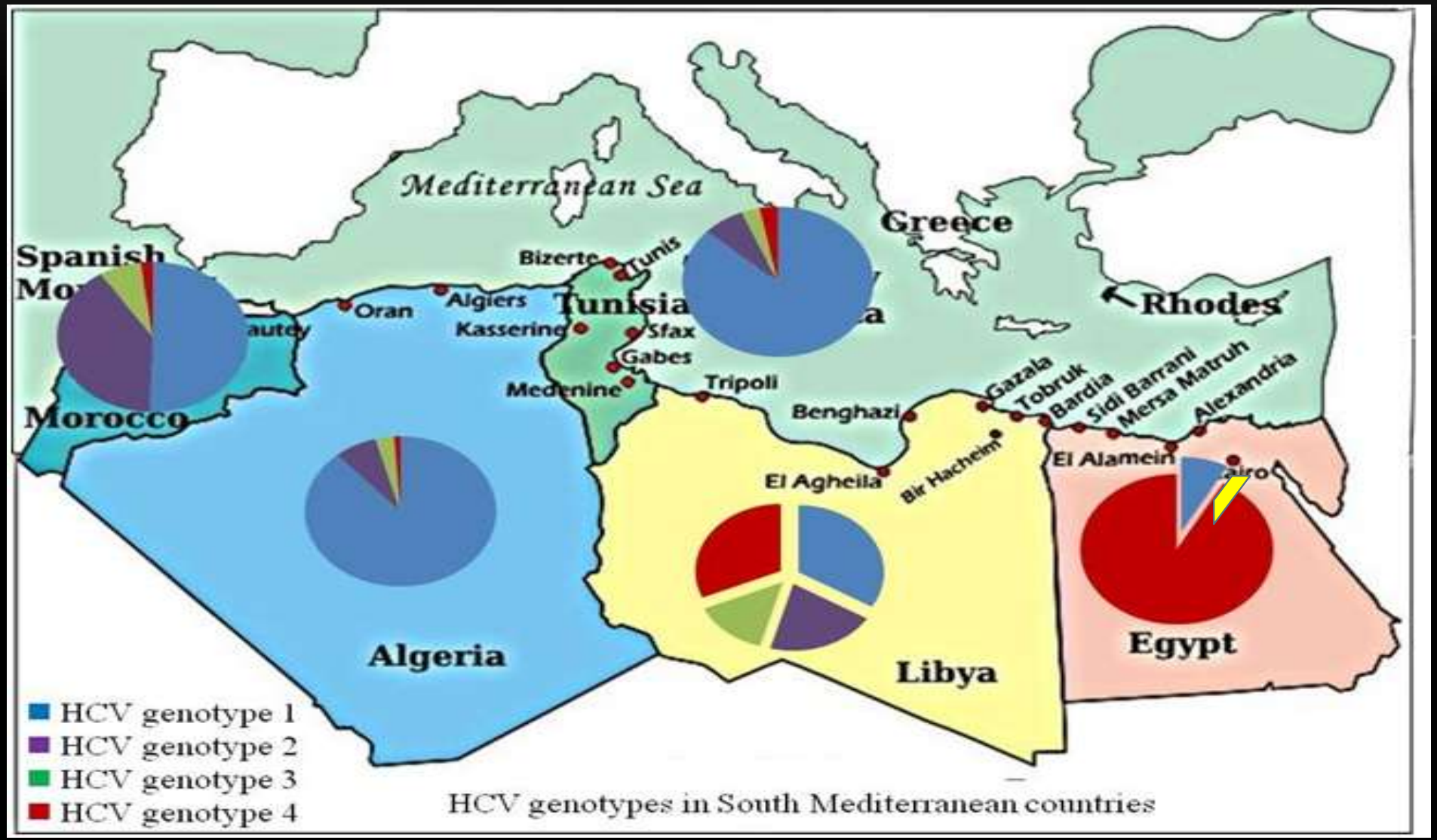
Meanwhile, the likelihood of HCV infection also decreased with the wealth quintile from 12 percent among persons in the lowest wealth quintile to 7 percent among those in the highest wealth quintile.



why

The iatrogenic role of parenteral antischistosomal therapy campaigns to control endemic schistosomiasis, which ceased some decades ago, is a widely held hypothesis

The prevalent genotype in Egypt is type 4 (73%) , followed by genotype 1 (26%), whereas mixed HCV genotypes infection in 15.7% in cases.




NORTH AMERICA
EUROPE
MIDDLE EAST
CENTRAL AMERICA
AFRICA
SOUTH AMERICA
OCEANIA

Origin, evolution, and dynamics of genotype 4

Country	% type 4	Subtypes
Egypt	90%	4a (55%), 4 (24%), 4o (7%), 4m (3%), 4l (3%), 4n (2%)
Gabon	97%	**4c (36%), 4h (15%), 4e (13%), 4 (13%), 4g(13%), 4f (5%), 4a (2.6%)**
Central African Republic	100%	**4 (66.7%), 4k (33.3%)**
Cameroon	36%	**4f (22%), 4 (5%), 4t (5%), 4k (5%), 4e (1.4%), 4o (1%), 4p (1%)**
Tanzania	50%	4 (100%)

An exponential spread of genotype between 1920 and 1960 in Cameroon, which coincided with the mass campaign against trypanosomiasis and mass vaccinations

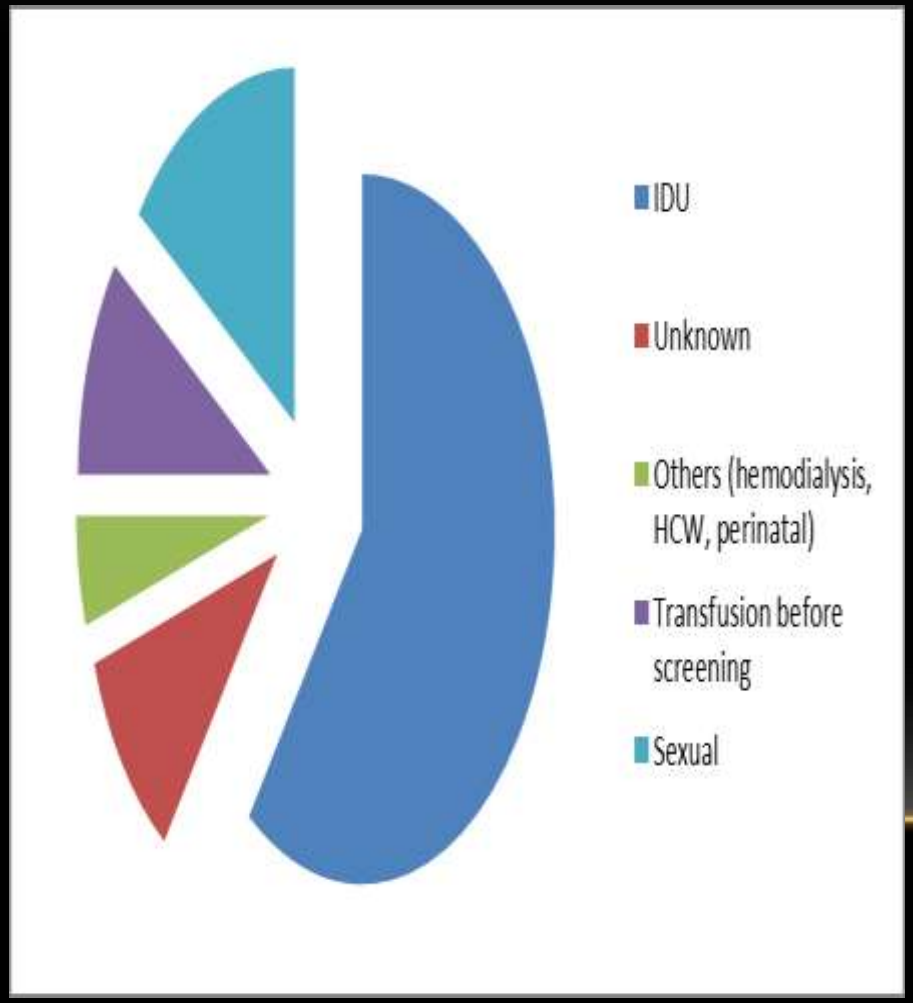
Sexual practices,
Sexual transmission

- In Egypt, studies have suggested that the epidemic pattern of type 4 infection was more recent and quite different from the endemic pattern in sub-Saharan Africa. HCV's lack of genetic diversity compared with the sub-Saharan strains & predominance of HCV 4a are evidences.

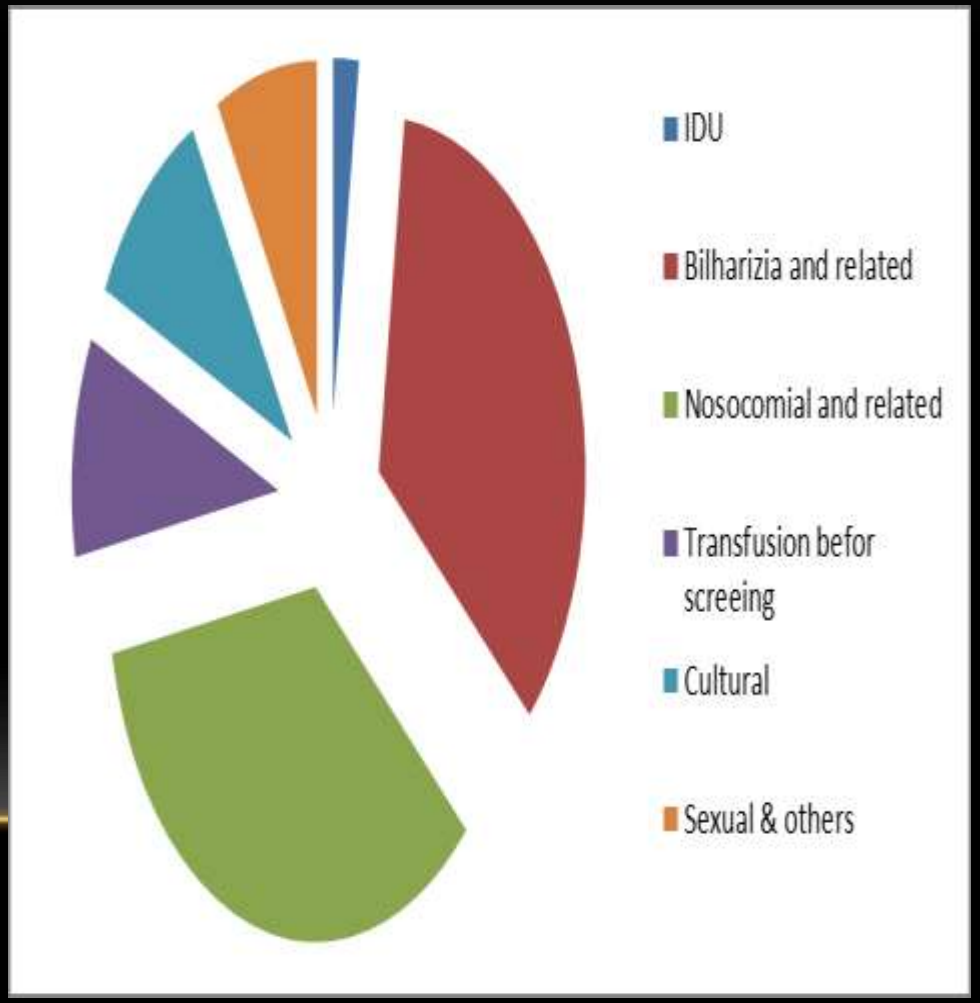
- The spread of HCV 4 increased exponentially in rural areas during the 1930s through the early 1980s, coinciding with the mass antischistosomiasal campaigns, with the most rapid exponential growth between 1930 and1955. Although the campaigns were terminated in the early 1980s, the prevalence and incidence of HCV remains high in Egypt. Thus, it seems that the current status of HCV in Egypt is not only a consequence of the mass anti-schistosomal therapy but also due to new infections acquired beyond that era, given that HCV currently represents more than 30% of the annually reported acute hepatitis cases.

Risk factors and transmission

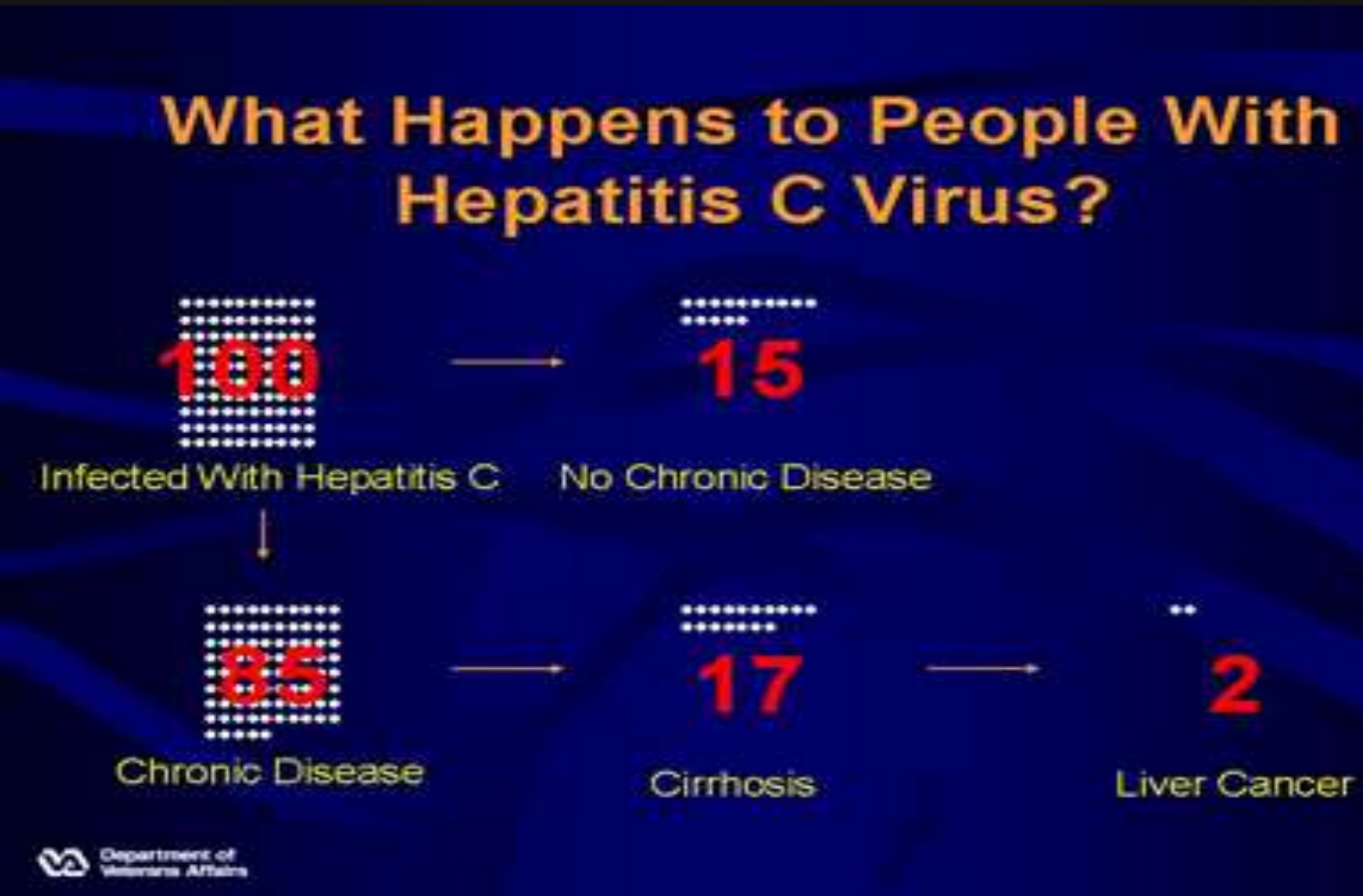
Western countries



Egypt



Complications



- **Chronic HCV is the main cause of liver cirrhosis and liver cancer in Egypt and, indeed, one of the top five leading causes of death.**

HCV kills an estimated 40,000 Egyptians a year

World Health Organization

HCV infection in children

Magnitude of the problem

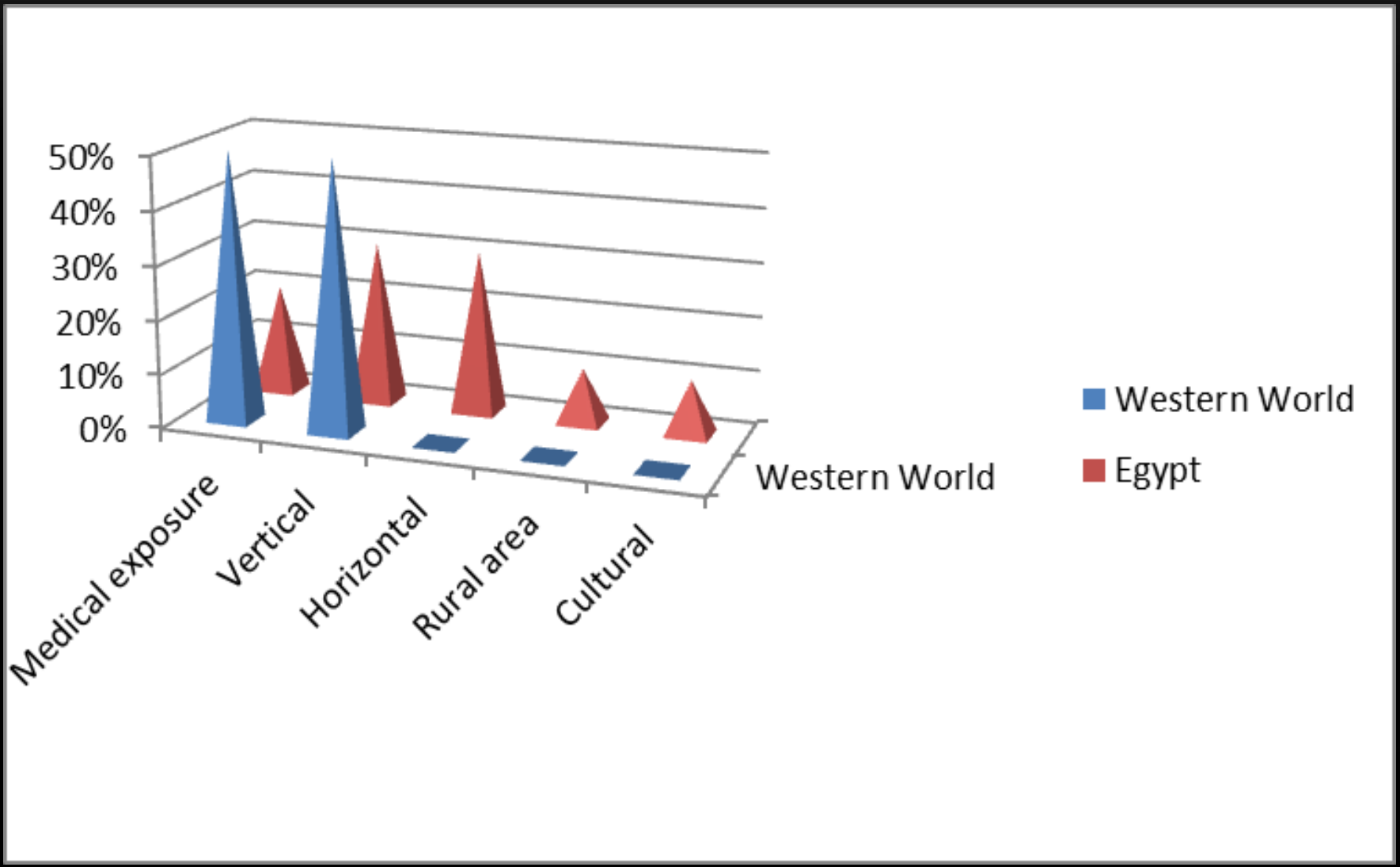
- In the Western world the prevalence of HCV infection is relatively low, with prevalence rate of 0.2%-0.4%.

- In Egypt, although mass campaigns to control schistosomiasis that took place decades earlier may have been responsible for much of seropositivity in the old-age people, current seroprevalence is also high in children too young to have been involved in those campaigns. The prevalence in those under age 20 is approximately 5-8%, demonstrating the continued presence of significant hepatitis C transmission in modern-day Egypt,

Summary of the most recent studies performed for HCV in children.

Year	Age	Study sample	location	ELISA	+ve no (%)	PCR	+ve no (%)	Others +ve no (%)	R
2000	<19	2010	Lower egypt		178 (9%)	-			Habib *et al.*, 2001
2002	<19	2967	Upper Egypt	+	84 (3%)	-			Medhat *et al.*, 2002
2007	1-9	1042	Hospital -based	+	15 (1.4%)	+	5	ALT(6)	El-Raziky *et al.*, 2007
2010	2m-15y	465	Assuit	3rd gen	121(26%)	+	87 (72%)		Kalil et al., 2010
2011	6-15	500	Alex	+	5.8%	+			Barakat , 2011
2014	3-16	150 (T1DM)	Assuit	3rd gen	18(12%)	+	12(75%)	Total & diect bl, ptn,ALT , AST	Farghaly *et al.*, 2014

Risk factors



- It is worth mentioning that HCV infection is not always benign in the childhood period in Egypt. A recent study has shown:
  - ALT levels are elevated in up to half of the HCV RNA-positive children.
  - Symptoms such as diarrhea, abdominal pain, history of fatigue and school absence because of illness were also common.
  - Histological abnormalities detected in three quarters of the HCV RNA-positive children.

Occult HCV infection

- The presence of HCV RNA in liver and in peripheral blood mononuclear cells (PBMCs) in the absence of detectable viral RNA in serum by standard assays.

Diagnosis

- **Gold-standard method:** detection of HCV RNA in the liver biopsy.

- **If liver biopsy is not available:** when occult HCV infection is suspected, testing, with a highly sensitive real-time PCR technique, for the presence of viral RNA in PBMCs **"identifies between 60%-70% of the cases"**.

Reactivation of occult HCV

Reappearance of serum HCV-RNA in patients:

- Immunocompromised
- On long term chemotherapy
- Receiving immunosuppressive therapy (including undergone liver, kidney or bone marrow transplant)

Significance

- Has been a matter of controversy in recent years.
- identified in
  - patients with chronic liver disease of unknown origin.
  - in cryptogenic liver cirrhosis.
  - hepatocellular carcinoma.
  - lymphoproliferative disorders.
  - hemodialysis patients with abnormal values of liver enzymes of unknown origin.
  - and even in healthy subjects without evidence of hepatic disease.

Occult HCV in Egypt

- Interest in occult HCV has emerged recently in Egypt. Studies at a national level are being carried out, but no results have yet been released.

- Many small scale studies:

1. Occult HCV was found to be highly prevalent among Egyptian nonalcoholic fatty liver disease patients (NAFLD) (40.7%).
2. OCI detected in 20% of patients group with lymphoproliferative disorders, compared to only 4% OCI in controls group.
3. High prevalence of occult HCV infection (25%) reported in patients with -unexplained persistently abnormal liver function test results.
4. The risk of acquiring post-transfusion HCV infection from an occult HCV blood unit is 5%.

CONCLUSIONS AND CLOSING REMARKS

- HCV infection is a major health problem in Egypt. The beginning was iatrogenic, however, other routes of transmission led to continuation of the problem up till now. Both adults and children are affected by this disease.

- Occult HCV infection is an entity which has been recently described. Studies at national level are being conducted. However studies for special groups of patients have highlighted its importance.

All efforts should be exerted to bring HCV disease to an end.


Thank You