

LABORATORY-BASED HEPATITIS A IgM SURVEILLANCE IN SOUTH AFRICA, 2018

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Summary

Hepatitis A virus (HAV) causes acute liver disease and is mainly transmitted by the faecal-oral route. South Africa is transitioning from high to intermediate endemicity for hepatitis A. Although the majority of young children are infected, older individuals not exposed in childhood are also being infected, leading to increasing average age of cases. Passive laboratory-based surveillance data from the National Health Laboratory Service (NHLS) Corporate Data Warehouse (CDW) was used to provide a report of laboratory-confirmed hepatitis A IgM positive cases in the public health sector in South Africa in 2018. Of the 88 654 cases tested, 1672 cases (1.9%) were positive. National prevalence of diagnosed cases was 3 per 100 000 population. Incidence was highest in the Western Cape Province (7/100 000), followed by KwaZulu-Natal Province (5/100 000), with all other provinces having a prevalence equal to or below 3/100 000. Western Cape Province had the lowest testing rate but showed the highest detection rate. Of the total IgM positive cases, only 46% were under 10 years of age and 41% were over 15 years. Adults (>20 years) comprised 30% of total cases, with 8% in the >40 year age group. Considering the shift of the transmission to older age groups, planning of hepatitis A vaccine introduction in the public sector in medium term is recommended. Further investigation is required in the Western Cape Province to identify sources of transmission and sentinel site studies are needed to identify risk factors for infection. Population seroprevalence studies would also add value.

Introduction

Hepatitis A virus (HAV) is a hepatovirus in the family *Picornaviridae*. HAV is a small, non-enveloped RNA virus and is mainly transmitted by the faecal-oral route, during which an uninfected person

consumes food or drinks water that is contaminated with the faeces of an infected person. Risk factors include consumption of unsafe water or food, inadequate sanitation, poor personal hygiene and oral-anal sex.^{1,2}

Hepatitis A is an acute disease affecting the liver. It usually has a long incubation period of around 28 days (range 15-50 days).³ Adults are more likely to present with symptoms than children. Symptoms include fatigue, low appetite, abdominal pain, nausea, and jaundice. Antibodies produced in response to hepatitis A infection or vaccine may last for life and protect against reinfection.³

A clinical diagnosis of hepatitis A is not possible as most types of viral hepatitis have similar symptoms. Serologic testing for hepatitis A IgM is required to confirm the diagnosis of an acute infection. Hepatitis A IgM can be detected 5-10 days before the onset of symptoms and can persist for up to 6 months.⁴

Hepatitis A is endemic in Africa, Asia, Central and South America, the Middle East, and the Western Pacific. It is associated with poor sanitation, inadequate clean drinking water and unhygienic practices.¹ In these areas, the infection will mostly be in children younger than 10 years of age, and usually without symptoms. These children will then be protected with lifelong immunity, resulting in rare outbreaks and symptomatic disease when they are adults.¹ In high-income countries, such as England and USA, infection rates are low and age of first infection is later and often symptomatic in adult high-risk groups, such as injecting drug users, men who have sex with men, and homeless people.^{2,5} In countries, like South Africa and most of South America, hygienic conditions may vary resulting in intermediate levels of infection. Consequently, there may be high susceptibility in older age, resulting in large outbreaks amongst adults.¹

In countries that are transitioning from high to intermediate endemicity, large-scale vaccination programs may be cost-effective and beneficial.⁶ It is suggested that South Africa is at the transition stage to intermediate endemicity according to the WHO classification, which uses immunity to hepatitis A (hepatitis A IgG or total antibody) to define various levels of endemicity.⁷ The World Health Organization (WHO) considers areas to be highly endemic if hepatitis A seroprevalence is $\geq 90\%$ by 10 years of age, intermediate if seroprevalence is less than 90% by age 10 years but $\geq 50\%$ by 15 years, low if seroprevalence is under 50% by 15 years but $\geq 50\%$ by 30 years, and very low if

seroprevalence is under 50% by 30 years of age.⁶ In South Africa currently, the hepatitis A vaccine is only provided in the private health sector and is not part of the national expanded program on immunization (EPI). Hepatitis A vaccine is given at 12 and 18 months (Amayeza, 2020).⁸

Hepatitis A is a notifiable disease in many countries, including South Africa. National surveillance of hepatitis A infection in South Africa is important to monitor age trends and identify outbreaks. Passive laboratory-based surveillance data that describes the hepatitis A IgM prevalence in the country for the period 01 January to 31 December 2018 is given.

Methods

Passive laboratory-based surveillance data from the National Health Laboratory Service (NHLS) Corporate Data Warehouse (CDW) was used to analyze laboratory-confirmed hepatitis A IgM positive cases in the public health sector in South Africa in 2018. NHLS-CDW is a centralized system from which data on all laboratory tests performed at NHLS laboratories throughout the country can be accessed. Data from 01 January to 31 December 2018 were used after removal of duplicates. Data from private laboratories were not included in the analysis. Descriptive analyses included age, gender and geographical location (Microsoft Excel 2016).

Data are reported using mid-year population statistics (Stats-SA, 2018) to calculate the testing rate and number of positive cases per 100 000 population. The detection rate was calculated by dividing the number of positive cases by total number of hepatitis A IgM tests done, and reported as a percentage. Epidemic curves were plotted for provinces with the highest burden to identify districts and sub-districts with the highest number of positive cases per week.

Results

During the 2018 review period 88 654 cases were tested for the presence of hepatitis A IgM antibodies. Of these, 1672 cases were positive for hepatitis A IgM, with an overall detection rate of 1.9% (1672/88 654, Table 1).

KwaZulu-Natal, Western Cape and Gauteng provinces accounted for the highest proportion of positive cases (Table 1). Western Cape Province showed the highest number of positive cases per 100 000 population even though this province had one of the lower testing rates.

Table 1. Provincial statistics for hepatitis A IgM testing in South Africa, 2018.

Province	Population 2018	Total number of Hepatitis A IgM tests	Testing rate/100000	Number of hepatitis A IgM positives	Detection rate (%)	Positives per 100 000
Eastern Cape	6522700	8845	135.6	136	1.5	2
Free State	2954300	2121	71.8	40	1.9	1
Gauteng	14717000	14729	100.1	188	1.2	1
Kwazulu-Natal	11384700	38058	334.3	564	1.5	5
Limpopo	5797300	6689	115.4	156	2.3	3
Mpumalanga	4523900	7800	172.4	92	1.2	2
North West	3979000	3749	94.2	30	0.8	1
Northern Cape	1225600	1443	117.7	32	2.2	3
Western Cape	6621100	5138	77.6	434	8.5	7
Total	57725600	88654	153.6	1672	1.9	3

Age was reported for 1633/1672 (97.6 %) of the hepatitis A IgM positive cases and ranged from <1 year to 89 years. The mean age was 16 years, median age was 10 years (IQR, 5-23 years). The distribution by age showed the highest proportion in the 5-9 year age group (n=405, 24.2%), followed by <5 year age group (n=358, 21.4%) (Fig. 2). The proportion in the ≥45 years age group was 6.4% (n=107). There were almost equivalent numbers of males and females, namely 823 and 807 respectively, and 42 were of unknown gender. In the age group <5 years, males were more prevalent (192 males versus 157 females) (Figure 1).

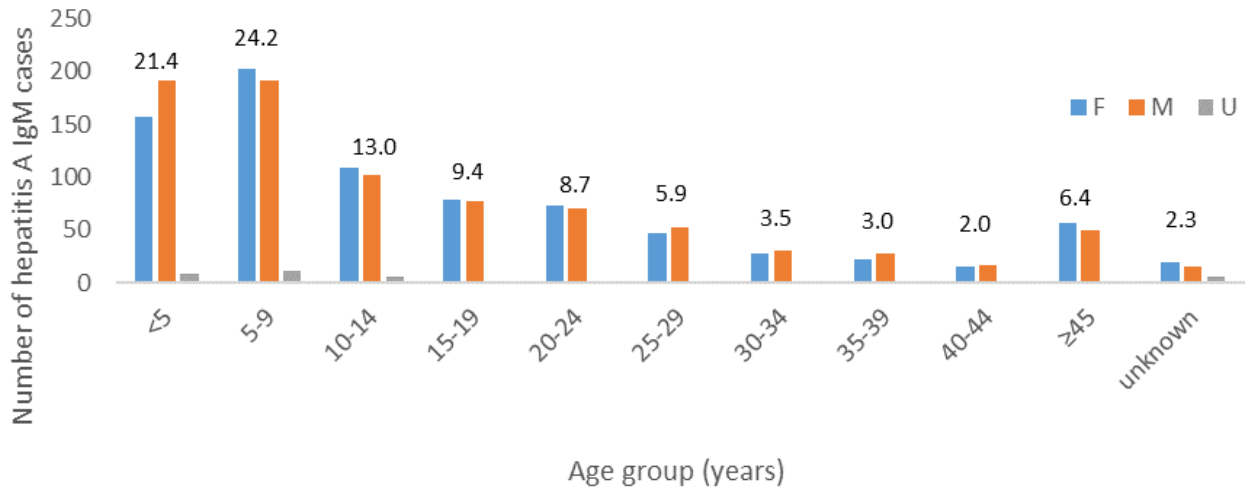
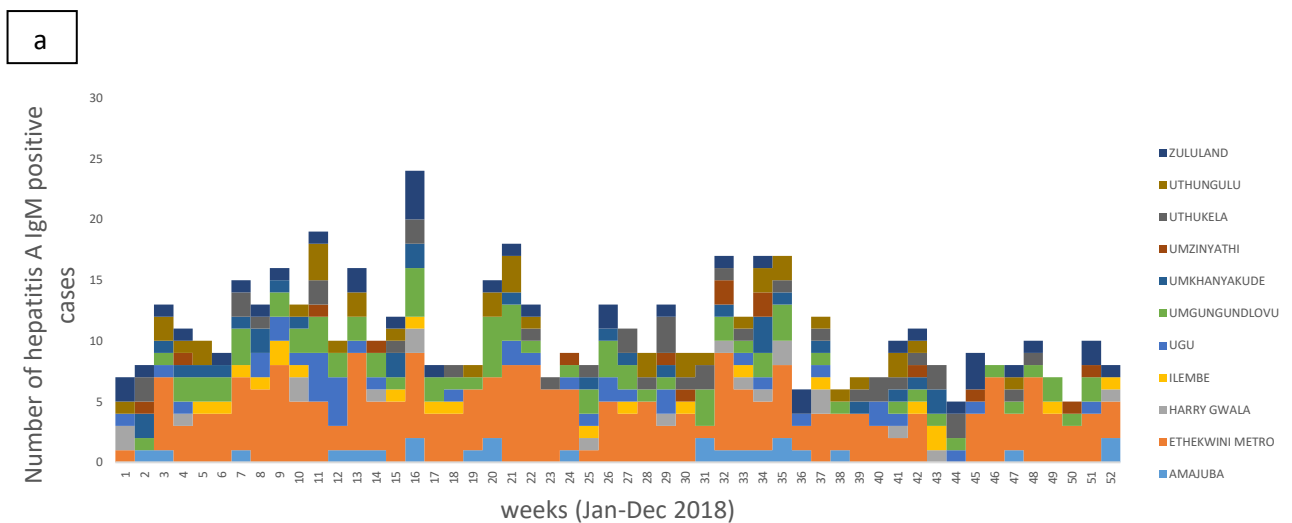


Figure 1. Number of hepatitis A IgM positive cases by age group and gender for 01 January-31 December 2018. South Africa. Figures above the bars are percentages for each age group.

Epidemic curves by district are given for provinces with the highest burden, i.e. KwaZulu-Natal (KZN), Western Cape (WC) and Gauteng (GP) (Figures 2a-c). In KwaZulu-Natal Province, the Ethekewini Metro had the highest number of positive cases (222/564, 39%) (Figure 2a). The Western Cape Province showed two districts with high burden, namely City of Cape Town metro (211/434, 49%) and Cape Winelands (104/434, 24%) (Figure 2b). For Gauteng Province, the Ekurhuleni Metro (69/188, 37%) and City of Tshwane Metro (41/188, 22%) had the highest number of hepatitis IgM positive cases (Figure 2c).



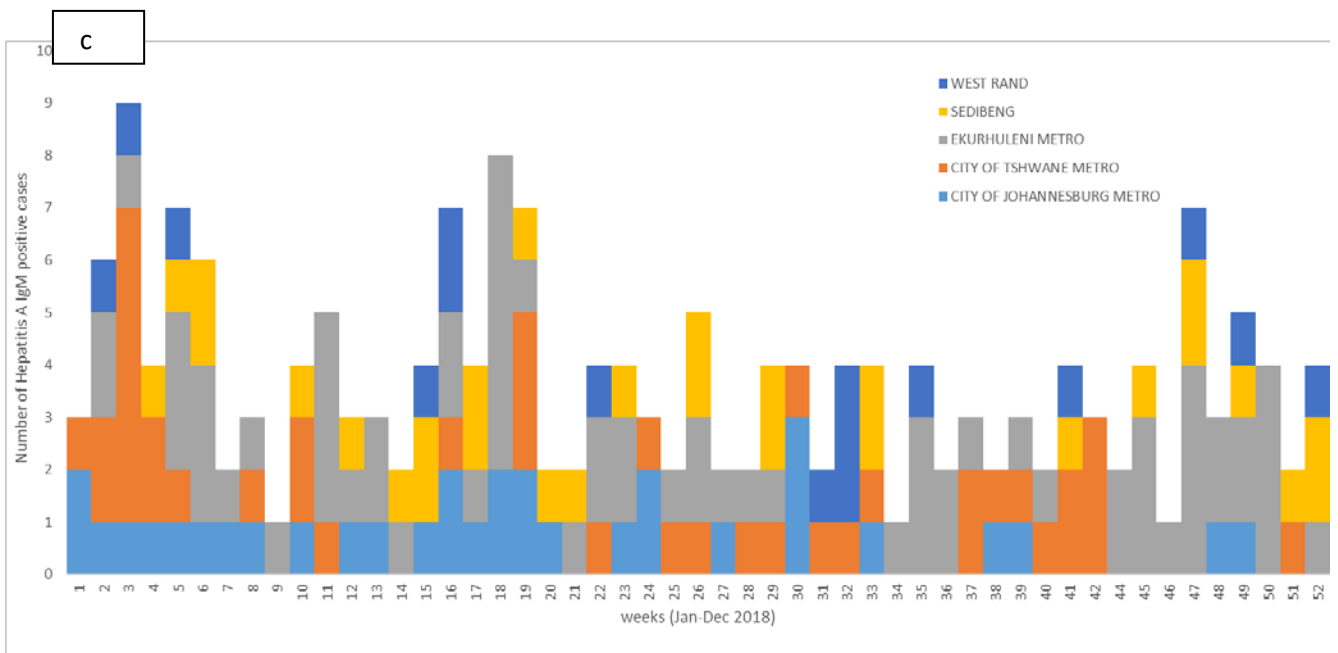
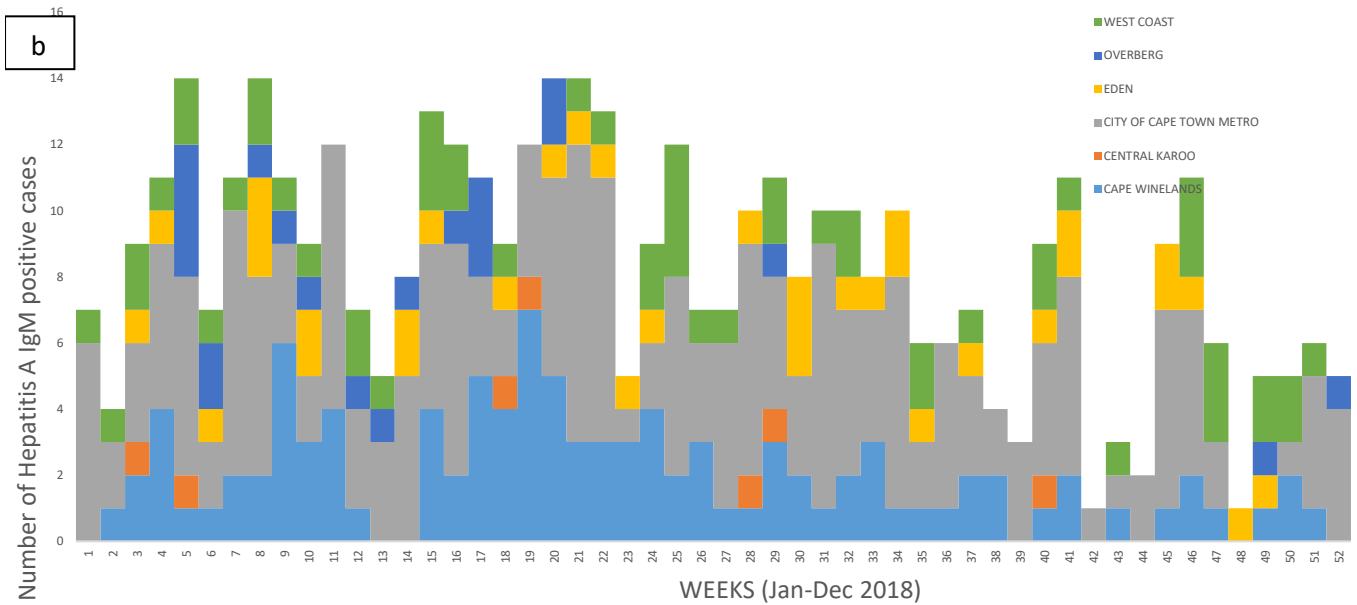


Figure 2. Epidemic curves of hepatitis A cases by week for districts of KwaZulu-Natal (KZN) Province (a), Western Cape (WC) Province (b) and Gauteng Province (GP) (c), in 2018, South Africa.

Epidemic curves for sub-districts with the highest burden are given in Figures 3a and b. In the City of Cape Town Metro, 2 sub-districts had the highest number of cases i.e. Southern (58/211, 28%) and Mitchells Plain (53/211, 25%) (Figure 3a). For Ekurhuleni Metro in Gauteng Province, the Ekurhuleni North 1 sub-district had 30/69 (43%) positive cases (Figure 3b).

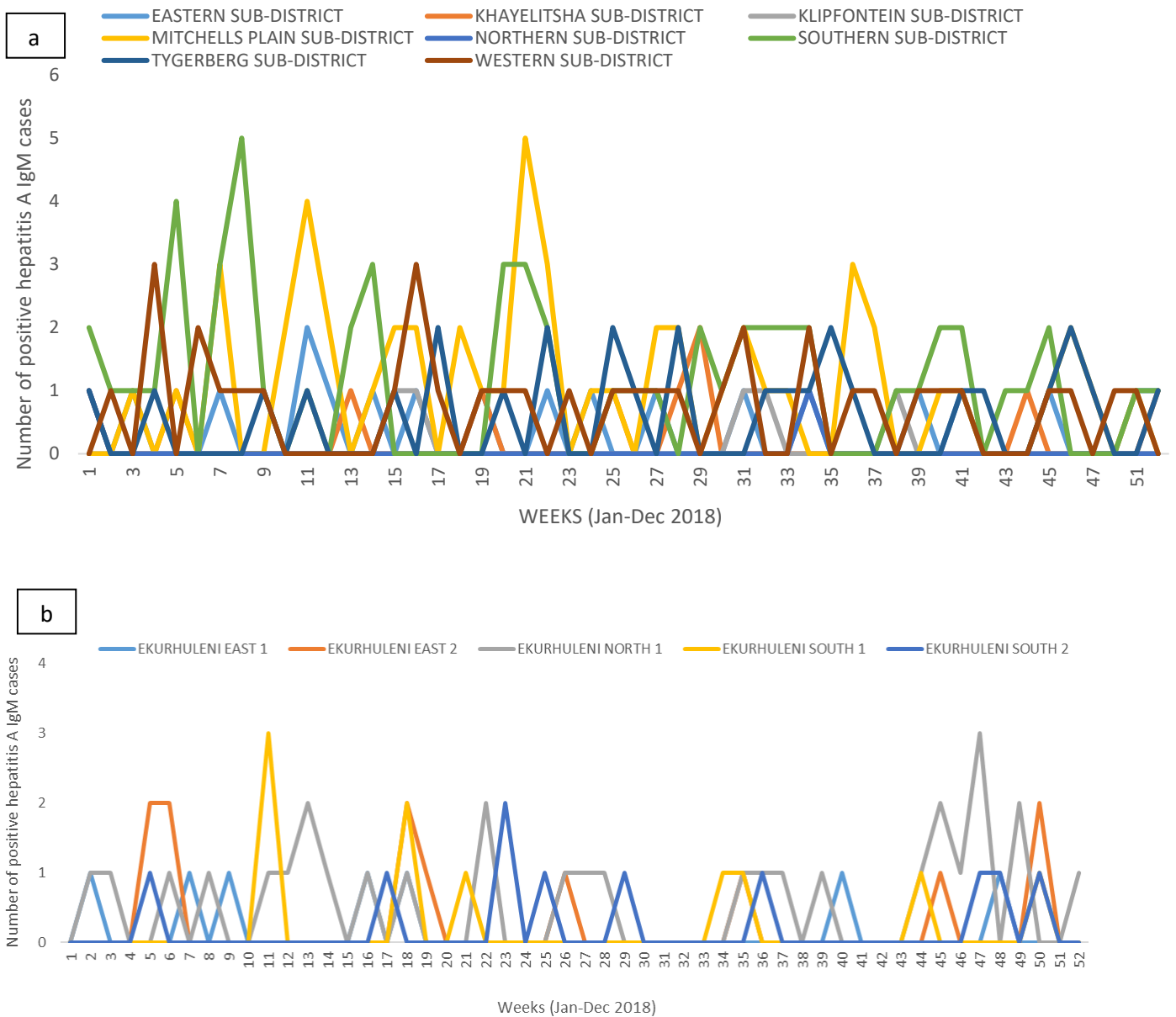


Figure 3. Epidemic curve of hepatitis A cases by week for sub-districts in the City of Cape Town Metro (a), and Ekurhuleni Metro (b), in 2018, South Africa.

Discussion

The national prevalence of laboratory-confirmed hepatitis A was three per 100 000 people in 2018. The true prevalence is likely much higher due to mild cases who do not seek medical attention. Additionally, data from private sector laboratories was not included in the analysis. The Western Cape Province had the highest number of cases per 100 000 population (7/100 000) in 2018 followed by KwaZulu-Natal Province at 5/100 000 with all other provinces having a rate equal to or below

3/100 000. These data show a need for further investigations in the Western Cape Province to identify sources of transmission.

Of the total number of IgM positive cases, the 5-9 year age group was most prevalent, followed by those less than five years. Forty-six percent were <10 years of age, compared with 50% as previously reported using data over a ten-year period from 2005 to 2015.⁷ Fifty-nine percent of cases in this survey were under 15 years, slightly less than the 64% previously reported.⁷ Adults (>20 years) comprised 30% of the total number of positive cases. Interestingly, there was an increase in the proportion of cases in the >40 year age group (8%) compared to previous statistics (5%).⁷

Common risk factors for hepatitis A in children are poor sanitation, inadequate supply of safe drinking water, and living in a household with an infected person. For adults, additional risk factors include sex with a partner with acute hepatitis A, use of recreational drugs, sex between men, and travelling to areas of high endemicity without being immunized.¹

This laboratory-based survey shows the burden of diagnosed hepatitis A in the public sector in South Africa and highlights provincial differences in the number of diagnosed cases. The true national burden, including undiagnosed infections, remains unquantified. Estimations of population endemicity rates require population-based serosurveys. Planning for hepatitis A vaccine introduction in the public sector in the medium term is recommended.

Acknowledgements

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