Background document

Two decades of the VHPB: Achievements, impact and remaining challenges in prevention and control of viral hepatitis

Viral Hepatitis Prevention Board Meeting
Antwerp, Belgium, 13-14 November 2014.

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Content

This pre-meeting document contains a list of selected abstracts/ references from a Pubmed MEDLINE search on different search terms. The references are ranged by publication year (most recent first) and for each year in alphabetical order of the first author's name.

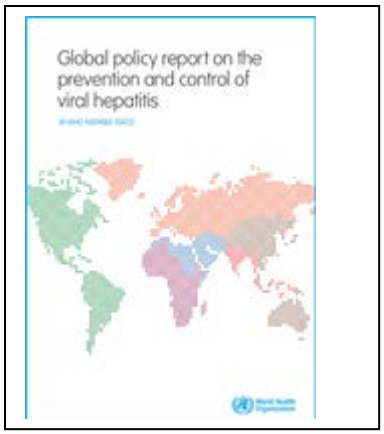
List of publications achieved via speakers form when this form was not available a Pubmed MEDLINE search was performed on Name of the speaker in [Author] and [hepatitis*]. If more than 10 references only the most recent articles are shown.

1. Meeting subjects

Session 1: Global Viral hepatitis prevention and control

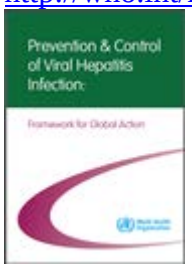
Presentation Stefan Wiktor (WHO) - Global viral hepatitis

- *World Health Organization information on hepatitis*
  - *http://who.int/topics/hepatitis/en/*
  - Global hepatitis programme
    - http://who.int/hiv/topics/hepatitis/en/
  - Global policy report on the prevention and control of viral hepatitis in WHO Member States
    - http://who.int/hiv/pub/hepatitis/global_report/en/



- The periodic evaluation of implementation of the WHO strategy requires an initial baseline survey of all Member States. In mid-2012, WHO, in collaboration with the World Hepatitis Alliance, conducted such a survey, asking Member States to provide information relating to the four axes of the WHO strategy. In particular, Member States were asked whether key prevention and control activities are being conducted. This report presents the results.
- The first chapter provides an introduction to viral hepatitis and to the global response to this group of diseases. The second chapter provides a global overview of the survey findings. Chapters three through eight present findings from the six WHO regions, including summaries of data from all responding countries. Additional survey data, study methodology information and the survey instrument can be found in Annexes A–E.

  - Prevention and Control of Viral Hepatitis Infection: Framework for Global Action
    - http://who.int/hiv/pub/hepatitis/Framework/en/



Most recent WHO viral hepatitis publication

Guidelines for the screening, care and treatment of persons with hepatitis C infection

These guidelines complement existing guidance on the prevention of transmission of bloodborne viruses, including HCV. They serve as a framework that can allow the expansion of clinical services to patients with HCV infection, as they provide key recommendations in these areas and discuss considerations for implementation.

RELATED Abstracts

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND (WHO)** } in in title/abstract and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }. Manual selection. The reference were sorted by publication year and first author

"**Global routine vaccination coverage, 2009**." MMWR Morb Mortal Wkly Rep **2010** 59(42): 1367-1371.

The widespread use of vaccines has greatly improved global public health, preventing millions of childhood hospitalizations and deaths each year. Vaccination of children also is projected to avert adult deaths through the prevention of hepatitis B (HepB) virus--related chronic liver disease and liver cancer and human papilloma virus--related cervical cancer. When the World Health Organization (WHO) began the Expanded Programme on Immunization in 1974, <5% of the world's children had been fully vaccinated with bacille Calmette-Guerin (BCG), diphtheria-tetanus-pertussis (DTP) vaccine, oral poliovirus vaccine, and measles-containing vaccine (MCV) during the first year of life. Since then, increased vaccination coverage has resulted in substantial reductions in morbidity and mortality, including a >99% decline in polio incidence since 1988, with eradication on the horizon, and a 78% decline in measles-associated mortality from 2000 to 2008 With the introduction of Haemophilus influenzae type b (Hib) vaccine, HepB vaccine, pneumococcal conjugate vaccine (PCV), and rotavirus vaccine into many countries' routine vaccination schedules, further reductions in morbidity and mortality are expected. However, based on an annual global birth cohort of approximately 130 million, an estimated 23 million infants worldwide still do not receive the benefits of routine vaccination (i.e., 3 doses of DTP during the first year of life). The Global Immunization Vision and Strategy (GIVS), developed in 2005 by WHO and UNICEF, assists countries in strengthening immunization programs and vaccinating more persons. GIVS aims to achieve 90% national 3-dose DTP (DTP3) coverage by age 12 months in all countries, and 80% coverage in every district or equivalent administrative unit by 2010 (and to sustain these levels through 2015). This report summarizes global routine vaccination coverage during 2000--2009 and progress toward achieving GIVS goals.

Lee, H. and Park, W. "**Public health policy for management of hepatitis B virus infection: historical review of recommendations for immunization**." Public Health Nurs **2010** 27(2): 148-157.

Chronic hepatitis B virus (HBV) infection is the leading cause of cirrhosis, liver failure, and liver cancer, and an estimated 620,000 persons die annually from HBV-related liver disease (Goldstein et al., 2005; World Health Organization, 2000). Immunization with the HBV vaccine is the most effective means of preventing HBV infection and its consequent acute and chronic liver diseases such as cirrhosis and hepatocellular carcinoma. The HBV vaccine has been used against HBV in the United States since 1982 (Centers for Disease Control and Prevention, 1982); during the last 25 years, HBV vaccine policy continued to evolve in response to public health issues and epidemiologic data. Although the number of newly acquired HBV infections has substantially declined as a result of implementation of a national immunization program, the prevalence of chronic HBV infection remains high. The purpose of this article is to review the epidemiology of HBV, provide a historical review of health policies for HBV immunization, and summarize the recent evidence-based public health guidelines for management of HBV infection in the United States.

Guidance on Prevention of Viral Hepatitis B and C Among People Who Inject Drugs. Geneva, World Health Organization. **2012**.

The guidance is the first step in the provision of comprehensive guidance on viral hepatitis surveillance, prevention and treatment by the World Health Organization. The following recommendations are based on systematic reviews of scientific evidence, community values and preferences and implementation issues. Recommendation 1: It is suggested to offer people who inject drugs the rapid hepatitis B vaccination regimen. Recommendation 2: It is suggested to offer people who inject drugs incentives to increase uptake and completion of the hepatitis B vaccine schedule. Recommendation 3: It is suggested that needle and syringe programs also provide low dead-space syringes for distribution to people who inject drugs. Recommendation 4: Psychosocial interventions are not suggested for people who inject drugs to reduce the incidence of viral hepatitis. Recommendation 5: It is suggested to offer peer interventions to people who inject drugs to reduce the incidence of viral hepatitis.

Ott, J. J., Stevens, G. A. and Wiersma, S. T. "**The risk of perinatal hepatitis B virus transmission: hepatitis B e antigen (HBeAg) prevalence estimates for all world regions**." BMC Infect Dis **2012** 12: 131.

BACKGROUND: HBeAg presence in childbearing-age women is a major determinant of perinatal hepatitis B virus (HBV) transmission. The risk of developing chronic HBV infection and liver disease is highest at young age. Our aim was to assess perinatal HBV transmission risk by means of estimating age- and region-specific HBeAg prevalence. METHODS: Based on observed HBeAg seroprevalence data obtained from a systematic literature review, we modeled HBeAg prevalence using an empirical Bayesian hierarchical model. Age- and region-specific estimates were generated for 1990 and 2005. RESULTS: Globally, highest HBeAg prevalence of over 50 % was found in 0-9 years old girls. At reproductive age, HBeAg prevalence was 20-50 %. Prevalence was highest in young females in East Asia in 1990 (78 %), the infection was less common in Sub-Saharan and North Africa. Regional differences in prevalence were smaller in 2005. There was an overall decrease in HBeAg between 1990 and 2005, which was strongest among girls in Oceania (23.3 % decline), South and South-East Asia (14 % decline). However, in these regions, prevalence remained high at 67 % among young females in 2005. Smaller decreases were observed in women at reproductive age, at which 24-32 % of all HBsAg-positive women were HBeAg-positive in 2005, with lowest prevalence in Southern Sub-Saharan Africa and highest prevalence in Oceania and South-East Asia. CONCLUSIONS: HBeAg estimates are crucial for understanding the epidemiology of HBV and for prioritizing implementation of WHO`s prevention recommendations for all infants to receive the first dose of hepatitis B vaccine within 24 hours of birth. Results will have importance as access to treatment for chronic HBV infection is expanded.

Chen, D. S., Locarnini, S., Wait, S., Bae, S. H., Chen, P. J., Fung, J. Y., Kim, H. S., Lu, S. N., Sung, J., Tanaka, J., et al. "**Report from a Viral Hepatitis Policy Forum on implementing the WHO Framework for Global Action on viral hepatitis in North Asia**." J Hepatol **2013** 59(5): 1073-1080.

BACKGROUND & AIMS: The World Health Organisation (WHO) Prevention & Control of Viral Hepatitis Infection: Framework for Global Action offers a global vision for the prevention and control of viral hepatitis. In October 2012, the Coalition to Eradicate Viral Hepatitis in Asia Pacific (CEVHAP) organised the North Asia Workshop on Viral Hepatitis in Taipei to discuss how to implement the WHO Framework in the North Asia region. This paper presents outcomes from this workshop. METHODS: Twenty-eight representatives from local liver associations, patient organisations, and centres of excellence in Hong Kong, Japan, Korea, and Taiwan participated in the workshop. FINDINGS: Priority areas for action were described along the four axes of the WHO Framework: (1) awareness, advocacy and resources; (2) evidence and data; (3) prevention of transmission; and (4) screening and treatment. Priorities included: axis 1: greater public and professional awareness, particularly among primary care physicians and local advocacy networks. Axis 2: better economic data and identifying barriers to screening and treatment uptake. Axis 3: monitoring of vaccination outcomes and targeted harm reduction strategies. Axis 4: strengthening links between hospitals and primary care providers, and secure funding of screening and treatment, including for hepatocellular carcinoma. CONCLUSIONS: The WHO Framework provides an opportunity to develop comprehensive and cohesive policies in North Asia and the broader region. A partnership between clinical specialists, primary care physicians, policy makers, and people with or at risk of viral hepatitis is essential in shaping future policies.

Cui, F., Drobeniuc, J., Hadler, S. C., Hutin, Y. J., Ma, F., Wiersma, S., Wang, F., Wu, J., Zheng, H., Zhou, L., et al. "**Review of hepatitis B surveillance in China: improving information to frame future directions in prevention and control**." Vaccine **2013** 31 Suppl 9: J79-84.

BACKGROUND: As the WHO verified that China reached the target of 1% prevalence of chronic hepatitis B infection among children targeted by universal hepatitis B immunization of newborns, the country considered new options for hepatitis B prevention and control. We reviewed hepatitis B surveillance in the broader context of viral hepatitis surveillance to propose recommendations to improve the system. METHODS: We described surveillance for viral hepatitis in China with a specific focus on hepatitis B. We assessed critical attributes of the system, including data quality, predictive positive value and usefulness. RESULTS: While remarkable progress in hepatitis B immunization of infants and children has likely almost eliminated transmission in younger age groups, reported rates of hepatitis B increased steadily in China between 1990 and 2008, probably because of a failure to distinguish acute from chronic infections. Elements that prevented a clearer separation between acute and chronic cases included (1) missed opportunity to report cases accurately among clinicians, (2) low availability and use of tests to detect IgM against the hepatitis B core antigen (IgM anti-HBc) and (3) lack of systems to sort, manage and analyze surveillance data. CONCLUSIONS: To improve hepatitis B surveillance, China may consider (1) training clinicians to diagnose acute cases and to use IgM anti-HBc to confirm them, (2) improving access and use of validated IgM anti-HBc tests and (3) developing data management and analysis techniques that sort out acute from chronic cases.

Diez-Padrisa, N. and Castellanos, L. G. "**Viral hepatitis in Latin America and the Caribbean: a public health challenge**." Rev Panam Salud Publica **2013** 34(4): 275-281.

Viral hepatitis (VH) is an emergent concern in public health agendas worldwide. More than one million people die annually from hepatitis and 57% and 78% of global cirrhosis and hepatocellular carcinoma cases, respectively, are caused by VH. The burden of disease caused by hepatitis in Latin America and the Caribbean (LAC) is high. Data on hepatitis has been collected in several countries, but more accurate and comparable studies are needed. Hepatitis B vaccination and screening of donated blood are routine practices in the region. However, integrated policies covering prevention and control of disease caused by all types of hepatitis viruses are scarce. Existing preventive measures need to be reinforced. Attention must be paid to at-risk populations, awareness campaigns, and water and food safety. Affordable access to diagnosis and treatment, population screening, referral to health services and monitoring of positive cases are among the main challenges currently posed by VH in LAC. The World Health Organization framework and Pan American Health Organization regional strategy, defined in response to resolution WHA63.18 of the World Health Assembly, may help to overcome these difficulties. Successful experiences in the fight against hepatitis in some LAC countries may also provide very interesting solutions for the region.

Hirnschall, G., Harries, A. D., Easterbrook, P. J., Doherty, M. C. and Ball, A. "**The next generation of the World Health Organization's global antiretroviral guidance**." J Int AIDS Soc **2013** 16: 18757.

The 2013 World Health Organization's (WHO) Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection provide more than 50 new recommendations across the continuum of HIV care, including recommendations on HIV testing, using antiretroviral drugs for prevention, linking individuals to HIV care and treatment services, initiating and maintaining antiretroviral therapy (ART) and monitoring treatment. Guidance is provided across all age groups and populations of adults, pregnant and breastfeeding women, adolescents and key populations. The guidelines are based on a public health approach to expanding the use of ARV drugs for HIV treatment and prevention, with a particular focus on resource-limited settings. The most important new clinical recommendations include: treating adults, adolescents and older children earlier - starting ART in all individuals with a CD4 cell count of 500 cells/mm(3) or less (but giving priority to those with advanced clinical disease or a CD4 cell count less than 350 cells/mm(3)); starting ART at any CD4 cell count in certain populations, including those with active TB (existing recommendation), Hepatitis B infection and severe chronic liver disease, HIV-positive partners in serodiscordant couples (existing recommendation), pregnant and breastfeeding women, and children younger than 5 years of age; a preferred first-line ART regimen of Tenofovir+3TC or FTC+ Efavirenz as a once-daily fixed-dose combination for adults, pregnant women, and children aged 3 years and older; and the use of viral load testing as the preferred approach to monitoring the response to ART and to diagnose treatment failure. Guidance is also provided on enhancing the efficiency and effectiveness of HIV services, including strategies to improve retention in care, and adherence to ART; task-shifting to address human resource gaps; decentralizing delivery of ART to primary health care, and integrating ART services within maternal and child health, TB or drug dependency clinics. There is additional guidance for programme managers on how to plan HIV programmes and use resources most efficiently.

Gottlieb, S. L., Low, N., Newman, L. M., Bolan, G., Kamb, M. and Broutet, N. "**Toward global prevention of sexually transmitted infections (STIs): the need for STI vaccines**." Vaccine **2014** 32(14): 1527-1535.

An estimated 499 million curable sexually transmitted infections (STIs; gonorrhea, chlamydia, syphilis, and trichomoniasis) occurred globally in 2008. In addition, well over 500 million people are estimated to have a viral STI such as herpes simplex virus type 2 (HSV-2) or human papillomavirus (HPV) at any point in time. STIs result in a large global burden of sexual, reproductive, and maternal-child health consequences, including genital symptoms, pregnancy complications, cancer, infertility, and enhanced HIV transmission, as well as important psychosocial consequences and financial costs. STI control strategies based primarily on behavioral primary prevention and STI case management have had clear successes, but gains have not been universal. Current STI control is hampered or threatened by several behavioral, biological, and implementation challenges, including a large proportion of asymptomatic infections, lack of feasible diagnostic tests globally, antimicrobial resistance, repeat infections, and barriers to intervention access, availability, and scale-up. Vaccines against HPV and hepatitis B virus offer a new paradigm for STI control. Challenges to existing STI prevention efforts provide important reasons for working toward additional STI vaccines. We summarize the global epidemiology of STIs and STI-associated complications, examine challenges to existing STI prevention efforts, and discuss the need for new STI vaccines for future prevention efforts.

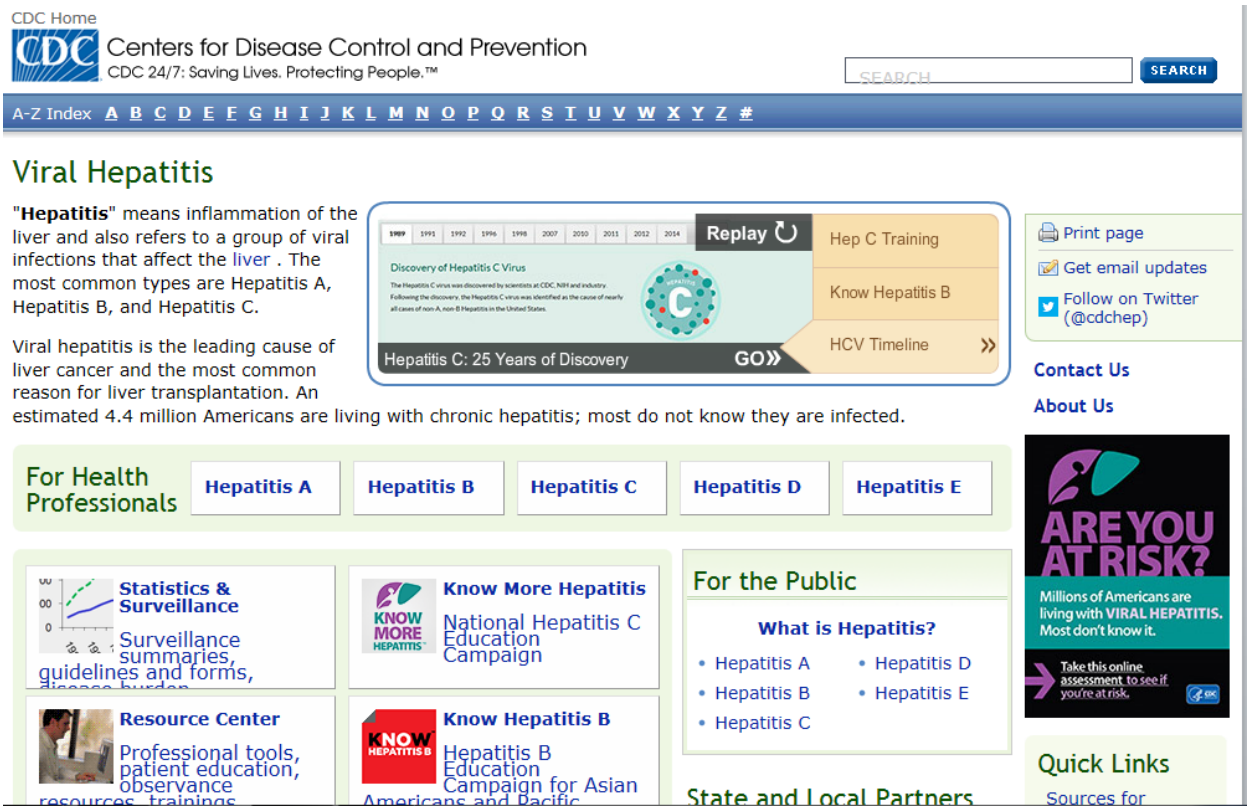
Walsh, N., Verster, A., Rodolph, M. and Akl, E. A. "**WHO guidance on the prevention of viral hepatitis B and C among people who inject drugs**." Int J Drug Policy **2014** 25(3): 363-371.

Viral hepatitis B and C (HBV, HCV) disproportionately affect people who inject drugs (PWID) across the world. To date there has been little global action focusing on prevention, care and treatment of HBV and HCV among PWID. Here we report on the development process and discuss the implications of evidence informed WHO Guidelines for the Prevention of HBV and

HCV in PWID. The World Health Organization (WHO) convened a Guideline Development Panel to develop recommendations on the prevention of HBV and HCV among PWID. The process followed the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology. It included the development of PICO (Population, Interventions, Comparator, Outcomes) questions and conducting systematic reviews. Quality of evidence was classified into 4 levels: high, moderate, low, and very low. In the process of moving from evidence to recommendations, the following were considered: quality of evidence, balance of benefits and harms, community values and preferences and resource use. The WHO recommendations include the following for working with PWID: offer the rapid HBV vaccination regimen; offer incentives to increase uptake and completion of the HBV vaccine schedule; needle and syringe programs should also provide low dead-space syringes for distribution; and offer peer interventions to reduce the incidence of viral hepatitis. This guideline complements other WHO documents regarding PWID, including HIV prevention initiatives such as needle and syringe programs and opioid substitution therapy. This guidance offers a first step in the prevention of HBV and HCV among PWID. However, the lack of high quality evidence in this area necessitates further research and resources for implementation.

Presentation John Ward (CDC) - Overview of current hepatitis prevention and control issues

CDC Hepatitis information http://www.cdc.gov/hepatitis/(accessed on 10/11/2014)



CDC hepatitis statistics &Surveillance

http://www.cdc.gov/hepatitis/Statistics/2012Surveillance/index.htm (accessed 10/11/2014

RELATED Abstracts

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND (CDC) AND John Ward**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }. The reference were sorted by publication year and first author

Ward, J. W. "**The epidemiology of chronic hepatitis C and one-time hepatitis C virus testing of persons born during 1945 to 1965 in the United States**." Clin Liver Dis **2013** 17(1): 1-11.

Hepatitis C virus (HCV) is the most common blood-borne infection in the United States. HCV infection is a leading cause of chronic liver disease, end-stage liver disease, and liver transplantation. Newly available therapies can clear HCV in most infected persons who receive treatment. However, many persons living with HCV infection are unaware of their infection status, including those born during 1945-1965 (a population at increased risk for chronic hepatitis C in the United States). This review highlights the epidemiology of hepatitis C and the importance of HCV testing and linkage to care in an era of more effective antiviral therapies.

Ward, J. W. "**The hidden epidemic of hepatitis C virus infection in the United States: occult transmission and burden of disease**." Top Antivir Med **2013** 21(1): 15-19.

Society faces an immense burden of hepatitis C virus (HCV) infection-related morbidity and mortality. Transmission of HCV is ongoing, and the incidence of HCV infection has been increasing in recent years. New therapies for treating HCV infection hold considerable promise for increasing cure rates and thus reducing HCV transmission. However, many persons with HCV infection in the United States are unaware of their infection status. The Centers for Disease Control and Prevention (CDC) recently expanded its HCV testing recommendations to include 1-time HCV testing for individuals born between 1945 and 1965, a population with a 3% prevalence of infection. Linkage to care and treatment for those identified with infection through testing would have a profound impact in reducing HCV disease burden. Coordinated efforts by public health agencies, clinical care providers, laboratories, and payers are necessary to improve primary and secondary prevention of HCV disease. This article summarizes a presentation by John W. Ward, MD, at the IAS-USA live continuing medical education program held in Atlanta, Georgia, in October 2012.

Moorman, A. C., Gordon, S. C., Rupp, L. B., Spradling, P. R., Teshale, E. H., Lu, M., Nerenz, D. R., Nakasato, C. C., Boscarino, J. A., Henkle, E. M., et al. "**Baseline characteristics and mortality among people in care for chronic viral hepatitis: the chronic hepatitis cohort study**." Clin Infect Dis **2013** 56(1): 40-50.

BACKGROUND: The Chronic Hepatitis Cohort Study (CHeCS), a dynamic prospective, longitudinal, observational cohort study, was created to assess the clinical impact of chronic viral hepatitis in the United States. This report describes the cohort selection process, baseline demographics, and insurance, biopsy, hospitalization, and mortality rates. METHODS: Electronic health records of >1.6 million adult patients seen from January 2006 through December 2010 at 4 integrated healthcare systems in Detroit, Michigan; Danville, Pennsylvania; Portland, Oregon; and Honolulu, Hawaii were collected and analyzed. RESULTS: Of 2202 patients with chronic hepatitis B virus (HBV) infection, 50% were aged 44-63 years, 57% male, 58% Asian/Pacific Islander, and 13% black; and 5.1% had Medicaid, 16.5% Medicare, and 76.3% private insurance. During 2001-2010, 22.3% had a liver biopsy and 37.9% were hospitalized. For the 8810 patients with chronic hepatitis C virus (HCV) infection, 75% were aged 44-63 years, 60% male, 23% black; and 12% had Medicaid, 23% Medicare, and 62% private insurance. During 2001-2010, 38.4% had a liver biopsy and 44.3% were hospitalized. Among persons in care, 9% of persons

with HBV and 14% of persons with HCV infection, mainly those born during 1945-1964, died during the 2006-2010 five-year period. CONCLUSIONS: Baseline demographic, hospitalization, and mortality data from CHeCS highlight the substantial US health burden from chronic viral hepatitis, particularly among persons born during 1945-1964.

Ward, J. W., Valdiserri, R. O. and Koh, H. K. "**Hepatitis C virus prevention, care, and treatment: from policy to practice**." Clin Infect Dis **2012** 55 Suppl 1: S58-63.

The prevention of hepatitis C virus (HCV) infection and associated health conditions (eg, cirrhosis and hepatocellular carcinoma) is a public health priority in the United States. Hepatitis C virus-related morbidity and mortality is increasing at a time when the advent of highly effective therapies greatly increases opportunities to prevent HCV transmission and disease. In 2010, the Institute of Medicine recommended that national action be taken to address this "underappreciated health concern for the nation." In response, in 2011, the US Department of Health and Human Services (HHS) published a viral hepatitis action plan that guides response to the viral hepatitis epidemic by providing explicit steps to be undertaken by specific HHS agencies to improve provider training and community education; expand access to testing, care, and treatment; strengthen public health surveillance; improve HCV preventive services for injection drug users; develop a hepatitis C vaccine; and prevent HCV transmission in healthcare settings. For all aspects of the action plan, infectious disease specialists and other clinicians assume a key role in efforts to reduce HCV-related morbidity and mortality. With successful collaboration of the public and private sectors, the hepatitis C epidemic can be forever silenced.

Ward, J. W. "**Testing for HCV: the first step in preventing disease transmission and improving health outcomes for HCV-infected individuals**." Antivir Ther **2012** 17(7 Pt B): 1397-1401.

In the US, application of antibody-based and nucleic acid testing for HCV has dramatically reduced HCV transmissions over the past two decades. In addition to testing donors of blood, tissue and organs to reduce the risk of transfusion/transplantation-associated HCV, testing can also motivate individuals to adopt safer behaviours. HCV testing, when accompanied by appropriate care and treatment, can reduce the extent of morbidity and mortality that often accompanies chronic HCV infection. Options for HCV treatment have recently been expanded and improved with the availability of more effective, anti-HCV drugs; furthermore, the remarkable results of clinical trials of these drugs suggest that safe, all-oral therapies requiring relatively short duration are on the immediate horizon. These advances have prompted new US initiatives to recommend HCV testing to the wider community (including those populations with a high prevalence of hepatitis C) and promote linkage to treatment for those found to be HCV-infected. Crucial to the success of these initiatives are the development of tests capable of identifying active infection, recent infection, or both, and the implementation of testing strategies that facilitate broad access to HCV testing linked to care and treatment.

Smith, B. D., Morgan, R. L., Beckett, G. A., Falck-Ytter, Y., Holtzman, D. and Ward, J. W. "**Hepatitis C virus testing of persons born during 1945-1965: recommendations from the Centers for Disease Control and Prevention**." Ann Intern Med **2012** 157(11): 817-822.

DESCRIPTION: The Centers for Disease Control and Prevention (CDC) and a group of governmental and private sector partners developed these evidence-based recommendations to increase the proportion of hepatitis C virus (HCV)-infected persons who know their status and are linked to appropriate care and treatment. The recommendations also address brief alcohol screening, as alcohol accelerates progression of liver disease among HCV-infected individuals. These recommendations augment CDC's 1998 and 1999 recommendations based on risk and medical indications and are not meant to replace those recommendations. METHODS: These recommendations are based on systematic reviews of evidence

published from 1995 through February 2012 in MEDLINE, EMBASE, CINAHL, the Cochrane Central Register of Controlled Trials, Sociological Abstracts, and Database of Abstracts of Reviews of Effects. Selected studies included cross-sectional and cohort studies that addressed either prevalence of hepatitis C in the United States or clinical outcomes (for example, hepatocellular carcinoma and serious adverse events) among treated patients and systematic reviews of trials that assessed effectiveness of brief screening interventions for alcohol consumption. The Grading of Recommendations Assessment, Development, and Evaluation framework was used to assess quality of the evidence. RECOMMENDATION 1: Adults born during 1945-1965 should receive 1-time testing for HCV without prior ascertainment of HCV risk. (Grade: strong recommendation; moderate-quality evidence). RECOMMENDATION 2: All persons with identified HCV infection should receive a brief alcohol screening and intervention as clinically indicated, followed by referral to appropriate care and treatment services for HCV infection and related conditions (Grade: strong recommendation; moderate-quality evidence).

Smith, B. D., Morgan, R. L., Beckett, G. A., Falck-Ytter, Y., Holtzman, D., Teo, C. G., Jewett, A., Baack, B., Rein, D. B., Patel, N., et al. "**Recommendations for the identification of chronic hepatitis C virus infection among persons born during 1945-1965**." MMWR Recomm Rep **2012** 61(RR-4): 1-32.

Hepatitis C virus (HCV) is an increasing cause of morbidity and mortality in the United States. Many of the 2.7-3.9 million persons living with HCV infection are unaware they are infected and do not receive care (e.g., education, counseling, and medical monitoring) and treatment. CDC estimates that although persons born during 1945-1965 comprise an estimated 27% of the population, they account for approximately three fourths of all HCV infections in the United States, 73% of HCV-associated mortality, and are at greatest risk for hepatocellular carcinoma and other HCV-related liver disease. With the advent of new therapies that can halt disease progression and provide a virologic cure (i.e., sustained viral clearance following completion of treatment) in most persons, targeted testing and linkage to care for infected persons in this birth cohort is expected to reduce HCV-related morbidity and mortality. CDC is augmenting previous recommendations for HCV testing (CDC. Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. MMWR 1998;47[No. RR-19]) to recommend one-time testing without prior ascertainment of HCV risk for persons born during 1945-1965, a population with a disproportionately high prevalence of HCV infection and related disease. Persons identified as having HCV infection should receive a brief screening for alcohol use and intervention as clinically indicated, followed by referral to appropriate care for HCV infection and related conditions. These recommendations do not replace previous guidelines for HCV testing that are based on known risk factors and clinical indications. Rather, they define an additional target population for testing: persons born during 1945-1965. CDC developed these recommendations with the assistance of a work group representing diverse expertise and perspectives. The recommendations are informed by the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) framework, an approach that provides guidance and tools to define the research questions, conduct the systematic review, assess the overall quality of the evidence, and determine strength of the recommendations. This report is intended to serve as a resource for health-care professionals, public health officials, and organizations involved in the development, implementation, and evaluation of prevention and clinical services. These recommendations will be reviewed every 5 years and updated to include advances in the published evidence.

Ly, K. N., Xing, J., Klevens, R. M., Jiles, R. B., Ward, J. W. and Holmberg, S. D. "**The increasing burden of mortality from viral hepatitis in the United States between 1999 and 2007**." Ann Intern Med **2012** 156(4): 271-278.

BACKGROUND: The increasing health burden and mortality from hepatitis B virus

(HBV) and hepatitis C virus (HCV) in the United States are underappreciated. OBJECTIVE: To examine mortality from HBV; HCV; and, for comparison, HIV. DESIGN: Analysis of U.S. multiple-cause mortality data from 1999 to 2007 from the National Center for Health Statistics. SETTING: All U.S. states and the District of Columbia. PARTICIPANTS: Approximately 22 million decedents. MEASUREMENTS: Age-adjusted mortality rates from HBV, HCV, and HIV. Logistic regression analyses of 2007 data generated 4 independent models per outcome (HCV- or HBV-related deaths) that each included 1 of 4 comorbid conditions and all sociodemographic characteristics. RESULTS: Between 1999 and 2007, recorded deaths from HCV [corrected] increased significantly to 15,106, whereas deaths from HIV declined to 12,734 by 2007. Factors associated with HCV-related deaths included chronic liver disease, HBV co-infection, alcohol-related conditions, minority status, and HIV co-infection. Factors that increased odds of HBV-related death included chronic liver disease, HCV co-infection, Asian or Pacific Islander descent, HIV co-infection, and alcohol-related conditions. Most deaths from HBV and HCV occurred in middle-aged persons. LIMITATION: A person other than the primary physician of the decedent frequently completed the death certificate, and HCV and HBV often were not detected and thus not reported as causes of death. CONCLUSION: By 2007, HCV had superseded HIV as a cause of death in the United States, and deaths from HCV and HBV disproportionately occurred in middle-aged persons. To achieve decreases in mortality similar to those seen with HIV requires new policy initiatives to detect patients with chronic hepatitis and link them to care and treatment. PRIMARY FUNDING SOURCE: Centers for Disease Control and Prevention.

Ward, J. W., Averhoff, F. M. and Koh, H. K. "**World Hepatitis Day: a new era for hepatitis control**." Lancet **2011** 378(9791): 552-553.

Teshale, E. H., Ramachandran, S., Xia, G. L., Roberts, H., Groeger, J., Barry, V., Hu, D. J., Holmberg, S. D., Holtzman, D., Ward, J. W., et al. "**Genotypic distribution of hepatitis B virus (HBV) among acute cases of HBV infection, selected United States counties, 1999-2005**." Clin Infect Dis **2011** 53(8): 751-756.

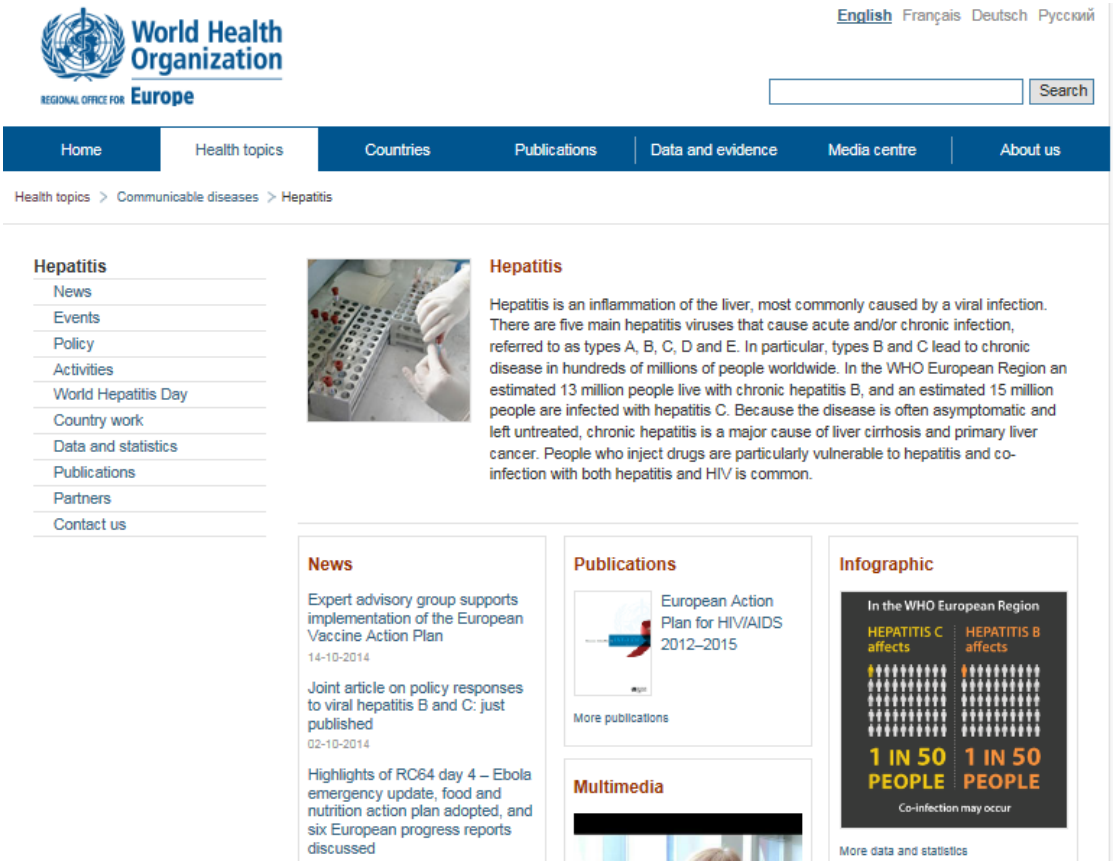
BACKGROUND: Knowledge of the genotypic distribution of hepatitis B virus (HBV) facilitates epidemiologic tracking and surveillance of HBV infection as well as prediction of its disease burden. In the United States, HBV genotyping studies have been conducted for chronic but not acute hepatitis B. METHODS: Serum samples were collected from patients with acute hepatitis B cases reported from the 6 counties that participated in the Sentinel Counties Study of Acute Viral Hepatitis from 1999 through 2005. Polymerase chain reaction followed by nucleotide sequencing of a 435-base pair segment of the HBV S gene was performed, and the sequences were phylogenetically analyzed. RESULTS: Of 614 patients identified with available serum samples, 75% were infected with genotype A HBV and 18% were infected with genotype D HBV. Thirty-two percent of genotype A sequences constituted a single subgenotype A2 cluster. The odds of infection with genotype A (vs with genotype D) were 5 times greater among black individuals than among Hispanic individuals (odds ratio [OR], 5; 95% confidence interval [CI], 2.3-10.7). The odds of infection with genotype A were 49, 8, and 4 times greater among patients from Jefferson County (Alabama), Pinellas County (Florida), and San Francisco (California), respectively, than among those living in Denver County (Colorado). Genotype A was less common among recent injection drug users than it was among non-injection drug users (OR, 0.2; 95% CI, 0.1-0.4). CONCLUSIONS: HBV genotype distribution was significantly associated with ethnicity, place of residence, and risk behavior.

Session 2: MORE THAN 2 DECADES PREVENTION AND CONTROL OF VIRAL HEPATITIS

Presentation *Nedret Emiroglu* Prevention and control of viral hepatitis B and C in WHO European Region

Presentation *Liudmila Mosina* Hepatitis B immunization in WHO European Region

World health organization regional office for Europe – Hepatitis information
http://www.euro.who.int/en/health-topics/communicable-diseases/hepatitis



Key publications – WHO Euro Hepatitis

Barriers and facilitators to hepatitis C treatment for people who inject drugs

2012 Hepatitis C virus (HCV) infection is a significant global public health problem. The burden of HCV infection is concentrated among people who inject drugs (PWID), with an estimated five million PWID living with chronic

HCV in the European Region. HCV antiviral treatment with peginterferon alfa and ribavirin is the standard care for chronic HCV, with a 50-85% cure rate depending on genotype. Research indicates that PWID are interested in HCV treatment uptake and have rates of viral clearance comparable with other populations. Current injectors are not precluded from HCV treatment access in a number of European countries, yet uptake rates are substandard.

Protocol 6. Management of Hepatitis C and HIV Coinfection (2007)

In Europe, the prevalence of hepatitis C virus (HCV) infection in HIV-infected patients is particularly high. Yet only a minority of HCV/HIVcoinfected patients are treated for their hepatitis.

European Vaccine Action Plan 2015–2020

The European Vaccine Action Plan (EVAP) sets a course through a regional vision and goals for immunization and control of vaccine-preventable diseases by defining objectives, priority action areas and indicators, taking into account the specific needs and challenges of WHO European Region Member States.

2012 Revision - Protocol 7. Management of hepatitis B and HIV coinfection

The update is built on new evidence in the area of HBV/HIV treatment and the global WHO 2010 recommendations for a public health approach antiretroviral therapy for HIV infection in adults and adolescents.

Presentation on viral hepatitis (PowerPoint) (2013)

A series of slides prepared for World Hepatitis Day describing the virus, its transmission, treatment and WHO response to the epidemic.

Hope, V. D., Eramova, I., Capurro, D. and Donoghoe, M. C. "**Prevalence and estimation of hepatitis B and C infections in the WHO European Region: a review of data focusing on the countries outside the European Union and the European Free Trade Association**." Epidemiol Infect **2014** 142(2): 270-286.

Knowledge of hepatitis B and C prevalence, and numbers infected, are important for planning responses. Published HBsAg and anti-HCV prevalences for the 20 WHO European Region countries outside the EU/EFTA were extracted, to complement

published data for the EU/EFTA. The general population prevalence of HBsAg (median 3.8%, mean 5.0%, seven countries) ranged from 1.3% (Ukraine) to 13% (Uzbekistan), and anti-HCV (median 2.3%, mean 3.8%, 10 countries) from 0.5% (Serbia, Tajikistan) to 13% (Uzbekistan). People who inject drugs had the highest prevalence of both infections (HBsAg: median 6.8%, mean 8.2%, 13 countries; anti-HCV: median 46%, mean 46%, 17 countries), and prevalence was also elevated in men who have sex with men and sex workers. Simple estimates indicated 13.3 million (1.8%) adults have HBsAg and 15.0 million (2.0%) HCV RNA in the WHO European Region; prevalences were higher outside the EU/EFTA countries. Efforts to prevent, diagnose, and treat these infections need to be maintained and improved. This article may not be reprinted or reused in any way in order to promote any commercial products or services.

RELATED Abstracts

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND Immunization AND Europe**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Van Damme, P., Leuridan, E., Hendrickx, G., Vorsters, A., Theeten, H., Leino, T., Salminen, M. and Kuusi, M. "**Should Europe have a universal hepatitis B vaccination programme?**" BMJ **2013** 347: f4057.

Qureshi, H. "**Hepatitis B infection in Eastern Mediterranean Region: challenges and the way forward**." East Mediterr Health J **2013** 19(7): 585-586.

Kanitz, E. E., Wu, L. A., Giambi, C., Strikas, R. A., Levy-Bruhl, D., Stefanoff, P., Mereckiene, J., Appelgren, E., D'Ancona, F. and Venice National Gatekeepers, C. P. "**Variation in adult vaccination policies across Europe: an overview from VENICE network on vaccine recommendations, funding and coverage**." Vaccine **2012** 30(35): 5222-5228.

BACKGROUND: In 2010-2011, in the framework of the VENICE project, we surveyed European Union (EU) and Economic Area (EEA) countries to fill the gap of information regarding vaccination policies in adults. This project was carried out in collaboration with the United States National Vaccine Program Office, who conducted a similar survey in all developed countries. METHODS: VENICE representatives of all 29 EU/EEA-countries received an online questionnaire including vaccination schedule, recommendations, funding and coverage in adults for 17 vaccine-preventable diseases. RESULTS: The response rate was 100%. The definition of age threshold for adulthood for the purpose of vaccination ranged from 15 to 19 years (median=18 years). EU/EEA-countries recommend between 4 and 16 vaccines for adults (median=11 vaccines). Tetanus and diphtheria vaccines are recommended to all adults in 22 and 21 countries respectively. The other vaccines are mostly recommended to specific risk groups; recommendations for seasonal influenza and hepatitis B exist in all surveyed countries. Six countries have a comprehensive summary document or schedule describing all vaccines which are recommended for adults. None of the surveyed countries was able to provide coverage estimates for all the recommended adult vaccines. CONCLUSIONS: Vaccination policies for adults are not consistent across Europe, including the meaning of "recommended vaccine" which is not comparable among countries. Coverage data for adults should be collected routinely like for children vaccination.

Haverkate, M., D'Ancona, F., Giambi, C., Johansen, K., Lopalco, P. L., Cozza, V., Appelgren, E., gatekeepers, V. p. and contact, p. "**Mandatory and recommended vaccination in the EU, Iceland and Norway: results of the VENICE 2010 survey on the ways of implementing national vaccination programmes**." Euro Surveill **2012** 17(22).

> This report provides an updated overview of recommended and mandatory vaccinations in the European Union (EU), Iceland and Norway, considering the differences in vaccine programme implementation between countries. In 2010, the Vaccine European New Integrated Collaboration Effort (VENICE) network, conducted a survey among the VENICE project gatekeepers to learn more about how national vaccination programmes are implemented, whether recommended or mandatory. Information was collected from all 27 EU Member States, Iceland and Norway. In total 15 countries do not have any mandatory vaccinations; the remaining 14 have at least one mandatory vaccination included in their programme. Vaccination against polio is mandatory for both children and adults in 12 countries; diphtheria and tetanus vaccination in 11 countries and hepatitis B vaccination in 10 countries. For eight of the 15 vaccines considered, some countries have a mixed strategy of recommended and mandatory vaccinations. Mandatory vaccination may be considered as a way of improving compliance to vaccination programmes. However, compliance with many programmes in Europe is high, using only recommendations. More information about the diversity in vaccine offer at European level may help countries to adapt vaccination strategies based on the experience of other countries. However, any proposal on vaccine strategies should be developed taking into consideration the local context habits.

"**JCVI response on hepatitis B vaccination**." Lancet **2012** 379(9818): 803.

Romano, L., Paladini, S., Van Damme, P. and Zanetti, A. R. "**The worldwide impact of vaccination on the control and protection of viral hepatitis B**." Dig Liver Dis **2011** 43 Suppl 1: S2-7.

> Viral hepatitis B is a leading cause of acute and chronic liver disease worldwide, including cirrhosis and hepatocellular carcinoma. Vaccination is the most effective measure for controlling and preventing hepatitis B and its severe long-term sequelae. According to the World Health Organization (WHO), by the end of 2008 177 countries had introduced hepatitis B vaccination into their national routine neonatal, infant and/or adolescent immunisation programmes, and Italy was one of the first countries to implement a universal strategy of hepatitis B vaccination. The implementation of such vaccination programmes has globally resulted in a marked decrease in disease burden, in the carrier rate and in hepatitis B-related morbidity and mortality. Despite this success, work remains to be done to fully achieve the WHO goal of control of hepatitis B and HBV-related diseases on a global scale.

Aspinall, E. J., Hawkins, G., Fraser, A., Hutchinson, S. J. and Goldberg, D. "**Hepatitis B prevention, diagnosis, treatment and care: a review**." Occup Med (Lond) **2011** 61(8): 531-540.

> Hepatitis B virus (HBV) infection is a major cause of morbidity and mortality worldwide. Chronic hepatitis B (CHB) infection is associated with an increased risk of cirrhosis, hepatic decompensation and hepatocellular carcinoma (HCC). The likelihood of developing CHB is related to the age at which infection is acquired; the risk being lowest in adults and >90% in neonates whose mothers are hepatitis B e antigen positive. Treatment of CHB infection aims to clear HBV DNA and prevent the development of complications. There are currently seven drugs available for the treatment of CHB: five nucleos(t)ide analogues and two interferon-based therapies. Long-term treatment is often required, and the decision to treat is based on clinical assessment including the phase of CHB infection and the presence and extent of liver damage. A safe and effective HBV vaccine has been available since the early 1980s. Vaccination plays a central role in HBV prevention strategies worldwide, and a decline in the incidence and prevalence of HBV infection following the introduction of

universal HBV vaccination programmes has been observed in many countries including the USA and parts of South East Asia and Europe. Post-exposure prophylaxis (PEP) with HBV vaccine +/- hepatitis B immunoglobulin is highly effective in preventing mother to child transmission and in preventing transmission following sharps injuries, sexual contact and other exposures to infected blood and body fluids. Transmission of HBV in the health care setting has become an increasingly rare event in developed nations. However, it remains a significant risk in developing countries reflecting the higher prevalence of CHB, limited access to HBV vaccination and PEP and a lack of adherence to standard infection control precautions.

Mereckiene, J., Cotter, S., Lopalco, P., D'Ancona, F., Levy-Bruhl, D., Giambi, C., Johansen, K., Dematte, L., Salmaso, S., Stefanoff, P., et al. "**Hepatitis B immunisation programmes in European Union, Norway and Iceland: where we were in 2009?**" Vaccine **2010** 28(28): 4470-4477.

In January 2009 25 European Union (EU) Member States (MSs), Norway and Iceland, participated in a survey seeking information on national hepatitis B vaccination programmes. Details of vaccination policy, schedule, population groups targeted for vaccination, programme funding, vaccine coverage and methods of monitoring of vaccine coverage were obtained. Twenty (74%) countries reported that they have a universal hepatitis B vaccination programme, in addition to immunisation of at risk groups; seven (26%) countries recommend HBV for high risk groups only (with some inter-country variation on groups considered at high risk). Among countries without universal hepatitis B vaccination programmes, the major factor for non-introduction is low disease endemicity.

Kretzschmar, M. and de Wit, A. "**Universal hepatitis B vaccination**." Lancet Infect Dis **2008** 8(2): 85-87; author reply 90.

COUNTRY EXAMPLES

Presentation **Alessandro Zanetti** Prevention and control of viral hepatitis B and C in WHO European Region

Zanetti, A. R., Mariano, A., Romano, L., D'Amelio, R., Chironna, M., Coppola, R. C., Cuccia, M., Mangione, R., Marrone, F., Negrone, F. S., et al. "**Long-term immunogenicity of hepatitis B vaccination and policy for booster: an Italian multicentre study**." Lancet **2005** 366(9494): 1379-1384.

BACKGROUND: Universal anti-hepatitis-B vaccination of infants and adolescents was implemented in Italy in 1991. We undertook a multicentre study in previously vaccinated individuals to assess the duration of immunity and need for booster, over 10 years after vaccination. METHODS: In 1212 children and 446 Italian Air Force recruits vaccinated as infants and adolescents, respectively, we measured the concentrations of antibodies to hepatitis-B surface antigen (anti-HBs) and the presence of antibodies to hepatitis-B core antigen (anti-HBc) at enrollment; postimmunisation values were not available. Individuals positive for anti-HBc were tested for hepatitis B surface antigen (HBsAg) and hepatitis B viral DNA. Individuals with anti-HBs concentrations at 10 IU/L or more were regarded as protected; those with antibody less than 10 IU/L were given a booster dose and retested 2 weeks later. Individuals showing postbooster anti-HBs concentrations of less than 10 IU/L were offered two additional vaccine doses and retested 1 month after the third dose. FINDINGS: Protective anti-HBs concentrations were retained in 779 (64%, 95% CI 61.6-67) children and 398 (89%, 86.4-92.1) recruits. We recorded antibody amounts

of less than 10 IU/L in 433 children (36%, 33-38.4) and 48 (11%, 7.9-13.6) recruits. One child and four recruits were positive for anti-HBc, but negative for HBsAg and hepatitis B viral DNA. Antibody concentrations were higher in recruits than in children (geometric mean titre 234.8 IU/L vs 32.1 IU/L, p=0.0001). 332 (97%) of 342 children and 46 (96%) of 48 recruits who received a booster showed an anamnestic response, whereas ten (3%) children and two (4%) recruits remained negative for anti-HBs or had antibody concentrations of less than 10 IU/L. Prebooster and postbooster antibody titres were strongly correlated with each other in both groups. All individuals given two additional vaccine doses (eight children and two recruits) showed anti-HBs amounts of more than 10 IU/L at 1 month after vaccination. INTERPRETATION: Strong immunological memory persists more than 10 years after immunisation of infants and adolescents with a primary course of vaccination. Booster doses of vaccine do not seem necessary to ensure long-term protection.

Zanetti, A. R., Romano, L., Giambi, C., Pavan, A., Carnelli, V., Baitelli, G., Malchiodi, G., Valerio, E., Barale, A., Marchisio, M. A., et al. "**Hepatitis B immune memory in children primed with hexavalent vaccines and given monovalent booster vaccines: an open-label, randomised, controlled, multicentre study**." Lancet Infect Dis **2010** 10(11): 755-761.

BACKGROUND: In 2000, hexavac and infanrix hexa were licensed in Europe for primary immunisation of children against diphtheria, tetanus, pertussis, poliomyelitis, hepatitis B, and invasive infections caused by Haemophilus influenzae b. In 2005, hexavac was suspended because of concerns about the long-term immunogenicity of its hepatitis B component. We aimed to assess the duration of immunity and need for booster injections in children primed with these vaccines. METHODS: In an open-label, randomised, controlled, multicentre study in six local health units and at the Bambino Gesu Paediatric Research Hospital in Italy, antibody concentrations were measured 5 years after immunisation of infants with hexavac or infanrix hexa. Children with concentrations of antibodies to hepatitis B surface antigen (anti-HBs) lower than 10 mIU/mL were randomly assigned by simple randomisation to receive a booster of HBVaxPro or engerix B monovalent hepatitis B vaccine and tested 2 weeks later. Primary endpoints were the proportion of children with anti-HBs concentrations of at least 10 mIU/mL, geometric mean concentrations (GMCs) of antibody 5 years after vaccination, and the proportion of children with anti-HBs concentrations lower than 10 mIU/mL who had anamnestic response to booster. The study is registered with Agenzia Italiana del Farmaco, code FARM67NFPN. FINDINGS: 1543 children were enrolled, 833 had received hexavac and 710 infanrix hexa. 831 children who received hexavac and 709 who received infanrix hexa were included in the analysis. 319 children who received hexavac (38.4%, 95% CI 35.1-41.7) had anti-HBs concentrations of at least 10 mIU/mL compared with 590 who received infanrix hexa (83.2%, 80.5-86.0; p<0.0001). GMCs before booster were 4.5 mIU/mL in the hexavac group compared with 61.3 mIU/mL in the infanrix hexa group (p<0.0001). After booster 409 (92.1%, 89.6-94.6) of 444 children primed with hexavac and 99 (94.3%, 89.8-98.7) of 105 primed with infanrix hexa had anti-HBs concentrations of at least 10 mIU/mL (p=0.4); GMCs were 448.7 mIU/mL and 484.9 mIU/mL (p=0.6). The two booster vaccine groups did not differ in number of side-effects; no serious adverse events were reported. INTERPRETATION: 5 years after immunisation with hexavalent vaccines, immunological memory seems to persist in children with anti-HBs concentrations lower than 10 mIU/mL, suggesting that booster doses are not needed. Additional follow-up is needed. FUNDING: Agenzia Italiana del Farmaco.

Romano, L., Paladini, S. and Zanetti, A. R. "**Twenty years of universal vaccination against hepatitis B in Italy: achievements and challenges**." J Public Health Res **2012** 1(2): 126-129.

ABSTRACT: Viral hepatitis B is a vaccine-preventable disease. Vaccination has proved to be safe and highly effective in reducing the incidence, the carrier rate and

HBV-related mortality on a global scale. In Italy, universal vaccination against hepatitis B started in 1991 in infants as well as in adolescents, providing an outstanding record of safety and effectiveness. Within a few years, over 95% coverage was consistently reported. Today, some 17 million people are immune against hepatitis B and their immunity has been shown to be long-lasting. At present, no booster is required in healthy vaccinated people to sustain protection. Surveillance data from Italy have shown a clear overall decline in hepatitis B among successfully vaccinated individuals. Furthermore, a generation of children and young people (at present cohorts ranging from 0 to 32 years) is emerging with practically no markers of HBV infection. Italy's vaccination programme has resulted in substantial progress towards the prevention and control of hepatitis B. The vaccination programme must continue. Maintaining mandatory vaccination of infants and increasing HBV vaccination coverage in high-risk groups, including households of HBsAg carriers as well as immigrants, remain a priority for the future. ACKNOWLEDGMENTS: Data reported in this paper were presented at a national Meeting, Towards the elimination of hepatitis B: celebrating 20 years of vaccination in Italy, held in Milano (19 November 2011) under the high patronage of the President of the Italian Republic. Distinguished figures from the world of Italian Public Health as well as international experts participated and paid tribute to the work of those who had contributed to the saving of lives, prevention of suffering, and the savings made to the State.

Spada, E., Romano, L., Tosti, M. E., Zuccaro, O., Paladini, S., Chironna, M., Coppola, R. C., Cuccia, M., Mangione, R., Marrone, F., et al. "**Hepatitis B immunity in teenagers vaccinated as infants: an Italian 17-year follow-up study**." Clin Microbiol Infect **2014**.

We assessed the persistence of hepatitis B surface antigen antibody (anti-HBs) and immune memory in a cohort of 571 teenagers vaccinated against hepatitis B as infants, 17 years earlier. Vaccinees were followed-up in 2003 and in 2010 (i.e. 10 years and 17 years after primary vaccination, respectively). When tested in 2003, 199 vaccinees (group A) had anti-HBs <10 mIU/mL and were boosted, 372 (group B) were not boosted because they had anti-HBs >/=10 mIU/mL (n = 344) or refused booster (n = 28) despite anti-HBs <10 mIU/mL. In 2010, 72.9% (416/571) of participants had anti-HBs >/=10 mIU/mL (67.3% in group A vs. 75.8% in group B; p 0.03). The geometric mean concentrations (GMCs) were similar in both groups. Between 2003 and 2010, anti-HBs concentrations in previously boosted individuals markedly declined with GMC dropping from 486 to 27.7 mIU/mL (p <0.001). Fifteen vaccinees showed a marked increase of antibody, possibly due to natural booster. In 2010, 96 individuals (37 of group A and 59 of group B) with anti-HBs <10 mIU/mL were boosted; all vaccinees of the former group and all but two of the latter had an anamnestic response. Post-booster GMC was higher in group B (895.6 vs. 492.2 mIU/mL; p 0.039). This finding shows that the immune memory for HBsAg persists beyond the time at which anti-HBs disappears, conferring long-term protection.

RELATED Abstracts Italy

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND Immunization AND Europe**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Fortunato, F., Tafuri, S., Cozza, V., Martinelli, D. and Prato, R. "**Low vaccination coverage among italian healthcare workers in 2013: Contributing to the voluntary vs. mandatory vaccination debate**." Hum Vaccin Immunother **2014** 11(1).

Vaccination of healthcare workers (HCWs) reduces the risk of occupational infections, prevents nosocomial transmission and maintains healthcare delivery during outbreaks. Despite the European directive and national legislation on workers'

protection, immunization coverage among HCWs has often been very low. In light of Italian National Vaccination Plan 2012-2014 recommendations, the aim of this study was to assess levels of immunization and factors influencing adherence to vaccinations needed for HCWs in Puglia region, South Italy. The study was conducted using an interview-based standardized anonymous questionnaire administered to hospital employees in the period November 2009-March 2011. A total of 2198 health professionals responded in 51/69 Apulian hospitals (median age: 45 years; 65.2% nurses, 22.6% doctors and 12.2% other hospital personnel). Vaccination coverage was 24.8% for influenza, 70.1% for hepatitis B, 9.7% for MMR, 3.6% for varicella, and 15.5% for Td booster. Receiving counselling from occupational health physicians (OHPs) was associated with influenza (OR = 1.8; 95%CI = 1.5-2.2; P<0.001), hepatitis B (OR = 4.9; 95%CI = 3.9-6.3; P<0.001), varicella (OR = 43.7; 95%CI = 18.9-101.7; P<0.001), MMR (OR = 8.8; 95%CI = 4.1-18.6; P<0.001) and tetanus (OR = 50.5; 95%CI = 30.1-88.3; P<0.001) vaccine uptake. OHPs should be trained with standard guidelines specific for healthcare settings and HCWs' risk groups to facilitate their crucial role in improving vaccine coverage among HCWs and increase awareness on the duty to protect both employees and patients.

Baldo, V., Bonanni, P., Castro, M., Gabutti, G., Franco, E., Marchetti, F., Prato, R. and Vitale, F. "**Combined hexavalent diphtheria-tetanus-acellular pertussis-hepatitis B-inactivated poliovirus-Haemophilus influenzae type B vaccine; Infanrix hexa: twelve years of experience in Italy**." Hum Vaccin Immunother **2014** 10(1): 129-137.

Infant vaccination using 2-dose priming at 3 and 5 mo of age with a booster at 11-12 mo of age was pioneered in Italy. The 3-5-11 schedule is now used in a growing number of European countries. Infanrix hexa (DTPa-HBV-IPV/Hib, GlaxoSmithKline Vaccines) was first licensed for use in 2000 and has been the only pediatric hexavalent vaccine available since 2005. We reviewed available clinical trial data describing the immunogenicity of DTPa-HBV-IPV/Hib when administered at 3, 5, and 11 mo of age, and conducted an analysis of safety using global and Italian post-marketing surveillance data. In Italy, DTPa-HBV-IPV/Hib has a demonstrated safety record extending over a decade of use, it has been associated with record levels of vaccine coverage, and with sustained disease control in vaccinated cohorts. Hexavalent vaccines will continue to contribute to high vaccine coverage in Italy and across Europe.

Chiara, F., Bartolucci, G. B., Mongillo, M., Ferretto, L., Nicolli, A. and Trevisan, A. "**Hepatitis B vaccination at three months of age: a successful strategy?**" Vaccine **2013** 31(13): 1696-1700.

Vaccination of infants, children and adolescents against the hepatitis B virus (HBV) is mandatory in Italy. It is crucial to assess whether vaccinated subjects have protective antibody level during adulthood when the risk of HBV infection increases due to lifestyle or occupational exposure. Two groups of students attending to University of Padova Medical School were enrolled between 2004 and 2011 and HBV antibodies and antigens were measured. The first group (Group A) comprised students vaccinated at three months of age and the second group (Group B) comprised students vaccinated after the first year of life. The follow-up was 18.0 (Group A) and 17.9 (Group B) years. The students vaccinated at three months of age had a higher rate of non-protective antibodies (47.2%) comparing to those vaccinated after the first year of life (17.0%, P<0.0001) with a significantly lower antibody level (P<0.001). The rate of non-protective antibodies was inversely related to vaccination age. The results clearly show that children vaccinated after the first year of life are better protected against HBV. On the other hand, both groups show a good immunological memory as evidenced by the achievement of protective antibody level after the booster dose in 97.8% of subjects.

Boccalini, S., Taddei, C., Ceccherini, V., Bechini, A., Levi, M., Bartolozzi, D. and Bonanni, P.

"**Economic analysis of the first 20 years of universal hepatitis B vaccination program in Italy: an a posteriori evaluation and forecast of future benefits**." Hum Vaccin Immunother **2013** 9(5): 1119-1128.

Italy was one of the first countries in the world to introduce a routine vaccination program against HBV for newborns and 12-y-old children. From a clinical point of view, such strategy was clearly successful. The objective of our study was to verify whether, at 20 y from its implementation, hepatitis B universal vaccination had positive effects also from an economic point of view. An a posteriori analysis evaluated the impact that the hepatitis B immunization program had up to the present day. The implementation of vaccination brought an extensive reduction of the burden of hepatitis B-related diseases in the Italian population. As a consequence, the past and future savings due to clinical costs avoided are particularly high. We obtained a return on investment nearly equal to 1 from the National Health Service perspective, and a benefit-to-cost ratio slightly less than 1 for the Societal perspective, considering only the first 20 y from the start of the program. In the longer-time horizon, ROI and BCR values were positive (2.78 and 2.46, respectively). The break-even point was already achieved few years ago for the NHS and for the Society, and since then more and more money is progressively saved. The implementation of universal hepatitis B vaccination was very favorable during the first 20 y of adoption, and further benefits will be increasingly evident in the future. The hepatitis B vaccination program in Italy is a clear example of the great impact that universal immunization is able to provide in the medium-long-term when health care authorities are so wise as to invest in prevention.

Stroffolini, T., Guadagnino, V., Rapicetta, M., Menniti Ippolito, F., Caroleo, B., De Sarro, G., Foca, A., Liberto, M. C., Giancotti, A., Barreca, G. S., et al. "**The impact of a vaccination campaign against hepatitis B on the further decrease of hepatitis B virus infection in a southern Italian town over 14 years**." Eur J Intern Med **2012** 23(8): e190-192.

BACKGROUND: Hepatitis B virus infection has decreased in Italy. The aims of this study were to identify changes, if any, in the epidemiological pattern of HBV infection in a southern Italian town first surveyed in 1996 and to assess the effectiveness of vaccination campaign against hepatitis B. METHODS: In 2010, subjects were selected from the census by a systematic 1:4 random sampling procedure. Hepatitis B surface antigen (HBsAg) and antibodies to hepatitis B core antigen (anti-HBc) were detected by ELISA. Associations (odds ratios) linking exposure to hepatitis B virus infection to potential risk factors were estimated by univariate and multivariate analyses. RESULTS: Of the 1100 eligible subjects, 1020 (92.0%) agreed to participate. The prevalences of HBsAg (0.6%) and anti-HBc (15.2%) were significantly lower than in 1996 (0.8% and 21.5%) ($p<0.01$). No subject below 30 years of age (those that had been targeted for compulsory immunization) had been exposed to HBV infection. At multiple logistic regression analysis, age>45 years (OR=9.8; 95% CI=5.1-18.7) and past use of glass syringes (OR=1.9; 95% CI=1.2-3.1) independently predicted the likelihood of anti-HBc positivity. CONCLUSIONS: These results, albeit obtained in a small town and thus not generalizable, confirm the continuous decreasing trend of HBV infection and demonstrate the effectiveness of the Italian hepatitis B vaccination program.

Stroffolini, T., Guadagnino, V., Caroleo, B., De Sarro, G., Foca, A., Liberto, M. C., Giancotti, A., Barreca, G. S., Marascio, N., Lombardo, F. L., et al. "**Long-term immunogenicity of hepatitis B vaccination in children and adolescents in a southern Italian town**." Infection **2012** 40(3): 299-302.

PURPOSE: Universal anti-hepatitis B vaccination of infants and of 12-year-old children became mandatory in Italy in 1991. The purpose of this study was to evaluate the persistence of anti-hepatitis B surface (HBs) antibodies several years after a primary course of vaccination. METHODS: In 2010, anti-HBs titers were measured in all subjects aged between 5 and 25 years residing in a southern Italian

town. Individuals with an anti-hepatitis B antibody concentration of 10 IU/ml or more were considered to be protected. RESULTS: Of the 671 subjects evaluated, 149 (30%) lacked protective antibodies. Fifty-three (29.4%) of the subjects had been vaccinated </=10 years earlier and 96 (30.3%) more than 10 years earlier (P = not significant). Subjects vaccinated in infancy were more likely to lack protective anti-HBs antibodies than subjects vaccinated at 12 years of age, regardless of the years elapsed since immunization. CONCLUSIONS: Most subjects maintained protective antibodies for a considerable number of years after vaccination. Vaccination in adolescence results in more prolonged immunogenicity than vaccination in infancy.

Pandolfi, E., Carloni, E., Marino, M. G., Ciofi degli Atti, M. L., Gesualdo, F., Romano, M., Giannattasio, A., Guarino, A., Carloni, R., Borgia, P., et al. "**Immunization coverage and timeliness of vaccination in Italian children with chronic diseases**." Vaccine **2012** 30(34): 5172-5178.

Since children with chronic diseases represent a primary target for immunization strategies, it is important that their immunization coverage and timeliness of vaccines is optimal. We performed a study to measure immunization coverage and timeliness of vaccines in children with type 1 diabetes, HIV infection, Down syndrome, cystic fibrosis, and neurological diseases. A total of 275 children aged 6 months-18 years were included in the study. Coverage for diphtheria-tetanus-pertussis (DTP), polio (Pol), and hepatitis B (HBV) vaccines approximated 85% at 24 months, while measles-mumps-rubella (MMR) coverage was 62%. Immunization coverage for seasonal influenza was 59%. The analysis of timeliness revealed that there was heterogeneity among children with different chronic diseases. A proportional hazard model showed that children with HIV infection had the longest time to complete three doses of DTP, Pol, and HBV, and those with neurological diseases received the first dose of MMR later than the other categories. Causes of missing or delayed vaccination mostly included a concurrent acute disease. Children with chronic diseases should be strictly monitored for routine and recommended vaccinations, and health care providers and families should be properly informed to avoid false contraindications.

Chironna, M., Prato, R., Sallustio, A., Martinelli, D., Tafuri, S., Quarto, M. and Germinario, C. "**Hepatitis A in Puglia (South Italy) after 10 years of universal vaccination: need for strict monitoring and catch-up vaccination**." BMC Infect Dis **2012** 12: 271.

BACKGROUND: Raw seafood consumption was identified as the major risk factor for hepatitis A during the large epidemic of 1996 and 1997 in Puglia (South Italy). In Puglia, vaccination for toddlers and preadolescents has been recommended since 1998.The aim of the study was to evaluate the incidence, seroprevalence, molecular epidemiology, and environmental circulation of hepatitis A virus (HAV) in Puglia more than ten years after the introduction of anti-HAV vaccination in the regional immunization program. METHODS: Data on the incidence of acute hepatitis A in Puglia were analyzed. Characteristics and risk factors of 97 acute hepatitis A cases occurring in 2008-2009 were analyzed. Serum samples from 868 individuals aged 0 to 40 years were tested for anti-HAV antibodies. Fecal samples from 49 hepatitis A cases were analyzed by sequence analysis in the VP1/P2A region. In 2008, 203 mussel samples and 202 water samples from artesian wells were tested for HAV-RNA. RESULTS: Between 1998 and 2009, the incidence of acute hepatitis A declined from 14.8 to 0.8 per 100,000. The most frequent risk factors reported by cases in 2008-2009 were shellfish consumption (85%) and travel outside of Puglia or Italy (26%). Seroepidemiologic survey revealed high susceptibility to HAV in children and adults up to age 30 (65%-70%). None of the mussel or water samples were HAV-positive. Phylogenetic analysis revealed co-circulation of subtypes IA (74%) and IB (26%) and clustering of strains with strains from Germany and France, and those previously circulating in Puglia. CONCLUSION: Vaccination and improved sanitation reduced the incidence of hepatitis A. Strict monitoring and improved vaccination coverage are needed to prevent disease resurgence.

Spada, E., Tosti, M. E., Zuccaro, O., Stroffolini, T. and Mele, A. "**Evaluation of the compliance with the protocol for preventing perinatal hepatitis B infection in Italy**." J Infect **2011** 62(2): 165-171.

OBJECTIVE: To evaluate the compliance with the protocol for preventing perinatal hepatitis B infection in Italy, including HBsAg screening of pregnant women and immunization of newborns to infected mothers. METHODS: Women consecutively delivering, over 6 months in 2008-2009, in public and private hospitals of 13 Italian regions were recruited. Data on socio-demographic characteristics, HBsAg prenatal screening and newborns immunization were collected. RESULTS: 17,260 pregnant women were enrolled. Of them 16,858 (97.7%) attended prenatal screening. Delivering in a public hospital and in hospitals located in South Italy were both independent predictors of non-adherence to HBsAg screening. Foreign pregnant women were also less likely to be screened. Overall, HBsAg prevalence was 0.86%; it was 0.4% for Italian women and 2.5% for foreign women. Differences in prevalence by country of origin and education were statistically significant. Of 138 newborns from HBsAg positive mothers 131 received passive/active immunization; 7 newborns received just vaccine. CONCLUSION: In this study compliance with the protocol for preventing perinatal hepatitis B was very good. Further efforts are needed to improve adherence to prenatal screening in public hospitals, in hospital located in southern Italy and among foreign women. HBV spread in Italy is progressively declining, also involving immigrant population.

Prato, R., Tafuri, S., Fortunato, F. and Martinelli, D. "**Vaccination in healthcare workers: an Italian perspective**." Expert Rev Vaccines **2010** 9(3): 277-283.

The Italian National Vaccination Plan 2005-2007 strongly recommends that healthcare workers (HCWs) be offered hepatitis B and influenza vaccines and that susceptible workers should also be offered measles, mumps, rubella and varicella vaccines. Nationwide figures for vaccination coverage among HCWs are not currently available. Vaccination coverage is high but not yet satisfactory for hepatitis B and is absolutely insufficient for influenza. Susceptibility rates to childhood exanthematic diseases are low: when attempting to achieve complete immunity, screening the individuals at recruitment is cost effective. The procedures for TB prevention are a consolidated practice for occupational health physicians. Hospital health directors should be empowered on the importance of vaccinating HCWs as a milestone of hospital risk management. More adequate training, including specific courses on vaccinations, is required for occupational health physicians.

Esposito, S., Tansey, S., Thompson, A., Razmpour, A., Liang, J., Jones, T. R., Ferrera, G., Maida, A., Bona, G., Sabatini, C., et al. "**Safety and immunogenicity of a 13-valent pneumococcal conjugate vaccine compared to those of a 7-valent pneumococcal conjugate vaccine given as a three-dose series with routine vaccines in healthy infants and toddlers**." Clin Vaccine Immunol **2010** 17(6): 1017-1026.

A 13-valent pneumococcal conjugate vaccine (PCV13) has been developed to improve protection against pneumococcal disease beyond that possible with the licensed 7-valent vaccine (PCV7). This study compared the safety and immunogenicity of PCV13 with those of PCV7 when given as part of the pediatric vaccination schedule recommended in Italy. A total of 606 subjects were randomly assigned to receive either PCV13 or PCV7 at 3, 5, and 11 months of age; all subjects concomitantly received diphtheria-tetanus-acellular pertussis-hepatitis B-inactivated polio-Haemophilus influenzae type B (DTaP-HBV-IPV/Hib) vaccine. Vaccine reactions were monitored. Antibody responses to DTaP-HBV-IPV/Hib antigens, serotype-specific anticapsular polysaccharide IgG responses, and antipneumococcal opsonophagocytic assay (OPA) activity were measured 1 month after the two-dose primary series and 1 month after the toddler dose. Overall, the safety profile of PCV13 was similar to that of PCV7. The response to DTaP-HBV-IPV/Hib antigens

was substantially the same with both PCV13 and PCV7. PCV13 elicited antipneumococcal capsular IgG antibodies to all 13 vaccine serotypes, with notable increases in concentrations seen after the toddler dose. Despite a lower immunogenicity for serotypes 6B and 23F after the primary series of PCV13, responses to the seven common serotypes were comparable between the PCV13 and PCV7 groups when measured after the toddler dose. PCV13 also elicited substantial levels of OPA activity against all 13 serotypes following both the infant series and the toddler dose. In conclusion, PCV13 appeared comparable to PCV7 in safety profile and immunogenicity for common serotypes, demonstrated functional OPA responses for all 13 serotypes, and did not interfere with immune responses to concomitantly administered DTaP-HBV-IPV/Hib vaccine.

Presentation **Rui Tato Marinho** Portugal

RELATED Abstracts Portugal

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND Immunization AND portugal (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Chodick, G., Ashkenazi, S. and Lerman, Y. "**The risk of hepatitis A infection among healthcare workers: a review of reported outbreaks and sero-epidemiologic studies**." J Hosp Infect **2006** 62(4): 414-420.

All reports of hepatitis A (HA) outbreaks in healthcare settings published between 1975 and 2003 were studied to determine the background immunity or susceptibility of healthcare workers (HCWs) to HA. Twenty-six reports were found. The number of infected personnel ranged from one to 66 and, in most outbreaks, nurses accounted for the majority of personnel infected, reflecting high attack rates reaching 15-41%. In addition, we found 23 sero-epidemiological studies for HA among HCWs that had been performed in 13 different countries. Seroprevalence rates of HCWs with anti-HA antibody ranged between 4% among paramedical workers in Germany to 88% among hospital maintenance workers in Portugal. Effective infection control of HA outbreaks in hospitals demands early recognition, including awareness of atypical presentations of the infection, and strict adherence to universal infection control measures. Education programmes are of special importance for HCWs in neonatal, paediatric and intensive care units. The findings of the current study suggest that a pre-employment screening policy and administration of active vaccination to susceptible HCWs, particularly nurses, should be seriously considered in high-risk settings.

Antunes, H., Macedo, M. and Estrada, A. "**[Hepatitis B virus vaccination rate with immunization]**." Acta Med Port **2004** 17(4): 303-308.

The hepatitis B virus is an important cause of morbidity and mortality in humans, thus making it a serious public health issue. The purpose of this study was to determine the hepatitis B virus vaccination rate with immunization, the risk of this population group becoming infected before vaccination and the prevalence of hepatitis B virus infection. The study involved randomly analyzing the serum of 311 adolescents of both sexes aged 14 from a total population of 536 adolescents attending schools in Braga, Portugal. A questionnaire was administered to the adolescents and asked them if they had received the Hepatitis B vaccine, how many doses they received, if they had a history of acute hepatitis, drug abuse, whether or not they had had sexual intercourse and if so, if they had used protection. The determination of the hepatitis B surface antigen (HbsAg), the antibody to HbsAg and the antibody to hepatitis B core

antigen was carried out using the chemoluminiscence method. The vaccination rate with immunization was 85.8 %, [95% CI 81.9-89.7%]. The prevalence of hepatitis B virus infection was 0.6%, [95% CI 0-1.5%]. CONCLUSIONS: The prevalence of hepatitis B virus infection was low in this adolescent population of Braga. The vaccination rate with immunization is satisfactory, but does not reach 100%, which means that the risk of transmission is still present in this age group.

Presentation **Vana Papaevangelou** GREECE

RELATED Abstracts Greece

Pubmed MEDLINE search on {(Hepatitis) AND (Prevention) **AND Immunization AND Greece (Title/abstreact)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Karageorgou, K., Katerelos, P., Efstathiou, A., Theodoridou, M. and Maltezou, H. C. "**Vaccination coverage and susceptibility against vaccine-preventable diseases of healthcare students in Athens, Greece**." Vaccine **2014** 32(39): 5083-5086.

BACKGROUND: Vaccination of healthcare students is important to protect them from acquiring and transmitting vaccine-preventable diseases (VPDs) to high-risk patients and other healthcare workers (HCWs). The aim of the current study was to estimate the vaccination coverage, the susceptibility against VPDs, the knowledge and attitudes toward vaccinations of healthcare students studying at the Athens Technological Educational Institute. METHODS: The study was conducted during the academic year 2012-2013 using a standardized questionnaire. RESULTS: The mean knowledge score (correct answers) of healthcare students about the vaccines that are recommended by the Greek Ministry of Health for HCWs was 41%. Completed vaccination rates range from 19.6% for varicella to 80.2% for tetanus-diphtheria. A history of measles, mumps, rubella, varicella, hepatitis A, hepatitis B, or pertussis was reported by 8.2%, 4%, 5.4%, 70.4%, 1.5%, 0%, and 3% of students, respectively. Susceptibility rates were 20.5% against measles, 26.4% against mumps, 13.9% against rubella, 15.7% against varicella, 47.8% against hepatitis A, 17.3% against hepatitis B, and 19.8% against tetanus-diphtheria. Mandatory vaccination of HCWs was supported by 145 (96.7%) students. CONCLUSIONS: There are significant immunity gaps against all VPDs among healthcare students in Athens. A system to easily identify non-immune students should be established in association with efficient reminder systems. Education of healthcare students about VPDs and vaccines will improve their attitudes toward vaccinations and their vaccination coverage. Mandatory vaccinations should be considered for HCWs in order to promote safety within healthcare facilities.

Karatapanis, S., Skorda, L., Marinopoulos, S., Papastergiou, V., Drogosi, M., Lisgos, P. and Antsaklis, A. "**Higher rates of chronic hepatitis B infection and low vaccination-induced protection rates among parturients escaping HBsAg prenatal testing in Greece: a 2-year prospective study**." Eur J Gastroenterol Hepatol **2012** 24(8): 878-883.

OBJECTIVES: Universal screening for the identification of hepatitis B surface antigen [HBsAg(+)] mothers is essential to prevent perinatal hepatitis B virus (HBV) infection. In Greece, although adherence to HBV prenatal testing has improved significantly, there are still pregnant women who do not receive testing, and there is concern that this group may include women with a higher disease burden. METHODS: The seroprevalence of HBV markers among parturient women escaping HBsAg prenatal testing was assessed prospectively. Seropositivity rates were compared with those from a control group of women [n=1304, Greek: 1156 (88.7%), Albanian: 148 (11.3%)], with appropriate prenatal HBsAg documentation, who delivered in the same

public hospital. RESULTS: Between January 2007 and March 2009, 9546 women delivered at the Alexandra Hospital, Athens, Greece, and 1000 (10.6%, mean age: 26.6+/-6.2 years) were unable to document their HBsAg status. Among women tested for the first time in the delivery room, 70.4% were immigrants (Albanians: 41.7%, Eastern European: 14.7%, African: 7.2%, Asian: 6.9%), 15.2% were of Roma origin, and 14.4% were Greek. Overall, 53/1000 (5.3%, 95% confidence interval: 4.1-6.9%) HBsAg(+) cases were found (Albanians: 7.4%, Roma: 5.3%, Asians: 4.3%, Eastern European: 3.4%, Greeks: 2.8%, African: 2.8%, P<0.05 between Greek and Albanian women) versus 15/1304 (1.2%, 95% confidence interval: 0.7-1.9%) in the control group (P<0.0001). Greek women nonadherent to HBV maternal testing were more likely to be chronically infected with HBV (0.6 vs. 2.8%, P<0.05), whereas a similar trend was observed in Albanian women (5.4 vs. 7.4%, P=0.45). Disappointingly low vaccination-induced protection rates (mean 21.4%) were observed among women escaping HBV maternal testing. CONCLUSION: Higher HBV disease burden and low vaccination-induced protection are characteristic in pregnant women nonadherent to HBsAg prenatal testing. More intense surveillance and implementation of immunization programs should be applied in these populations.

Elefsiniotis, I. S., Brokalaki, H., Tsoumakas, K., Vezali, E., Glynou, I. and Saroglou, G. "**Current vaccination coverage against hepatitis B among pregnant women in Greece: far away from the ideal target**." Eur J Obstet Gynecol Reprod Biol **2010** 152(2): 227-228.

Elefsiniotis, I. S., Vezali, E., Brokalaki, H. and Tsoumakas, K. "**Hepatitis B markers and vaccination-induced protection rate among Albanian pregnant women in Greece**." World J Gastroenterol **2009** 15(43): 5498-5499.

Hepatitis B has long been a serious public health problem both in Greece and in Albania. In the February 2009 issue of World Journal of Gastroenterology, Resuli et al presented the interesting epidemiological data concerning hepatitis B virus infection in Albania. The results of this study were discussed and several data from our similar research were provided.

Presentation **Vladimir Chulanov** RUSSIA

RELATED Abstracts Russia

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND Immunization AND Russia (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Tulisov, A., Buzinov, R. and Gordienko, T. "**Incidence of viral hepatitis B and vaccination in the Arkhangelsk region, Russian Federation**." Int J Circumpolar Health **2004** 63 Suppl 2: 205-208.

INTRODUCTION: Hepatitis B (HB) incidence in Russia decreased from 36.6 in 1997 to 19.8 per 100,000 population in 2002. Despite this fact, there is an increasing transmission rate among young adults. STUDY DESIGN: Survey of official epidemiological surveillance data from 1997 to 2002 and results of serological screening of the population in the Arkhangelsk region are represented. METHODS: Incidence of HB was compared and age-specific analysis was performed during the survey period. Immunofluorescent method was used to determine HB carriage status. RESULTS: From 1997 to 2002, incidence of HB increased from 11.3 to 12.1 per 100,000. Young adults between 15 and 29 years old were the most affected group in 2001 (more than 60% of all cases). The leading route of transmission in this group was intravenous one. Vaccination of newborns resulted in decrease of HB incidence

among children under 14 years from 8.7 in 1997 to 4.5 per 100,000 in 2002. Serum of 13,128 future mothers was investigated in 2001, 208 women (1.58%) appeared to be positive (there were only 1.22% carriers in this group in 1999). CONCLUSIONS: Analysed data show the importance of immunisation against Hepatitis B not only among newborns, but also among teenagers. In addition, special attention should be paid to the growing problem of Hepatitis B carriage among pregnant women.

Beutels, P., Shkedy, Z., Mukomolov, S., Aerts, M., Shargorodskaya, E., Plotnikova, V., Molenberghs, G. and Van Damme, P. "**Hepatitis B in St Petersburg, Russia (1994-1999): incidence, prevalence and force of infection**." J Viral Hepat **2003** 10(2): 141-149.

Hepatitis B (HB) is thought to be an expanding health problem in Russia. The incidence of infection was estimated from mandatorily reported HB cases in St Petersburg. The two-sided t-test for independent samples and the LOESS (locally-weighted regression) smoother were used to compare the age at infection for symptomatic, asymptomatic and chronic infections, by gender. The force of infection was estimated from seroprevalence data (907 sera taken in 1999) using a newly developed nonparametric method based on local polynomials, as well as an earlier method based on isotonic regression and kernel smoothers. With the local polynomial method, pointwise confidence intervals (95%) were constructed by bootstrapping. On average, men contracted HB infection at a significantly younger age than women (in 1999, 21.8 vs 22.7 years, respectively). The overall male to female ratio was 1.92. In 1999 the overall incidence almost doubled compared with the preceding years and tripled among the age groups with highest incidence (15-29-year olds: 85% of cases in 1999). The incidence increase was associated with a lower average age at infection (24.1 years in 1994 vs 22.1 years in 1999). The age and gender-specific force of infection estimates generally confirmed the incidence estimates and emphasized the usefulness of local polynomials to do this. Hence HB transmission in St Petersburg occurs mainly in young adults. The dramatic increase of infections in 1999 was probably due to injecting drug use. Without intervention, HB virus is expected to continue to spread rapidly with a greater proportion of female infections caused by sexual transmission. These trends may also provide an indication for HIV transmission.

Presentation **Silvia Bino** ALBANIA

RELATED Abstracts Albania

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND Immunization AND Albania (Title/abstract)**} in all fields and filters used on this search '**last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Elefsiniotis, I. S., Vezali, E., Brokalaki, H. and Tsoumakas, K. "**Hepatitis B markers and vaccination-induced protection rate among Albanian pregnant women in Greece**." World J Gastroenterol **2009** 15(43): 5498-5499.

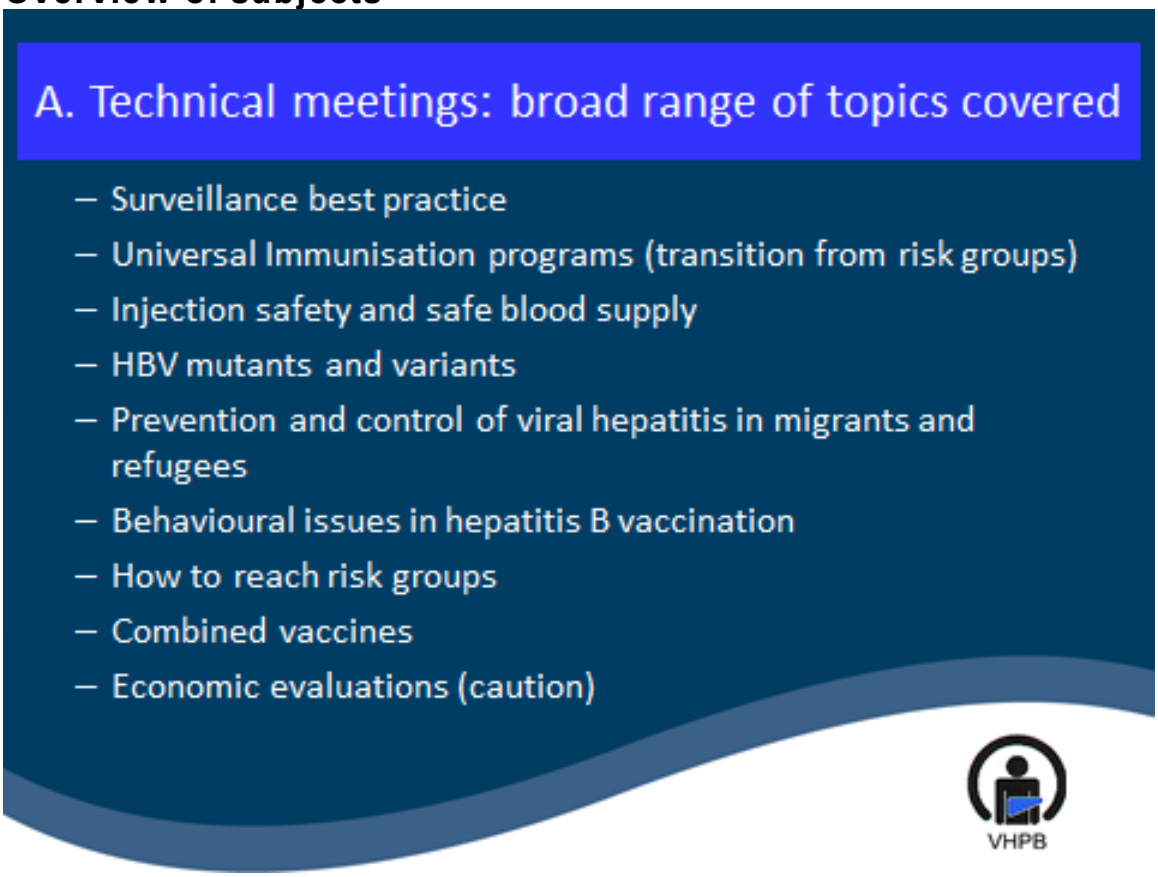
Hepatitis B has long been a serious public health problem both in Greece and in Albania. In the February 2009 issue of World Journal of Gastroenterology, Resuli et al presented the interesting epidemiological data concerning hepatitis B virus infection in Albania. The results of this study were discussed and several data from our similar research were provided.

Session 3: LESSONS LEARNT FROM TECHNICAL VHPB MEETINGS

Subject of the technical VHPB meeting

Programs and presentation of the meetings available on website http://www.vhpb.org/vhpb-meetings

Overview of subjects



A. Technical meetings: broad range of topics covered (2)

- Hepatitis B vaccination safety issues
- Hepatitis A and B vaccine and long term efficacy
- Hepatitis infections and immunization strategies in HCW
- Prevention of perinatal transmission
- Adolescent programs
- Patient and advocacy groups
- Hepatitis A and E
- Identification and management of persons with HCV
- Treatment of hepatitis B and C

VHPB

A. Technical meetings: Output

- Fact sheets
- Viral Hepatitis
- Scientific publications


BMJ

HEAD TO HEAD

Should Europe have a universal hepatitis B vaccination programme?


1995

VIRAL HEPATITIS PREVENTION BOARD

ACTION ON HEPATITIS B AS AN OCCUPATIONAL HAZARD

FACT SHEET

All publications and viral hepatitis related to the meetings are accessible at the VHPB website http://www.vhpb.org/vhpb-publications (accessed 10/11/2014)

Presentation Daniel Shouval

- Control hepatitis A and E
- Control hepatitis C (public health issue)
- Healthcare workers
- Perinatal transmission

Presentation Alessandro Zanetti Mutants

Romano, L., Paladini, S., Galli, C., Raimondo, G., Pollicino, T. and Zanetti, A. R. "**Hepatitis B vaccination: are escape mutant viruses a matter of concern?**" Hum Vaccin Immunother **2014** 11(1).

Hepatitis B virus is a worldwide leading cause of acute and chronic liver disease including cirrhosis and hepatocellular carcinoma. Effective vaccines have been available since the early '80s and vaccination has proved highly successful in reducing the disease burden, the development of the carrier state and the HB-related morbidity and mortality in the countries where vaccination has been implemented. Neutralizing (protective) antibodies (anti-HBs) induced by vaccination are targeted largely towards the amino acid hydrophilic region, referred to as the common a determinant which is present on the outer protein coat or surface antigen (HBsAg), spanning amino acids 124-149. This provides protection against all HBV genotypes (from A to H) and is responsible for the broad immunity afforded by hepatitis B vaccination. Thus, alterations of residues within this region of the surface antigen may determine conformational changes that can allow replication of the mutated HBV in vaccinated people. An important mutation in the surface antigen region was identified in Italy some 25 years ago in infants born to HBsAg carrier mothers who developed breakthrough infections despite having received HBIG and vaccine at birth. This virus had a point mutation from guanosine to adenosine at nucleotide position 587, resulting in aa substitution from glycine (G) to arginine (R) at position 145 in the a determinant. Since the G145R substitution alters the projecting loop (aa 139-147) of the a determinant, the neutralizing antibodies induced by vaccination are no longer able to recognize the mutated epitope. Beside G145R, other S-gene mutations potentially able to evade neutralizing anti-HBs and infect vaccinated people have been described worldwide. In addition, the emergence of Pol mutants associated with resistance to treatment with nucleos(t)ide analogues can select viruses with crucial changes in the overlapping S-gene, potentially able to alter the S protein immunoreactivity. Thus such mutants have the potential to infect both naive and immunized people, negatively affecting the efficacy of both the antiviral treatment and the vaccination programs. Despite concern, at present the overall impact of vaccine escapes mutants seems to be low and they do not pose a public health threat or a need to modify the established hepatitis B vaccination programs. The development of novel NAs with a high barrier to resistance is warranted.

Session 4: (LACK OF) EVIDENCE FOR UNIVERSAL HEPATITIS B IMMUNIZATION

Presentation Paolo Bonanni Hepatitis B: are at-risk individuals vaccinated if screened and found negative for HBV? Results of an online survey conducted in six EU countries

Levi, M., Ahmad, A., Bechini, A., Boccalini, S., Nguyen, Q. V., Veldhuijzen, I., Richardus, J. H., Reintjes, R. and Bonanni, P. "**Hepatitis B: Are at-risk individuals vaccinated if screened and found negative for HBV? Results of an online survey conducted in six EU countries**." Vaccine **2014**.

INTRODUCTION: Vaccination is the best way to prevent hepatitis B infection and its consequences. The aim of the present study is to analyze the current vaccination practices within various population subgroups who are offered screening for hepatitis B, when found negative, in Germany, Hungary, Italy, the Netherlands, Spain and the UK. METHODS: Online surveys were conducted in the six countries. In total, 1181 experts from six different health professions were invited to participate. Descriptive analyses of data were performed. RESULTS: Less than half of the respondents in the Netherlands, only about 1/4 in Germany and none in Hungary reported that the vaccine is commonly offered to people who inject drugs. Less than half of the respondents in Germany reported vaccinating sex workers or HIV positive patients against hepatitis B as common practice. None in Hungary stated that vaccinating sex workers is common practice, and only according to a minority (17%) HIV patients are commonly vaccinated. 1/4 to 1/3 of respondents in Germany, the Netherlands, Italy, Hungary and the UK, indicated that HCV positive patients are only sporadically immunized. Only in Spain almost half of the respondents reported that migrants from hepatitis B endemic areas who are screened negative are commonly vaccinated. Widespread uncertainty about vaccination practices for asylum seekers was reported. CONCLUSIONS: By showing the gaps between current practices and policies in place, our findings can help to increase the success of future vaccination programmes. Implementation of training for health care professional, e.g. introducing vaccinology and vaccination policy courses in the medical and paramedical curriculum, could contribute to a more homogenous application of the recommendations regarding immunization against hepatitis B. Our results show, nonetheless, that the universal vaccination approach, coupled with targeted programmes for immigrants, represents the only way to make the elimination of hepatitis B a foreseeable, realistic objective.

RELATED Abstracts Albania

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND Immunization AND Vaccination AND Universal AND Europe (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Van Damme, P., Leuridan, E., Hendrickx, G., Vorsters, A., Theeten, H., Leino, T., Salminen, M. and Kuusi, M. "**Should Europe have a universal hepatitis B vaccination programme?**" BMJ **2013** 347: f4057.

Houweling, H., Spaendonck, M. C., Paulussen, T., Verweij, M. and Ruitenberg, E. J. "**Preparing for the next public debate: universal vaccination against hepatitis B**." Vaccine **2011** 29(48): 8960-8964.

WHO have long called for universal vaccination against hepatitis B worldwide. However, in north-western Europe low incidence of the disease has fueled debate whether targeted or universal vaccination strategies are the way to go for. Careful assessment has made it clear that the extensive targeted hepatitis B vaccination programmes in the Netherlands nevertheless fail to reach a significant part of the risk groups and have not succeeded in eliminating the disease. Modelling suggests that the public health benefits obtained through targeted programmes could be augmented considerably by universal vaccination. Therefore, the Minister of Health of the Netherlands has decided to implement universal vaccination by October 2011. We illustrate the case of the Netherlands and explore lessons, which can be learnt from the vaccination programmes against HPV and influenza A/H1N1 and how to prepare for a potential public debate that might arise when implementing universal vaccination against hepatitis B.

Hontelez, J. A., Hahne, S., Koedijk, F. H. and de Melker, H. E. "**Effectiveness and impact of hepatitis B virus vaccination of children with at least one parent born in a hepatitis B virus endemic country: an early assessment**." J Epidemiol Community Health **2010** 64(10): 890-894.

OBJECTIVE: To determine the effectiveness and impact of the Dutch childhood hepatitis B virus (HBV) vaccination policy targeted at children with at least one parent born in a HBV endemic country. METHODS: The Dutch vaccination registration database was used to determine vaccine coverage for HBV and DTP-IPV-Hib in the target population. HBV notifications were used to estimate the impact. The HBV incidence was determined in children aged 0-4 years and born after (2003-7) and before (1990-2002) the introduction of the HBV vaccination programme. RESULTS: HBV vaccine coverage in the target population was 89.6% (96,186/107,338) in the period 2003-5. There were 37 notified acute infections in the pre-vaccination birth cohort 1990-2002 (incidence 2.9/10(6) person-years), compared with one in the post-vaccination birth cohort 2003-7 (incidence 0.3/10(6) person-years). The incidence rate ratio for the 2003-7 birth cohort compared with the 1990-2002 birth cohort was 0.12 (95% CI 0.02 to 0.87; p=0.04). CONCLUSIONS: This paper shows that the incidence of HBV notifications in children born after the introduction of targeted childhood HBV vaccinations is lower compared with the incidence in children born before the start of this vaccination programme. Although this is consistent with a good HBV vaccine coverage, the interpretation is hampered by a change in case definition for notification in 1999. The results are of importance to policy makers in both The Netherlands and other countries that have a targeted HBV vaccination programme.

Zuckerman, J., van Hattum, J., Cafferkey, M., Gjorup, I., Hoel, T., Rummukainen, M. L. and Weiland, O. "**Should hepatitis B vaccination be introduced into childhood immunisation programmes in northern Europe?**" Lancet Infect Dis **2007** 7(6): 410-419.

Infection with hepatitis B causes between 500,000 and 1.2 million deaths per year worldwide, and is the leading cause of liver cancer. Over 12 years ago, WHO recommended that universal childhood hepatitis B vaccination be implemented globally. Despite this, Denmark, Finland, Iceland, Ireland, the Netherlands, Norway, Sweden, and the UK have yet to implement such a policy and instead currently adopt an "at-risk" strategy. Although all eight countries are classed as having low endemicity, factors such as increased travel and integration of immigrant communities are increasing the number of at-risk individuals in these countries. Considering the difficulty in identifying all at-risk individuals, and the lack of effectiveness of at-risk vaccination on reducing the overall incidence of hepatitis B, we recommend that these countries reassess their hepatitis B prevention strategies. Universal vaccination against hepatitis B is the only way to eliminate the major public-health impact of this disease.

Presentations Hans Houweling Country example the Netherlands

Matysiak-Klose, D., Ahmed, F., Duclos, P., Falck-Ytter, Y., Forland, F., Houweling, H., Kramarz, P., Langley, J. M., Mertens, T., Schunemann, H., et al. "**Report on the 1st international workshop on procedures for the development of evidence-based vaccination recommendations, Berlin, Germany, 22-23 November 2010**." Vaccine **2012** 30(14): 2399-2404.

In November 2010, experts from European and North-American countries met in Berlin, Germany, to discuss improved methods for the development of evidence-based vaccination

recommendations. The objectives of the workshop were to (i) review current procedures and experiences of National Immunization Technical Advisory Groups (NITAGs) in developing a framework for evidence-based vaccination recommendations, (ii) discuss the applicability of methods like Grading of Recommendations Assessment, Development and Evaluation (GRADE), and (iii) to identify opportunities for international collaboration to support NITAGs in the development of vaccination recommendations at country-level. Recognizing that a systematic and transparent approach is necessary to promote the quality and acceptance of vaccination recommendations, various decision making frameworks have been implemented by national and international advisory groups addressing common key aspects of knowledge, such as the burden of disease or characteristics of the vaccine. There are several challenges when grading the quality of evidence of some immunization-specific topics (e.g. population-level effects of vaccination). This does not, however, necessitate development of an entirely new systematic methodology. The participants concluded that (i) GRADE or a modification of this methodology is suitable for the grading of quality of evidence related to vaccine effectiveness and safety, and that (ii) international cooperation would be beneficial to develop common framework methodologies for certain aspects of national immunization recommendation developments in order to avoid duplication of efforts, to build on existing strengths, and to support NITAGs worldwide.

Houweling, H., Spaendonck, M. C., Paulussen, T., Verweij, M. and Ruitenberg, E. J. "**Preparing for the next public debate: universal vaccination against hepatitis B**." Vaccine **2011** 29(48): 8960-8964.

WHO have long called for universal vaccination against hepatitis B worldwide. However, in north-western Europe low incidence of the disease has fueled debate whether targeted or universal vaccination strategies are the way to go for. Careful assessment has made it clear that the extensive targeted hepatitis B vaccination programmes in the Netherlands nevertheless fail to reach a significant part of the risk groups and have not succeeded in eliminating the disease. Modelling suggests that the public health benefits obtained through targeted programmes could be augmented considerably by universal vaccination. Therefore, the Minister of Health of the Netherlands has decided to implement universal vaccination by October 2011. We illustrate the case of the Netherlands and explore lessons, which can be learnt from the vaccination programmes against HPV and influenza A/H1N1 and how to prepare for a potential public debate that might arise when implementing universal vaccination against hepatitis B.

Houweling, H., Wittevrongel, C. F., Verweij, M. and Ruitenberg, E. J. "**Public vaccination programmes against hepatitis B in The Netherlands: assessing whether a targeted or a universal approach is appropriate**." Vaccine **2010** 28(49): 7723-7730.

To date, the policy to control hepatitis B in the Netherlands is to vaccinate specific risk groups, rather than all children. Low incidence of the disease has fueled debate whether such a targeted vaccination strategy or rather a universal strategy, as recommended by the World Health Organization, is appropriate. The standard framework for assessing whether a particular vaccination should be included in a public programme, as recently proposed by the Health Council of the Netherlands (HCN), was applied to the various options for hepatitis B vaccination. This framework includes seven selection criteria, grouped under five thematic headings: seriousness and extent of the disease burden, effectiveness and safety of the vaccination, acceptability of the vaccination, efficiency of the vaccination, and priority of the vaccination. From about 1990 the disease burden has stayed more or less the same over time and careful assessment has made it clear that the targeted approach has failed to reach a significant part of the risk groups. Models suggest that the public health benefits obtained through targeted programmes could be augmented considerably by universal vaccination. Based on the assessment that universal vaccination means better protection for high-risk groups as well as the whole population, the HCN calls for universal immunisation, even though hepatitis B to a large extent is limited to specific high-risk groups. Should the Netherlands adopt universal vaccination, several immunisation programmes targeted to high-risk groups will, however, remain of crucial importance for years to come.

Houweling, H., Verweij, M. and Ruitenberg, E. J. "**Criteria for inclusion of vaccinations in public programmes**." Vaccine **2010** 28(17): 2924-2931.

As more and more new vaccines are developed and brought to the market, governments have to make decisions about which vaccinations to include in public programmes. This paper describes the experience in the Netherlands in developing a framework for assessing whether a vaccination should be included in the National Immunization Programme (NIP). Bearing in mind the public nature, the factors that determine a vaccine's suitability for inclusion in a communal vaccination programme have been translated into seven selection criteria, grouped under five thematic headings: seriousness and extent of the disease burden, effectiveness and safety of the vaccination, acceptability of the vaccination, efficiency of the vaccination, and priority of the vaccination. The seven criteria and the explanation of them provide a framework for the systematic examination of arguments for and against the inclusion and prioritisation of particular vaccinations. As an illustration, the vaccinations currently provided in the Netherlands through public programmes as well as 23 'candidate' vaccinations are assessed against the seven criteria. The proposed assessment framework including the selection criteria can take full account of the values and specificities as they may differ between situations and countries; the transparency of the approach may help to clarify which elements of the assessment are pivotal in specific situations. Using the criteria furthers a trustworthy, transparent and accountable process of decision-making about inclusion of new vaccinations in public vaccination programmes and may help to retain public confidence.

Gunning-Schepers, L. J. and Houweling, H. "**[National hepatitis B vaccination closer to implementation, but not soon enough: recommendations from the Dutch Health Council]**." Ned Tijdschr Geneeskd **2001** 145(32): 1572-1573.

Goettsch, W., de Graaf, R., Dorigo-Zetsma, J. W., van Zessen, G. and Houweling, H. "**Broader vaccination of expatriates against HBV infection: do we reach those at highest risk?**" Int J Epidemiol **1999** 28(6): 1161-1166.

BACKGROUND: The effects of the implementation of a new Dutch hepatitis B virus (HBV) vaccination strategy (1991) for expatriates on HBV vaccination status and HBV infection prevalence were evaluated in a group of 864 expatriates returning from HBV-endemic areas. METHODS: During a routine medical examination at the participating medical centres Dutch expatriates were asked to complete a questionnaire and to donate a serum sample for HBV testing. Blood was tested for antibodies against the hepatitis B core (anti-HBc) and surface antigens (anti-HBs). The serological data were related to information gathered on aspects of residence, sexual risk behaviour and occupational risks. RESULTS: A significantly higher percentage of expatriates (37%) were vaccinated compared to a previous study in 1987-1989 (14%). However, the percentage of expatriates with HBV infection markers (5%) had not decreased significantly. Moreover, the risk for HBV infection, as determined with a questionnaire, was still affected by well-known risk factors such as homosexual contacts (odds ratio [OR] = 6.6, 95% CI: 1.7-26), more than five casual local partners (OR = 3.6, 95% CI: 1.2-11) and more than five occupational accidents in the last 3 years (OR = 20, 95% CI: 2-187). Detailed analysis of the vaccination status indicated that especially young female expatriates with low risk behaviour (65%) were protected, while older male expatriates with high risk behaviour were less protected (20%). CONCLUSION: We conclude that the new vaccination strategy has resulted in a higher percentage of expatriates protected. However, only a small proportion was reached of those at highest risk for HBV infection.

RELATED

Pubmed MEDLINE search on {(Hepatitis B) AND (**Prevention) AND Immunization AND Netherlands (Title/abstract)**} in all fields and filters used on this search '**last 5 year' and ' Review'** on**,** was performed. **}**.Manual selection of most relevant The reference were sorted by publication year and first author

Vet, R., de Wit, J. B. and Das, E. "**The role of implementation intention formation in promoting hepatitis B vaccination uptake among men who have sex with men**." Int J STD AIDS **2014** 25(2): 122-129.

This study assessed the separate and joint effects of having a goal intention and the completeness of implementation intention formation on the likelihood of attending an appointment to obtain vaccination against the hepatitis B virus among men who have sex with men (MSM) in the Netherlands. Extending previous research, it was hypothesized that to be effective in promoting vaccination, implementation intention formation not only requires a strong goal intention, but also complete details specifying when, where and how to make an appointment to obtain hepatitis B virus vaccination among MSM. MSM at risk for hepatitis B virus (N = 616), with strong or weak intentions to obtain hepatitis B virus vaccination, were randomly assigned to form an implementation intention or not. Completeness of implementation intentions was rated and hepatitis B virus uptake was assessed through data linkage with the joint vaccination registry of the collaborating Public Health Services. Having a strong goal intention to obtain hepatitis B virus vaccination and forming an implementation intention, each significantly and independently increased the likelihood of MSM obtaining hepatitis B virus vaccination. In addition, MSM who formed complete implementation intentions were more successful in obtaining vaccination ($p < 0.01$). The formation of complete implementation intentions was promoted by strong goal intentions ($p < 0.01$).

Xiridou, M., van Houdt, R., Hahne, S., Coutinho, R., van Steenbergen, J. and Kretzschmar, M. "**Hepatitis B vaccination of men who have sex with men in the Netherlands: should we vaccinate more men, younger men or high-risk men?**" Sex Transm Infect **2013** 89(8): 666-671.

OBJECTIVES: The selective vaccination programme against hepatitis B virus (HBV) was introduced in the Netherlands in 2002 targeting high-risk groups, including men who have sex with men (MSM). Despite the high average age of vaccination in MSM, the number of notifications of acute HBV recently declined. We investigate whether this can be attributed to the selective vaccination programme. We examine how vaccination strategies could be improved and the impact of universal infant vaccination introduced in 2011. METHODS: We use a mathematical model for HBV transmission among MSM. The incidence of HBV was calculated from the model and from notification data of acute HBV. RESULTS: A decline was observed in the incidence of HBV since 2006, as calculated from the model; this decline was smaller than that observed in data if all MSM were equally likely to be vaccinated. Assuming that high-risk MSM were more likely to be vaccinated than low-risk MSM resulted in a steeper decline in modelled incidence and better agreement with observed incidence. Vaccinating MSM at a younger age or doubling the vaccination rate would increase the impact of selective vaccination, but is less effective than vaccinating high-risk MSM. CONCLUSIONS: Selective HBV vaccination of MSM in the Netherlands has had a substantial impact in reducing HBV incidence. The reduction suggests that vaccination rates among high-risk MSM were higher than those among low-risk MSM. Countries that have not yet reached 35-year cohorts with universal childhood vaccination should actively implement or continue selective high-risk MSM vaccination.

van Rijckevorsel, G., Whelan, J., Kretzschmar, M., Siedenburg, E., Sonder, G., Geskus, R., Coutinho, R. and van den Hoek, A. "**Targeted vaccination programme successful in reducing acute hepatitis B in men having sex with men in Amsterdam, the Netherlands**." J Hepatol **2013** 59(6): 1177-1183.

BACKGROUND & AIMS: In the Netherlands, transmission of hepatitis B virus occurs mainly within behavioural high-risk groups, such as in men who have sex with men. Therefore, a vaccination programme has targeted these high-risk groups. This study evaluates the impact of the vaccination programme targeting Amsterdam's large

population of men who have sex with men from 1998 through 2011. METHODS: We used Amsterdam data from the national database of the vaccination programme for high-risk groups (January 1, 1998 to December 31, 2011). Programme and vaccination coverage were estimated with population statistics. Incidence of acute hepatitis B was analyzed with notification data from the Amsterdam Public Health Service (1992-2011). Mathematical modelling accounting for vaccination data and trends in sexual risk behaviour was used to explore the impact of the programme. RESULTS: At the end of 2011, programme coverage was estimated at 41% and vaccination coverage from 30% to 38%. Most participants (67%) were recruited from the outpatient department for sexually transmitted infections and outreach locations such as saunas and gay bars. Incidence of acute hepatitis B dropped sharply after 2005. The mathematical model in which those who engage most in high-risk sex are vaccinated, best explained the decline in incidence. CONCLUSIONS: Transmission of hepatitis B virus among Amsterdam's men who have sex with men has decreased, despite ongoing high-risk sexual behaviour. Vaccination programmes targeting men who have sex with men do not require full coverage; they may be effective when those who engage most in high-risk sex are reached.

Hahne, S., van Houdt, R., Koedijk, F., van Ballegooijen, M., Cremer, J., Bruisten, S., Coutinho, R. and Boot, H. "**Selective hepatitis B virus vaccination has reduced hepatitis B virus transmission in the Netherlands**." PLoS One **2013** 8(7): e67866.

BACKGROUND & AIMS: In the Netherlands, a selective hepatitis B virus (HBV) vaccination programme started in 2002 for men having sex with men, drug users, commercial sex workers and heterosexuals with frequent partner changes. We assessed the programme's effectiveness to guide policy on HBV prevention. METHODS: We analysed reports of acute HBV infection in the Netherlands between 2004 and 2010 requesting serum from patients for HBV-genome S- and C-region sequencing. We used coalescence analyses to assess genetic diversity of nonimported genotype-A cases over time. RESULTS: 1687 patients with acute HBV infection were reported between 2004 and 2010. The incidence of reported acute HBV infection decreased from 1.8 to 1.2 per 100,000 inhabitants, mostly due to a reduction in the number of cases in men who have sex with men. Men were overrepresented among cases with an unknown route of transmission, especially among genotype A2 cases mainly associated with transmission through male homosexual contact. The genetic diversity of nonimported genotype-A strains obtained from men who have sex with men decreased from 2006 onwards, suggesting HBV incidence in this group decreased. CONCLUSIONS: The selective HBV-vaccination programme for behavioural high-risk groups very likely reduced the incidence of HBV infection in the Netherlands mainly by preventing HBV infections in men who have sex with men. A considerable proportion of cases in men who did not report risk behaviour was probably acquired through homosexual contact. Our findings support continuation of the programme, and adopting similar approaches in other countries where HBV transmission is focused in high-risk adults.

Harmsen, I. A., Lambooij, M. S., Ruiter, R. A., Mollema, L., Veldwijk, J., van Weert, Y. J., Kok, G., Paulussen, T. G., de Wit, G. A. and de Melker, H. E. "**Psychosocial determinants of parents' intention to vaccinate their newborn child against hepatitis B**." Vaccine **2012** 30(32): 4771-4777.

From October 2011, The Netherlands started to vaccinate all newborns against hepatitis B. The aim of the present study was to get insight in the psychosocial factors that determine parents' intention to vaccinate their child against hepatitis B, and to test whether intention to vaccinate is a good predictor of actual vaccination behaviour. In total, 2000 parents of newborns (0-2 weeks old) received a self-report questionnaire measuring intention towards hepatitis B vaccination and its psychosocial determinants (response rate 45.6%). Participants were invited for follow-up research and subsequently offered the opportunity to have their child vaccinated against hepatitis B. The findings showed that the large majority of parents intend to

vaccinate their child against hepatitis B. The intention to vaccinate was most strongly determined by parents' attitude towards hepatitis B vaccination, which in turn was positively associated with perceived benefits of the vaccination and perceptions of the child's susceptibility to hepatitis B. The majority of the 246 parents that accepted the invitation for a follow-up study had their child vaccinated (83.7%). Intention was found to be a significant predictor of vaccination behaviour although less strong than expected. It is concluded that Dutch parents were positive towards hepatitis B vaccination in terms of both intention and behaviour. To further sustain parents' positive attitudes towards hepatitis B vaccination, educational campaigns should strengthen the benefits of vaccination along with emphasizing the child's risk to hepatitis B infection.

Hahne, S., van den Hoek, A., Baayen, D., van der Sande, M., de Melker, H. and Boot, H. "**Prevention of perinatal hepatitis B virus transmission in the Netherlands, 2003-2007: children of Chinese mothers are at increased risk of breakthrough infection**." Vaccine **2012** 30(9): 1715-1720.

BACKGROUND: In the Netherlands, different hepatitis B vaccination schedules have been used for children born to HBV-infected mothers. All schedules included a birth dose of hepatitis B immunoglobuline (HBIg). We assessed determinants of perinatal HBV transmission and determinants of anti-HBs titers in infants born to HBsAg positive mothers. METHODS: We included infants born to HBV infected mothers between 1.1.2003 and 30.6.2007, using national databases and a separate database for Amsterdam. Risk factors for perinatal transmission and determinants of the anti-HBs titer were studied using logistic and linear regression, respectively. RESULTS: Of 2657 infants registered in the national database, 91% were registered to have received HBIg and at least three hepatitis B vaccinations. In Amsterdam, this coverage among 413 children at risk was higher (96%, $p<0.01$). Serological test results for 2121 infants (80%) indicated that 13 (0.6%) were HBsAg positive. A mother of Chinese descent was the only risk factor for perinatal HBV infection identified (RR 9.1, 95% CI 3.1-26.8). Receiving a birth dose of hepatitis B vaccine later than in the first week of life was not associated with an increased risk of perinatal HBV infection. A shorter period between last vaccination and testing, and having received more doses of hepatitis B vaccine were independently associated with a higher anti-HBs titer. CONCLUSIONS: Infants born to Chinese mothers were at increased risk of perinatal HBV infection. All HBsAg positive pregnant women of Chinese origin should be assessed to determine whether there is an indication for anti-viral treatment during pregnancy. Among infants who received HBIg at birth, we did not detect an increased risk of perinatal HBV infection when the first dose of hepatitis B vaccine was administered after the first week of life.

Vet, R., de Wit, J. B. and Das, E. "**The efficacy of social role models to increase motivation to obtain vaccination against hepatitis B among men who have sex with men**." Health Educ Res **2011** 26(2): 192-200.

This study assessed the effects of role models in persuasive messages about risk and social norms to increase motivation to obtain hepatitis B virus (HBV) vaccination in men who have sex with men (MSM). MSM at risk for HBV in The Netherlands (N = 168) were recruited online via a range of websites and were randomly assigned to one of four conditions in a 2 (risk communication: yes and no) x 2 (social norms communication: yes and no) factorial design. In each condition, participants subsequently provided self-completed assessments of their perceived risk of HBV infection, perceived social norms regarding HBV vaccination and their intention to obtain vaccination against HBV. Risk communication and social norms communication that used social role models were effective in significantly increasing men's intention to obtain vaccination against HBV. No additive effect was found for a combined message. Mediation analyses showed that communications influenced intention via perceived risk and social norms. Findings extend previous theorizing and research and show that both role model-based risk communication and social norms

communication can be effective in increasing intentions to obtain HBV vaccination in MSM. This knowledge contributes to the development of effective health promotion to increase HBV vaccination in MSM.

Baars, J. E., Boon, B. J., Garretsen, H. F. and van de Mheen, D. "**The reach of a hepatitis B vaccination programme among men who have sex with men**." Eur J Public Health **2011** 21(3): 333-337.

BACKGROUND: Homosexual contact is a major risk factor for acute hepatitis B infection. This study explores how many and which men who have sex with men (MSM) are reached by the ongoing hepatitis B vaccination programme in The Netherlands (started in 2002), and investigate reasons for non-participation and non-compliance. METHODS: In this cross-sectional study, on the basis of ethnographic mapping and targeted sampling, 320 MSM were interviewed at different venues in three regions in The Netherlands. RESULTS: Of the sample, 74% reported to be aware of the opportunity to obtain free hepatitis B vaccination, and 50% reported to be vaccinated (received at least one injection). Compliance with the three-dose vaccination schedule was 84%. The most important reason for non-participation in the vaccination programme was a low perceived risk of getting infected with the virus. A personal approach by STD-prevention workers, the recruitment region and having sex with casual partners were positively associated with vaccination uptake. Being bisexual was negatively associated with, and visiting gay bars/discos was positively associated with, awareness of the opportunity to obtain free hepatitis B vaccination. CONCLUSION: This study shows a large proportion of MSM is aware that they could opt for free hepatitis B vaccination. Future vaccination programmes should focus on a personal approach, since the use of STD prevention workers was shown to be a successful tool for participation in the vaccination programme. The personal information should focus on perceived risk of infection, since this was a major reason for vaccine refusal.

Hontelez, J. A., Hahne, S. J., Oomen, P. and de Melker, H. "**Parental attitude towards childhood HBV vaccination in The Netherlands**." Vaccine **2010** 28(4): 1015-1020.

In The Netherlands, children with at least one parent born in a hepatitis B virus (HBV) endemic country are offered HBV vaccination within the National Immunization Programme (NIP) since 2003. However, in the eligible group the HBV vaccine coverage is lower than the DPT-IPV-Hib coverage. We therefore conducted a questionnaire survey in order to determine the acceptance of HBV vaccination among parents of eligible children. Given the possibility that universal HBV vaccination will be introduced in the Netherlands, we also assessed the attitude towards universal HBV vaccination among parents whose children are currently not eligible for HBV vaccination. Participants were selected based on the registered vaccination status of their child. Only 13 of 83 parents (16%) within the HBV-eligible group whose child was registered as 'incompletely vaccinated' for HBV reported that they refused a vaccine for their child. Risk factors for HBV refusal were a low risk perception of HBV, a high socioeconomic status and one parent born in The Netherlands. Within the non-eligible group, we found that 9% (95% CI: 3-22%) of the parents whose child was fully vaccinated with DPT-IPV-Hib had a negative attitude towards universal HBV vaccination. Considering the recent recommendation of the Dutch Health Council to introduce universal HBV vaccination, this resistance deserves further attention.

Presentations Hans Blystad: Country example Scandinavia

RELATED

Pubmed MEDLINE search on {(Hepatitis B) AND (**Prevention) AND Immunization AND Sweden OR Norway Or Denmark (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Insulander, M., Hokeberg, I., Lind, G., von Sydow, M., Lindgren, S., Petersson, I. and Fischler, B. "**Evaluation of a new vaccination program for infants born to HBsAg-positive mothers in Stockholm County**." Vaccine **2013** 31(40): 4284-4286.

To overcome previous shortcomings in the routines for prophylaxis to newborns of hepatitis B infected pregnant women, we established a new program in 2005. This program combined monovalent hepatitis B vaccine at birth and at one month with three doses of hexavalent vaccine, including a hepatitis B vaccine component, at 3, 5 and 12 months, respectively. The hexavalent vaccine and follow-up serologies were administered at the well baby clinics. Three hundred and eighty babies born to 356 HBsAg positive mothers (9% HBeAg positive), were evaluated. Twenty-two children were lost to follow-up, 329 of the remaining 358 children (92%) completed follow-up serology at ages 13-18 months, with protective anti-HBs levels in 99%. For comparison, in a previous cohort from 2000 to 2001, only 63% completed follow-up serology. We conclude that the adherence to the new program was good and that it resulted in a very high rate of protective antibody levels.

Stenkvist, J., Lidbrink, P., Olofsson, I., von Sydow, M. and Lindh, G. "**Hepatitis B seroprevalence in persons attending youth clinics in Stockholm, Sweden in 2008**." Int J STD AIDS **2012** 23(11): 767-771.

Sweden is a low endemicity country for hepatitis B virus (HBV). The previously reported prevalence of chronic HBV is <1% and of overall markers <5%. HBV is not included in the universal childhood vaccination programme. Instead, selected high-risk groups are targeted. Our aim was to examine the HBV seroprevalence in youth clinic clients in Stockholm and identify if this population might be a new target group for vaccination. In total, 515 clients aged 18-22 years were recruited. They completed a risk-assessment questionnaire and 464 (90%) had a serum specimen tested for HBV serology. Chronic HBV was found in 0.6% and 0.9% had previously been infected with HBV. A seroprevalence of 1.8% HBV markers was found among non-vaccinated persons. This is lower than reported from other countries and not different from the general population in Sweden. However, in persons originating from HBV endemic countries (n = 123), the prevalence was higher, 6.5%. Only 14% were vaccinated and the majority hence susceptible to HBV. The target groups are not reached by the present vaccination strategy. Youth clinics are ideal settings for catch-up vaccination.

Rimseliene, G., Nilsen, O., Klovstad, H., Blystad, H. and Aavitsland, P. "**Epidemiology of acute and chronic hepatitis B virus infection in Norway, 1992-2009**." BMC Infect Dis **2011** 11: 153.

BACKGROUND: Norway is classified as a low prevalence country for hepatitis B virus infection. Vaccination is only recommended for risk groups (intravenous drug users (IDUs), Men who have Sex with Men (MSM), immigrants and contacts of known carriers). We describe the epidemiology of reported cases of hepatitis B in Norway, during the years 1992-2009 in order

to assess the validity of current risk groups and recommend preventive measures. METHODS: We used case based data from the national surveillance system on acute and chronic hepatitis B. The Norwegian Statistics Bureau provided population and migration data and the Norwegian Institute for Alcohol and Drug Research the estimated number of active IDUs between 2002-2007. Incidence rates (IR) and incidence rate ratios (IRR) for acute hepatitis B and notification rates (NR) and notification rate ratios (NRR) for chronic hepatitis B with 95% confidence intervals were calculated. RESULTS: The annual IR of acute hepatitis B ranged from 0.7/100,000 (1992) to 10.6/100,000 (1999). Transmission occurred mainly among IDUs (64%) or through sexual contact (24%). The risk of acquiring acute hepatitis B was highest in people aged 20-29 (IRR = 6.6 [3.3-13.3]), and in males (IRR = 2.4 [1.7-3.3]). We observed two peaks of newly reported chronic hepatitis B cases in 2003 and 2009 (NR = 17.6/100,000 and 17.4/100,000, respectively). Chronic hepatitis B was more likely to be diagnosed among immigrants than among Norwegians (NRR = 93 [71.9-120.6]), and among those 20-29 compared to those 50-59 (NRR = 5.2 [3.5-7.9]). CONCLUSIONS: IDUs remain the largest risk group for acute hepatitis B. The observed peaks of chronic hepatitis B are related to increased immigration from high endemic countries and screening and vaccination of these groups is important to prevent further spread of infection. Universal screening of pregnant women should be introduced. A universal vaccination strategy should be considered, given the high cost of reaching the target populations. We recommend evaluating the surveillance system for hepatitis B as well as the effectiveness of screening and vaccinating immigrant populations.

Harder, K. M., Cowan, S., Eriksen, M. B., Krarup, H. B. and Christensen, P. B. "**Universal screening for hepatitis B among pregnant women led to 96% vaccination coverage among newborns of HBsAg positive mothers in Denmark**." Vaccine **2011** 29(50): 9303-9307.

In Denmark selective screening programs of pregnant women for hepatitis B missed 30-50% of high-risk groups and in late 2005 a universal screening of pregnant women for HBsAg was implemented. During a 2-year period a prospective enhanced surveillance of the universal screening was performed to examine the effectiveness of universal HBV-screening of pregnant women and HBV-immunizations of their newborn, and to provide a prevalence-estimate for HBV in Denmark. On a opt out basis all women in Denmark attending antenatal care were tested for hepatitis B serology. Vaccination data of the newborns and households of HBsAg positive pregnant women were assembled. Among 140,376 HBsAg tests of pregnant women, 371 (0.26%) were positive. The prevalence among women of Danish origin was 0.012% and 2.74% among foreign born women, highest for women from Southeast Asia (14.5%). Genotype C was the most prevalent (37%) and 13% had a HBVDNA >/=10(8) IU/ml. The prevalence estimate of chronic hepatitis B in Denmark was 0.2-0.3% in the general population. Among children born within the project period, 96% received vaccination at birth compared to 50% of siblings born prior to universal screening. During 3 years of passive follow-up two transmissions (0.5%) have been notified. Among children born of the positive mothers prior to the trial-period 7.3% had been notified. Thus the prevalence of HBV positive mothers has more than doubled in Denmark over the last 40 years, but among women of Danish origin it has decreased 10-fold. By replacing selective screening with universal, identification of

newborns in need of HBV-immunization was increased from 50% to almost complete coverage, and also identifies mothers with high viral load for evaluation of pre-term treatment to interrupt in utero transmission.

Bjerke, S. E., Vangen, S., Holter, E. and Stray-Pedersen, B. "**Infectious immune status in an obstetric population of Pakistani immigrants in Norway**." Scand J Public Health **2011** 39(5): 464-470.

AIM: To investigate cytomegalovirus, rubella, varicella, toxoplasma, and hepatitis B immune status and factors associated with susceptibility for infections among Pakistani pregnant women in Norway. METHODS: A total of 206 pregnant Pakistani women living in Norway participated in the evaluation. Blood samples were collected during pregnancy and tested for IgG antibodies against cytomegalovirus, rubella virus, varicella-zoster virus, Toxoplasma gondii, and hepatitis B (HB) virus. RESULTS: All women had IgG antibodies against cytomegalovirus. Positivity for rubella IgG was 92%, 93% had varicella IgG antibodies, while 17% had toxoplasma IgG. Eleven per cent were anti-HBc positive, one of whom was HBsAg positive, which means that blood and cervix secretions are infectious with risk of virus transmission to the baby at the time of birth. Six women were only anti-HBc positive, they may have low-level HB infection, and risk of transmission cannot be excluded. Age younger than 25 years, having less than two children, and having lived less than 5 years in Norway were factors significantly associated with varicella-seronegative status, and thus susceptible for primary infection. CONCLUSIONS: To decrease the incidence of neonatal and maternal morbidity related to rubella, varicella, toxoplasma, and hepatitis B in our Pakistani immigrant population, we should intensify our rubella antenatal screening programme and focus upon rubella vaccination postpartum. We should offer varicella-seronegative women immunisation, advise toxoplasma-seronegative women to avoid visit to their home country during pregnancy, and give hepatitis B vaccine to all newborns regardless of maternal HBsAg status.

Presentations Howard Thomas: Country example UK- Control and management of CHB

Kennedy, P. T., Lee, H. C., Jeyalingam, L., Malik, R., Karayiannis, P., Muir, D., Main, J., Thursz, M., Goldin, R., Smith, B., et al. "**NICE guidelines and a treatment algorithm for the management of chronic hepatitis B: a review of 12 years experience in west London**." Antivir Ther **2008** 13(8): 1067-1076.

BACKGROUND: Treatment strategies in chronic hepatitis B (CHB) are evolving as more potent oral antivirals become available. However, drug resistance remains a major challenge and policy guidelines on management are limited by the evidence base. This study aims to review the implications of the National Institute for Health and Clinical Excellence (NICE) guidelines in a cohort of unselected CHB patients in the United Kingdom and to evolve a management algorithm for their treatment. METHODS: In total, 783 unselected hepatitis B surface antigen-positive patients, were assessed of whom 212 (27%) underwent liver biopsy. Age, alanine aminotransferase, hepatitis B virus DNA and necroinflammatory score were analysed to determine their value as predictors of fibrosis. Patients with biopsy evidence of fibrosis were offered treatment and followed longitudinally. Six-month on-treatment virologic response was evaluated to determine the validity of this strategy in

predicting the early emergence of resistance. RESULTS: Age, gender and necroinflammatory score were predictors of fibrosis in CHB patients, whereas age > 40 years was a predictor of cirrhosis in both hepatitis B e antigen (HBeAg)-positive (P < 0.03) and HBeAg-negative patients (P < 0.003). A total of 81% of HBeAg-positive and 65% of HBeAg-negative CHB patients who required adefovir add-on therapy were identifiable after 6 months of lamivudine monotherapy, by continuing HBV DNA positivity (P < 0.002 and P < 0.0001, respectively). CONCLUSIONS: Advanced liver disease was present in patients falling outside current treatment guidelines, highlighting the importance of liver histology in identifying fibrosis and the need for antiviral therapy. While 6 month on-treatment virologic response as a trigger for instituting add-on therapy may be an improvement on the current recommendations, such a strategy should be integrated into any new treatment algorithm, likely to consist of entecavir and tenofovir.

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Pubmed MEDLINE search on {(Hepatitis B) AND (**Prevention) AND Immunization AND UK (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Yates, T. A., Paranthaman, K., Yu, L. M., Davis, E., Lang, S., Hackett, S. J., Welch, S. B., Pollard, A. J. and Snape, M. D. "**UK vaccination schedule: persistence of immunity to hepatitis B in children vaccinated after perinatal exposure**." Arch Dis Child **2013** 98(6): 429-433.

OBJECTIVE: To assess persistence of immunity to hepatitis B (HBV) in primary school children vaccinated following perinatal exposure. DESIGN: Serological survey. SETTING: Five UK sites (Berkshire East, Birmingham, Buckinghamshire, Milton Keynes and Oxfordshire). PARTICIPANTS: Children from 3 years 4 months to 10 years of age (mean age 6.2 years), vaccinated against HBV from birth following perinatal exposure. INTERVENTIONS: A single booster dose of the paediatric formulation of a recombinant HBV vaccine. MAIN OUTCOME MEASURES: Titres of antibody against hepatitis B Surface Antigen (anti-HBs) measured immediately before and 21-35 days after the HBV vaccine booster. RESULTS: Prebooster anti-HBs titres were >10 mIU/ml in 84.6% of children (n=26; 95% CI 65.1 to 95.6%). All children (n=25, 95% CI 86.3 to 100%) had titres >100 mIU/ml after the booster. CONCLUSIONS: This study of antibody persistence among UK children born to hepatitis B infected women, immunised with a 3-dose infant schedule with a toddler booster suggests sustained immunity through early childhood. These data should prompt further studies to address the need for a preschool booster. TRIAL REGISTRATION: Eudract Number 2008-004785-98.

Puliyel, J. "**Vaccine uptake rather than disease mitigation seems to be aim of universal hepatitis B vaccination in the UK**." BMJ **2013** 347: f5187.

Balogun, M. A., Parry, J. V., Mutton, K., Okolo, C., Benons, L., Baxendale, H., Hardiman, T., Boxall, E. H., Sira, J., Brown, M., et al. "**Hepatitis B virus transmission in pre-adolescent schoolchildren in four multi-ethnic areas of England**." Epidemiol Infect **2013** 141(5): 916-925.

The aim of this study was to estimate the amount of childhood hepatitis B virus

transmission in children born in the UK, a very low-prevalence country, that is preventable only by universal hepatitis B immunization of infants. Oral fluid specimens were collected from schoolchildren aged 7-11 years in four inner city multi-ethnic areas and tested for the presence of antibody to hepatitis B core antigen (anti-HBc). Those found positive or indeterminate were followed up with testing on serum to confirm their hepatitis B status. The overall prevalence of anti-HBc in children was low [0.26%, 95% confidence interval (CI) 0.14-0.44]. The estimated average annual incidence of hepatitis B was estimated to be 29.26/100 000 children (95% CI 16.00-49.08). The total incidence that is preventable only by a universal infant immunization programme in the UK was estimated to be between 5.00 and 12.49/100 000. The study demonstrates that the extent of horizontal childhood hepatitis B virus transmission is low in children born in the UK and suggests that schools in the UK are an uncommon setting for the transmission of the virus. Targeted hepatitis B testing and immunization of migrants from intermediate- and high-prevalence countries is likely to be a more effective measure to reduce childhood transmission than a universal infant immunization programme.

Siddiqui, M. R., Gay, N., Edmunds, W. J. and Ramsay, M. "**Economic evaluation of infant and adolescent hepatitis B vaccination in the UK**." Vaccine **2011** 29(3): 466-475.

A Markov model of hepatitis B virus (HBV) disease progression in the UK estimated that 81% of predicted HBV-associated morbidity and mortality could be prevented by universal infant vaccination at a cost of approximately pound 260,000 per QALY gained. Universal adolescent vaccination would be less effective (45% prevented) and less cost-effective (pound 493,000 per QALY gained). Higher HBV incidence rates in males and intermediate/high risk ethnic populations meant it was approximately 3 times more cost-effective to vaccinate these groups. At current vaccine costs a selective infant vaccination programme, based on vaccinating intermediate/high risk ethnic populations would not be considered cost effective. The threshold cost per vaccinated child at which the programme would be considered cost-effective was investigated. Universal infant vaccination would be cost-effective if the average cost of vaccinating each child against HBV, including vaccine and administration costs of all doses, was less than pound 4.09. Given the low cost of vaccination required to make a universal programme cost-effective the most feasible policy in the UK would be to use a suitably priced combined vaccine that included the other antigens in the current infant vaccination schedule.

Kale, A. R. and Snape, M. D. "**Immunisation of adolescents in the UK**." Arch Dis Child **2011** 96(5): 492-495.

The recent introduction of routine immunisation against human papillomavirus (HPV) in adolescent girls in the UK has focused attention on the potential for immunisation in this age group. In this review the authors suggest that this is an opportunity that is not being fully utilised. In particular, there are arguments for adolescent vaccines to boost immunity against Bordetella pertussis and Neisseria meningitidis infections, and the successful implementation of the HPV vaccine could be taken as a model to prevent another sexually transmitted carcinogenic infection, hepatitis B virus.

English, P. "**Should universal hepatitis B immunisation be introduced in the UK?**" Arch Dis Child **2006** 91(4): 286-289.

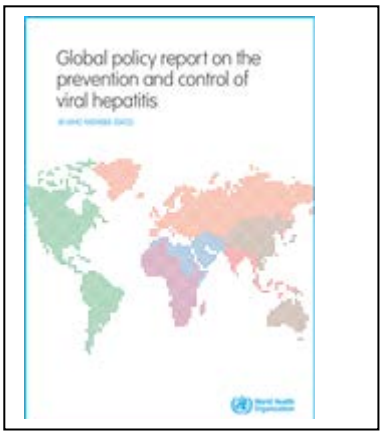
RELATED Abstracts session 5

Pubmed MEDLINE search on {(Hepaitits C OR Hep C OR HCV) AND (**screeening** OR **impact OR access**) AND (**public health OR recommendations)**} in all fields and filters used on this search **'last 5 year' and ' Review'** was performed. }. Relevant article were manually selected. The reference were sorted by publication year and first author

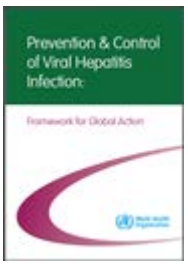
Session 5: EUROPEAN COUNTRIES AND THEIR NATIONAL HEPATITIS PLAN

Presentation Stefan Wiktor (WHO) - Global viral hepatitis

- Global policy report on the prevention and control of viral hepatitis in WHO Member States
  - http://who.int/hiv/pub/hepatitis/global_report/en/



- The periodic evaluation of implementation of the WHO strategy requires an initial baseline survey of all Member States. In mid-2012, WHO, in collaboration with the World Hepatitis Alliance, conducted such a survey, asking Member States to provide information relating to the four axes of the WHO strategy. In particular, Member States were asked whether key prevention and control activities are being conducted. This report presents the results.
- The first chapter provides an introduction to viral hepatitis and to the global response to this group of diseases. The second chapter provides a global overview of the survey findings. Chapters three through eight present findings from the six WHO regions, including summaries of data from all responding countries. Additional survey data, study methodology information and the survey instrument can be found in Annexes A–E.



- Prevention and Control of Viral Hepatitis Infection: Framework for Global Action
  - http://who.int/hiv/pub/hepatitis/Framework/en/

RELATED Abstracts session 5

Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND (Action plan) (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant The reference were sorted by publication year and first author

Sociedad Espanola de Patologia, D. "**The position of the Sociedad Espanola de Patologia Digestiva on the current situation of hepatitis C management in Spain**." Rev Esp Enferm Dig **2014** 106(1): 46-49.

The advent of direct-action antivirals telaprevir and boceprevir has entailed a radical change in the healing possibilities for patients with hepatitis C. This change has coincided with the emergence of highly robust evidence on the benefits of cure as regards increased overall survival, mainly brought about by a reduction in liver-related events in the long run. Therefore, a finite-in-time treatment is available that achieves very notable results both short- and long-term. Triple therapy, consisting of the association of one of these novel drugs with the previously standard regimen of pegylated interferon and ribavirin, has come in the setting of a financial crisis, which has led to restrict its use primarily for patients with advanced fibrosis. These patients--who need a cure the most--are those with the lowest healing rates and the commonest, most severe side effects. The time has then come to shift the aim point towards patients with less severe fibrosis, better cure rates, and fewer side effects where therapeutic intervention may prevent the development of significant liver disease. Despite record-time approval by the European Medicines Agency, various barriers--mainly at the Autonomic regional level--have delayed access to these therapies by our patients, thus giving rise to inequality situations. New oral therapies are now on the near horizon that will increase the numbers of patients eligible for treatment with fewer side effects and a higher cure rate. We hope that the lesson is learned and no such situation will be repeated. An Integrated National Action Plan Against Hepatitis C would be an essential tool for countering this disease.

McLeod, A., Weir, A., Aitken, C., Gunson, R., Templeton, K., Molyneaux, P., McIntyre, P., McDonald, S., Goldberg, D. and Hutchinson, S. "**Rise in testing and diagnosis associated with Scotland's Action Plan on Hepatitis C and introduction of dried blood spot testing**." J Epidemiol Community Health **2014** 68(12): 1182-1188.

BACKGROUND: A key aim of the Hepatitis C Action Plan for Scotland was to reduce the undiagnosed population through awareness-raising activities, for general practitioners and those at risk, and the introduction of dried blood spot (DBS) sampling in community drug services to overcome barriers to testing. This study evaluates the impact of these activities on testing and diagnosis. METHODS: Data on hepatitis C virus (HCV) testing undertaken between January 1999 and December 2011 in Scotland's four largest health boards were analysed. Segmented regression analysis was used to examine changes in testing following the (1) launch of the Action Plan and (2) introduction of DBS testing. RESULTS: Between the pre-Action Plan and Action Plan periods, increases were observed in the average number of HCV tests (19 058-29 045), positive tests (1993-2405) and new diagnoses (1221-1367). Since July 2009, 26% of new diagnoses were made in drug services. The trend in the number of positive tests was raised during the Action Plan, compared to pre-Action Plan, particularly in drug services (rate ratio (RR)=1.4, $p<0.001$) and prisons (RR=1.2, $p<0.001$); no change was observed in general practice. Following introduction of DBS testing, there was a 3-fold increase in testing (RR=3.5, $p<0.001$) and 12-fold increase in positives (RR=12.1, $p<0.001$) in drug services. CONCLUSIONS: The introduction of DBS sampling in community drug services has made an appreciable contribution to efforts to diagnose the HCV-infected population in Scotland. These findings are important to other countries, with injecting-related HCV epidemics, needing to scale-up testing/case-finding initiatives.

McDonald, S. A., Hutchinson, S. J., Innes, H. A., Allen, S., Bramley, P., Bhattacharyya, D., Carman, W., Dillon, J. F., Fox, R., Fraser, A., et al. "**Attendance at specialist hepatitis clinics and initiation of antiviral treatment among persons chronically infected with hepatitis C: examining the early impact of Scotland's Hepatitis C Action Plan**." J Viral Hepat **2014** 21(5): 366-376.

Primary goals of the Hepatitis C Action Plan for Scotland Phase II (May 2008-March 2011) were to increase, among persons chronically infected with the hepatitis C (HCV) virus, attendance at specialist outpatient clinics and initiation on antiviral therapy. We evaluated progress towards these goals by comparing the odds, across time, of (a) first clinic attendance within 12 months of HCV diagnosis (n = 9747) and (b) initiation on antiviral treatment within 12 months of first attendance (n = 5736). Record linkage between the national HCV diagnosis (1996-2009) and HCV clinical (1996-2010) databases and logistic regression analyses were conducted for both outcomes. For outcome (a), 32% and 45% in the respective pre-Phase II (before 1 May 2008) and Phase II periods attended a specialist clinic within 12 months of diagnosis; the odds of attendance within 12 months increased over time (OR = 1.05 per year, 95% CI: 1.04-1.07), but was not significantly greater for persons diagnosed with HCV in the Phase II era, compared with the pre-Phase II era (OR = 1.1, 95% CI: 0.9-1.3), after adjustment for temporal trend. For outcome (b), 13% and 28% were initiated on treatment within 12 months of their first clinic attendance in the pre-Phase II and Phase II periods, respectively. Higher odds of treatment initiation were associated with first clinic attendance in the Phase II (OR = 1.9, 95% CI: 1.5-2.4), compared with the pre-Phase II era. Results were consistent with a positive impact of the Hepatitis C Action Plan on the treatment of chronically infected individuals, but further monitoring is required to confirm a sustained effect.

Maticic, M., Videcnik Zorman, J., Gregorcic, S., Schatz, E. and Lazarus, J. V. "**Are there national strategies, plans and guidelines for the treatment of hepatitis C in people who inject drugs? A survey of 33 European countries**." BMC Infect Dis **2014** 14 Suppl 6: S14.

BACKGROUND: Hepatitis C virus (HCV) infection represents a major global health problem, which in high-income countries now mostly affects people who inject drugs (PWID). Many studies show that the treatment of HCV infection is as successful among PWID as among other populations and recently PWID have been included in the international guidelines for the treatment of HCV infection. The aim of this survey was to collect data from European countries on the existence of national strategies, action plans and clinical guidelines for HCV treatment in the general population and PWID in particular. METHODS: Thirty-three European countries were invited to participate. Data on available national strategies, action plans and guidelines for HCV treatment in general population and in PWID specifically were collected prospectively by means of a structured electronic questionnaire and analyzed accordingly. RESULTS: All of the 33 invited European countries participated in the survey. Twenty-two responses came from non-governmental organizations, six from public health institutions, four from university institutions and one was an independent consultant. Fourteen (42.4%) of the countries reported having a national strategy and/or national action plan for HCV treatment, from which ten of them also reported having a national strategy and/or national action plan for treatment of HCV infection in PWID. Nearly three-quarters reported having national HCV treatment guidelines. PWID were included in the majority (66.7%) of the guidelines. Fourteen (42.4%) countries reported having separate guidelines for the treatment of HCV infection in PWID. CONCLUSIONS: Given the high burden of HCV-related morbidity and mortality in PWID in Europe, the management of HCV infection should become a healthcare priority in all European countries, starting with developing or using already-existing national strategies, action plans and guidelines for this population.

Cohen, C., Caballero, J., Martin, M., Weerasinghe, I., Ninde, M. and Block, J. "**Eradication of hepatitis B: a nationwide community coalition approach to improving vaccination, screening, and linkage to care**." J Community Health **2013** 38(5): 799-804.

Infection with the hepatitis B virus (HBV) is a significant public health concern in the US, disproportionately affecting Americans of Asian, Native Hawaiian and Pacific Islander descent, despite the availability of a simple blood test, approved treatments, and an effective vaccine. Hep B United, a national campaign to support and leverage the success of community-based HBV coalitions, convened a partner summit in 2012

to develop a strategic response to the HHS Action Plan for the Prevention, Care, and Treatment of Viral Hepatitis. The resulting community action plan focuses on advancing three areas of the HHS plan: educating providers and communities to reduce health disparities; improving testing and linkage to care to prevent HBV-related liver disease and cancer; and eliminating perinatal HBV transmission.

Hope, V., Parry, J. V., Marongui, A. and Ncube, F. "**Hepatitis C infection among recent initiates to injecting in England 2000-2008: Is a national hepatitis C action plan making a difference?**" J Viral Hepat **2012** 19(1): 55-64.

Around 80% of hepatitis C virus (HCV) infections in England are among injecting drug users (IDUs). The HCV Action Plan launched in 2004 includes targets to reduce HCV prevalence in recent initiates (those starting injecting in the preceding 3 years), and to increase HCV voluntary confidential testing (VCT). The Action Plan's impact is examined using surveillance data from recent initiates participating in an annual survey of IDUs in contact with specialist services across England, 2000-2008. Participants provided an oral fluid sample (tested for anti-HCV) and completed a short questionnaire (including HCV VCT and result of last test). Overall, anti-HCV prevalence among the recent initiates was 18% (619/3463); in 2004, it was 20% (59/291), other than being lower in 2000 [11%, 73/672, adjusted odds ratio (AOR) = 0.63 95%CI 0.42-0.93] there was no change over time. Prevalence increased with age; was higher among those ever imprisoned, using a needle exchange, and having a HCV VCT; and varied by region. Overall, 42% (1460) had ever had a HCV VCT; in 2004 uptake was 45% (130/291) having increased from 26% (175/672, AOR = 0.57 95%CI 0.42-0.77) in 2000, and it rose to 62% (197/320, AOR = 2.12 95%CI 1.50-2.99) in 2008. The proportion of anti-HCV-positive IDUs aware of their infection was higher in 2006-2008 than in earlier years. The HCV Action Plan has probably helped increase recent initiates' uptake of HCV VCT and the proportion of those diagnosed with HCV infection. However, its impact on HCV transmission is unclear. There is a need to reinvigorate, and improve coverage of, interventions to prevent HCV transmission.

Presentation Nicola Rowan - National hepatitis plan lessons learnt Scotland

Wylie, L., Hutchinson, S., Liddell, D. and Rowan, N. "**The successful implementation of Scotland's Hepatitis C Action Plan: what can other European stakeholders learn from the experience? A Scottish voluntary sector perspective**." BMC Infect Dis **2014** 14 Suppl 6: S7.

Goldberg, D., Brown, G., Hutchinson, S., Dillon, J., Taylor, A., Howie, G., Ahmed, S., Roy, K. and King, M. "**Hepatitis C action plan for Scotland: phase II (May 2008-March 2011)**." Euro Surveill **2008** 13(21).

Related articles

(Pubmed MEDLINE search on {(Hepatitis) AND (**Prevention) AND (Scotland AND (Action plan) (Title/abstract)**} in all fields and filters used on this search **'last 5 year' and ' Review'** on**,** was performed. }.Manual selection of most relevant refernces. The reference were sorted by publication year and first author

McDonald, S. A., Hutchinson, S. J., Cameron, S., Bird, S. M., Mills, P. R., McLeod, A. and

Goldberg, D. J. "**Uptake of hepatitis C antibody testing in patients with end-stage liver disease in Glasgow, 1993-2007**." J Viral Hepat **2011** 18(4): e61-65.

Individuals infected with hepatitis C virus (HCV) need to be diagnosed well before developing end-stage liver disease to benefit from treatment. We aimed to ascertain what proportion of cases had been tested for HCV to inform on the effectiveness of current guidelines. Record linkage between national databases of HCV tests, hospital discharges and deaths identified 10,645 persons who were hospitalized or had died with mention of end-stage liver disease in Glasgow, Scotland, between 1993 and 2007. We estimated HCV test uptake and prevalence of HCV infection within the study population. The associations between both HCV test uptake and HCV-antibody status and sex, age group and deprivation quintile were estimated using logistic regression. We found that 43% of those hospitalized (n = 9153) and 23% of those who otherwise died (n = 1492) with first-time mention of end-stage liver disease had been tested for HCV during this period. Test uptake in those hospitalized increased from 13 (95% CI: 12-14%) in 1993-1997 to 58% (56-59%) in 2003-2007. The adjusted odds of being tested for HCV were significantly higher for men (OR=1.3, 95% CI: 1.2-1.5), for ages 25-54 (25-34 years: 2.7, 95% CI: 2.1-3.4; 35-44 years: 2.3, 95% CI: 2.0-2.6; 45-54 years: 1.5, 95% CI: 1.4-1.7) compared with 55+ years, and for those residing in the two most deprived quintiles (1.1, 95% CI: 1.0-1.2). Twenty-eight per cent of the HCV testees aged 25-44 years were HCV infected. These results highlight the continuing need for raising awareness among medical professionals for comprehensive HCV testing in patients with liver disease.

Hakeem, L., Thomson, G., McCleary, E., Bhattacharyya, D. and Banerjee, I. "**Prevalence and Immunization Status of Hepatitis B Virus in the HIV Cohort in Fife, Scotland**." J Clin Med Res **2010** 2(1): 34-38.

BACKGROUND: Routes of transmission of hepatitis B virus (HBV)/HIV infections are similar and there is a significant rate of co-infection in patients. A study was recently carried out in NHS Fife, Scotland from February 2007 - February 2008 to estimate the prevalence of HBV/HIV co-infection, occult HBV infection and immunisation status against HBV in a cohort of patients with HIV attending the departments of infectious diseases and genitourinary medicine. METHODS: Case notes were reviewed retrospectively (n = 70). Details on patient demographics, risk category, nadir/current CD4 count, HIV viral load and vaccination history were analysed. HBV markers (HBsAg/anti-HBs/anti-HBc/HBV DNA) and alanine transaminase (ALT) levels were tested prospectively if these tests had not been carried out in the previous 12 months. RESULTS AND CONCLUSION: Prevalence of HBV/HIV co-infection was 5.6% of which 2.8% of patients had occult infection and 22.9% had evidence of previous exposure. Although HBV is preventable by vaccination, only 24.2% of patients had been vaccinated against it. Improvements could therefore be made in the field of prevention with vaccination and monitoring the immune response in this cohort. KEYWORDS: Prevalence; Immunization status; Hepatitis B Virus; HIV.

Steiner, M., Murphy, E., Roy, K. M. and Dick, F. "**Benchmarking self-reported practice regarding Scottish Executive guidance on hepatitis C-infected health care workers**." Occup Med (Lond) **2007** 57(8): 607-609.

BACKGROUND: The 2002 Scottish Executive guidance 'hepatitis C-infected health care workers' advised NHS Scotland occupational health departments regarding screening health care workers (HCW) who perform or who may perform exposure-prone procedures (EPPs) for hepatitis C virus (HCV) infection. In 2004, 2 years following the launch of the guidance, there was anecdotal evidence of challenges to implementation and clinical and ethical concerns regarding the screening process. AIM: To benchmark the implementation of the Executive guidance on hepatitis C-infected HCW in NHS Scotland. METHODS: Lead occupational health practitioners in 15 Scottish NHS Boards completed a questionnaire and provided relevant local policies. RESULTS: All 15 NHS Boards responded: 87% (n = 13) had implemented the guidance with partial implementation in the remaining boards. While 87% required

identified and validated samples (IVS), no consistent method was reported for how results from an IVS were recorded. There was also no consensus as to the duration a result was considered valid or consistency in charging for tests required by other employers. Across Scotland, some employee groups were being screened over and above those recommended within the guidance. Overall, there was agreement on the value of a standardized NHS hepatitis C status certificate and the importance of explicit screening criteria and identifying EPP workers. CONCLUSION: The survey confirms the challenges in implementing the guidance on managing HCV-infected HCW within NHS Scotland. These include lack of clarity regarding who, when and how frequently a HCW should be screened and how the results of such tests should be recorded.

Roy, K. M., Hutchinson, S. J., Wadd, S., Taylor, A., Cameron, S. O., Burns, S., Molyneaux, P., McIntyre, P. G. and Goldberg, D. J. "**Hepatitis C virus infection among injecting drug users in Scotland: a review of prevalence and incidence data and the methods used to generate them**." Epidemiol Infect **2007** 135(3): 433-442.

It is estimated that of 50,000 persons in Scotland (1% of the county's population), infected with the hepatitis C virus (HCV), around 90% injected drugs. This paper reviews data on the prevalence and incidence of HCV, and the methods used to generate such information, among injecting drug users (IDUs), in Scotland. The prevalence estimate for HCV among IDUs in Scotland as a whole (44% in 2000), is comparable with those observed in many European countries. Incidence rates ranged from 11.9 to 28.4/100 person-years. The data have shaped policy to prevent infection among IDUs and have informed predictions of the number of HCV-infected IDUs who will likely progress to, and require treatment and care for, severe HCV-related liver disease. Although harm reduction interventions, in particular needle and syringe exchanges and methadone maintenance therapy, reduced the transmission of HCV among IDUs during the early to mid-1990s, incidence in many parts of the country remains high. The prevention of HCV among IDUs continues to be one of Scotland's major public health challenges.

McMillan, A. "**The changing prevalence of hepatitis B virus infection among men who have sex with men who attended a sexually transmitted infections clinic in Edinburgh, Scotland between 1989 and 2003**." Int J STD AIDS **2006** 17(8): 539-542.

The aim of the study was to discover if the prevalence of serological markers of hepatitis B virus infection among men who have sex with men (MSM) who attended a sexually transmitted infections clinic in Edinburgh, Scotland had changed in a 15-year period. This was a retrospective study of 3334 MSM attending the clinic as new patients. Forty-four men (1%) had hepatitis B surface antigenaemia. Overall, sera from 398 (12%) men gave positive results for anti-HBc. The seroprevalence of HBV in men aged 25-34 years and older men declined significantly during the study period. There was no significant change in seropositivity for anti-HBc in men aged 16-24 years. The proportion of men who had been vaccinated previously rose significantly during the most recent three-year period. Although there has been a decline in the prevalence of infection in clinic attendees, there is continued transmission of HBV in the local community.

Hutchinson, S. J., Roy, K. M., Wadd, S., Bird, S. M., Taylor, A., Anderson, E., Shaw, L., Codere, G. and Goldberg, D. J. "**Hepatitis C virus infection in Scotland: epidemiological review and public health challenges**." Scott Med J **2006** 51(2): 8-15.

INTRODUCTION: In 2004, Scotland's Health Minister stated that the hepatitis C virus (HCV) "is one of the most serious and significant public health risks of our generation". METHODS: To appreciate the prevention and care challenges posed by HCV in Scotland, we reviewed all country-specific data on i) the prevalence of infection among different populations, ii) the numbers infected with HCV, and iii) the current and future HCV disease burden. RESULTS: An estimated 1% of Scotland's

population has HCV; 85-90% of those infected were injecting drug users (IDUs). Reductions in HCV prevalence among young IDUs during the early 1990s suggest that the incidence of HCV had decreased; since then, the absence of further reductions highlight that existing prevention measures are insufficient. Two-thirds of the estimated 37,500 chronically HCV-infected individuals in Scotland remain undiagnosed and two-thirds of this group are former IDUs. An estimated 9,000 former IDUs were living with either moderate or severe HCV disease in 2004; if the current uptake of antiviral therapy continues, this number was estimated to double by 2016. Approximately 1,200 HCV-infected IDUs had developed liver failure by 2004; this figure was predicted to increase to 3,200 by 2020. CONCLUSIONS: Scotland faces three principal public health challenges: i) the prevention of HCV among current IDUs, ii) the diagnosis of HCV-infected persons, particularly those most in need of therapy to prevent severe HCV disease, and iii) the current and future provision of adequate resources to ensure that the movement of patients through the diagnostic and clinical care pathway is optimal.

Presentation Françoise Roudot-Thoraval - National hepatitis plan lessons learnt France

Related articles

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Spenatto, N., Boulinguez, S., Mularczyk, M., Molinier, L., Bureau, C., Saune, K. and Viraben, R. "**Hepatitis B screening: who to target? A French sexually transmitted infection clinic experience**." J Hepatol **2013** 58(4): 690-697.

BACKGROUND & AIMS: Hepatitis B virus (HBV) infection is a major public health burden in France and worldwide. Routine screening for hepatitis B is not currently recommended in France. Medical experts and public health agencies opinions can differ concerning targeting criteria. Our study aims at developing a risk assessment strategy for identifying possible hepatitis B cases among the patients consulting in a French Sexually Transmitted Infection (STI) clinic. METHODS: 6194 asymptomatic patients requesting an STI screening were also screened for hepatitis B infection. The association between hepatitis B surface antigen (HBsAg) positivity and/or total hepatitis B core antibody (anti-HBc) positivity and self-reported risk factors for hepatitis were analysed. RESULTS: Only male gender, lack of employment, and birth, in medium or high endemic country, were independently associated with HBsAg positivity in multivariate analysis. Sexual behaviour or self-reported vaccination status is therefore not necessary to target high-risk populations. These three simple criteria could save 25% of unnecessary tests and 6-16% undiagnosed hepatitis B compared to usual targeting criteria. CONCLUSIONS: To detect HBsAg carriers, only three simple targeting criteria, without taking into account the self-reported vaccination status or sexual behaviour, could improve screening efficiency and save unnecessary testing.

Brouard, C., Gautier, A., Saboni, L., Jestin, C., Semaille, C. and Beltzer, N. "**Hepatitis B knowledge, perceptions and practices in the French general population: the room for improvement**." BMC Public Health **2013** 13: 576.

BACKGROUND: Little is known about the knowledge, perceptions and prevention practices of the French general population with respect to Hepatitis B virus (HBV)

infection. This article describes this population's knowledge of HBV, their perceptions of the disease, and associated screening and vaccination practices. It compares these indicators with those observed in the same population for HIV, an infection with a chronic course and transmission modes resembling those of HBV. METHODS: A module on hepatitis B was added into the HIV KABP (Knowledge, Attitudes, Beliefs and Practices) survey which was carried out telephonically in 2010 among a random sample of 9,014 individuals aged between 18-69 and living in metropolitan France. RESULTS: Compared with HIV, the general population was less aware that needle exchange during intravenous drug use and sexual relationships are HBV transmission modes (HBV: 89.9% and 69.7%; HIV: 99.1% and 99.4%). The fear of both illnesses was similar at 20.3%. The individual perceived risk of infection was higher for HBV than for HIV with, respectively, 60.8% and 40.3% of respondents believing they had an equal or greater risk of being infected than the average person. However, the percentage of those reporting HBV screening during their lifetime (27.4%) was half that for HIV screening (61.4%). In multivariate analysis, HBV screening was reported more often by individuals born in areas with high HBV endemicity (OR = 2.1 [95% CI: 1.5-2.9]) than by those born in low HBV endemicity areas, and more often by those who reported they had taken drugs intravenously during their lifetime (OR = 2.2 [95% CI: 1.2-4.2]) than those who did not report such behavior. Almost one in two respondents (47%) reported HBV vaccination. The intermediate or high endemicity groups did not report vaccination more often than those born in low endemicity areas nor did those reporting intravenously drug use compared with those who did not. CONCLUSIONS: This study highlights very contrasting levels of knowledge, perceptions and practices regarding HBV and HIV in the French general population. Our results demonstrate the need to improve the general and high-risk populations' knowledge of HBV, in particular concerning sexual transmission, in order to improve screening and vaccination practices.

Mir, O., Adam, J., Gaillard, R., Gregory, T., Veyrie, N., Yordanov, Y., Berveiller, P., Chousterman, B. and Loulergue, P. "**Vaccination coverage among medical residents in Paris, France**." Clin Microbiol Infect **2012** 18(5): E137-139.

Medical residents are particularly exposed to the risk of occupational infection. We aimed to determine the vaccination coverage in residents with an anonymous self-reporting electronic questionnaire. A total of 250 residents took part in this survey. Vaccination rates were particularly high for mandatory vaccinations (diphtheria, tetanus, poliomyelitis, hepatitis B virus and tuberculosis). Regarding recommended vaccinations (influenza, 45.6%; pertussis, 65.2%; measles, 62.8%; varicella, 62.8%), rates were insufficient to prevent hospital epidemics, but higher than those reported in other healthcare workers. Further immunization programmes should target residents, and not only senior healthcare workers, with a critical role for occupational medicine departments.

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BACKGROUND: Data regarding the prevalence of hepatitis C (HCV) and hepatitis B (HBV) in inflammatory bowel disease (IBD) patients are conflicting. METHODS: In all, 315 IBD (252 Crohn's disease [CD] and 63 ulcerative colitis [UC]) patients were consecutively recruited between June 2005 and May 2009. RESULTS: The median age was 33 years (interquartile range [IQR]: 24-43) and median disease duration was 5 years (IQR: 2-11). Present and/or past HBV and HCV infection was found in 2.86% of 315 patients (CD: HBsAg 0.79%, anti-HBc 2.78%, anti-HCV 0.79%; UC: HBsAg 1.59%, anti-HBc 1.59%, anti-HCV 1.59%). Effective vaccination (anti-HBs without anti-HBc) was present in 48.9% of 315 patients. In multivariate analysis, age at diagnosis over 31 years (odds ratio [OR] 0.29; 95% confidence interval [CI] 0.15-0.58; P = 0.005), disease duration over 7 years (OR 0.43; 95% CI 0.23-0.83; P = 0.005),

age at inclusion over 33 years (OR 0.44; 95% CI 0.20-0.94; P = 0.005), and CD (OR 0.29; 95% CI 0.15-0.58; P = 0.005) were associated with the lack of effective vaccination. Two HBsAg-positive patients, including 1 under curative nucleoside/nucleotide analog treatment, had received 6 and 7 infliximab infusions, and 1 HCV RNA-positive subject had been receiving corticosteroid and azathioprine therapies for 12 and 33 months, respectively. No viral reactivation occurred in these patients. CONCLUSIONS: The prevalence of HBV and HCV infection in French IBD patients is similar to that of the general population. While the ECCO recommends an effective HBV vaccination in IBD, half of the patients were not vaccinated. The nonvaccination risk factors identified in our study may allow targeted vaccination coverage.

2. Bibliography of the Speakers

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