PROJECT REVIEW MODULE 2020, Online edition

Mediterranean and Black Sea Programme for Intervention Epidemiology Training

Abstract booklet

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ABSTRACTS

Seroprevalence of Measles Antibodies in Tunisia: First findings of 2019 National Survey

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Background: In Tunisia, measles incidence declined significantly since introduction of vaccination in the national schedule in 1983 and plateaued around a total of 12 yearly cases, with a vaccine coverage greater than 90% since 2000. In January 2019, a nosocomial measles outbreak started in Kasserine and Sfax, and reached countrywide with a total of 3896 cases in September.

Our aim was to estimate the seroprevalence of measles-specific IgG antibodies in the Tunisian population by age and region.

Methods: It was a seroprevalence study, on serum bank of 19 663 samples collected in 2015 across Tunisia, with a representativeness of all age groups.

Considering an 85% vaccination coverage, we required a sub-sample of 3500 randomly selected specimens. ELISA technique was used by the microbiology and biochemistry laboratory of Aziza Othmana hospital and the microbiology laboratory of the Charles Nicolle hospital.

Results: Out of 3454 samples tested, overall seroprevalence of anti-measles IgG was 94.9% (95%CI:94.3%-95.6%). In urban areas, seropositivity was 95.5% (95%CI: 94.7%-96.2%). By gender, anti-measles IgG was almost equal betwen the two sexes. Individuals born between 1982 and 1997 were more susceptible to measles; seroprevalence among those 20-30 years-old was 83.2% (95%CI: 79.7%-86.1%) and only 70.0% for those 1989-born.

Governorates of Sidi Bouzid and Tataouine had the lowest proportions of measles seropositivity (<90%).

Conclusions: The 2019 national serosurvey showed relatively high overall measles seropositivity in the Tunisian population. However, Tunisians born during 1982-1997 are unprotected against measles. Strengthening surveillance and raising healthcare workers and public awareness is essential. Also, vaccination of subjects aged 20 to 35, a childbearing age, is strongly recommended.

Keywords: measles, antibodies, seroepidemiologic studies, Tunisia.

Analysis of national surveillance data of Lyme Borreliosis, Georgia, 2019

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Background: Lyme Borreliosis is one of the most common vector-borne diseases in Georgia. The disease exposure characteristics have never been described before. We aimed to estimate the disease burden and describe the disease by demographics and exposure characteristics in 2019.

Methods: Case-based data was extracted from the national Electronic Integrated Disease Surveillance System (EIDSS). We performed descriptive analysis to estimate incidence and characterize the reported cases by age, gender, geographic area and exposures.

Results: During 2019, 687 suspected cases were reported in EIDSS. Among them, 267 (39%) were probable and 37 (5%) confirmed, while 383 (56%) were rejected. The overall disease incidence was 7.8/100,000 population. The disease is widespread in the country with highest incidence in the Racha-Lechkhumi (23.5/100,000) and lowest in Kakheti (3.2/100,000) regions. From June to September, 134 (44%) cases occurred. Disease incidence was higher among women (p-value =0.028). The median age of the cases was 36 years (IQR:24-53 years). Out of 236 interviewed, 73 (31%) and 30 (13%) reported a tick bite and contact with the tick blood, respectively. Around 68 (29%) travelled within Georgia, while 12 (5%) abroad. Forty-seven (20%) cases reported being close to green areas, while contact with animals was reported by only 1% of the cases.

Conclusions: Lyme disease is widespread and follows the typical seasonal pattern with people of productive age being mostly affected. Only 1/3 of the cases reported being bitten by a tick, which is significantly lower than global data and might suggest flaws in data recording. In 2019, over half of the reported cases were rejected, highlighting the need for raising awareness among clinicians so that diagnosis is based on local experience, especially in regions with higher incidence.

Keywords: Lyme Disease, Tick Bites, Morbidity, Georgia

Challenges in the implementation of a COVID-19 Electronic Integrated Disease Surveillance System, Ukraine, 2020

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Background: The Ukrainian surveillance system is paper-based. The web-based Electronic Integrated Disease Surveillance System (EIDSS) was piloted since 2011. Since the first COVID-19 cases, on March 2020, we used the online Google sheets for data collection, but after 50000 records the database export time was one hour and security not guaranteed. We implemented the EIDSS to ensure the secure and timely data collection and analysis and better respond to the ongoing pandemic.

Methods: We adapted the existing EIDSS to the investigation form and transferred the existing data. We drafted a ministerial order, provided trainings and IT support, established personal crypto-server user identification and simultaneous multiuser access and piloted the system. We requested logistical support from international partners. Healthcare professionals submit suspect case data in paper to regional epidemiologists, which enter and update them into the EIDSS. Data is analyzed at national level for management decisions.

Results: We created a video-guide and conducted 2 webinars with regional users. Since May, 205 users from all 25 regions are securely connected to the EIDSS. Partners donated computers and pay the internet services of the regions. Six people provide 24/7 support. On 30 June, the database contained 88165 records with 15min average exporting time. The main implementation challenges were: insufficient trained personnel, increased human and material needs including computer equipment, 24/7 IT support and stable internet in regions, online trainings only, legislative framework adaptation.

Conclusions: The EIDSS implementation process was resource-intensive but allowed for timely data collection, analysis and decision-making. It needs further improvement, expansion to different healthcare levels and incorporation of the laboratory module to allow for rapid data exchange and decision-making at national level. The legislative framework needs fast-track approval.

Key words: data collection, COVID-19, database management systems, Ukraine, epidemiology, Public Health Surveillance

COVID-19 among Health Care Workers in Albania, March-June 2020

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Background: Health care workers (HCWs) are at risk for severe acute respiratory syndrome-coronavirus-2 infection. On March 8th the first case of COVID-19 was detected in Albania, an imported case from Italy. The first HCW infected was confirmed on March 11th 2020. We aimed to gain insight in predisposing factors for HCWs infection in Albania.

Methods: We extracted surveillance data of the entire COVID-19 case series March8th to June30th 2020. We also gathered demographic information, COVID-19 testing, potential symptoms and vital status of HCWs throughout that period. All clinical specimens were tested (RT-PCR) at the national reference Virology Laboratory (IPH Albania). We estimated cumulative incidence, overall case fatality rate (CFR) and CFR among HCWs. Characteristics of infected HCWs were summarized with descriptive statistics.

Results: On June 30th 2020, there were 2535 COVID-19 cases and a cumulative incidence 87.4/100,000 persons in Albania. A total of 23816 tests were performed, 12% (2896 tests) among HCWs and other support staff. There were 234 HCWs with positive results countrywide: 168 cured, 1 deceased and 65 active cases. Up to 10% of all reported cases were among HCWs. Overall CFR was 2.4% while among HCWs CFR was 0.4%. At the time of testing, 44% of infected HCWs were asymptomatic. Infected HCWs were more frequently female (69%), from Tirana (72%) and serving at general hospitals (72%), followed by specialized hospitals and health centers. Among infected HCWs 60% were nurses, 29% were doctors and 11% were support staff.

Conclusions: Frontline HCWs are at higher risk of COVID-19 infection, especially nurses and those serving at general hospitals. Adequate protection of most-at-risk HCWs is essential for the functioning of healthcare services and to mitigate COVID-19 impact on vulnerable populations.

Keywords COVID-19 infection, Healthcare workers, Case fatality rate.

First observations of Human Alveolar Echinococcosis in the Republic of Armenia, 2008-2020

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Background: Alveolar echinococcosis (AE) follows accidental ingestion of *Echinococcus multilocularis* eggs. After 5-15 years of asymptomatic latency, a growing liver tumour develops, with subsequent infiltrative local growth or metastatic spread.

Since the 90s' *E.multilocularis* infection in foxes is rising and central-eastern European countries had firsts AE human cases. Because orography and fauna are suitable for its spread, this study aims to confirm whether there are human AE cases in Armenia, identify areas at risk and estimate AE annual incidence.

Methods: Retrospective AE case finding, through review of clinical histories from January 2008 until June 2020 in main Armenian hospitals and, also verification of any AE suspicion reported by a surgeon. Diagnosis was confirmed by positive histopathology and/or liver lesion morphology identified by imaging techniques with or without the detection of serum antibodies. A questionnaire was designed in EpiInfo v7.2 to collect medical data and at-risk exposures.

Results: Eleven AE cases were confirmed based on tissue biopsy results, including 8 newly identified and 3 surgeon suspicions. Six were females (54.5%). Age ranged from 19 to 59 years with a median of 39yrs and 12.9yrs standard deviation. Annual AE incidence per 100.000 inhabitants was 0.033 varying between 0.032 in 2008 and 0.1 in 2017. All cases lived in rural communities: 54.5% in Gegharkunik (6cases), 18.2% in Shirak (2), 18.2% case in Aragatsotn (2) and 9.1% in Vayots-Dzor. All had contact with animals and half of them had been in Russia (54.5%).

Conclusion: Identification of first cases of AE in four Armenian regions calls for implementation of surveillance with adoption of a case definition and registry of all cases, early diagnosis (screening) and raising clinical and public awareness among at-risk populations.

Keywords: Alveolar Echinococcosis, Echinococcosis, hepatic.

Epidemiologic features of human brucellosis in Georgia, 2015-2019

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Background: Brucellosis, a zoonosis caused by ingestion of unpasteurized milk or undercooked meat from infected animals, or close contact with their secretions, is endemic to Georgia. According to the National Center for Disease Control and Public Health of Georgia (NCDC) the median annual incidence rate is 4.7/100,000 population. We aimed to describe the epidemiology of brucellosis for the years 2015-2019 in Georgia to prioritize interventions.

Methodology: Case-based information on brucellosis during the years 2015-2019 was extracted from the NCDC's Electronic Integrated Disease Surveillance System (EIDSS). We conducted descriptive analysis of demographic and possible risk factor data using STATA16.

Results: During 2015-2019, 999 cases (17 confirmed, 982 probable) of brucellosis were reported. The median annual incidence was 5.5/100,000 population (range=4.0-5.5/100,000). Median age of cases was 36 years (Interquartile range=30) and the highest median annual incidence was observed in the 15-19 (7.6/100,000) and 30-59 (7.0/100,000) age-groups. Among cases, 76% (757) were males. The highest incidence was found in region of Kakheti (26/100,000), Kvemo Kartli (12/100,000), and Mtskheta-Mtianeti (7.5/100,000), where livestock is farmed. Among cases with known exposure information 64% (516/802) reported consuming unpasteurized milk/dairy products and 40% (295/732) undercooked meat, 94% (345/368) reported direct contact with sick animals. Occupation was reported in 27% (N=269) of cases and 63% (169/269) worked in agriculture.

Conclusions: During the 5-year period brucellosis annual incidence remained rather stable and infection was more frequent in young adults aged 15-19 years, males, and among individuals residing in regions, where livestock is farmed. More than half of the cases consumed unpasteurized dairy products. Evaluating high risk population groups' awareness and educating them on brucellosis and risk factors are recommended. Public health professionals need retraining for data quality improvement.

Keywords: Georgia, Zoonosis, Brucellosis, Risk factors, Incidence

COVID-19 infection among healthcare workers in Republic of Moldova

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Background: On March 7th Republic of Moldova reported first COVID-19 case, surpassing a hundred in two weeks and thousand cases in a month. Health care workers (HCWs), who are at high-risk of SARS-CoV-2 infection were largely affected. We evaluated the risk for COVID-19 among HCWs compared to the general population.

Methods: We used surveillance data of the entire case series in Moldova from 7th March up to 22nd June 2020. COVID-19 cases were defined as confirmed by PCR-RT, following WHO guidelines. HCWs were categorized as clinicians (physicians, nurses, orderlies) and non-clinicians (auxiliar/administrative). We estimated cumulative incidence per 100.000 inhabitants, general and HCWs case fatality rate (CFR), attack rates and relative risk (RR) plus 95% confidence intervals (95%CI) in different categories of HCWs compared to general population.

Results: Out of 14.363 COVID-19 cases with a cumulative incidence of 413 cases-per-100.000-population, 2201 (15.3%) were HCWs. There were 480 deaths reported, including 24 among HCWs. Overall CFR was 3.34 (CI 3.0-3.6), while for HCWs was 1.09 (CI 0.7-1.6). Mean age of infected HCWs was 47.9 years, females being 3.7 times more affected. Among infected HCWs, 68% (n=1.491) served at hospital wards, 16% (n=341) at emergency services, 13% (n=290) at primary care facilities and 3% (n=79) other services. RR in HCWs compared to general population was 8.8 (CI 8.4-9.2), higher RR was among physicians and nurses with 10.5 (CI 9.6-11.3 and CI 9.8-11.1) each one, and orderlies RR 10.2 (CI 9.3-11.2).

Conclusions: In Moldova, HCWs are nine times more likely to get infected with SARS-CoV-2 than non-HCWs, but less likely to die of it. Two thirds of infected HCWs were frontline at hospitals. High-risk exposures of HCWs deserves further investigation.

Key words: COVID-19, HCW, Republic of Moldova, risk, health services.

Epidemiological features of shigellosis in the Republic of Armenia, 2016-2019

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Background: With increasing multidrug-resistant isolates and changing predominant modes of transmission, Shigellosis is gaining worldwide attention. Preventing shigellosis morbidity is a public heath priority in Armenia, endemic cases as well as outbreaks. This study describes shigellosis reported cases 2016-2019.

Methods: All case report paper-forms collected through passive surveillance of laboratory-confirmed human Shigella infections from January 1st 2016 to December 31st 2019, as well as outbreak report cards, were retrieved and data entered in Excel. We characterized shigellosis cases with summary statistics and mapped estimated incidence.

Results: During 2016-2019, a total 2934 lab-confirmed cases of shigellosis were reported in Armenia. No death was attributed to Shigella. Annual disease incidence decreased from 24.4 in 2016 to 14.3/100,000 inhabitants in 2019, compared to 1.9 in the EU. Overall 51% of shigellosis cases were males, with an increase to 54% in 2019. While 80% of cases were under 18 years-old, in 2019 cases among adults represented 30%. All cases were domestically acquired. Only 32% cases lived in rural areas; 40% were from Yerevan. A September-peak was clearly observed in 2017 and 2018, not in 2019. In 2019, out of 422 isolates type 28% were Shigella sonnei and 21% Shigella flexneri. Throughout 2016-2019, 10 outbreaks were registered with in total 329 cases (11% of total). Four outbreaks were waterborne and six foodborne at kindergartens, at a school and at an elderly-home.

Conclusions: Shigellosis incidence is seven-fold greater in Armenia, than average in EU. Children are most affected. Provision of even stronger control on safe drinking water and food production, sanitation measures in at-risk settings and raising public awareness about careful hand washing are recommended.

Keywords: Armenia, shigellosis, surveillance system.

Gastroenteritis outbreak investigation in Metn, Mount Lebanon, September 2019

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Background: On September 28th, 2019, a number of gastroenteritis cases who had attended a religious workshop in Metn/Mount Lebanon, were notified to the Ministry of Public Health. An outbreak investigation was performed to assess the magnitude of the outbreak, and to identify the vehicle of transmission.

Methods: We conducted a retrospective cohort study. Case was defined as any person developing fever, dyspnoea, dizziness, nausea, colic, headache, vomiting, and/or diarrhoea, 24 hours following the common meal in Metn on September 28th, 2019. Demographics, symptoms, and food items consumed were collected using a questionnaire. We performed descriptive analysis, calculated attack rates, and used binomial regression for multivariable analysis. Stool samples from four patients were collected for *Salmonella* spp. and *Shigella* spp. culture, but no food items were leftover to be analysed.

Results: All 78 attendees were interviewed. Males represented 54% and 83% of attendees were between 19 and 49 years old. Reported symptoms were colic (92%), nausea (85%), diarrhoea (73%), headache (69%), and vomiting (63%). Attack rate was 62% (48/78). Among 15 food items, 5 were more likely to be associated with illness: rice with chicken (RR=3.57, 95%CI:1.28-9.94), moghrabia (RR=1.95, 95%CI:1.22-3.13), Kashta (RR=1.48, 95%CI:1.08-2.04), salad pasta (RR=1.47, 95%CI:1.02-2.12), and salad pullet (RR=1.47, 95%CI:1.02-2.12). Multivariable binomial regression indicated that consumption of chicken dishes (rice with chicken, moghrabia, salad pullet) and kashta were associated with illness (RR=7.59, 95%CI:1.14-50.66 and RR=1.43, 95%CI:1.14-1.79, respectively). Stool samples were negative to both *Salmonella* spp and *Shigella* spp. Source of chicken was not identified.

Conclusion: Epidemiological investigation suggested that dishes including chicken have been the main vehicles for the outbreak. However, since chicken source was not identified, public authorities must cooperate to enhance food source traceability.

Keywords: Gastroenteritis, Disease Outbreaks, Retrospective Studies, Cohort Studies, Lebanon.

High burden of severe acute respiratory infections (SARI) and influenza like illnesses (ILI) among adults and elderly using sentinel surveillance data, Ukraine, 2018-2019

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Background: Since 2016, Ukraine has implemented a SARI and ILI sentinel surveillance system comprising 18 sites in six regions. However, the influenza burden in specific age-groups is unknown. We estimated the burden of influenza-associated SARI and ILI for 2018/19 in order to identify the at-risk age-groups and guide programmatic decisions.

Methods: We analysed sentinel surveillance data collected weekly from 11 SARI regional hospitals and 7 ILI polyclinics for 2018/19. We estimated age-specific medians and 95% confidence intervals (95%CI) for SARI influenza-associated 1) proportional contribution to all hospital admissions and 2) in-hospital case fatality ratio (CFR) and for ILI influenza-associated incidence rate using the standard WHO methodology and pooled the data of the two years.

Results: The highest median proportion of influenza-associated sentinel hospital admissions was observed in the 18-29 years age-group: 2.2% (95% CI: 1.7-2.9) in 2018 (N=6 sites) and 1.6% (95% CI: 1.1-2.1) in 2018/19 (N=6 sites) while in 2019 the most affected age-group was the 65+: 1.4% (95% CI: 0.8-2.4) (N=6 sites). In 2018, the median CFR was 0% (95% CI:0.0-0.0) across all ages (n=3 deaths). In 2019 and 2018/19 the highest CFR was observed in the 30-64 year age-group: 14% (95% CI: 7.0-27.0) (N=5 sites) and 8.1% (95% CI: 3.5-18.7) (N=6 sites) respectively. The highest median incidence rate of influenza-associated ILI was observed in the 18-29 years age-group: 127/100000 (95%CI:79-205) in 2018 (N=5 sites), 110/100000 (95%CI:41-292) in 2019 (N=4 sites) and 200/100000 (95%CI:109-367) in 2018/19 (N=4 sites). Only 70 positive ILI cases were reported in 2018/19.

Conclusions: SARI and ILI burden was highest among young adults and the elderly. ILI cases were under-reported. We recommend improving sites performance and undertake further studies to confirm these findings.

Key words: Influenza, Sentinel Surveillance, Population Groups, Incidence, Case Fatality Rate, Ukraine

Knowledge, attitude and practice towards West Nile virus infection among final year medical students in Belgrade, Serbia, 2019

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Background: In 2018, Serbia ranked 2nd in Europe in the number of the reported human West Nile virus (WNV) infection cases. This implicates that Serbian health sciences' students as future health workers should be familiar with WNV infection. Therefore, we carried out a study with the aim to assess the medical students' knowledge, attitude, and practice (KAP) towards WNV infection.

Materials and methods: We conducted a cross-sectional study among all final year students at School of Medicine, University of Belgrade between 16th and 20th December 2019. Information on KAP, sociodemographic and academic performance data earned within courses were collected by self-administered pretested questionnaire. We used univariate and multivariable binary logistic and binomial regression analysis to investigate factors associated with KAP after dichotomizing the scores using 70% cut off-points.

Results: Among a total of 489 students, 488 (99.7%) [median age (interquartile range), 24 (1), years] answered the questionnaire. Among respondents 58% (281/488) were categorized as have been knowledgeable about WNV infection, 68% (332/488) had positive attitude towards the disease and only 7.9% (38/479) practiced effective personal protective behaviors against mosquito bites. A students' grade point average (GPA) earned in courses, over time, at School of Medicine was independent predictor of better knowledge [prevalence ratio=1.19 (95% Confidence Interval: 1.08-1.32)] on WNV infection. Female gender of participants [PR=1.18 (95%CI: 1.03-1.36)] and GPA [PR=1.14 (95%CI: 1.04-1.24)] independently predicted positive attitude towards WNV infection.

Conclusion: Moderate knowledge, positive attitude, and poor practice towards WNV infection among final year medical students at School of Medicine, University of Belgrade, indicate a need for educational programmes to create higher awareness regarding this disease and its prevention.

Keywords: Health knowledge, attitudes, practice; West Nile virus; medical students; Serbia

Insecticide thermal fogging in hyrax dens is effective in the control of leismaniasis vectors in rural Palestine, 2019

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Background: Zoonotic cutaneous leishmaniasis (ZCL) is endemic in Tubas district, Palestine and transmitted by the sandfly *Phlebotomus sergenti* that inhabits hyrax dens, the main reservoir animal. Since 1996, control measures include spraying of affected domestic areas with synthetic pyrethroids, however cases still occur. We evaluated the effectiveness of thermal fogging using Permethrin insecticide in dens on decreasing the sandfly density and consequently the ZCL incidence in the area.

Method: From June to October 2019, in the outskirts of Tayasir, Tubas, we conducted a 12-week prospective study using a controlled interrupted time series design in three purposefully selected sites (two controls, one intervention), each containing three hyrax dens. At week 6, we applied Permethrin thermal fogging to the intervention site. We measured weekly (pre- and post-intervention) and 36 hours post-intervention the sandfly species' abundance using CDC light traps inside and Sticky paper traps outside the dens. We identified the species, estimated their density and calculated the abundance reduction using Mulla's formula.

Results: A total of 13969 sandflies were collected and identified; 63% were female. *Phlebotomus* genus (N=2123, 15%) was abundant inside dens, comprising ten species *P. sergenti* (46%), *P. major s.l. complex* (27%), *P. tobbi* (21%), other (6%) including *P. arabicus* (N=7), reported for the first time in Palestine. The remaining sandflies (N=11846, 85%) were identified as *Sergentomyia spp*. Thermal fogging resulted in 97% and 60% sandfly abundance reduction inside the dens after 36 hours and 5 weeks post-intervention, respectively. Fogging did not affect sandfly abundance outside dens.

Conclusion: Permethrin thermal fogging inside hyrax dens could be an effective complementary method for "source reduction of ZCL vector" especially when starting at the beginning of the sandfly season and applying bimonthly.

Keywords: Cutaneous Leishmaniasis, Hyrax, Interrupted Time Series, Permethrin, Prevention and Control, Sandfly

REVIEWERS

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