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**PIN35**

EVALUATION OF EFFECTIVENESS OF KNOWLEDGE TRANSFER OF ANTIMICROBIAL RESISTANCE TO HONG KONG ELDERLY: A QUASI-EXPERIMENT

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**Objectives:** Community perception on antimicrobials plays a role in driving the development of antimicrobial resistance (AMR). The aim of the study was to evaluate the effectiveness of knowledge transfer of AMR in Hong Kong elderly aged 65 or above. **Methods:** A quasi-experimental posttest-posttest controlled study was carried out within October, 2018 to March, 2019. 144 participants were targeted to be reached through a university-based summer outreach program. The one-to-one intervention was conducted by final-year pharmacy students in community elderly centers with the aid of video and verbal explanation to educate the elderly about the definition, causes, and consequences of AMR, as well as preventative measures against AMR. Eleven questions on knowledge on antibiotics and AMR were used as a tool to reflect the effectiveness. The questionnaire was completed twice, before and one week after the intervention. Chi-square test, t-tests and regression analysis were used to analyze the data.

**Results:** The study eventually interviewed a total of 93 Chinese elders, with 61 of them in the intervention group and 32 in the control group. The score obtained by the intervention group increased from 40.1% to 83.3% (p<0.001), while that of control group increased from 33.0% to 44.0% (p>0.001). The increase attained in the intervention group was significantly greater than that of the control group (p<0.001). **Conclusions:** The significant change in knowledge level showed effective knowledge transfer on Hong Kong elderly regarding antibiotics and AMR in the short term. The study could be used as a reference when allocating resources to implement effective community health education in the elderly population.

**PIN36**

COMPARISON OF VACCINE MARKET ACCESS PATHWAYS IN EUROPEAN AND ASIAN COUNTRIES

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**Objectives:** Although benefits of vaccination are well known, vaccine market access is complex and time-consuming. The study objective was to compare vaccine market access pathways between the European Union (EU) member states (MSs), Japan and China. A literature review was conducted in medical databases (Embase, Pubmed, Medline via Ovid) and other sources (WHO, NITAG resource, ISPOR webpages) to obtain key publications about vaccine policies. Search results were screened to select the most relevant publications in English. **Results:** National Immunization Technical Advisory Groups (NITAGs) recommend on inclusion of a vaccine into the national immunization program in nearly all EU MSs and in both Japan and China. However, Health Technology Assessment (HTA) for vaccines is conducted in less than half of the EU MSs. In China, only 2 vaccines (pneumococcal and human papillomavirus vaccines) were subject to HTA. In Japan, HTA was established in 2010, but currently the assessment for vaccines is limited to cost-effectiveness studies funded by the Ministry of Health, Labour and Welfare. The number of diseases covered by vaccination in the national immunization programs in the EU MSs ranges between 11 and 17, while in Japan and China this is 14 and 12, respectively. Although vaccine market access in Japan and China seems less developed than in the EU, this does not impact the number of vaccine-preventable diseases included in the national immunization programs.

**PIN37**

PROJECTION OF COVID-19 BASED ON DECISION TREE ANALYSIS: WE HAVE NOT WON BUT WE HAVE NOT LOST THE WAR!

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**Objectives:** The World Health Organization has initialised categorised COVID-19 infection as a Public Health Emergency of International Concern in late January 2020 and later on declared the outbreak as a pandemic on March 11, 2020. **Methods:** On February 4, 2020 the first Malaysian positive COVID-19 patients was detected. It was estimated through a decision tree technique, that cumulatively 32,000 positive patients were expected nationwide through four main known big clusters reported. **Results:** At the current rate of disease detection, screening yield and clinical capacity, the identification of the positive patients will have to be continuously done until middle of May 2020. Another prediction with the forecasted testing capacity of screening program, was made through similar decision tree technique with several parameters included. The parameters included are R0, R of COVID-19, numbers of daily test conducted, positive yield of the test, rate and trend of intensive care admissions, treated and death. In contrast to the estimated 94% with cumulative, massive screening program caused number of positive patients to be saturated earlier, by the end of April 2020. Based on the projection 346, 307 cumulative tests will be conducted and 225,100 cumulative positive cases will be identified through the screening initiatives. Of the numbers, the cumulative number of patients in care would be 17,631 with 705 cumulative number of admission to intensive care unit and 353 cumulative patients required for ventilator. The cumulative death and cumulative discharge are expected to be 394 and 6008 respectively. **Conclusions:** It is challenging for Malaysia to flatten the epidemic curve especially if the movement control order (MCO) is not successful due to the constraints in healthcare resources. These challenges potentially highlight the need for realistic strategies with regard to the country’s capacity, which may include extending the MCO and implementing bigger scale of screening and treatment program.

**PIN40**

INFLUENZA VACCINATION IN ADULT PATIENTS WITH HYPERTENSION OR DIABETES IN SOUTH KOREA: A CROSS-SECTIONAL STUDY

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**Objectives:** To address the coverage rate for influenza vaccination and related factors depending on hypertension or diabetes status in Korean adults. **Methods:** The study was conducted from 1st April to 30th September 2020. 12,000 participants aged >20 years from the Korea National Health and Nutrition Examination Survey, 2016 to 2018. The health interview was a self-administered questionnaire and that gathered socioeconomic factors and health-related factors. The influenza vaccination status was estimated by the question about receiving a flu shot in the last 12 months. **Results:** About 14% of the respondents aged >60 years were vaccinated with or without diseases. Improving influenza vaccination coverage rate for adults with hypertension and diabetes is encouraged. It is necessary to devise strategies to raise coverage in patients with hypertension and diabetes.

**PIN41**

ECONOMIC BURDEN OF 2009 PANDEMIC H1N1 INFLUENZA IN MAINLAND CHINA: A SYSTEMATIC REVIEW AND MODELLING STUDY

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**Objectives:** To characterize the economic burden of 2009 pandemic H1N1 influenza in mainland China through a systematic review and modelling study. **Methods:** We used a hurdle model to search the economic burden per capita and number of patients published between 2009 to 2020 in PubMed, Web of science, CNKI, and Wangfeng, including “influenza A H1N1”, “pandemic”, “cost”, “economic”, “burden”, “China”. We pooled the costs per capita attributable to 2009 pandemic H1N1 influenza. For the provinces without data, we extrapolated the pooled results weighted by regional specific GDP per capita. Then a multiplier model was built to estimate the national economic burden of the pandemic. **Results:** We identified 16 economic studies in Chinese and English. Of 13 studies, the study participants were lab-confirmed cases of 2009 pandemic H1N1 influenza. Among a total of 127,885 lab-confirmed cases, the patients were CNY 45,381 per capita, and CNY 2,347-16,936 for patients. 4 studies reported the cost per capita in different clinical subtypes. The direct cost of mild outpatient and mild inpatients was CNY 303-357, and CNY 4,282, respectively. The direct cost of severe/critical cases was CNY 13,754-19,739, and CNY 50,955 for fatal cases. The indirect cost per capita was CNY 963 for outpatients, and CNY 1,059-5,596 for inpatients. By extrapolating these estimates to the national level, the adjusted outpatient cost per capita was CNY 528, and that of inpatients was CNY 9,950 in China. As of July 4, 2010, a total of 127,885 lab-confirmed cases were reported, among which 31,615 were hospitalized. We estimated that the total costs were over CNY 365 million. **Conclusions:** Considering the direct and indirect cost, 2009 pandemic H1N1 influenza caused heavy economic burden in mainland China. The economic burden of inpatients is much higher than that of outpatients. Better preparedness towards influenza is needed to prevent the impacts of potential pandemic in the future.

**Infectious Diseases - Health Policy & Regulatory**

**PIN42**

CURRENT TRENDS IN COVID-19 TESTING RATES AND UNMET NEEDS

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**Objectives:** To analyze the current rate of COVID-19 testing in select countries and what India can learn Methods: Number of tests per million people and case doubling time was collected through tracking websites and analyzed for 1 Feb – 6 Apr 2020 for 11 countries. **Results:** South Korea, with a very high testing rate, reported 380 cases per
million for as early as Feb 22, a rate matched by the UK two weeks later. Germany also steeply increased its testing rate starting Mar 10. The total number of samples tested in Germany was 1,090,249 as of Sep 29 and the case doubling time was 9 days. S. Korea had tested 443,273 (1% of the total population) cases as of Apr 3 and the case doubling time was 33 days. In contrast, test numbers in India were negligible, and doubling time was 4 days1. Importantly, testing capacity globally is currently limited. S. Korea, at number three after US and China in terms of testing kit production, can only support a capacity of 135,000 tests per day at present2. Additionally, ICMR guidelines such as “Laboratory test should only be offered when prescribed by a qualified physician” and 48 hours of turnaround time for test results further delay case identification and isolation3. Conclusions: If India was to mirror the testing rate of S. Korea, ≈15 million individuals may have to be tested within coming few weeks to be able to bend the curve of the COVID-19 cases. A balance of both the strategies – exponentially increasing testing and social distancing will be crucial. Sources:
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2. Statista, https://www.statista.com/statistics/1104809/days-for-covid19-cases-to-double-select-countries-worldwide, accessed on Apr 6, 2020
3. News: https://www.astrang.com/News/News_View.php?NewsS=549093
4. MoHFW website, https://www.mohfw.gov.in/pdf/NotificationofCMsguidelinesforCOVID19testingimplsraboratoriesinIndia.pdf, accessed on Apr 7, 2020

PIN43
IMPACT OF CRE INFECTIONS ON HOSPITAL LOS AND MORTALITY IN ASIA
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Objectives: Carbapenem-resistance Enterobacteriaceae (CRE) are considered a critical public health problem, characterized by being difficult-to-treat and high levels of multi-drug resistance. This has led to negative clinical outcomes and higher healthcare costs. This study aims to understand the existing evidence burden of CRE infections in Asia. Methods: A systematic literature review (SLR) and meta-analysis of randomized controlled trials and observational studies published in the last 10 years were conducted following Cochrane and PRISMA guidelines. Evidence-Based Medicine Reviews, EMBASE, and Medline were searched on October 14, 2019. Studies were evaluated for comparability and only those with comparable baseline characteristics were included. The metafor package in R was used to conduct the meta-analysis. Pooled results for adult hospital length of stay (LOS) (6 studies) and all-cause mortality (8 studies) are reported here. Results: Overall, there was limited published data reporting on CRE burden in Asia. Hospital LOS ranged from 19 to 54 days, 42 days (China; 3 studies), 36 days (Malaysia; 1 study), 23 days (Taiwan, 1 study) and 19 days (India, 1 study). The pooled mean hospital LOS was 34 days. The mean difference in LOS was higher for CRE patients compared to non-CRE patients by 9.51 days (p<0.0001), based on 3 studies. Hospital mortality among CRE patients ranged from 35% to 46%. The pooled all-cause mortality was 40% using all studies. Comparing CRE to non-CRE patients, mortality risk was 3.67 times (p<0.0001) greater for CRE patients. Conclusions: Pooled risk estimates from the analysis revealed that CRE infections were associated with longer hospitalization and an increased mortality risk. Our analysis highlights the importance of targeted infection prevention, control programs and antimicrobial stewardship activities to contain CRE in Asia.

PIN44
BENEFIT DESIGN CONSIDERATIONS DURING EMERGENCIES: LESSONS FROM COVID 19
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The Philippines declared a public health emergency owing to the rapid increase in Corona Virus Disease 2019 (COVID 19) cases. Given the highly infectious and severe nature of COVID 19, many individuals were infected and cost of care was higher compared to usual cases of influenza or pneumonia. Majority of cases were admitted to primary hospitals with normal balance billing, leaving many patients saddled with huge hospital bills.The Philippine Health Insurance Corporation (PhilHealth) was tasked to cover for health care costs of COVID 19 cases in the country. Objectives: Design benefit packages for COVID 19. Methods: Costing the benefit package included developing a basic clinical profile and pathway for COVID 19 using available guidelines and consultations with experts. Designing the package took into consideration the full continuum of care and available financing from government. Cost estimates and design features were periodically reviewed as guidelines were updated. Results: The development of the packages was aligned with government’s benefit design considerations. Results: Benefit packages for testing, community quarantine and pneumonia (mild, moderate, severe and critical) were developed along with their corresponding case rates. Cost drivers differed across package types (e.g. PCR procedure for testing; drugs and treatment procedures for pneumonia admissions). To deal with the uncertainty in costs and clinical profile of COVID 19 cases, PhilHealth initially decided to cover the full cost of care during the quarantine period prior to introducing case rates. Rules on eligibility for benefits and claims processes were likewise relaxed to ensure access and decrease potential financial risk. Conclusions: Benefit development during emergencies such as with the COVID 19 pandemic can be undertaken quickly even with limited information. Given uncertainty in costs and clinical profiles, social insurance agencies may opt to be liberal in granting benefits. Periodic reviews will be necessary to update the packages and ensure the sustainability of the fund.

Infectious Diseases - Patient-Centered Research

PIN45
COMPARISON OF ANTIBIOTICS POLICIES BETWEEN EUROPEAN UNION COUNTRIES AND JAPAN
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Objectives: Drug resistance is one of the major problems across the world. To address this, Japanese government has been promoting development of new anti-biotics. This is a comparative study between European Union countries and Japan on antibiotics policy and its impact in the recent years. Methods: Governmental reports, Chukyo (Central Social Insurance Medical Council) documents (JAPAN), and policy consultations: The development of new antibiotics is promoted across the world to combat drug resistance and to help people from infectious diseases at an early stage. Despite the aggressive measures taken by the Japanese government, number of launched antibiotics remained low compared to other EU countries, reflecting the medical drug lag that still exists in Japan. While reducing drug resistance by reinforcing appropriate use of existing and future antibiotics is equally important, there is an urgent need for the Japanese government and pharmaceutical industry to work together to develop effective new antibiotics.

Infectious Diseases - Methodological & Statistical Research

PIN46
PREDICTING INVASIVE CANDIDIASIS IN INTENSIVE CARE UNITS
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Objectives: Despite advances in antifungal treatment, the mortality associated with invasive candidiasis (IC) remains high. Early diagnosis of IC can be challenging, leading to the high morbidity and mortality. To assist early detection, the objective of the study was to develop a tool that predicts IC in intensive care units. Methods: Data from the Medical Information Mart for Intensive Care III database were used to construct a retrospective cohort of patients with infection. IC was defined if a patient (1) had a positive microbiom test and received 0 or 2 had a diagnosis code indicating IC; or (3) had a sepsis diagnosis and received intravenous antifungal treatment. Candidate predictors included patient demographics, comorbidities, primary diagnosis, procedures, laboratory scores (e.g. SOFA, ASP III), laboratory tests, and medications used. An iterative purposeful selection was used to select the most prognostic features. A risk score was calculated for each patient to enumerate the IC risk. Model performance was evaluated using classification, discrimination, and calibration. Internal validation was conducted using an independent subsample of the study cohort. Results: A total of 15,580 eligible patients were included, including 1,368 (8.8%) with IC. The average age of the cohort was 81 years and 46.5% were female. Top prognostic features included total parenteral nutrition, gastrointestinal surgery, central line, APS III, neutrophil count, weight, and preexisting conditions such as cancer, hepatic disorders, and AIDS. The prediction model has a sensitivity of 0.74, a specificity of 0.75, and a c-statistic of 0.82. Calibration results show consistently increased IC rates for patients with higher predicted risk scores. The internal validation showed comparable results. Conclusions: The prediction tool shows good predictive performance in evaluating the risk of IC among patients receiving intensive care. Accurate early detection of IC followed by appropriate treatment is expected to prevent mortality and improve clinical outcomes.

PIN49
VACCINATION RATES AMONG THE GENERAL ADULT POPULATION AND HIGH-RISK GROUPS IN EU, US, JAPAN, SOUTH KOREA AND TAIWAN
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Objectives: To evaluate the vaccination rates among the general adult population and high-risk groups in EU, US, Japan, South Korea, and Taiwan. Methods: The vaccination rates for the general adult population and high-risk groups were collected. Results: The vaccination rates varied across the regions. In the EU, the vaccination rates for the general adult population were highest in Japan and lowest in South Korea. In the US, the vaccination rates were highest in Japan and lowest in South Korea. In Japan, the vaccination rates for the general adult population and high-risk groups were the highest. In South Korea, the vaccination rates were the lowest for both the general adult population and high-risk groups. Conclusion: The vaccination rates vary across the regions, and further research is needed to understand the factors influencing these rates.