Summary of work activities
Vasco Ricoca Peixoto
Intervention Epidemiology path (EPIET)
Cohort 2018

Background

The ECDC Fellowship Training Programme includes two distinct curricular pathways: Intervention Epidemiology Training (EPIET) and Public Health Microbiology Training (EUPHEM). After the two-year training EPIET and EUPHEM graduates are considered experts in applying epidemiological or microbiological methods to provide evidence to guide public health interventions for communicable disease prevention and control.

Both curricular paths are part of the ECDC fellowship programme that provides competency based training and practical experience using the 'learning by doing' approach in acknowledged training sites across the European Union (EU) and European Economic Area (EEA).

Intervention Epidemiology path (EPIET)

Field epidemiology aims to apply epidemiologic methods in day to day public health field conditions in order to generate new knowledge and scientific evidence for public health decision making.In Public Health we often lack the opportunity to perform controlled trials and we are faced with the need to design good quality observational studiesand interpret complex results. Field epidemiologists use epidemiology as a tool to design, evaluate or improve interventions to protect the health of a population.

The European Programme for Intervention Epidemiology Training (EPIET) was created in 1995. Its purpose is to create a network of highly trained field epidemiologists in the European Union, thereby strengthening the public health epidemiology workforce at Member State and EU/EEA level. Current EPIET alumni are providing expertise in response activities and strengthening capacity for communicable disease surveillance and control inside and beyond the EU. In 2006 EPIET was integrated into the core activities of ECDC.

The objectives of the ECDC Fellowship - EPIET path are:

- To strengthen the surveillance of infectious diseases and other public health issues in Member States and at EU level;
- To develop response capacity for effective field investigation and control at national and community level to meet public health threats;
- To develop a European network of public health epidemiologists who use standard methods and share common objectives;

The views expressed in this publication do not necessarily reflect the views of the European Centre for Disease Prevention and Control (ECDC).

This portfolio does not represent a diploma. Fellows receive a certificate acknowledging the 2-year training and listing the theoretical modules attended. Additionally, if all training objectives have been met, they receive a diploma.

Stockholm, July 2020

- To contribute to the development of the community network for the surveillance and control of communicable diseases.

Fellows develop core competencies in field epidemiology mainly through project or activity work, but also partly through participation in training modules. Outputs are presented in accordance with the EPIET competency domains, as set out in the ECDC Fellowship Programme Manual.

Pre-fellowship short biography

Vasco Ricoa Peixoto has been selected as a fellow within the Member-State track of the EPIET fellowship 2018-2020. Before starting EPIET in 2018, Vasco, a Medical Doctor, was completing the Public Health Residency in Portugal. During his Residency he worked in public health services at local, regional and national levels. His main activities included epidemiological surveillance, health planning and intervention projects, community health, health quality and development of national guidelines. He collaborated in local and national outbreak investigations at the Directorate-General of Health (measles, hepatitis A, Legionnaires' Disease) and in Epidemic Intelligence and guideline development activities with the Centre of Public Health Emergencies in the same institution. During this first year, Vasco continued being a Member of the External Evaluation Commission of the Agency for Evaluation and Accreditation of Higher Education (A3ES) for the Integrated Masters in Medicine and other degrees (2016-2018).

Fellowship assignment: Intervention Epidemiology path (EPIET)

In September 2018, Vasco started his EPIET fellowship (Member State-Track) at the Directorate-General of Health, Lisbon, Portugal, under the supervision of Paula Vasconcelos. In March 2020, Paula initiated work in WHO and she was replaced by Carlos Carvalho in the supervisor role. Initial Frontline Coordinator, Christian Winter left the Programme and Daniel Rhys Thomas took up the role in February 2020. This report summarizes the work performed during the fellowship.

Fellowship portfolio

This portfolio presents a summary of all work activities (unless restricted due to confidentiality regulations) conducted by the fellow during the ECDC Fellowship, EPIET path.

Projects included epidemiological contributions to public health event detection and investigation (surveillance and outbreaks); applied epidemiology field research; teaching epidemiology; summarising and communicating scientific evidence and activities with a specific epidemiology focus. The outcomes include publications, presentations, posters, reports and teaching materials prepared by the fellow.

This portfolio also includes a reflection from the fellow on the field epidemiology competencies developed during the 2-year training, a reflection from the supervisor on the added value of engaging in the training of the fellow, as well as a reflection by the programme coordinator on the development of the fellow's competencies.

Fellowship projects

1. ## Surveillance

Title: Epidemic Intelligence in Portugal: analysis of the reported events in the national weekly Bulletin – Report on Observations, News, Data and Alerts (RONDA)

Background

Epidemic intelligence (EI) ensures early detection, assessment and communication of Public Health threats. In Portugal, the Directorate-General of Health (DGS) develops EI activities since 2006 and publishes a weekly public health threat bulletin (RONDA) considering risk of importation/dissemination in Portugal. Similar reporting activities are developed in other European Member States. We aim to describe EI procedures and outputs in Portugal, contributing to a broader discussion of EI activities among national and international stakeholders.

Methods:

We used a database of threats reported in RONDA from 2016-2018. We described threats by type of event, ECDC disease groups, place of occurrence and origin, geographic extension, information sources and number of published updates, among other variables. We describe EI procedures and outputs.

Results

In total, 196 threats were reported, mostly outbreaks (78%). Most common disease groups were Emerging and Vector- borne Diseases (EVD; 29.1%), Food and Waterborne Diseases (FWD; 25.5%) and Vaccine-preventable Diseases (VPD; 8.7%) and the 3 groups increased in proportion from 2016 to 2018.Most updates were made, on average, for Influenza and Respiratory Virus (5.9), EVD (3.1), and VPD (2.3). Most reported threats occurred in other European Countries (35.7%) and Portugal (31.6%). The main information sources were DGS/Regional Health Authorities (83.9%) for threats occurring in Portugal and ECDC (56.1%), WHO (23.5%) and Early Warning Response System (EWRS, 18.4%) for threats occurring elsewhere.

Conclusion

Most reported threats (EVD, FWD and VPD) were related to cross-border threats, occurring outside Portugal, mostly in other European countries. RONDA bulletin is disseminated to the national network of public health authorities in the country, raising awareness and guiding appropriate preparedness and response activities. We recommend the evaluation of RONDA´s usefulness by stakeholders' at regional and local level. Similar processes and outputs in different Member States can be compared to improve EI reporting activities.

Role and outputs: [principal investigator]

Vasco wrote the protocol, performed data entry, recoding and analysis. Within the process it was also an opportunity to go through the main tasks and identify the main steps of EI procedures.

Oral Communication in ESCAIDE 2019. Wrote a paper proposal for publication reviewed by co-authors (yet to submit). EI Presentation for the officers at DGS/CESP (Centre for Public Health Emergencies) and discussion of EI procedures with focus on threats inclusion criteria.

Supervisor(s): Paula Vasconcelos

Competencies developed: Knowledge and critical thinking on EI processes, opportunities and limitations. Understanding the contributions of open sources of information for situation reports and risk assessments. Data cleaning, coding and data analysis planning. Challenges in conducting and communicating findings and hypothesis related to descriptive epidemiology.

Perspective Article: Epidemic Surveillance of Covid-19: Considering Uncertainty and Under-Ascertainment

Abstract

Epidemic surveillance is a fundamental part of public health practice. Addressing under-ascertainment of cases is relevant in most surveillance systems, especially in pandemics of new diseases with a large spectrum of clinical presentations as it may influence timings of policy implementation and public risk perception. From this perspective, this article presents and discusses early evidence on under-ascertainment of COVID-19 and its motifs, options for surveillance, and reflections around their importance to tailor public health measures. In the case of COVID-19, systematically addressing and estimating under-ascertainment of cases is essential to tailor timely public health measures, and communicating these findings is of the utmost importance for policy making and public perception.

Role and outputs: [principal investigator]

Vasco was responsible for the literature review, conceptualization, data analysis, and Publication in a peer-reviewed journal https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7206356/ .

Supervisor(s): Alexandre Abrantes, Carla Nunes, Carlos Carvalho

Competencies developed: Critical synthesis of early evidence related to surveillance system sensitivity of a new pandemic disease, practical aspects of different surveillance strategies and key questions for impact and communication.

3

Report : Portugal should be in the safe European touristic corridors : Considering COVID-19 surveillance system sensitivity, testing strategies, geographic distribution of cases, and tourism risk in context

In the beginning of July 2020, the United Kingdom and other EU countries had excluded Portugal from the list of countries for which it no longer applied the recommendation to limit international travel to the essential minimum. From a practical point, this means that any traveller arriving in the UK from Portugal will have to be isolated for 14 days. The epidemiological situation of COVID-19 in Portugal and the country's position in each of these areas does not seem to justify the exclusion of Portugal from tourist corridors in the United Kingdom.

Portugal is possibly being penalized by a metric (the incidence of COVID-19 per 100,000 inhabitants in the last 14 days) that alone does not correctly reflect the epidemic in Portugal or elsewhere due to difference surveillance system sensitivity for infections in different countries and different levels of under-ascertainment.

These decisions are questionable because of a comprehensive testing policy in Portugal (top in tests per capita in any period), which identifies a large number of asymptomatic and mild cases that may go unnoticed in other countries, and because analyses do not take into account the regional distribution of cases, applying sanctions to the entire national territory , based on figures that refer largely to 19 parishes concentrated in a restricted geographical area in Lisbon suburbs, with specific social vulnerabilities, outside tourist circuits. Estimates of case ascertainment in Portugal in July by the London School of Hygiene and Tropical Medicine and by the Imperial College London place Portugal among those with highest detection capacity. This may indicatethat data available from Portugal reflects a more comprehensive and realistic overview of the epidemic and its real incidence.

Such decisions should take into account other epidemiological risk indicators, that should be made public, including:

1.　　　Incidence rates adjusted for estimated under-ascertainment;

2.　　　Number of tests per capita and positivity rates in the last 7/14 days;

3.　　　Percentage of new asymptomatic cases and % of new tests performed on asymptomatic people or on those with symptoms that do not fit in the current COVID-19 criteria for testing(fever or cough);

4.　　　14 day incidence and Rt, at detailed geographical levels (Municipality / Parish) and trends;

5.　　　Mortality and lethality rates per 100,000 inhabitants in the last 7/14 days;

6.　　　Rates of general hospitalization and intensive care units per 100,000 inhabitants in the last 7/14 days;

7.　　　Occupancy rates for COVID beds in general inpatient and ICU; and

8.　　　The geographical distribution of cases, Rt, deaths and hospitalizations.

9.　　　Measures in place to prevent transmission in different countries in relevant contexts(ex tourism related activities)

COVID-19 is a pandemic that requires a concerted response at a global level and that of the European Union. Unilateral decisions by the United Kingdom and other European Union countries (Austria, Denmark, Greece, and the Czech Republic), without European coordination, and based on weak scientific technical criteria, are economically rewarding countries with low rates of infection detection , to the detriment of those who are detecting and reporting a higher percentage of infections through more comprehensive testing strategies.

Role and outputs: Vasco was responsible for conceptualization, analysis, writing and communication. Published in Nova National School of Public Health – COVID-19 Barometer https://barometro-covid-19.ensp.unl.pt/analise-portugal-deveria-estar-nos-corredores-turisticos-da-europa/ (English version) Generated media reports and TV interviews. Opinion Article "COVID-19 Safe Travel Corridors: Why Policy Makers need to Understand Surveillance bias and the need for a coordinated approach to restrictions of free movement in the EU"

Supervisor: Alexandre Abrantes, Carlos Carvalho

Competencies developed: Insight into policy and epidemiology of COVID-19, further exploration of aspects related to surveillance of COVID-19, proposal of a broader range of indicators to inform international policy.

Protocol proposal: Evaluation of the National Epidemic Surveillance System (SINAVE) for Tuberculosis (TB)

Following previous work with local surveillance data analysis (see in section 6. Other activities) identifying areas for improvement, a project proposal of evaluation of SINAVE TB national surveillance system was conducted. Portugal has the highest incidence of TB in Western Europe (concentrated in the urban centres of Lisbon and Porto)

The National Epidemic Surveillance System (SINAVE) allows for notification and public health management/intervention on all notifiable diseases in Portugal including TB. Despite its importance, the TB component of SINAVE has not been formally evaluated for simplicity, acceptability, usefulness, completeness(internal), timeliness and internal validity(data quality). Debate about these attributes is ongoing, and it is recognized that these attributes could be improved. We proposed a protocol to evaluate the following surveillance system attributes to find areas for improvement, propose changes and identify training needs: Timeliness , Completeness(internal), Internal Validity (data quality) , Usefulness and acceptability for different stakeholders/system users.

Role and outputs: Vasco wrote a project proposal and protocol. Discussed and agreed with supervisors and frontline coordinator. Initiated discussion for the data extraction with the Surveillance Department

Supervisor: Carlos Carvalho, Paula Vasconcelos

Competencies developed: Writing a project proposal and protocol for surveillance system evaluation considering system specificities, users, data and objectives following ECDC recommendations and guidance.

TB surveillance in North Lisbon Public Health Unit

Vasco conducted Surveillance system description and analysis of local TB Surveillance data (descriptive epidemiology 2015-2017) and surveillance system evaluation (timeliness, completeness, data quality at the local level)evaluation 20 and. Produced a Surveillance Report and proposed a local intervention project for quality improvements in TB surveillance and control at the Local PH Unit of North Lisbon and in the Surveillance System functions. Results were presented in different settings (see Communication)

Supervisor: Vera Pereira Machado

2. Outbreak investigations

Title: Contact tracing activities and control measures in a measles outbreak in Lisbon, Portugal, 2018: Need to improve timely Post Exposure Prophylaxis (PEP)?

Background

Since 2016, measles outbreaks became more frequent in Europe. In Portugal, contact tracing and administration of post-exposure prophylaxis (PEP) is recommended. We evaluated contact tracing and PEP administration during a 23-case measles outbreak in Lisbon, in November-December 2018, to find areas for improvement.

Methods

We analysed a dataset on contacts of measles cases, provided by the Local Public Health Units (LPHU) in Lisbon Region, including personal and clinical information, setting of exposure and vaccination status. Contacts were defined as anyone who shared a room with a case or was there within 30 minutes after the case left.

Results

Out of 1257 registered contacts, 81% were exposed in healthcare facilities (75% patients, 6% healthcare workers) and 7% were social contacts. Three hundred and thirty-seven contacts were considered eligible for PEP (27%):

161 were vaccinated (48%), but only 60 within 72 hours after contact with confirmed case (18%). Six received immunoglobulin. One adult contact refused PEP, became a case, and had 190 contacts in a hospital. Seventy-three percent of infants and 69% of 1-4 years-old were eligible for PEP, but only 7% and 11%, respectively, received it within 72h. Cases seeking care through telephone help lines generated on average less healthcare contacts than those who went directly to healthcare facilities (9 and 62, respectively).

Conclusion

Contact tracing is resource demanding and our findings suggest that a prioritization system considering case and contact vaccination status and age should be implemented to facilitate timely PEP for those at higher risk. Early mass messaging (email/text) could be considered for all contacts reducing phone calls for those with low risk. Healthcare exposure could be minimized by promoting the use of telephone health lines for suspect cases for articulation of care.

Role and outputs: [principal investigator]

Vasco met with regional and local public health teams involved in the outbreak investigation and data collection/management. Analysed outbreak data and wrote an outbreak report with the Regional Public Health Department for the Directorate General of Health. Wrote an article proposal(ongoing request for submission) with a focus in PEP during this outbreak (main project). Oral Presentation in Annual Meeting of the Portuguese Association for Promotion and Protection of Public Health APPSP in Calouste Gulbenkian Foundation, Poster Presentation in 1st Portuguese Public Health Physicians Congress.

Supervisor(s): Carlos Orta-Gomes, Paula Vasconcelos, Carlos Carvalho

Competencies developed:
Outbreak report writing, data analysis, teamwork, knowledge about measles outbreak management protocols/procedures at local, regional and national level, as well as in different countries.

Title: Gastroenteritis outbreak in a National Guard training centre in Alentejo in October-December 2018

Background

An outbreak of acute gastroenteritis occurred between October and December 2018 in the facilities of a military training centre in the Portuguese region of Alentejo, where 601 trainees lived. We investigated the outbreak to find the source (s) and contain the spread.

Methods

The case definition was any person with a link to the facilities that presented diarrhoea throughout the period from 10 October to 14 December. A questionnaire (EUSurvey) was answered by 758 people who were exposed to the training centre (trainees, trainers and other individuals with contact and/or meals on the premises). A retrospective cohort studied was performed. The results of descriptive and analytical epidemiology were organized in tables summarizing the main aspects of the outbreak.

Results

Of 758 respondents, we identified 304 cases (AR 40%). Symptoms included diarrhoea (100%), abdominal pain (36%), headache (34%), fever (23%), with less frequent vomiting (18%) and had a median duration 4 days and IQR between 2 and 6. The epicurve showed 4 point-source waves of similar duration(6 days). The risk of being a case was higher among: i) trainees than others (relative risk (RR): 5.8, (confidence interval (CI) 95%: 3.4-9.9), ii) women than men (RR: 1.5, CI95%: 1.2-1.9), iii) respondents under 25 years of age than the others (RR:1.4, CI95%: 1.2-1.7), and those who had always or almost always dinner at the canteen than all the other than had dinner less frequently at the canteen (RR:2.5, CI95%: 1.7-3.5). The Epidemic curve suggests 4 moments of exposure with 4 peaks, the largest with 61 daily cases, On October 19. Of 22 specimens from the cases, Campylobacter Jejuni was isolated in five. Specific food items list could not be retrieved.

Conclusions

Considering the clinical picture, the waves in the epicurve, analytical epidemiology and Campylobacter incubation period, Campylobacter was probably responsible for most of the cases and has been reintroduced through contaminated food items before each of the waves. Some challengeswere identified to ensure timely sample collection (stools and food) and to receive lists of specific food items. An after-action review was recommended to

issue recommendations for outbreak investigation in institutional settings. In response to the outbreak, the regional and local authorities implemented public health measures on food safety and prevention of transmission routes; the training course was interrupted for six days within the peak of the outbreak.

Role and outputs: [principal investigator within a field team of 3 colleagues from local and regional level for the cohort study component of the outbreak investigation]

Vasco met with the outbreak management team from the local Public Health Unit. Developed a survey, piloted the survey in person with attendants of the training classes, analysed outbreak data. Data compilation and epidemiological approach were carried out with the collaboration of other EPIET fellow (EU -track). Responsible for writing the joined report on Epidemiology contributions for the Outbreak Investigation Regional Coordination considering Epi and lab findings and biological agents characteristics and possible recommendations to consider further by regional and local public health in articulation with military supervisors

Supervisor(s): Paula Vasconcelos (in collaboration with Aléxis Sentis and Vera Leal Pessoa)

Competencies developed:

Knowledge on gastroenteritis agents, outbreak investigation field practicalities, using digital tools for developing and piloting a survey for a specific outbreak and population with the local team, considering and exploring contextual aspects of outbreaks in institutional settings. Analytical Epidemiology basics. Operational obstacles and timing for lab sample collection. Epicurve interpretation and hypothesis. Using outbreaks to identify areas for improvement. Understanding the challenges of local-regional-national interactions regarding public health interventions and the role of intersectoral collaboration on applying measures.

Outbreak Investigation: Regionally spread *Salmonella* Newport Outbreak Investigation (detected by WGS)

Investigation of *Salmonella* Newport outbreak, 23 cases spread geographically during a 3 month period in Lisbon Region at the Regional Public Health Department detected by WGS.

Role and outputs: Vasco contributed to the descriptive epidemiology, trawling questionnaire development and analysis of results, case finding and notification promotion. Vasco met with local public health units to promote trawling questionnaire application and further investigation. Presentation of the initial investigation and trawling questionnaire findings in a regional meeting with Local Public Health Units, Infectiologists and representatives of the animal and veterinary authority. No suspect sources were identified.

Supervisor: Maria João Martins, Vera Pereira Machado

3. **Applied epidemiology research**

Title:COVID-19 :Determinants of Hospitalization, ICU admission and Deathamong 20,293 reported cases in Portugal

Background Determinants of hospitalization, intensive care unit (ICU) admission and death are still unclear for COVID-19 and only a few studies have adjusted for confounding for different clinical outcomes including all reported cases in a country. We used routine surveillance data from Portugal to identify risk factors for COVID-19 outcomes, in order to support risk stratification, clinical and public health interventions, and scenarios to plan health care resources.

Methods

We conducted a retrospective cohort study including 20,293 laboratory confirmed cases of COVID-19 in Portugal extracted on April 28 2020, electronically through the National Epidemic Surveillance System of the Directorate-General of Health(DGS). We calculated absolute risks, relative risks (RR) and adjusted relative risks (aRR) to identify demographic and clinical factors associated with hospitalization, admission to ICU and death using Poisson regressions.

Results

Increasing age after 60 years was the greatest determinant for all outcomes. Assuming 0-50 years as reference, being aged 80-89 years was the strongest determinant of hospital admission (aRR-5.7), 70-79 years for ICU(aRR-10.4) and >90 years for death(aRR-226.8) with an aRR of 112.7 in those 70-79 . Among comorbidities, immunodeficiency, cardiac disease, kidney disease, and neurologic disease were independent risk factors for hospitalization (aRR 1.83, 1.79, 1.56, 1.82)For ICU these were cardiac, immunodeficiency, kidney and lung disease (aRR 4.33, 2.76, 2.43, 2.04), and for death they were kidney, cardiac and chronic neurological disease (aRR: 2.9, 2.6, 2.0) Male gender was a risk factor for all outcomes. There were small statistically significant differences for the 3 outcomes between regions.

Discussion and Conclusions

Older age stands out as the strongest risk factor for all outcomes, especially for death, as absolute risk was small for those younger than 50. These findings have implications in terms of risk stratified public health measures that should prioritize protecting older people although preventive behaviour is needed in all ages. Epidemiologic scenarios of health care demand and clinical guidelines may consider these estimated risks, even though under-ascertainment of mild and asymptomatic cases should be considered.

Role and outputs: [principal investigator]

Vasco wrote the protocol, submitted to an ethical committee, analysed data, pre-published manuscript (https://www.medrxiv.org/content/10.1101/2020.05.29.20115824v1

, submitted a manuscript to a peer-reviewed journal. Gave a webinar about the article with the Portuguese Pneumology Society with more than 7,000 views (https://www.facebook.com/286925394675785/videos/3002794469828091). Generated media interest with different news articles. Developed a Risk Calculator using model parameters and allowing for adjustment for possible under-ascertainment of cases.

Supervisor(s): Pedro Aguiar, Carlos Carvalho, Alexandre Abrantes, Carla Nunes

Competencies developed:
Improved capacity for conducting data management and multivariable analysis methods, results interpretation in context considering recent evidence. Understanding the relevance clinical and health care data within epidemics. Developed communication skills.

Title: Initial Assessment of the Impact of the Emergency State Lockdown Measures on the 1st Wave of the COVID-19 Epidemic in Portugal

Background

Portugal took early action to control the COVID-19 epidemic, initiating lockdown measures on March 16th when it recorded only 62 cases of COVID-19 per million inhabitants and reported no deaths. The Portuguese public complied quickly, reducing their overall mobility by 80%. The aim of this study was to estimate the initial impact of the lockdown in Portugal in terms of the reduction of the burden on the healthcare system.

Methods

We forecasted epidemic curves for cases, hospital inpatients (overall and in intensive care), and deaths without lockdown, assuming that the impact of containment measures would start 14 days after initial lockdown was implemented. We used exponential smoothing models for deaths, intensive care and hospitalizations and an ARIMA model for number of cases. Models were selected considering fitness to the observed data up to the 31st March 2020. We then compared observed (with intervention) and forecasted curves (without intervention).

Results

Between April 1st and April 15th, there were 146 fewer deaths (-25%), 5568 fewer cases (-23%) and, as of April 15th, there were 519 fewer intensive care inpatients (-69%) than forecasted without the lockdown. On April 15th, the number of intensive care inpatients could have reached 748, three times higher than the observed value (229) if the intervention had been delayed.

Discussion

If the lockdown had not been implemented in mid-March, Portugal intensive care capacity (528 beds) would have likely been breached during the first half of April. The lockdown seems to have been effective in reducing transmission of SARS-CoV-2, serious COVID-19 disease, and associated mortality, thus decreasing demand on health services.

Conclusion

An early lockdown allowed time for the National Health Service to mobilize resources and acquire personal protective equipment, increase testing, contact tracing and hospital and intensive care capacity and to promote broad prevention and control measures. When lifting more stringent measures, strong surveillance and communication strategies that mobilize individual prevention efforts are necessary.

Role and outputs: [principal investigator]

Vasco wrote the protocol, analysed data and published a manuscript in a peer-reviewed journal.

Supervisor(s): Pedro Aguiar, Carlos Carvalho, Alexandre Abrantes

Competencies developed:

Use of Time-Series Analysis methods, challenges and limitations and interpretation of results. Understanding the relevance of Public Health measures on management of health care services supply.

Title: Rapid estimation of excess mortality in times of COVID-19 in Portugal - Beyond reported deaths

Background

One month after the first COVID-19 infection was recorded, Portugal counted 18,051 cases and 599 deaths from COVID-19. To understand the overall impact on mortality of the pandemic of COVID-19, we estimated the excess mortality registered in Portugal during the first month of the epidemic, from March 16 until April 14 using two different methods.

Methods

We compared the observed and expected daily deaths (historical average number from daily death in the past 10 years) and used 2 standard deviations confidence limit for all-cause mortality by age and specific mortality cause,

considering the last 6 years. An adapted ARIMA model was also tested to validate the estimated number of all-cause deaths during the study period.

Results

Between March 16 and April 14 2020, there was an excess of 1,255 all-cause deaths, 14% more than expected. The number of daily deaths often surpassed the 2 standard deviations confidence limit. The excess mortality occurred mostly in people aged 75+. Forty-nine percent (49%) of the estimated excess deaths were attributable to COVID-19. The other 51% were from other natural causes.

Conclusion

Even though Portugal took early containment measures against COVID-19, and the population complied massively with those measures, there was significant excess mortality during the first month of the pandemic, mostly among people aged 75+. Only half of the excess mortality was registered as directly due do COVID-19.

Role and outputs:

Vasco collaborated in writing the the protocol, analysed data. The paper was submitted and published in peer-reviewed journal Generated media reports. Raised awareness that deaths were increasing for other reasons especially among older people, as emergency visits and follow-up consultations were greatly reduced with impact on chronic disease management and timely acute care.

Supervisor(s): Alexandre Abrantes, Pedro Aguiar in collaboration with André Vieira (First Author)

Competencies developed:

Use of Time-Series Analysis methods for estimating excess mortality, opportunities, challenges and limitations and interpretation of results. Interaction with communication team of the National School of Public Health to answer questions from the media. Better understanding of vulnerable groups within COVID-19 infection, implications and challenges for the health systems.

Title: Influenza Vaccine Uptake and use of Complementary and Alternative Medicine Therapies (CAM): Is there a negative association?

Background

Recent studies have shown an association between the use of complementary and alternative medicines (CAM) therapies and lower vaccine uptake, including for seasonal influenza vaccine (IV), and have linked the use of CAM with the promotion of anti-vaccine misinformation. In Portugal it is currently not known if users of CAM are less likely to vaccinate. We investigated whether users of specific CAMs (homeopathy, acupuncture, phytotherapy, others) have a lower probability of being vaccinated for seasonal influenza.

Methods

We used data from the Portuguese National Health Examination Survey 2015 to describe influenza vaccine uptake in 2015 and calculated crude and adjusted prevalence Ratios (PR) and 95% confidence intervals for each CAM, using poisson regression. All estimates were weighted to account for complex sample design. The selection of initial covariates to include in the model was done considering previous literature.

Results

Influenza vaccine uptake was lower among those <65 year old (10.2 vs 44.6% p<0.001) and those with secondary education or higher (10.5 vs 18.7% p<0.001), and higher among those who visited a GP in last 12 months (19.3 vs 9.7% p<0.001) and those with chronic disease (20.4 vs 7.03% p<0.001). After multivariable analysis, age >65, having visited a GP in last 12 months, having a CD, and living in an urban area had a positive significant association with vaccine uptake (PR=3.352, 1.357, 1.585, 1.414). Educational level(high-school or higher) and being from Algarve Region had a negative significant association (aPR= 0.676, 0.668) respectively). Homeopathy and other CAM were not found to be associated with vaccine uptake.

Discussion

CAM users in Portugal do not seem to have a lower vaccine uptake for influenza. However, considering this survey is 5 years old, study limitations, study period and recent international literature, further research and monitoring of the situation is recommended to detect, investigate and act upon mechanisms through which some CAM use

and associated factors may lower vaccine uptake. In order to improve influenza vaccine uptake among target groups, interventions should target more educated individuals, individuals with no chronic conditions, and those with less frequent use of primary health care services.

Role and outputs: [principal investigator]

Vasco wrote the protocol, discussed the protocol with representatives from National School of Public Health, Public Health Residency and INSA, submitted to ethical committee, analysed data, wrote project report and manuscript proposal.

Supervisor(s): Carlos Dias, Baltazar Nunes, Carlos Carvalho

Competencies developed:

Used survey analytical methods to test associations between exposures with data from a National representative Health Survey (INSEF 2015). Conducted analytical epidemiology with data from a complex survey design. Learned basics on Directed Acyclic Graphs as a way to make relations between analysed variables explicit and avoid unnecessary adjustment and confounding bias.

Title: Cost-effectiveness of Vaccination against SgB Invasive Meningococcal disease (4CMenB) Vaccine: A Systematic Review

Background

The multicomponent meningococcal B (4CMenB) vaccine Bexsero, used for the prevention of serogroupB invasive meningococcal disease (SgB IMD), has been available in the European Economic Area since 2013. Concerns have been raised that including this vaccine in National Vaccination Programmes would represent significantcosts, for limited health benefits. We performed a systematic review of cost-effectiveness studies for 4CMenB.

Methods

The PubMed database was queried using a search strategy that included comprehensive keywords related to (vaccination, meningitis seroroupB, 4CMenB, cost-effectiveness analysis) until January 2020.Studies were eligible if they assessed the cost-effectiveness of 4CMenB vaccine and reported incremental cost-effectiveness ratios (ICER), in terms of cost per quality adjusted life years(QALY). Quality assessment was assessed based on the Drummond Checklist. We analysed the following dimensions of economic evaluations: perspective, model conceptualization, vaccine strategy and comparator, model parameters, sensitivity analyses, cost and QALY measurement, and ICER.

Results

We identified 11 eligible studies (8 countries), performed in Europe (n=10) and elsewhere (n=1). Studies used Markov (n=6), Transmission dynamic (n=1), both modelling techniques (n=3) or decision tree(n=1). One study considered social perspective only, three included both social and NHS perspectives, one considered restricted social perspective with direct costs only, two considered the State perspective, and four the health payer perspective. Vaccine strategies varied, although all studies included at least 4 doses in infants. Out of the 78 strategies and methods (perspectives, scenarios, models) reported, the ICER was below 50,000€/per QALY in eleven cases only (six considered societal perspective, four considered low discount rates (0% to 1,5%) and two considered adolescent-only strategies. Factors more often referred to have most impact in sensitivity analysis were vaccine cost, discount rates, incidence, and case fatality rate.

Conclusions

Although it is difficult to draw conclusion from highly heterogeneous methods and contexts, in most reported results, interventions in base case scenarios were not cost-effective in most European countries, 50,000€/per QALY threshold.

Role and outputs: [principal investigator]

Vasco wrote the protocol, collected and analysed data. Oral/Poster Communication in the 1st Portuguese Public Health Physicians Congress. Oral presentation in Vaccinology Module. Wrote a Manuscript proposal.

Supervisor(s):Carlos Carvalho, Julian Perelman

Competencies developed:

Learned how to conduct different stages of a systematic review including developing a systematic search strategy and collect and present results from a systematic review of heterogeneous studies. Learned about different vaccine cost-effectiveness evaluation methods and drafted a project proposal and Protocol for evaluation of cost-

effectiveness for the introduction of the vaccine in Portugal. Understanding the opportunities and challenges of collaboration between academia and public health services to support creating evidence for action.

Title: Insufficient seasonal Influenza Vaccine coverage in Health-care workers in the Lisbon Health Region in the 2018/2019 season (a call for action before the dual epidemics of COVID-19 and Influenza)

Background

Vaccination against seasonal influenza (VCGS) is strongly recommended to health-care workers(HCW) in Portugal. VCGS is effective for disease prevention, contributing to the reduction of its transmission between HCW and patients. Recognizing its importance, in 2009, the European Council recommended 75% coverage in all risk groups. Understanding vaccination coverage against seasonal influenza (VC) in this group is essential for identifying gaps, assessing impact and planning.

Objective To describe and analyse the CV in the Health Administrative Region of Lisbon and Tagus Valley(ARSLVT, I.P.). HCW, in the flu season 2018/2019, by professional category and type of health institution.

Methods The database of the Regional Vaccination Team of the Department of Public Health of ARSLVT, I.P. was extracted, with the CVs of the region's HCW, by professional category and type of institution, referring to the 2018/19 flu season. These data were compiled from records reported by hospitals and health-centres clusters. We calculated VC estimates by professional category and by health institution and respective confidence intervals (95% CI).

Results In the region, there was a global VC of 29.1% (n=49,628) in the HCW: doctors (35.2%, n=11,778), assistants technicians (27.8%, n = 5,512), operational assistants (26.1%, n=10,288),nurses (24.6%, n=15,956) other professionals (35.6%, n=6,094)). The global VC of the Health Centres 'HCW was 45.3% (n = 8,200) and in hospitals 25.9% (n = 41,428) (RR 0.57 CI95%, 0.56-0.59) and significantly lower in all professional categories, when compared with Health Centre HCW coverage. We found the largest difference for nurses when comparing VC in hospitals with health centres (RR 0.43, CI95% 0.41-0.46) Among the Health Centres Clusters the minimum VC was 19.6% (95%CI: 16.3-22.9) and a maximum of 66.3% (95%CI: 61.6-71.0). Among hospitals the minimum VC was 13.3% (95% CI: 11.8-14.8) and the maximum 45.9% (95% CI: 43.2-48.6).

Discussion and conclusion The estimated VCs were below that recommended in all institutions and in all professional categories. The VC of the hospitals' HCW was lower than that of the Health Centres, in all professional categories, especially in nurses, requiring investigation on the factors that condition these differences. In addition, the greater exposure of HCW to patients with severe pathology, immunosuppression and multimorbidity, in hospitals, may add importance to this finding, and its impact should be studied. Low VC demonstrate difficulty in implementing HCW vaccination programs. We suggest exploring the behavioural, environmental, administrative and political factors that lead to different VC between different health-care units, and different professional categories, in order to outline more effective interventions.

Role and outputs: Vasco was responsible for theconceptualization, access to data, data analysis (analytical epidemiology),writing of draft manuscript and supported Poster elaboration, Presented by first author in the XI National Meeting of Public Health Medical Residents. Article Proposal " Influenza Vaccination Coverage of Healthcare Workers in Lisbon and Tagus Valley, 2018/2019 – a call for action before the dual epidemics of COVID-19 and Influenza."

Supervisor(s): In collaboration with Vítor Veríssimo (first author); Vera Pereira Machado; Mário Durval

Competencies developed:
Insights into vaccination coverage surveillance in Health-care workers. Collaboration, analytical work, manuscript writing and supportive role on others projects.

Title: Factors associated with coinfection and reinfection by chlamydia, gonorrhoea and syphilis in Portugal

Introduction

In Europe, cases of chlamydia (CT), gonorrhoea (NG) and syphilis (TP) are rising and coinfections and reinfections are common. As there are limited data on factors associated with these events in Portugal, this study may be valuable to inform prevention strategies.

Methods

We conducted an analytical cross-sectional study with all probable and confirmed cases of CT (including lymphogranuloma venereum), NG and TP notified in Portugal in the national system of epidemiological surveillance (SINAVE®) between January 1st, 2015 and December 31st, 2018. Descriptive and multivariable analyses were conducted and adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were calculated.

Results

Among 6506 cases in SINAVE®, 858 (13.2%) were coinfections and 204 (3.1%) were reinfections. Coinfections were found in 14.0% of males and 10.2% of females, while reinfections were present in 3.8% of males and 0.8% of females. In multivariable analysis, coinfections were positively associated with being younger than 26 (aOR 2.45, 95% CI 1.81–3.30), living in Lisbon area (aOR 1.43, 95% CI 1.13–1.81), being symptomatic (aOR 1.82, 95% CI 1.53–2.18), being men who have sex with men (MSM) (aOR 1.63, 95% CI 1.28–2.07), HIV+ status (aOR 1.46, 95% CI 1.19–1.80) and being diagnosed in an NGO (aOR 1.68, 95% CI 1.29–2.19). Reinfections were positively associated with living in Lisbon area (aOR 2.53, 95% CI 1.43–4.47), being symptomatic (aOR 2.37, 95% CI 1.66–3.37), being MSM (aOR 3.69, 95% CI 2.17–6.30) and HIV+ status (aOR 1.68, 95% CI 1.18–2.39).

Conclusions

This study contributes to identifying risk profiles for coinfection and reinfection by these STIs in Portugal. Younger age, living in Lisbon area, being MSM, HIV+ status and being diagnosed in an NGO are some of the associated factors. Targeted interventions are needed to tackle specific settings and populations to be successful in lowering STI's incidence in Portugal.

Role and outputs:

Vasco collaborated in the design, analytical epidemiology, abstract writing, article writing. Accepted for Oral presentation in the World Public Health Conference 2020

Supervisor(s): In collaboration with Tiago Bandeira (first author); Carlos Carvalho

Competencies developed:
Insights into STI surveillance. Further experience in analytical epidemiology and abstract writing. Supportive role on joined projects.

Title: Failure to complete treatment for latent tuberculosis infection in Portugal, 2013–2017: geographic-, sociodemographic-, and medical-associated factors
Abstract

There is conflicting evidence about factors associated with failure to complete treatment (FCT) for latent tuberculosis infection (LTBI). We aim to identify the geographic, sociodemographic, and medical factors associated with FCT in Portugal, highlighting the two main metropolitan areas of Porto and Lisbon. We performed a retrospective cohort study including LTBI patients that started treatment in Portugal between 2013 and 2017. We calculated adjusted odds ratios (aOR) and 95% confidence intervals (95% CI) using multivariable logistic regression to identify geographic, sociodemographic, and medical factors associated with FCT. Data on completion of treatment were available for 15,478 of 17,144 patients (90.3%). Of those, 2132 (13.8%) failed to complete treatment. Factors associated with FCT were being older than 15 years (aOR, 1.65 (95% CI = 1.34–2.05) for those aged 16 to 29), being born abroad (aOR, 2.04 (95% CI = 1.19–3.50) for Asia; aOR, 1.57 (95% CI = 1.24–1.98) for Africa), having a chronic disease (aOR, 1.29 (95% CI = 1.04–1.60)), alcohol abuse (aOR, 2.24 (95% CI = 1.73–2.90)), and being intravenous drug user (aOR, 1.68 (95% CI = 1.05–2.68)). Three-month course treatment with isoniazid plus rifampicin was associated with decreased FCT when compared with 6- or 9-month courses of isoniazid-only (aOR, 0.59 (95% CI = 0.45–0.77)). In Lisbon metropolitan area, being born in Africa, and in Porto metropolitan area, alcohol abusing and being intravenous drug user were distinctive factors associated with FCT. Sociodemographic and medical factors associated with FCT may vary by geographical area and should be taken into account when planning interventions to improve LTBI treatment outcomes. This study reinforces that shorter course treatment for LTBI might reduce FCT.

Role and outputs:

Vasco contributed to the eview and discussion section. Published in a peer-reviewed journal.

Supervisor(s): In collaboration with Alexis Sentis (first author), Carlos Carvalho

Competencies developed:
Further insights into Latent TB surveillance, treatment monitoring and risk factors. Analytical insight on options to conduct multivariable analysis. Contributing and supporting others colleagues work and projects.

4. Communication

Publications in peer reviewed journals

1. Ricoca Peixoto V, Nunes C, Abrantes A. Epidemic Surveillance of Covid-19: Considering Uncertainty and Under-Ascertainment. Port J Public Heal [Internet]. 2020 Apr 9 [cited 2020 May 9];1–7. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7206356/

2. Peixoto VR, Mexia R, Santos N de S, Carvalho C, Abrantes A. From tuberculosis to Covid-19: Legal and constitutional framework regarding compulsory isolation/treatment due to contagious diseases in Portugal. Vol. 33, Acta Medica Portuguesa. CELOM; 2020. p. 225–8 https://pubmed.ncbi.nlm.nih.gov/32238235/

3. Sentís A, Vasconcelos P, Machado RS, Caylà JA, Guxens M, Peixoto V, et al. Failure to complete treatment for latent tuberculosis infection in Portugal, 2013–2017: geographic-, sociodemographic-, and medical-associated factors. Eur J Clin Microbiol Infect Dis. 2020 Apr 1;39(4):647–56. https://pubmed.ncbi.nlm.nih.gov/31797155/

4. Vieira A, Peixoto VR, Aguiar P, Abrantes A. Rapid Estimation of Excess Mortality during the COVID-19 Pandemic in Portugal -Beyond Reported Deaths. J Epidemiol Glob Health. 2020;10(3):209-213. doi:10.2991/jegh.k.200628.001 https://www.atlantis-press.com/journals/jegh/125941684

5. Ricoca Peixoto V, Vieira A, Aguiar P, Carvalho C, Thomas DR, Abrantes A. Initial Assessment of the Impact of the Emergency State Lockdown Measures on the 1 st Wave of the COVID-19 Epidemic in Portugal Avaliação Inicial do Impacto das Medidas de Confinamento do Estado de Emergência na Primeira Onda da Epidemia de COVID-19 em Portugal. Acta Med Port. 2020;33(11):733-741. doi:10.20344/amp.14129 https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/14129

Manuscripts submitted to peer reviewed journals/ prepublished

6. Peixoto VR, Vieira A, Aguiar P, Sousa P, Carvalho C, Thomas DR, et al. COVID-19:Determinants of Hospitalization, ICU and Death among 20,293 reported cases in Portugal. medRxiv. 2020 May 30;2020.05.29.20115824. -Submited to Eurosuveillance https://www.medrxiv.org/content/10.1101/2020.05.29.20115824v1

7. Peixoto VR, Vieira A, Aguiar P, Carvalho C, Thomas D, Abrantes A. Rapid assessment of the impact of lockdown on the COVID-19 epidemic in Portugal. medRxiv. 2020 May 27;2020.05.26.20098244. https://www.medrxiv.org/content/10.1101/2020.05.26.20098244v1

8. Vieira A, Peixoto VR, Aguiar P, Abrantes A. Rapid estimation of excess mortality in times of COVID-19 in Portugal - Beyond reported deaths. medRxiv. 2020 May 19;2020.05.14.20100909. https://www.medrxiv.org/content/10.1101/2020.05.14.20100909v1

Manuscripts in advanced stages (not submitted)

9. Ricoca Peixoto V, Sentis A, Firme A, Marinho Falcão I, Vasconcelos P, Epidemic Intelligence in Portugal: analysis of the reported events in the national weekly Bulletin – Report on Observations, News, Data and Alerts (RONDA)
10. Ricoca Peixoto V, Rodrigues F, Ferreira F, Guedes M, Carvalho C, Perelman J, Cost-effectiveness of 4CMenB Vaccine: A Systematic Review
11. Contact tracing activities and control measures in a measles outbreak in Lisbon, Portugal, 2018: Need to improve timely Post Exposure Prophylaxis (PEP)?
12. Insufficient seasonal Influenza Vaccine coverage in Health-care workers in the Lisbon Health Region in the 2018/2019 season

Conference presentations

13. Epidemic Intelligence in Portugal: analysis of the reported events in the national weekly Bulletin – Report on Observations, News, Data and Alerts (RONDA) – Oral Presentation ESCAIDE 2019

14. Contact Tracing and PEP Contact tracing activities and control measures in a measles outbreak in Lisbon, Portugal, 2018: Need to increase timely Post Exposure Prophylaxis (PEP)? –Oral Presentation at Annual Meeting of The Portuguese Association for Promotion of Public Health in Calouste Gulbenkian Foundation 29th October and accepted for poster in 1st National Congress of Public Health Medical Doctors

15. Cost-effectiveness of 4CMenB Vaccine: A Systematic Review - Poster Presentation in the 1st National Congress of Public Health Medical Doctors

16. Poster Presentation Co-author in the National Meeting of Public Health Medical Residents: Surveillance of Influenza Vaccine Coverage in Health Care Workers in Lisbon Region: Identification of vaccination gaps in Institutions and professional group

17. Oral Presentation in the 1st Meeting of the Portuguese Epidemiology Association: "The new Influenza Surveillance Dashboard of Lisbon Region", covering descriptive analysis 2016-2019 incidence and epicurves, geographic and seasonal heterogeneity and correlation between incidence(per population) and absolute incidence and primary care extra-hours in different Health Centres Groups(no correlation was found).

18. Poster Presentation Co-author:Active Syndromic Surveillance for Mass Gatherings – Boom Festival 2018" in the International Meeting on Emerging Diseases and Surveillance (IMED)- Wien, November 9-12, 2018

19. Poster co-authorship: "Acute gastroenteritis caused by calicivirus during international festival in Portugal, July 2018" in the 29th European Congress of Clinical Microbiology and Infectious Diseases, ECCMID, Amsterdam, April 2019

20. Co-author of Presentation "Ethical criteria for priority setting in Health Technology Assessment" within the Workshop "Prioritization in Public Health: new insights in the frame of Health Technology Assessment" at the European Public Health (EUPHA) Conference 2018, in collaboration with the President of Public Health Ethics Section of EUPHA (Peter Schröder-Bäck)

EPIET Modules/Webinar Presentations

21. Presentation at the Outbreak Investigation Module Berlin – An Outbreak of Legionnaires` Disease in a Hospital in Lisbon

22. Presentation at Vaccinology Module - Cost-effectiveness of vaccination for the prevention of SgB Invasive Meningococcal Disease: A systematic Review

23. Presentation at 1st COVID-19 ThinkTank Webinar - COVID-19 related Actvities 1.(Opinion Article: Surveillance of COVID-19 : Considering uncertainty and under-ascertainment (and implications) 2. Report: Analysis of 1st month of COVID-19 in PT; 3.Excess Mortality in times of COVID-19 in PT; 4. Report Portugal Acted Early, Mobility reduced, impact is observed; 5.Analysis: Risk factors for Hospital admission among COVID-19 cases in North Lisbon Public Health Area(n=479); 6. Local Public Health Unit – Case/Notification Management; Contact Tracing; Local Epidemic Surveillance Reports; Working with community partners and clinicians

24. [Presentation at 3rd COVID-19 ThinkTank Webinar- Migration and ethnic minoritiies and COVID-19](Coordiantion of Seassion by Daniel Thomas – Presentation of Migration and COVID-19 Situational/Policy Brief in Portugal (Lancet Migration Situtional/Policy Brief from Portgual)

Other presentations

-*Salmonella* Newport Outbreak Investigation (Detected by WGS) – Descriptive Epidemiology and reflections on surveillance system sensitivity
[Presentation and discussion Outbreak Situation](#) in Meeting with all Local Public Health Surveillance officers at the Regional PH Department including National Reference Lab and Veterinary Medicine.

- Local Surveillance data analysis on TB in Norh Lisbon Public Health Unit –[Report](#) of local data, completeness, timeliness and clusters from 2015-2017 (Authorship, data analysis and presentations) and [Report on Opportunities for TB surveillance and Control improvement at the local public health Unit](#)
      [-Anual Scientific Meeting of Residents of North Lisbon](#) Primary Care Units
      (http://joinlisboanorte2019.mystrikingly.com/) Table with Coordinator of National TB Programme, Isable Carvalho
      [-Public Health Unit and Local TB Programme Coordinators](#)
      -North Lisbon Respiratory Health Meeting(Hospital Pneumology and Primary Care) [Table with Coordinator of National TB Programme, Isable Carvalho](#)
      [-Benfica Primary Care Center (3 active clusters in the area at the time](#))

-[Oral Presentation](#) in the 1st Meeting of the Portuguese Epidemiology Association: "The new Influenza Surveillance Dashboard of Lisbon Region", covering descriptive analysis 2016-2019 incidence and epicurves, geographic and seasonal heterogeneity in resources availability among local and regional level.

[Presentation](#) for Public Health Medical Residents in the National School of Public Health: " Epidemic Surveillance of Invasive Meningococcal Disease in Portugal - current situation, limitations and future challenges" for evaluation within curricular unit of "Epidemic Surveillance"

[Oral Presentation](#) in plenary session main conclusions of workshop on Healthcare Associated Infections and Antimirobia Resistance included in the 2nd International Meeting on Patient Safety for New Generations of Healthcare Professionals, Lisbon

[Presentation](#) in the Meeting of Public Health Units Coordinators of Lisbon Region. Surveillance for Action:The new Influenza Surveillance Dashboard of Lisbon Region", covering descriptive analysis 2016-2019 incidence and epicurves, geographic and seasonal heterogeneity in resources availability(health centers consultation schedule extension) among local and regional level and discussion of options for intervention according to surveillance results.

Reports

-Lancet Migration SITUATIONAL BRIEF: COVID-19 & MIGRATION IN PORTUGAL (2nd author) : presented in EPIET COVID-19 ThinkTank Published in Lancet Migration Policy Briefs (peer-reviewed)

- Regional Public Health Department Measles Outbreak Report, Lisbon November-December 2018
Collaboration with Lisbon Region Public Health Department in data analysis and report of a measles outbreak of 23 cases with primary and index imported case

- Gastroenteritis outbreak in a National Guard training centre in Alentejo in October 2018 - Report on Epidemiology contributions for the Outbreak Investigation (Cohort Study)

-Portugal should be in the safe European touristic corridors (1st author) : Considering COVID-19 surveillance system sensitivity, testing strategies, geographic distribution of cases, and tourism risk in context – Nova National School of Public Health – COVID-19 Barometer https://barometro-covid-19.ensp.unl.pt/analise-portugal-deveria-estar-nos-corredores-turisticos-da-europa/Local Surveillance on Antimicrobial Prescription and Infection in North Lisbon Primary Health Care within PH Residency– Report elaboration

16

Short Report on local assessment of vaccination coverage - Obstacles for achieving higher vaccination coverage in North Lisbon Public Health Area (Writing , data collection, interviews with Nurses responsible for vaccination in every Health unit of North Lisbon Region(12), presentation of main difficulties and discussion- Sent to Lisbon Regional Level, within PH Residency. Report(portuguese):

- Report - First month of COVID-19- Descriptive Epidemiology in Portugal (first author) - http://barometro-covid-19.ensp.unl.pt/wp-content/uploads/2020/04/um-mes-em-tempos-de-covid-2-de-abril-aa-2.pdf

- Report - Mobility in Portugal in COVID-19 times – Using Google Mobility to reports to monitor mobility trends - http://barometro-covid-19.ensp.unl.pt/wp-content/uploads/2020/04/mobilitytrends-portugal-covid-barometro-politicas-08.04.2020.pdf

-Don't Flu Me: Promotion of Vaccination among Heathcare Workers in Portugal using Precede-Proceed Model – Report(co-author)

Other

- Short Essay – Opportunities for Research and Surveillance in Occupational Infectious Diseases – Available Information Systems and Data – For the Occupational Health Discipline in the National School of Public Health within PH Residency ;

- Presentation "Data-Policy Integration" within the module "Health Systems and Health Policy" for the National School of Public Health, Lisbon

5. ## Teaching activities

Risk and Epidemiology and The role of Epidemiology in Nursing , Opportunities and Challenges

Risk evaluation and assessment in Epidemiology is transversal to all health-related specialties and the importance of skills to appraise, evaluate and apply results of epidemiological research and epidemiological thinking is of increasing importance to nursing.

Vasco prepared a 4 hour training session (integrating theoretical concepts with practical examples using Gordis Epidemiology and scientific literature)for 33 final year nursing students from Universidade Católica (Lisbon) on Risk and Epidemiology and The role of Epidemiology in Nursing: Opportunities and Challenges.

The aim of the workshop was to allow understanding of different aspects of risk in epidemiology and practical applied examples to nursing:

•Understanding different aspects and concepts related to risk and risk measurement through practical examples

•Understanding different types of risk assessment and sources of information and uncertainty

•Identifying potential areas for research and surveillance in nursing in Portugal to promote awareness, involvement and action directed at these problems through nursing professionals.

The day consisted of an introduction by Professor Paulo Nogueira, followed by presentations by the fellow, discussion of practical examples and exercises/case studies.

Fellow focused presentations on main aspects of the subject, promoting participants interaction by raising questions and facilitating discussion. Participants used their smartphones to answer the exercise questions and the evaluation questionnaire. In a scale from 1(Strongly Disagree) to 5(Strongly Agree), 94% answered ≥4.

Session was considered successful. It provided references and it raised awareness about possibilities for nurses using epidemiology or epidemiological thinking in their practice and allowing for better critic appraisal of research. In a personal reflection, basic understanding of epidemiological methods and risk concepts should be promoted across all health-related fields

Supervisor(s): Paulo Nogueira

Educational outcome:
This worked helped the fellow to organize a session considering background and specific learning objectives, mounting an interactive session with practical examples and engaging in case-studies situations and preparing an online form for session evaluation considering specific learning outcomes and impact. An assignment report was produced.

6. # Other activities

Collaboration with Centre for Emergencies in Public Health of the Directorate General of Health

- Epidemic Intelligence - Participation in the weekly meeting RONDA of Epidemic Intelligence of the Public Health Emergency Center – CESP – DGS. Screening different sources of information, compiling summary for the weekly report, updating the data base and participating in the weekly discussion. Joined tasks of the Epidemic Intelligence team and achieving progressive autonomy on handling tasks in the epidemic intelligence screening and filtering information and its relevance at local, regional and national level. Following events at international level and the assessment of its impact at national level as well as national events with a potential cross border potential. For example,Crimea Congo Haemorrhagic Fever in Spain, Ebola in Rep Democratic of Congo, dengue in France and Spain, West Nile Fever in human and equids in Europe. Also, Vasco had the opportunity to support the threat assessments performed by the team in several of the alerts detected.
- Collaborated with the Intensive Care Units Influenza Surveillance having produced an online form (Eurosurvey) to facilitate data collection and analysis.
- Collaboration in literature reviews of technical documents to inform plans, guidelines and exercises (West-Nile fever, COVID-19)
- Participation in the Epidemex 2018 (1 day): table-top exercise based on the WHO simulation multi-threat scenario, organized by the Portuguese Military Health Services and General Directorate of Health involving professionals from different sectors: Health, military , Veterinary, Lab, Civil Protection, Police, NGOsv
- COVID-19 :
    o Revision and integration of Technical Documents: Translation adaptation ECDC technical Documents and communication to EI team and Public Health Emergency Centre of Key messages
    o Collaboration in the writing of Press Communication Document on the situation and measures taken at national level
    o Collaboration in writing of updates for the Ministry of Health
    o Collaboration in guidance/guidelines and orientations production (Home Isolation of COVID-19 cases; Approach to asymptomatic travellers arriving in Portugal)

Supervisor: Paula Vasconcelos

Perspective Article: From Tuberculosis to COVID-19: Legal and Constitutional Framework Regarding Compulsory Isolation/Treatment due to Contagious Diseases in Portugal

Summary of the article

Considering previous difficulties in interpretation and juridical implementation of isolation measures in tuberculosis cases, we analysed and interpreted the legal framework and identified potential gaps for COVID-19.

Given the legislative framework, interpretations and jurisprudence, there is a context for applying preventive isolation/treatment measures for a strictly necessary period of time in the face of serious and uncertain but potentially serious risks in exceptional situations, but there are no specific rules outside states of emergency and the Constitution does not specifically refer to these measures in the supposedly only exceptions to the right to freedom.

The issues of proportionality between risks and public health measures, and the balance between citizens' rights, freedoms and the defence of public health should always be examined in detail, in the light of available scientific

knowledge, which in the case of epidemics is often constructed on a daily basis and should therefore be considered the precautionary principle in decisions.

In Portugal, the length of a judicial decision process (criminal or civil) that could be necessary outside states of emergency, does not allow for the protection of the population against the risk to public health resulting from a refusal of isolation or treatment. The importance of constitutional clarification facilitating the production and interpretation of the legislation applicable event of a serious risk to public health from contagious diseases, may be relevant, especially outside States of Emergency.

In the COVID-19 epidemic, but also in older contagious diseases, such as tuberculosis, and in others to come, the first weapon should be a clear and transparent communication that includes adequate communication of uncertainty, the involvement and clarification of citizens, so that adoption of measures recommended by health authorities occurs in an informed and voluntary manner.

Role and outputs: [principal investigator]

Vasco contributed to the literature Review, conceptualization and a Publication in Portuguese Medical Journal. Generated media reports and referenced in the Portuguese Parliamentary Commission on COVID-19.

Supervisor: Carlos Carvalho

Protocol Proposal: Factors associated with late HIV diagnosis in Portugal

After working with data at local level and presenting a local level protocol in the National School of Public Health Statistics Curricualr Unit, a Project Proposal using national data was conducted. Factors associated with late HIV diagnosis in Portugal have not been researched in the last 8 years. We proposed a multivariate analysis logistic regression using data from SIVIDA (HIV clinical management information system). Focus on risk factors (socio-demographic, behavioural and clinical) for late diagnosis in Different Regions and Clinical Settings of diagnosis (primary care, hospital emergency, and specialized clinics) to issue recommendations for screening and clinicians awareness on the profile of late presenters to inquiry about risk behaviours.

Role and outputs: Vasco wrote a project Proposal and Protocol. Discussed and agreed on the proposal and data to be collected from National HIV diagnosis database.

Supervisor: Paula Vasconcelos

COVID-19 - Possible miscalculation of 14-day incidence in Lisbon Metropolitan Area (NUTSII) in ECDC Subnational notification rates map

Considering ECDC sources for Portugalfor the production of the subnational 14 days notification rate map and the authors calculations of incidence for the LVT Health Region and for the Lisbon Metropolitan Area NUTSII Region using cases from the whole LVT Administrative Health Region, it seemed possible that Lisbon Metropolitan Area calculations for the ECDC 14 day incidence notification rate at sub-national level map were using case data that did not correspond to the population denominator of that Statistical Region. This may have put the Lisbon Metropolitan Area in a worse perspective than it was.

Role and outputs: A report was shared with ECDC, a mismatch between origin of cases and denominator was confirmed and corrected.

Supervisor: Carlos Carvalho

COVID-19 Local Public Health Unit Surveillance, Case Management, Contact Tracing activities.

From April- June 2020, Vasco conducted regular analysis of local level clinical and lab notifications of the National Surveillance System and descriptive epidemiology of data from epidemic inquiries conducted by the Public Health Unit. Conducted case Georeferentiation. Contacted cases, contacts and workplaces to identify contacts and determine isolation and control measures.

Supervisor: Vera Pereira Machado

19

Collaboration with the Seasonal Heath/Winter Contingency group of the Regional Public Health Department:

Vasco collaboratied in the analysis of regional influenza surveillance data, writing of Winter Contingency Plans and Evaluation/Final Report of Winter Contingency Plans (see section 4, Communication for outputs)

Supervisor: Vera Pereira Machado

Member of the Working Group "Public Health Emergencies" in Regional Department of Public Health:

CVasco collaborated in writing of operational guidelines for outbreak identification, communication and management for the local Public Health Units

Salmonella Newport Outbreak investigation detected by WGS

Supervisor: Maria João Martins

Lancet Migration Situational and policy briefs: COVID-19 and migration in Portugal

Summary

This series of situational and policy briefs summarises key practical and operational aspects of the COVID-19 response in relation to migrants and refugees. The Lancet Migration proposed that Professor Sonia Dias of the National School of Public Health produce a situational brief for Portugal.

Although Portugal successfully "flattened the curve" and avoided the collapse of the healthcare system , in the recent weeks where economic and social activities resumed, the virus has been spreading in specific neighbourhoods in the suburbs of Lisbon with higher proportion of migrant population.

We described the migrant situation and risks related to COVID-19 in Portugal, described main public health responses and made recommendations to improve access.

After risks and health services obstacles were identified, the main recommendations were:

Ensure easy administrative access to healthcare and social support for all migrants and refugees

Ensure inclusion of migrants and refugee populations in prevention, preparedness for and response to COVID-19: Undertake responsible, transparent and migrant-inclusive public information and communication strategies :

Role and outputs:

Vasco wrote the draft, reviewed literature and legal documents and guidance related to migration and COVID-19 in Portugal. Published in Lancet Migration Policy Briefs after peer-review(https://www.migrationandhealth.org/migration-covid19-briefs). Generated media interest with one news article.

Supervisor(s): Alexandre Abrantes, Sónia Dias

Competencies developed:

Insight into COVID-19 risks related to different context were migrant communities and ethnic minorities live and work in Portugal. Understanding of the response and gaps and making recommendations with insights from local public health unit work with migrant communities and cases in specific neighbourhoods and working contexts.

Collaboration with National School of Public Health – COVID-19 Barometer – COVID-19 Epidemiology , Policy and Intervention

1.   COVID-19 :Determinants of Hospitalization, ICU and Death among 20,293 reported cases in Portugal

20

2. Rapid assessment of the impact of lockdown on the COVID-19 epidemic in Portugal. medRxiv. 2020 May 27;2020.05.26.20098244.
3. Rapid estimation of excess mortality in times of COVID-19 in Portugal - Beyond reported deaths. medRxiv. 2020 May 19;2020.05.14.20100909.
4. Report - First month of COVID-19- Descriptive Epidemiology in Portugal -http://barometro-covid-19.ensp.unl.pt/wp-content/uploads/2020/04/um-mes-em-tempos-de-covid-2-de-abril-aa-2.pdf 1st author
5. Report - Mobility in Portugal in COVID-19 times – Using Google Mobility to reports to monitor mobility trends - http://barometro-covid-19.ensp.unl.pt/wp-content/uploads/2020/04/mobilitytrends-portugal-covid-barometro-politicas-08.04.2020.pdf
6. Lancet Migration Situational and policy briefs: COVID-19 and migration in Portugal

Collaboration with the Public Health Medical Residency Coordination in Lisbon Region and Regional Department of Public Health in the assessment of the Profile of Public Health Medical Doctor.

Vasco developed the questionnaire (EU-Survey) to assess, at the local level, time dedicated to different Public Heath Essential Operations activities within legal and technical framework and perception of relevance (including Infectious Disease Control, Surveillance, Research and outbreak investigation, applied public health research and different types of intervention and programmes/projects in infectious diseases). Results were shared with the coordinator of public health residency in Lisbon and Public Health Department to inform training needs and public health resources planning.

Supervisor: Rui Portugal

Report (co-author) -Don't Flu Me: Promotion of Vaccination among Heathcare Workers in Portugal using Precede-Proceed Model

Within Public Health Residency, Public Health Course in National School of Public Health – Health Promotion and Planning, the report followed the assessment of Influenza vaccine coverage among health professionals by setting and health professional group and approached situation diagnosis considering social, epidemiological, environmental/behavioural, organizational/administrative and political aspects to inform options for action.

Tracking and analysis of measures implemented to slow down the infection rate of the covid-19 pandemic: a case study of Spain and Portugal

Background

Measures taken during the COVID-19 pandemic had different timings, typologies, and range in different countries Understanding thesevariations is relevant to understandpublic health emergency responses. Government systems and other factors may have an effect on the nature of the response at subnational and national levels. The objective of this study is to describe the typology, timing and stringency of the policy response in two countries to generate hypothesises regarding policy response.

Methods

A descriptive comparative study of policies issued in response to the COVID-19 pandemic was conducted through content analysis. Portugal and Spain, as well as the autonomous community of Madrid were selected considering their similar national health system, but different government organization and epidemic impact. For each, policies (decrees, decree-laws, orders, resolutions) to face the COVID-19 pandemic were selected. Content analysis was conducted to identify typologies, to analyse their timing (relating to deaths rates) and stringency (according to target population and severity).

Analysis and Discussion

Countries responded to the pandemic with a complex mix of measures across different policy sectors, aiming at reducing spread (including lockdown restrictions), enabling individuals and business to comply with physical distancing, and reinforcing NHS capacity. An analysis of the timeline revealed that the timing of beginning of state

of emergency was critical to convey and organize actions under a clear leadership in both countries across regions. Centralized leadership was particularly important to implement the more severe lockdown restrictions as they imposed limits to constitutional rights.

Conclusions

The response of countries to the COVID-19 pandemic followed specific dynamic patterns partly reflecting the epidemic evolution within and outside the country, and influenced by governance system. Our findings suggest that, in early epidemic phases, a centralized command can be more effective and timely in implementing nation-wide stringent measures. It is relevant to compare initiatives and measures between countries to further reflect on policy options for different Government systems , limitations and good practices.

Role and outputs: Vasco contributed to the manuscript writing and review.

Supervisor(s): Alexandre Abrantes, Sónia Dias

Report: The importance of mild symptoms for COVID-19 control in Autumn / Winter 2020: Beyond cough, fever, dyspnea, anosmia, ageusia or dysgeusia

We only find what we look for. If we do not test for COVID-19 people with symptoms of acute respiratory infection, we will not find many of the cases behind the current upsurge in the pandemic in Portugal. One epidemiological study show that the most frequent symptoms of COVID-19 among young people aged 15 to 39 are headache (70.3%), loss of smell (70.2%), nasal obstruction (67.8%), coughing (63.2%), fadigue (63.3%), muscle pain (62.5%), runny nose (60.1%), altered taste (54.2%) and sore throat (52.9%). Only 63% complained of cough, 49% of shortness of breath and 42% of fever. Other case series have showed increasing importance of other mild symptoms. If we include these symptoms in the criteria for testing suspected cases of COVID-19, we will detect many more cases and be able to take appropriate public health measures. If we make young people(<50) aware that these symptoms may be signs of COVID-19, most will take the necessary steps to reduce transmission in their family, social and professional environments and will ask to be tested. More general restrictions may fail to contain transmission if people continue to neglect symptoms of upper respiratory infections in a moment were pre-test probability for combination of this symptoms is higher and a higher clinical criteria sensitivity is relevant to control transmission. Several countries and organizations (WHO and CDC) have already adopted broader criteria for possible/suspected case in which testing should ideally occur. We present some examples in this article. These criteria include coriza/nasal obstruction/ runny nose or a combination of various other symptoms such as (sore throat, muscle pain, headache, rhinitis / rhinorrhea / blocked nose; diarrhea, vomiting, fatigue, etc.).

It seems now justified to broaden the definition of a suspected case for testing and the communication strategy with the general population. As in other countries, the recommending of self-isolation of anyone with upper respiratory symptoms of any severity, until de diagnosis is clarified is warranted.

Role and outputs:

Vasco wrote and finalized the report as first author https://barometro-covid-19.ensp.unl.pt/a-importancia-dos-sintomas-ligeiros-para-controlo-da-covid-19-no-outono-inverno-2020/ . Generated mediatic interest and public discussion.

Supervisor(s): Alexandre Abrantes

7. # EPIET/EUPHEM modules attended

1. Introductory Course, 24 Sep - 12 Oct 2018 , Spetses, Greece

2. Outbreak Investigation, 3 - 7 Dec 2018, Berlin , Germany

3. Multivariable Analysis, 25 - 29 March 2019, Madrid, Spain

4. Rapid Assessment and Survey Methods, 13 - 18 May 2019, Zagreb, Croatia

5. Project Review 2019, 26 - 30 Aug 2019, Prague, Czech Republic

6. Time Series Analysis, 4 - 8 Nov 2019, Bilthoven, Netherlands

7. Vaccinology, 4 May – 24 June, Online, country

    a.Institute Pasteur, SPOC (Small Private Open Course), 4 May – 12 June 2020, online.

    b.Rijksinstituut voor Volksgezondheid en Millieu (RIVM), facilitated sessions, 22-24 June 2020, Online Module.

8. Other training

EVA Online Training Modules (ECDC Virtual Academy)

1. Influenza vaccination campaigns targeting health care workers

2. Assessing and grading evidence in public health - e-learning course (PRECEPT)

3. Rapid Risk Assessment - e-Learning course

4. Cross-border sharing of public health data: 2nd pilot course

5. Abstract Writing Course

Nova National School of Public Health - Curricular Units within PH Residency(Course of Specialization in Public Health) Law and Ethics in Public Health; Global Public Health; Health Economics; Epidemiology ; Statistics for Public Health; Occupational Health; Information Systems in Health ; Health Systems and Policy; Organization and Management of Health Services, Qualitative Research methods; Health Planning and Evaluation; Research Methods in Public Health; Contracting for Public Health Services; Economic Evaluation in Health; Epidemic Surveillance; Health Authority Functions in Portugal; Public Health Foundations; Research Methods in Public Health II

Conference: 2nd International Meeting on Patient Safety for New Generations of Healthcare Professionals (Health Care Associated Infections and Antimicrobial resistance: https://imps2019.ensp.unl.pt/ (2 days). Main aspects converted: HAI and AMR. Participated on the Workshop on HAI and AMR and presented a workshops conclusions in Plenary Session.

Study Visit to Centre for Vectors research and Control- Francisco Cambournac (CEVDI – INSA) Overview of entomological surveillance and its contributions for integrated vector borne diseases surveillance.

Training Visit to the Information Technology Services of the MoH (SPMS/Shared Services of Ministry of Health); Overview and discussion of health information Systems architecture: opportunities and limitations for research and surveillance (mostly in Primary Care and The National Epidemic Surveillance System (SINAVE)

One-Health workshop/technical meeting with Veterinary professionals from Directorate-General of Food Veterinary and Veterinary Faculty of the University of Lisbon(PT). Presentation of opportunities for better articulation collaboration, information sharing. Activity within the Public Health Medical Residency. Faculty of Veterinary Medicine - Lisbon(1 day)

Supervisor's conclusions

Comments from Paula Vasconcelos – 1st supervisor
Under my supervision, Vasco has been a dedicated fellow, with a good overall perspective of public health and have shown how to apply epidemiology and achieved knowledge within policies and strategies. At the same time the fellowship was a great opportunity for him to learn how to best use knowledge in applied epidemiology and tools to build more consistent evidence before addressing recommendations. It was also an opportunity, and he used it at its best, to improve his skills on using data and information to better frame the local, regional, national and international dimensions of the activities developed. It was a pleasure to see he's professional evolution and how he complementarily achieved both EPIET fellowship and Public Health Residency goals.

Comments from Carlos Carvalho – 2nd supervisor
During his two-year fellowship at DGS, Vasco has undertaken a very wide range of applied epidemiology activities. Vasco has been a very dedicated fellow – proactive, constructive in his attitude to learning and committed to public health. He has gained a high level of hands-on experience with a series of projects of local, regional and national experience. His work has been published in peer-reviewed publications and presented orally at national and international conferences. It has been a pleasure to work with Vasco.

Coordinator's conclusions

Vasco Ricoca Peixoto entered the Fellowship with a broad interest in Public Health. During his two-year Fellowship, Vasco has successfully extended and built on his previous knowledge and skills to gain a good understanding of the role of field epidemiology in public health practice. During his Fellowship Vasco worked on a range of topics including immunisation, epidemic intelligence and sexually transmitted infections, and has produced an impressive portfolio. Vasco demonstrated his flexibility by quickly adapting his work programme in response to the Covid-19 pandemic and very quickly produced some first class outputs, with national and international impact. There was some disruption to Vasco's Fellowship with a changeover of both primary site supervisor and scientific coordinator during the two years. However, Vasco managed this organisational change well and did not let it interfere with his progress. Since taking over as Coordinator, I have enjoyed working with Vasco and have found him to be courteous, self-motivated and creative. I wish Vasco best wishes for his future career.

Personal conclusions of fellow

The EPIET fellowship has been a great experience of European collaboration for Public Health Infectious Diseases Epidemiology and Science and a success story of European proximity and cohesion. Being a Public Health Medical Resident involved with local, regional and national Public Health Institutions and with proximity to the academia (National School of Public Health), I searched for a wide range of opportunities from outbreak investigation at the regional and local level to surveillance in different levels and research projects with the academia and with the National Institute of Health Doutor Ricardo Jorge. I valued immensely the sharing of knowledge, science and values among European colleagues and networks and cross-border collaboration with a strong sense of the field and of surveillance systems functioning, methods for their interpretation, evaluation, improvement and to turn data into knowledge with practical implications for action and interventions. I hope I will continue to contribute to the knowledge cascade, sharing experiences and ideas within and outside Portugal strengthening the role of science, epidemiology and public health in promoting quality intervention and decision making to maximize well-being in complex situations and societies considering costs and benefits.

Acknowledgements

References

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