

# EUROMEDITERRANEAN BIOMEDICAL JOURNAL

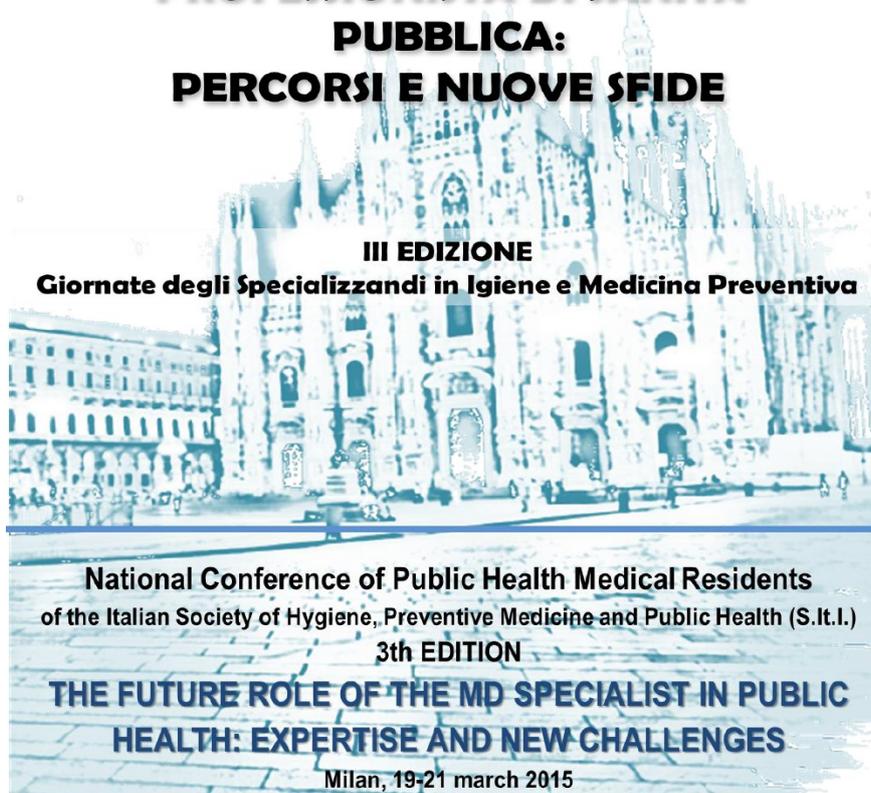
for young doctors

Special Issue



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## LE COMPETENZE DEL FUTURO PROFESSIONISTA DI SANITÀ PUBBLICA: PERCORSI E NUOVE SFIDE



### ABSTRACT BOOK

National Conference of Public Health Medical Residents  
of the Italian Society of Hygiene, Preventive Medicine and  
Public Health (S.It.I.)

The future role of the MD specialist in Public Health:  
expertise and new challenges

3th EDITION- Milan, 19-21 march 2015

### The Conference

The Italian National Conference of Italian Public Health Medical Residents reaches its 3th edition by renewing its format and getting bigger!

For the first time, the conference is not exclusively open to Medical Residents in Hygiene and Preventive Medicine, but also to Community Medicine and Health Statistics and Biometric Medical Residents, as well as to all members of the European Network of Medical Residents in Public Health (EuroNet MRPH).

**This Abstract Book** collects all the contributions of the Oral Sessions.

These are the TOPICS:

- MANAGEMENT AND QUALITY OF HEALTH SERVICES
- INFECTIOUS DISEASES
- PRIMARY HEALTH CARE AND NON COMMUNICABLE DISEASES
- LIFESTYLE, FOOD AND NUTRITION
- GLOBAL HEALTH AND HEALTH INEQUALITY
- ENVIRONMENTAL AND OCCUPATIONAL HEALTH

The contributions were collected and arranged by *Francesco Soncini, Francesca Campanella, Rocco Guerra* and the members of the Scientific Committee *Benedetto Arru, Michela Capelli, Elvira D'Andrea, Francesco Soncini*

### The Consulta

The "Consulta dei Medici in Formazione Specialistica SItI" (commonly "Consulta") is part of the Italian Society of Hygiene, Preventive Medicine and Public Health (S.It.I.)

Consulta promotes and to stimulates professional, cultural and personal development of the Italian Medical Residents in Public Health, to endorse cooperation between the Italian Public Health Schools and to inspire discussions about issues related to Public Health.

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## ABSTRACT BOOK

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### M. MANAGEMENT AND QUALITY OF HEALTH SERVICES

**M01. Are Italian physicians guided by evidence-based medicine principles? Results of a systematic review and analysis**

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#### *Background*

Ensuring a uniform delivery of high-quality healthcare across European countries requires the integration of knowledge from Evidence-Based Medicine (EBM). Using the best knowledge to identify what should be done and how to make it part of routine practice in an efficient and cost-effective manner would seem to be obvious course of action, but this integration of content and context seldom happens. This systematic review summarizes the results of cross-sectional surveys carried out among Italian physicians to analyze their knowledge and professional behaviors towards health interventions and EBM.

#### *Methods*

Surveys evaluating knowledge, attitudes, behaviors and training needs of Italian physicians in relation to any type of therapeutic or preventive intervention and

EBM were initially searched in Pubmed without language restrictions. Additional searches in EMBASE were carried out and bibliographies of relevant articles were systematically reviewed.

#### Results

A total of 192 studies were retrieved. Of these, 37 matched our inclusion criteria. Most of the surveys focused on training needs (21 surveys; 56.8%), five surveys (13.5%) regarded physicians' efficacy and cost-effectiveness evaluation, while other five (13.5%) and six (16.2%) studies involved specific issues concerning physicians' behaviors relating to therapies and preventive interventions, respectively. Despite satisfactory knowledge and substantially positive attitudes, the behaviors of Italian physicians do not appear to completely abide by EBM principles. The results of two surveys show that an appropriate professional use of EBM is more likely with a previous exposure to EBM during graduate/post-graduate training (OR 2.25, 95% CI 1.44-3.52), and that adequate knowledge and positive attitudes towards cost-effectiveness principles are associated with previous training experience in health economics and management. Nevertheless, Italian physicians demonstrate a high level of interest in further training.

#### Conclusions

Additional pre- and post-graduate educational interventions are needed to combine both components -efficacy and cost-effectiveness - in order to provide better patient care. An integrated evidence-based approach can reduce the quality gap in public healthcare between European countries and instill greater confidence in the Italian health care system.

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### **M02. Rethinking the model of hospital and medical management in the era of post-genomic personalized medicine (with a particular focus on diseasomics): towards complexity management in the hospital**

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In the last decades, medicine has undergone many changes and faced different challenges, due to the advancements and developments brought along by molecular biology, new technologies (such as the introduction of powerful imaging devices) and epidemiological transitions. Whilst the approach of classical medicine relied upon the principle of "*divide et impera*" and taxonomic diagnostics, consequently leading to rigid division of hospitals into wards, this theoretical framework fails to address the issues of post-genomic-era personalized medicine, if stratification and modularization are not incorporated. This new model of "network medicine" and diseasomics is emerging as a new discipline that can capture and translate such complexities, arising from the merging of molecular biology, systems biology and pathology, in which diseases are not considered separate, static entities, but highly interconnected and dynamic concepts. Hospitals are therefore reconsidered and redesigned on the basis of care intensity and complexity models. While the old approach stemmed from a Newtonian, classical view of the world, the new one represents the legacy of the failure of mechanistic theories, and is fully in agreement with complexity science and allied disciplines, which deal with open, non-linear, non-reversible systems, far from equilibrium and in continuous evolution. These systems have high degrees of interpenetration (lock-in systems), are entangled and characterized by coopetition (portmanteau for cooperation and competition, a hybrid form of "cooperative competition"), oscillating between fate and necessity, creation and destruction (chaordic systems), living "on the edge of chaos". Complex systems are characterized by emerging properties, are self-(re)producing organisms (principle of autopoiesis), learn from history, since they have a memory, and are robust and anti-frail.

The crisis of positivism marks the beginning of the *Risikogesellschaft* ("risk socie-

ty”), the society of “*genpatsu-sinshai*” (a neologism coined by the Japanese Katsushiko Ishibashi, referring to a hypothetical, apocalyptic and catastrophic earthquake), the post-modern liquid society of uncertainty (which could include the terrorist attack to the Twin Towers, stock market crash, or another “black swan”). The complexity of a hospital is determined, for example, by the heterogeneity of the involved actors, deciders and stakeholders, and the high degree of technological innovation: a concrete example are patients undergoing multitherapies, in which the drug interactions are further complicated by the underlying conditions of a frail subject who is, indeed, a “complex patient” (termed by some scholars as pharmaco-complexity). Further examples are waiting lists, and emergency department queues. In conclusion, we show how the concept of care intensity-based hospital and complexity management parallels the shift from an old to a new approach, in which the care process is not centered around the disease anymore, but around the patient.

Complexity management entails new resources, such as intuition, creativity, and flexibility. Problem solving and setting, lateral and paradoxical thinking, brainstorming, exploration, negotiation, comparison and, above all, systems thinking are further strategies employed by a complexity manager. Nothing is predetermined: “*le vent se lève, il faut tenter de vivre*”, the manager should find his own way and possibilities, as suggested by Edgar Morin. After all, it is not so bad: *omne ignotum pro magnifico!*

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### **M03. Communication in the healthcare relationship: some aspects of patients' perspectives in the context of perceived quality of care in the Verona University Hospital in 2013**

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#### *Introduction*

According to the “Good communication practices in the care relationship” adopted by the “slow medicine” approach, medical practices should be carried out in a sensible, impartial and respectful manner. The “slow medicine” philosophy considers the expectations and desires of people to be inviolable. According to its principles, it is indispensable to take into account the needs and values of the person and the context of relevance and to be mindful of the language; the task of the physician is to inform, guide, and advise, while involving patients in the decision-making process.

This study aimed to assess the levels of patient satisfaction regarding the right to be informed, listened to and involved in care decisions, with the intent of contributing to the dissemination and implementation of better quality care practices.

#### *Materials and methods*

Between October 7th and November 3rd, 2013, anonymous questionnaires were distributed to patients (aged 18 and over) who had been hospitalized at least overnight.

Data obtained from the 1231 questionnaires were entered into a database and analyzed.

#### *Results*

Patients who completed the questionnaires were predominantly male (52.48%), aged between 51 and 80 years old (56.46%), resident in Verona (73.35%), and Italian (92.28%). 32.49% of patients had a high school diploma. 58.25% of patients believed that doctors had spent enough time talking with them during hospitalization, while 60.44% of patients felt the same about nurses. 46.14% stated they had felt involved in decisions about their treatment, and 82.94% reported that they had been directly informed about their health or treatment to an appropriate extent. 35.01% had had the opportunity to talk about their fears and worries with hospital staff. 60.93% had experienced pain during the hospitalization, but 55.97% of patients stated that hospital staff had done everything possible to alleviate it.

42.24% reported that, in preparation for surgery/treatment procedure, hospital staff had explained in an understandable way what would happen during the surgery and the risks and benefits of the intervention. 39.16% declared that hospital staff had fully responded to their questions about the intervention in an understandable way; while 29.98% had received exhaustive information about how they would feel after the surgery. 85.13% of patients had felt they were being treated with respect and dignity at all times during the hospitalization.

#### *Discussion*

According to important international studies, the quality of communication between physicians and patients positively influences the outcome (resolution of symptoms, functional status, and psychological pain control). Despite this evidence, communication problems are widespread and little considered. Many studies have highlighted the importance of emotional support as an integral part of communication.

#### *Conclusions*

Measuring of the perceived quality of care has been included in the budget targets for the various organizational elements of the AOUI of Verona. This has determined an increasing awareness of these issues, resulting in a drive for improvement and productive involvement in the project, with active participation by the users based on the concept of empowerment. The results show a good margin of improvement, which the AOUI aims to further work on.

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#### **M04. Safety walkround: a risk assessment tool that improves safety culture. Practical experiences in two hospitals of the "Azienda USL Roma B"**

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#### *Background*

Safety walkround (SWR) is a risk assessment tool, consisting of "walks" through hospital patient care areas, performed by a multiprofessional Team delegated by the hospital's Medical Director. SWR allows to identify safety-related problems in collaboration with local staff. The SWR model, designed by A. Frankel for the Joint Commission for the accreditation of healthcare centers and hospitals in 2003, involves the Team asking the ward staff various questions. This method allows to identify critical issues related to patient safety, to analyze their frequency and seriousness, and to categorize safety concerns reported by the staff through the Vincent model, a classification system that is used to grade contributing factors to adverse events. After this analysis, the Team develops an Action Plan to solve the identified problems.

In 2013, the Risk Management (RM) Unit of the Italian Local Health Authority "Azienda USL Roma B" devised a SWR procedure to standardize the method to be used in its clinical settings. In 2014, the RM Unit planned safety walkrounds in several wards of the Sandro Pertini Hospital and the Policlinico Casilino.

#### *Methods*

In 2014, five SWRs were organized (4 in the Pertini Hospital and 1 in the Policlinico Casilino). The wards involved were: the Medicine ward of the Policlinico Casilino, and the Medicine 1 and 2 wards, Coronary Care Unit and Oncological Day Hospital of the Pertini Hospital. The Risk Manager participated in all SWRs, leading the Team. The local staff included Department directors, nurse directors, physicians and nurses. Local staff had been informed about the SWR method when the RM Unit first communicated the appointment. Team members used the form defined by the SWR procedure, consisting of 18 questions. All responses given by staff were reported (without recording names), analyzed by an assessment scale ("critical", "slightly critical", "not critical"), and classified according to the six Vincent's model categories (organization- and management-related factors, environmental factors, team-related factors, skill-related factors, task-

and process-related factors, and patient-related factors). Three patients from each Unit were also interviewed by the Team to evaluate their personal feelings about in-hospitals safety.

#### *Results*

The factors more frequently reported as critical were related to organization-management and environment, followed by task- and process-related factors. Patient-related factors were reported least frequently. A general trend to under-report adverse events and near misses was observed.

Action plans developed by the Team with the Chief Physicians and Head Nurses involved mainly equipment requests (such as medical and computer devices), communication improvements and staff training on incident reporting. Patient satisfaction on hospital safety was generally good.

#### *Conclusions*

The SWRs allowed us to identify critical factors contributing to safety issues in the examined hospitals and to develop action plans to solve these problems. Moreover, discussing safety issues seems to help staff to work better together, both between peers and with the management. In conclusion, the SWR method has demonstrated be not just a valid risk assessment tool, but also a means to improve safety culture in healthcare personnel working in hospitals.

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#### **M05. "Non CADIAMO dalle Nuvole": The Hendrich II Fall Risk Model in the IRCCS Policlinico San Donato**

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#### *Introduction*

Patients' accidental falls and their consequences have a significant negative impact on hospital outcomes, patients' functional independence and healthcare

expenditure, especially among the weakest and oldest population categories. Therefore, in order to implement strategies aimed at reducing accidental falls, research and validation of tools that can stratify the risk are necessary.

The scope of the present study was to confirm the predictive effectiveness of an adapted Hendrich II Fall Risk Model, tested in a previous pilot study (Se 69%, Sp 73%, RR 7.1, IC95% 2,3-22).

#### *Materials and Methods*

This prospective study was conducted from February 24th to August 15th, 2014 by the Hospital Health Direction in collaboration with the IRCCS Policlinico San Donato (PSD) nurse management, in all in-patient wards.

For each patient, a form (adapted-HIIFRM\*) assessing the fall risk was written up at the beginning of the hospitalization. Patients were categorized using the adapted-HIIFRM total score, and divided into two main groups (patients at risk and patients not at risk) depending on the cut-off value of the test (score = 5). Probability of remaining unaffected by accidental fall was estimated within each group using the Kaplan-Meier method, and the one-degree of freedom Log-rank test was used to compare the resulting curves.

#### *Main Results*

The present study involved 3,800 patients (some 50% of total patients hospitalized during the study period in the analysed wards); evaluation form was completed during the first day of hospitalization in 94% of cases. 623 patients (16.4%) resulted at risk of accidental fall, and 45 of them (7.2%) actually did experience an accidental fall during the observation period; on the other hand, within the not-at-risk group, only 24 (0.08%) experienced such fall. The difference in the probability of remaining unaffected by falls between the two groups is statistically significant (Log-rank test:  $\chi^2$  67.97; DoF 1;  $p << 10^{-6}$ ). The relative risk of falls for the at-risk patients was 9.6, while the confidential interval at 95% of the relative risk was between 5.8 and 15.

####

**M06. A Patient Education improvement project: integrating users' and professionals' perspectives**Martucci G.<sup>1</sup>, Veronesi A.<sup>2</sup>, Becchi M.A.<sup>1</sup>*1 School of Specialization in Community Medicine and Primary Care, University of Modena and Reggio Emilia, Italy**2 Internal Medicine Unit, Hospital of Sassuolo, Modena, Italy**Introduction*

Patient Education (PE) is one of the challenges of modern medicine: theoretical models to empower patients and increase their control on their illness and its consequences suggest that the analysis of educational needs should be conducted in a preliminary phase of a PE training project. This evaluation should include the analysis of users' and professionals' perspectives.

*Materials and methods*

A project of improvement of an internal medicine ward in Sassuolo (Modena) was designed following the Kirckpatrick model. Educational needs were assessed by integrating users' and professionals' perspectives. A single measurable and defined goal was targeted (the improvement of patient education in PEG home management) as a model to improve staff skills in PE.

In the initial phase of the intervention, the patients discharged from September to December 2014 with selected conditions were interviewed within 24 hours from hospital discharge.

Out-of-hospital service nurses ("ADI", Integrated Home Care) were interviewed using the Focus Group technique, and a questionnaire was also administered to hospital nursing staff.

*Results*

Focus group and interview results are going to be a useful starting point for training events addressing PE for all the ward nursing staff, and the data from user interviews will be useful to assess progress in the target goals, following the Kirckpatrick model.

*Conclusions*

In order to improve Patient Education in a hospital ward, it could be useful to assess user, hospital and out-of-hospital staff points of view to plan an interven-

tion that addresses the actual needs of the targeted organisational and professional environment, in an effort to improve transition of care between different services in a more patient-centered manner.

####

**M07. Establishing an algorithm to evaluate the probability of rehospitalization in patients of the Azienda Ospedaliera Universitaria Pisana (AOUP)**Memmini S.<sup>1</sup>, Lucaccini E.<sup>1</sup>, Macchiarulo M.<sup>1</sup>, Guarneri F.<sup>1</sup>, Bertoni L.<sup>1</sup>, Frangioni S.<sup>2</sup>, Uccelli F.<sup>2</sup>, Marini L.<sup>2</sup>, Privitera G.<sup>1,2</sup>, Casalini F.<sup>1</sup>*1 School of Specialization in Hygiene and Preventive Medicine - Department of translational research and new technologies in medicine and surgery, University of Pisa, Italy; 2 Unit of Hospital Hygiene and Epidemiology, Azienda Ospedaliera-Universitaria Pisana, Pisa, Italy**Background*

Reviewing records of patients with repeated hospital admissions can be a useful tool for the evaluation of appropriateness of management arrangements and care pathways for patients. Therefore, we analysed the demographic parameters and health status of patients with repeated unplanned hospital admissions within 30 days and patients with a single hospitalization or readmissions with longer intervals, relative to 2012 in the AOUP.

*Methods*

Urgent admission data of patients residing in the province of Pisa, concerning medical diagnosis-related groups (DRG) were extracted from the AOUP database from January 1st, 2012 to November 30th 2012. "Cases" were defined as patients with repeated admissions within 30 days, while all other patients were considered as "controls". Statistical analyses with univariate and multivariate calculus of risk functions (Kaplan-Meier) were then carried out in the obtained data, using the SPSS program.

*Results*

From the total of 4476 patients with at least one urgent hospitalization during the recruitment period from January to November 2012, were excluded 344

patients who died during the first admission; therefore, the analyses were performed on a sample of 4132 patients. The average age of the sample was 67 years (SD 23.9, min 0, max 104). The percentage of males was 48.1%. The "cases" were 482 (11.7%), with an average of 2.67 hospitalizations/patient, while the "controls" were 3650. Comparisons were carried out using data from the first admission of the patient. The number of admissions was normalized for observation days/year.

#### *Conclusions*

Patients with at least one rehospitalization within 30 days were found to have different demographic profiles and morbidity than those with a single hospitalization in the year or readmission(s) with intervals of over 30 days. In particular, the former are older and have a greater normalized number of hospitalizations, number of diagnoses documented in discharge records, and a higher prevalence of oncological diseases. These profiles, evident at first admission, could be used as indicators of risk for subsequent urgent admissions, to trigger appropriate care continuity responses and reduce inappropriate access to the emergency department. An algorithm based on our findings has been established to estimate the rehospitalization risk of a patient.

####

#### **M08. Assessment and improvement of quality in medical record compilation in the "Policlinico-Giovanni XXIII" Hospital, Bari**

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#### *Introduction*

The current Italian legislation relating to health documentation (DIEF 2009 and 2010, Legislative Decree 1101/2009, supplemented by Legislative Decree 1491/2010 on "Guidelines and guidance

on the methodology of controls on the appropriateness of hospitalizations (UVAR)", Regional Council Resolution 951/2013 and the Covenant of Health 2010-12) has provided an obligation on the part of the hospital to carry out an analysis of the medical records and corresponding hospital discharge records, according to the specific assessment protocols approved by the Puglia region, and the parameters of clinical and organizational inappropriateness.

#### *Target*

The aim of this study was the improvement of the quality medical records and hospital discharge records.

#### *Materials and methods*

In order to accomplish a practical and uniform implementation of the provisions listed above, the health direction, in collaboration with the Clinical Risk Management Unit, the Office of Information Technology, the Management Control Unit, the Statistics and Epidemiology Unit (SEU), and the Quality Office, has established a computerized form evaluation card, containing quality indicators for the medical records and clinical and organizational appropriateness.

Training courses on these topics were organized, primarily aimed at the reference personnel of each Operating Unit responsible for checking the appropriate compilation of medical records, and subsequently extended to all the doctors (structured and in training).

The verification card, intended to be used as a tool for self-assessment, was uploaded on the Company website, and must be mandatorily filled in after the completion of the medical record and hospital discharge record.

The checks to be carried out include:

- formal
- correct coding of hospital discharge card
- clinical-organizational appropriateness
- appropriateness of the compilation of medical records

An analysis of a sample of 10% of all medical records by the Quality Office is reported below.

#### *Results*

From an analysis performed on a sample of medical records relating to ordinary

hospital admissions during the second semester of 2014, it emerged that the index of conformity (quality) is equal to 66%, the index of prescription is 17%, the index of criticality is 8% and that of non-compliance is equal to 9%.

The above-mentioned results confirm the validity of the methodology and of the instrument used, with evident positive repercussions for the company, both in terms of the appropriateness of the care process, and in terms of proper appraisal of the services provided.

The work carried out so far has therefore been very useful, since it has confirmed the strategic importance of the continuous and systematic audit activities between the Medical Directorate and the professionals involved.

Moreover, it has highlighted the need for further improvement activities over time, according to the philosophy of MQC.

####

#### **M09. Adherence to international guidelines by operating room staff**

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##### *Background*

Surgical site infections (SSI) have always been a major challenge for surgeons, and represent one of the most important public health problems due to their serious repercussions on both the patient and the community. Epidemiological studies have shown that the onset of infections is not linked to the presence of microorganisms in the environment only, but, above all, to the way in which they enter into contact with a susceptible host. Therefore, a key role is played by the various steps taken to prevent the transmission of microorganisms through the adoption of care practices based on the relevant international guidelines.

##### *Aims*

The aim of this study was to observe the

behavior of healthcare workers during surgery at the 'G. Martino' University Hospital of Messina, in order to assess adherence to care practices (CDC Recommendations, Category IB) for surgical site infection (SSI) control.

##### *Methods*

The study, conducted from May 2012 to April 2013, consisted in direct observation of a sample group of healthcare workers (HCW), including 127 surgeons, 39 anesthetists, 62 nurses and 80 practicing doctors and students, during 201 surgical operations. Direct observation of healthcare workers during the course of surgery was carried out by appropriately trained personnel, who recorded the data on care practices recommended by international guidelines on a specific card. Moreover, correct ventilation system operation, closure of the doors and the number of HCW present during surgery were documented. The standard duration of surgery follow-up was about 30 minutes.

##### *Results*

The direct observation revealed an incomplete adherence to the international guidelines by the 308 HCW. The results highlighted several problems: workers, except for some anaesthetists, used the headgear incorrectly in 53% of cases; the surgical mask was worn by 92.5% of workers but it completely covered the nose, mouth and beard only in 78% of cases. The doors were closed during the surgical operation in 65% of the observations and the mean number of HCW present in the operating room was 8 (range 7-9).

##### *Conclusions*

As documented in literature, the main purpose of surgical clothing is to prevent bacterial contamination of the surgical site. Our results showed that some behaviors of the operating team need to be subjected to revision; in this regard, staff training is an essential element for achieving a greater adherence to international guidelines.

####

**M10. Quality indicators in breast and colorectal cancer care, measured using enhanced Cancer Registry data**

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*Introduction*

Breast and colorectal cancers are the most frequent tumors in Italy, accounting for 13% and 14%, respectively, of all cancers (AIRTUM Pool, <http://itacan.ispo.toscana.it/italian/itacan.htm>). Because of the significant health burden and the complexity of care pathways, they are an ideal target for surveillance and quality of care evaluation systems. In fact, we identified a set of evidence-based process indicators to support the clinical management and decision-making process.

*Objectives*

The aim of our work was to select and assess quality of care indicators through the Umbria Cancer Registry database and information management system. Specialists involved in the care pathways (Regional Oncologic Network) will be able to access the results through the newly introduced interface.

*Materials and methods*

Breast cancer care indicators were selected based on the guidelines of the European Society of Breast Cancer Specialists (EUSOMA), the "Associazione Senonetwork-Italia Onlus" working group and the "Gruppo Italiano per lo Screening Mammografico" (GISMa).

A specific web-based software with hierarchical definition of users was developed to calculate all quality indicators. Indicators were calculated for the whole Umbria region, and separately by hospital and age group with 95% confidence intervals (Wilson method). Dispersion of indicator values by hospital is shown with funnel plots. The completeness and validity of the data was evaluated through a resampling and re-extraction process.

*Results*

Variables included in the high resolution cancer registry database at present allow the calculation of 21 out of 37 indicators proposed to evaluate quality of diagnosis, locoregional treatment and systemic therapy, respectively. Multidisciplinary care, diagnostic imaging and follow-up intensity are the main areas for which the relevant variables are currently unavailable in the cancer registry. Indicators were calculated in 1673 breast cancer cases diagnosed in Umbria in 2009 and 2010.

Preliminary results show that surgery indicator values are close to or higher than the guideline-proposed standards (range from 81.3% to 95.4%), suggesting a good overall quality of surgical data.

Diagnosis indicators reach good levels for most variables, except for the diameter and distance from the nearest margin for non-invasive carcinomas and vascular invasion, which were not always included in pathological reports (range 42.11% to 88%).

Radiotherapy and chemotherapy indicators are currently being validated by comparing the registry data with newly acquired external archives.

*Conclusions*

The cancer registry can be used for a routine evaluation of clinical practices. Limitations include the difficulties in producing timely results (i.e. within 12 months) and obtaining information on various clinical variables (e.g. ambulatory treatments or multidisciplinary team results). Increasing availability of electronic data is quickly improving the ability of the cancer registry to provide timely, valid and detailed clinical indicators. Direct collaboration with health professionals involved in the care process would allow the assessment of a higher number of guideline indicators. Relevant literature has been selected and a similar set of quality of care indicators will soon be available for colorectal cancer.

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### M11. Implementation of a Bundle to reduce surgical site infections in patients undergoing colorectal and prosthetic surgery

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#### Introduction

Surgical site infection (SSI) is one of the most common complications for surgical patients in terms of morbidity, mortality and length of hospital stay. In Italy, there is a national surveillance system (SNICH), established in accordance with the recommendations of the ECDC. Its protocols define the operations to monitor, data collection methods, and follow-up timing. Adhesion is voluntary and can be enacted at a regional level or by individual local health authorities. In Piedmont, where the present study was conducted, SSIs are monitored through specific regional indicators with the aim to identify the best measures of infection prevention and control. In 2009, in addition to the routine surveillance system, a bundle of five evidence-based practices was introduced. The aim of this study was to evaluate of SSI incidence rates, in relation to the implementation of this bundle, from January to December 2012.

#### Methods

Data were collected from the regional SNICH surveillance system that involves 37 hospitals and monitors 15 categories of surgical operations. The variables analyzed were: personal data, date of surgery, ICD9-CM procedure codes, wound contamination class, ASA score, timing of the operation, emergency or elective surgery, open or endoscopic surgery and presence of infection. The bundle evaluated the appropriateness of five surgical items: pre-operative shower, trichotomy, antibiotic prophylaxis, body temperature, and blood glucose level check. Stratified univariate and multivariate analysis were conducted for hip surgery and colorectal surgery in order to identify any associations between the implementation of the bundle and the rate of SSIs.

#### Results

The regional surveillance system monitored 4077 surgical operations during 2012. The most prevalent categories were hip surgery (HPRO) with 1992 cases (48.85%) and colon surgery (COLO) with 1322 cases (32.42%). The bundle was implemented in 1114 (55.95%) and 671 operations (50.75%), respectively. The results of the univariate analysis showed that the bundle was a protective factor against infection risk (OR=0.56, C.I.=0.36-0.80); in the hip surgery cases, however, the implementation of the bundle was not found to be statistically associated with a decreased risk of infection (OR=0.71, C.I.=0.41-1.20). The main risk factors were: ASA Score >2 (OR=1.80, C.I.=1.26-2.57), contamination class >2 (OR=2.32, C.I.=1.62-3.31), open surgery approach (OR=2.07, C.I.=1.25-3.62), emergency surgery (OR=1.81, C.I.=1.22-2.66); the multivariate analysis showed a general decrease in surgical site infection rates (OR=0.55, C.I.=0.38-0.78) associated with the use of the bundle in colorectal surgery. However, in cases with an ASA Score >2 and contamination class >2, the risk of infection in colorectal surgery remained high (OR=1.57, C.I.=1.10-2.24 and OR=2.02, C.I.=1.37-2.97, respectively).

#### Conclusions

The use of this bundle seems to significantly reduce surgical site infection rates in colon surgery. This finding could be confirmed through the analysis of other surgery categories. Finally, it would be interesting to evaluate the cost-effectiveness of the routine application of this method in addition to traditional surveillance systems.

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## I. INFECTIOUS DISEASES

### 101. The prevalence of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infection in Italian adolescents

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#### *Background*

Chlamydia trachomatis and Neisseria gonorrhoeae are among the most common sexually transmitted infections (STI) in industrialized countries. They are mainly observed in people aged 15 to 24, and more prevalent in females than in males. C. trachomatis infection is commonly asymptomatic in its early stages, and therefore most infections remain undetected. Undiagnosed infections can persist and be transmitted to sexual partners. We carried out a population-based study to evaluate the prevalence of Chlamydia trachomatis and Neisseria gonorrhoeae infections in adolescents in Northern Italy.

#### *Methods*

We investigated the presence of C. trachomatis and N. gonorrhoeae in 13th grade students in the province of Brescia. All public and private schools in the province of Brescia were invited to participate to the study. Students attending the 13th grade, aged 18 or older, were eligible for the study. An educational intervention on STIs and their prevention was performed on the day of the survey. Each student filled out a questionnaire on sexual behaviour and provided an overnight urine sample for microbiological testing.

We compared demographic, laboratory and behavioural data using common statistical methods for proportional analysis. All statistical tests employed were two-sided, with a threshold of 0.05 for rejecting the null hypothesis. The associations between demographic variables, sexual behaviours and prevalence of C. trachomatis and N. gonorrhoeae were assessed with a logistic regression model using each infection status as dichotomous response variable, providing estimates of the odds ratios (ORs) as measures of association. The fitted models included all variables associated with each infection at the univariate analysis during the first step, followed by the

exclusion of the non-associated variables using a backward stepwise approach.

#### *Results*

A total of 2718 students (62.2% of those eligible; mean age: 18.4 years; 59.1% females) provided complete data. Overall, 2059 students (75.8%) were sexually active (i.e. had had at least one partner), and the mean age at sexual debut was 16.1 years (SD: 1.4). Regular condom use during the previous six months was reported by just 27.5% of the sexually active students, more often by males than females (33.8% vs. 24.2%). No cases of N. gonorrhoeae infection were detected, while C. trachomatis was found in 36 subjects, showing a prevalence of 1.7% (95% CI: 1.2-2.4) among sexually active students, with no statistical difference between females and males (1.9% and 1.4%, respectively). Inconsistent condom use (odds ratio, OR = 5.5) and having had more than one sexual partner during the previous six months (OR = 6.8) were associated with an increased risk of Chlamydia infection in the multivariate analysis.

#### *Conclusions*

In conclusion, the prevalence of Chlamydia trachomatis infection is lower than expected in the general population of Italian adolescents; therefore, a systematic population-based screening for this STI in this target group would not seem to be cost-effective. Nevertheless, the documented high proportion of students who engage in risky sexual behaviour is a public health concern. Our findings confirm the importance of behavioural education as a key intervention measure for curbing the epidemic of C. trachomatis in developed countries.

####

#### **I02. Appropriateness of intrapartum antibiotic prophylaxis to prevent early-onset neonatal group B streptococcal disease**

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*Introduction*

Despite an era of marked success with universal screening and substantial progress in the prevention of perinatal group B streptococcal (GBS) disease, GBS remains a significant public health issue as a leading cause of early-onset neonatal GBS (EOGBS) disease. The aim of this study was to evaluate the appropriateness of intrapartum antibiotic prophylaxis (IAP) administered to pregnant women to prevent EOGBS disease.

*Methods*

The study was carried out by retrospectively reviewing medical records of pregnant women who delivered in three randomly selected hospitals in Calabria, from January through December 2014. All pregnant women who did not undergo antenatal GBS screening or underwent vaginal, rectal or recto-vaginal swabs during pregnancy with positive or unavailable GBS culture result were included in the sample. Standardized form was used to collect data, including socio-demographic information, gestational age, type and date of delivery, antenatal GBS screening and culture results, risk factors (intrapartum maternal fever  $\geq 38^{\circ}$  C, membrane rupture  $\geq 18$  hours or preterm labour), administration of IAP (molecule, regimen, administration approach, timing), according to current recommendations based on the revised guidelines from the Centers for Disease Control and Prevention (CDC).

*Results*

431 (20%) medical records were selected. Antenatal GBS screening was performed in 249 women (57.8%) and 5.8% underwent vaginal swabs only. GBS was detected in 54.6% and 63.9% of vaginal and rectal screening tests, respectively. Screening results were unknown at hospital admission in 14.1% and 22.5% of vaginal and rectal swabs, respectively. Prenatal screening was performed between the 35th and 37th weeks of gestation in 64.9% of women, and at admission in 3.5% of preterm deliveries. Among 198 women (46%) with indications for prophylaxis, 91.4% were administered IAP, and in 49.2% of cases it was administered according to the CDC guidelines. Suboptimal IAP, defined as

the initiation of intrapartum penicillin or ampicillin during the intrapartum period 4 hours or more prior to the delivery, was administered in 38.7% of the sample. Almost 23% women also received an antibiotic prophylaxis without indication for IAP.

*Conclusions*

It is concerning that almost half of the sample did not undergo any antenatal GBS screening, and therefore, a considerable incidence of a "missed prevention opportunity" persists. A small percentage of women performed only vaginal swabs. It is well known that vaginal and rectal swab specimens obtained during late pregnancy appear necessary to accurately identify maternal GBS colonization. The study results confirm that rectal swab is more effective in detecting GBS carriers than the vaginal approach. The data demonstrated that swabbing of both vagina and rectum with a single swab is the preferable option. Finally, shortcomings in the GBS prophylaxis were highlighted. Indeed, some women failed to receive optimal IAP. Further improvements in prevention strategies may be gained by optimizing adherence to recommended practices to ensure GBS-positive or untested women are administered the appropriate IAP to reduce the burden of EOGBS disease.

####

**103. Italian Otolaryngologists' knowledge and attitudes related to HPV and its prevention**

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*Background*

Human papillomavirus (HPV) is a recognized causal factor for oropharyngeal cancers. Heavy tobacco and alcohol consumption are the main risk factors, while 30% of cases are related to HPV; this percentage is increasing in most regions.

Estimates suggest that HPV infection is involved in 6,000-33,000 oropharyngeal cancer cases worldwide (800-4,600 in USA). 90-95% of HPV-related oropharyngeal cancers are associated with the HPV16 genotype, which has also been linked with laryngeal cancer.

Recent studies have reported that the HPV vaccine appears to provide strong protection against oral HPV infections, potentially representing an effective oropharyngeal cancer prevention tool. This evidence, combined with the reported increase in oropharyngeal cancer incidence worldwide, highlights the crucial role that otolaryngologists have not only in the diagnosis and clinical management of HPV-associated cancers, but also in HPV prevention.

The aim of this study was to assess the knowledge and attitudes of Italian otolaryngologists regarding HPV infection, HPV-related oral diseases and cancers and the currently available prevention measures, including vaccines.

#### *Materials and methods*

A previously validated questionnaire consisted of three parts: the first section explored the otolaryngologists' socio-demographic characteristics; the second part investigated their knowledge on HPV infection, HPV-related oral diseases and cancers, and the currently available prevention measures, including vaccines; while the last section explored their opinions and attitudes towards HPV vaccination.

The questionnaire was distributed to otolaryngologists during the National Conference of the Italian Association of Otolaryngologists held in Catania, Sicily in May 2014. Descriptive analyses were performed in order to portray the study population, and a composite HPV knowledge score was established. Differences in knowledge and attitudes were explored through univariate analysis. Analyses were carried out using the SPSS statistical software (version 21.0).

#### *Results*

262 otolaryngologists (64% males, 66% aged 36-60) were included in the study. 71% had participated in continuing medical education courses on HPV. The average knowledge score was 64.1%

(SD=14.8), ranging from 23.5% to 88.2%.

The following HPV transmission routes were identified: sexual (99.2%), cutaneous (62.6%), transplacental (64.5%), haematic (67.9%) and airborne (58%). HPV-related diseases included: cervical (99.6%), vulvar/vaginal (79.8%), anal (80.9%), penile (80.2%) and oral (96%) cancers, genital warts (80%) and respiratory papillomatosis (74%). Having participated in educational programs and training on HPV prevention was positively associated with a higher knowledge score ( $p < 0.001$ ). Most respondents stated that the main objective of HPV vaccination is prevention of HPV-related cancers (87%). 48% was aware of the existence of both available vaccines, while for 74%, immunization target population should be females prior to initiation of sexual activity. 79% knew the appropriate age for vaccination. Educational campaigns (60.7%) and counseling (40.5%) were considered the best ways to improve compliance. Socio-demographic characteristics were not significantly associated with a better knowledge on HPV.

#### *Conclusions*

We report a heterogeneous level of knowledge on HPV infection and vaccination among Italian otolaryngologists. Considering the increasing and supporting role of these specialists in the prevention of oral and neck cancers, it is fundamental to promote their education and training in order to meet HPV coverage targets and control HPV-associated diseases.

####

#### **I04. Coverage of Human Papillomavirus vaccination program in the Local Health Unit of Lanciano-Vasto-Chieti**

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*Introduction*

In Italy, around 3,500 new cases of cervical cancer are diagnosed each year. The World Health Organization (WHO) states that Human Papillomavirus (HPV) is one of the most common sexually transmitted infections, and also the main cause of cervical cancer. Different HPV genotypes able to infect humans have been identified: approximately 70% of cervical cancer cases are associated with a chronic infection with "high risk" HPV types, 16 and 18; while types 6 and 11 cause a high percentage of low-risk cervical dysplasia and more than 90% of genital warts. In Italy, the two licensed HPV vaccines containing recombinant virus-like particles of HPV are the tetravalent Gardasil®, which contains HPV types 16, 18, 6 and 11, and the bivalent Cervarix®, containing HPV types 16 and 18. Vaccination against HPV was incorporated into the National Immunization Program in 2007, and its primary target population are girls aged 11-12 years. The National Immunization Program for the 2012-2014 period stated that the coverage with three doses in twelve-year-old females should be  $\geq 70\%$  in the 2001 cohort,  $\geq 80\%$  in the 2002 cohort and  $\geq 95\%$  in the 2003 cohort.

*Objectives*

To evaluate adherence to the free three-dose HPV vaccination campaign for girls aged between 11 and 12, residing within the catchment area of the Local Health Unit (LHU) of Lanciano-Vasto-Chieti.

*Methods*

Administrative data collected by the Department of Prevention of the LHU of Lanciano-Vasto-Chieti between November 2008 and December 2014 were analyzed. In the Abruzzo region, the tetravalent vaccine is offered as a co-payment option for women aged 13-45, not included in the active free vaccination campaign.

*Results*

By December 31st, 2014, the three-dose vaccination coverage for the birth cohorts 1999, 2000 and 2001 amounted to 73%, 72% and 74%, respectively. These rates were higher than those achieved in the regional 1999 (73% vs. 72.2%;  $p=0.437$ ), 2000 (72% vs.

68.4%;  $p<0.005$ ) and 2001 cohorts (74% vs. 67%;  $p<0.001$ ). The time trend of vaccination coverage in our LHU shows a decrease of 1% between the 1999 and 2000 cohorts, and an increase of 2% between the 2000 and 2001 cohorts, in contrast with the regional trend that shows a decrease of 5% between the cohorts 1999 (72.2%) and 2001 (67%). For both the 1997 and 1998 cohorts, the vaccination coverage was 71%; while for the birth cohorts of 1994, 1995 and 1996, which were not included in the target population of the free vaccination campaign, the coverage ratios were 11%, 12% and 15%, respectively.

*Conclusions*

The data highlighted a higher immunization coverage in the LHU of Lanciano-Vasto-Chieti for the 1999, 2000 and 2001 cohorts in contrast to the overall coverage rates in the Abruzzo region, reaching and exceeding the 70% target set by the National Immunization Program for the years 2012-2014 for all the target cohorts of the free vaccination campaign.

####

**105. Antimicrobial Stewardship in Friuli Venezia Giulia: A Regional Approach**

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*Background*

Antimicrobial resistance and antibiotic misuse represent a public health emergency worldwide. The spread of multi-drug resistant microorganisms causes higher morbidity, mortality, prolonged length of hospital stays and increased costs. Consequently, antibiotic overuse

and misuse is considered a first-line patient safety issue. This target has also been identified as a priority by the Friuli Venezia Giulia (FVG) regional health system due to the levels of in-hospital antibiotic exposure emerged from the ECDC HAI Point Prevalence Survey conducted in all regional acute-care hospitals in 2013.

#### *Discussion*

An antimicrobial stewardship project was launched for all 14 public and private FVG hospitals in early 2013, as part of the regional patient safety program. The main goals were the reduction of inappropriate exposure to antibiotic and infections from the MDR bacteria. In accordance with other experiences worldwide, we adapted the available evidence, mostly referred to single hospitals, to a regional approach. The project was based on a five-step process: evaluation of the current situation through a questionnaire; formal identification of one or more reference figures for antibiotic use within each structure; identification of a minimum set of alert microorganisms frequently encountered at regional level; development of regional guidelines on treatment of the most frequent infectious diseases; monitoring of compliance with the antimicrobial recommendations and use of antibiotics.

The questionnaire evaluated the availability of guidelines for the treatment of a selection of infectious diseases, the presence of local data on bacterial resistance and internal reference figures for antibiotic management.

70 professionals were identified within the regional health system as reference figures for antimicrobial stewardship. They covered the following disciplines: infectious diseases, microbiology, intensive care, internal medicine, pharmacology, and pharmacy. A one-day course was provided to increase their competence, skills and reinforce their role as a reference point for other healthcare workers. Practical guidelines for pneumonia and urinary tract infection treatment were established by a regional group of experts in infectious diseases, and published on the regional website in November 2014. These guidelines provided

information on diagnosis, treatment and optimal management for clinical practice. Another document created by a microbiology team defined a set of criteria for data reporting on antibiotic susceptibility and resistance by all microbiology laboratories. Furthermore, a list of "alert bacteria" was established.

Monitoring compliance with the project is one of the regional HS targets for 2015. Evaluation consists in: hospital rates of antibiotic exposure through the ECDC Point Prevalence Survey scheduled for October 2015; rates of antibiotic consumption through hospital pharmacy databases; semi-annual reports on antibiotic resistance and prevalence and compliance with regional guidelines. The project actively engaged a large proportion of the professionals involved in antibiotic management to increase the knowledge on the recommended measures.

#### *Conclusions*

It is important to operatively manage the problem of antimicrobial resistance and antibiotic misuse. The regional systems in Italy must play a key role in prevention and control efforts to effectively impact the existing, alarming data. The appropriate use of antibiotics is a critical aspect of the quality of care of our healthcare system.

####

#### **I06. Knowledge, attitudes and coverage of seasonal influenza vaccine among trainee physicians at the University of Sassari.**

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#### *Introduction*

Influenza represents an important public health problem. The high seasonal incidence of the infection and its consequences are responsible for high healthcare and social costs. Immunization is an effective prevention strategy.

In particular, immunization of healthcare workers appears to be effective in decreasing the burden of the disease since it decreases the circulation of the virus in hospitals, producing great benefits for patient safety. However, most of studies carried out in Europe and United States show a low coverage of seasonal influenza immunization campaigns among healthcare workers.

#### *Materials and methods*

The aim of the study was to find out the causes of the decrease in the number of trainee physicians who decided to take part in the immunization program this year in the University Hospital of Sassari, compared to the previous seasons. We suspected a correlation between this fact and the news of the withdrawal of FLUAD vaccine doses by the Italian Medicines Agency (AIFA), following some reports of suspicious deaths in November 2014. For this reason, we developed an anonymous questionnaire with 17 items that was distributed to all physicians attending specialist training at our hospital. The questions aimed to assess the level of knowledge on the vaccination campaign and the attitude to vaccination.

#### *Results*

232 completed questionnaires were collected, corresponding to 62.9% of total trainee physicians. The typical participant was female (68.4%); 31 years old ( $\pm 4$  SD); and undergoing training in the medical field (53.7%).

Overall, 94.4% of respondents did not get immunized. 84.5% (196 out of 232) stated they had not received any invitation to be immunized, and only 2.6% were advised to undergo vaccination by their directors. Although awareness of an increased risk among healthcare workers was prevalent (65.8%), and the influenza vaccination was perceived as safe (49.5%), the analysis of the reasons that led trainee doctors to avoid immunization reveals that they believe they will not get ill (24%), and consider themselves immune to complications related to the disease (21.6%). Of those who did not receive immunization, 96.4% stated they did not intend to receive the vaccination in the following days. We observed that only 8.3% of participants was affected by

the news regarding FLUAD, and even fewer (2.3%) were influenced by the increasingly popular anti-vaccination movements. Among the non-immunized respondents, 18.4% stated that vaccination should become mandatory.

#### *Conclusions*

The number of trainee physicians who receive the seasonal influenza vaccine is very limited. This finding seems unrelated to the media exposure of the FLUAD vaccine withdrawal in November 2014; a gap in the communication process would appear to cause the low compliance levels. Trainees reported that they had not been informed about vaccine availability by their superiors. Nevertheless, most participants stated they would continue to refuse vaccination. It is essential to improve communication through simple but effective means. A personal email should be sent to every trainee, and meetings should be organized to explain the risks related to the spreading of the influenza virus and the benefits obtained with a good vaccine coverage.

####

#### **107. Risk factors for Ventilator-Associated Events: the role of oral care with chlorhexidine - Results of a pilot study**

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#### *Introduction*

In 2013, the CDC released a new surveillance method for VAP (ventilator-associated pneumonia)<sup>1</sup>, based on the new and more objective definition of VAE (VA events): VAC (VA condition), IVAC (Infection-related VA Complication), PVAP (Possible VA-Pneumonia). However, little is known about the associated risk factors and how to prevent them. One of the recommended VAE prevention practices is oral care with chlorhexidine, but its efficacy is now being questioned by some recent meta-analyses.<sup>2</sup>

#### *Aim*

The goal of this study was to identify risk

factors for VAE in mechanically ventilated patients in the Intensive Care Unit (ICU) of a teaching hospital in Central Italy; particular attention was given to the effects of oral chlorhexidine. The following aspects were considered: ICU stay length, mechanical ventilation days (MV), and mortality.

#### Methods

Patients admitted to the ICU between January-February and September-October 2014, requiring MV for over 48 hours were included in the survey. In March 2014, oral care with 0.2% chlorhexidine twice/day was introduced among the daily ICU practices. According to the CDC criteria, VAC was defined as an increase in ventilator setting for at least two days, after at least two days of stable values. IVAC included the above criteria with concurrent inflammatory signs and  $\geq 4$  days of a new antimicrobial agent. PVAP were a subset of IVAC with purulent sputum or positive pulmonary culture. Bivariate analyses were performed to study associations between covariates and VAE. The level of significance was set at  $P < 0.05$ .

#### Results

80 ICU patients on MV for at least 48 hours were monitored. 37 of them received oral care with chlorhexidine. Overall, 14 VAEs were identified (17.5%), with an incidence of 14.8 events/1,000 MV-days. Eight patients (21.6%) among those receiving chlorhexidine and six (14.0%) among those not receiving it developed a VAE ( $p = \text{NS}$ ). 78.6% ( $N = 11$ ) of patients with VAE and 65.2% ( $N = 43$ ) of patients without VAE were male ( $p = \text{NS}$ ). Mean age was similar in the two groups, 63.0 years (95%CI: 59.0-67.1) in VAE negative and 63.2 (95%CI: 55.1-71.3) in VAE positive ( $p = \text{NS}$ ). Hospital mortality rates were higher for VAE-positive patients (28.6% vs. 21.2%,  $p = \text{NS}$ ), but not significantly, likewise for the mean ICU stay length ( $16.5 \pm 7.5$  vs.  $14.2 \pm 11.2$ ,  $p = \text{NS}$ ) and MV-days ( $15.9$  vs.  $11.2/\text{patient}$ ,  $p = \text{NS}$ ). Among the 14 VAEs identified, 9 were VACs, 3 IVACs and 2 PVAPs.

#### Conclusions

An incidence rate of 14.8 events/1,000 MV-days was registered using the defini-

tion of VAE, which identified a population of patients with longer ICU stay, more MV-days, and higher mortality compared to patients without VAE, as reported previously.<sup>3</sup>

Interestingly, we found no significant association between VAE and oral chlorhexidine, and VAE incidence was actually higher in the chlorhexidine group. Therefore, chlorhexidine does not seem to play a protective role in this context, but rather a detrimental one, possibly increasing VAE risk. The small sample population is a slight limitation of our results, but there is a clear need for further analyses to assess whether chlorhexidine should still be recommended for VAP prevention. We are therefore planning to extend our study.

####

#### I08. Trend of Carbapenem-Resistant *Klebsiella Pneumoniae* Bloodstream Infections in one Adult Acute-Care Teaching Hospital in Italy

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#### Introduction

Bloodstream infections (BSI) caused by carbapenem-resistant (C-R) *Klebsiella pneumoniae* (Kp) are currently a major problem for public health. These invasive infections are caused by bacterial clones resistant to almost all antibiotics used in the everyday clinical practice.

In Italy, carbapenem resistance among blood Kp isolates has dramatically increased from 1.3% in 2009 to 29.1% in 2012, and even higher rates of 34.3% have been reported in 2013.

In order to investigate the pattern of this increasing C-R Kp diffusion, we conducted a retrospective study in a large teaching hospital in northern Italy, in order to describe the C-R Kp BSI epidemiology on

a detailed year-by-year basis, dating back to the first positive C-R Kp blood culture in this hospital.

#### *Materials and methods*

We performed a retrospective study at the IRCCS AOU San Martino – IST, a 1,300-bed tertiary adult acute-care teaching hospital in Genoa, Italy. Between January 1st, 2007 and August 30th, 2014, numbers of overall hospitalizations and patient days were obtained from the digitally archived clinical chart database. Similarly, numbers of C-R Kp BSI were identified through the computerized microbiology laboratory database. C-R Kp BSI was defined as a positive blood culture collected at least 48 hours after hospital admission, or within 48 hours from hospital admission in patients who had been discharged in the preceding two days.

The annual incidences of C-R Kp BSI with their 95% confidence intervals (CI) were calculated as the number of events per 10,000 patient days. An additional aim was to detail the overall trends in the incidence of Kp BSI during the study period, thus also including episodes caused by C-S strains.

Finally, survival rates for C-R and C-S Kp BSI through the 30th day after Kp BSI detection were estimated with the Kaplan-Meier method, and compared using the nonparametric log-rank test.

#### *Results*

During the study period, we observed 511 episodes of Kp BSI, 349 of which were caused by C-R Kp (68.3%). The median age of patients with C-R Kp BSI was 68 years (IQR: 57-76), with a 2:1 male-female ratio. The overall incidence of C-R Kp BSI was 0.92/10,000 patient days, with a peak of 1.77/10,000 patient days in 2014, and a ward peak of 22.01/10,000 patient days in the ICU in 2012. The annual incidence of C-S Kp BSI did not vary throughout the study period. The 30-day survival rate was significantly lower in C-R patients than in those with Kp BSI caused by C-S strains (Log Rank  $p=0.006$ ).

#### *Conclusions*

In our hospital, the incidence of C-R Kp BSI has dramatically increased since 2009, without showing signs of being

contained by the intensification of infection control measures. During the evaluation of the data, we observed an increase of C-R Kp BSI, especially in the so-defined low-risk wards. More concerted efforts are needed to contain this alarming trend.

####

#### **109. Investigation and control of an outbreak of carbapenem-resistant *Acinetobacter baumannii* infection in an intensive care unit**

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#### *Introduction*

The ongoing worldwide spread of multi-drug-resistant microorganisms poses a serious threat to public health. The aim of this study was to describe a carbapenem-resistant *Acinetobacter baumannii* (CRAB) outbreak in an Intensive Care Unit (ICU) of a teaching hospital located in Calabria (Italy).

#### *Methods*

The outbreak involved eight patients admitted to the ICU between March and May 2014, and was detected through continuous epidemiological surveillance. Cases were defined according to criteria used by the Centers for Disease Control and Prevention. As soon as the outbreak was identified and the investigation was activated, the following bundle of actions was implemented: structural or functional isolation of patients; periodical meetings with all nursing and ancillary staff to provide information and training on the critical areas identified, and operational and technical procedures; checks to ensure compliance with hand hygiene protocols; stricter controls to ensure that behavioural protocols were respected by personnel from inside and outside the ward and the hospital; specific disinfection and sanitation procedures such as aerosolized hydrogen peroxide system use after each discharge. Environmental cultures from areas such as floors, fur-

nishings, medical facilities and healthcare workers' hands were obtained. Strains were identified with phenotypic and genotypic tests.

#### Results

A 57-year-old patient with CRAB pneumonia was transferred to our hospital from a tertiary hospital located in the Calabria region, on March 28th. She was managed with strict isolation precautions until discharge. Approximately one week later, CRAB isolates were identified in other two patients. A fourth patient, admitted on April 5th, was found to carry CRAB in a rectal swab upon ICU admission, and CRAB was isolated from the patient's bronchial secretions on April 16th. During the following month, further four patients yielded CRAB-positive bronchial aspirates. All patients involved in the outbreak were intubated, with progressive infiltrates on chest radiograph, leukocytosis, and purulent tracheobronchial secretions, and met the case definition of ventilator-associated pneumonia (VPA). Bacterial counts were over the recommended threshold in samples from nursing staff hands in one occasion, while negative for CRAB. CRAB was isolated during the environmental investigation from the side of the bed of one of the infected patients. Molecular typing revealed two distinct clones during the outbreak. The CRAB strain isolated from the first patient was genetically dissimilar to all other strains, that in turn were all compatible with the environmental one.

#### Conclusion

Our results confirm the considerable dissemination ability of CRAB through environmental routes and patient-to-patient transmission via hospital personnel and equipment. The action bundle implemented during the outbreak helped to contain and resolve the outbreak. In addition, staff awareness and training may have played a decisive role. The CRAB strain isolated in the first patient did probably not play any role in the outbreak. Regarding the strain from the other cases, a common source of contamination, spread by the animate and inanimate components of the ICU environment, could be postulated. In this context, ongoing effective surveillance

protocols in place before the outbreak were essential to prevent its spread through a prompt identification and response process.

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#### I10. Surveillance of methicillin-resistant *Staphylococcus aureus*, multidrug-resistant Gram-negatives and fungi colonization in the Neonatal Intensive Care Units in the city of Palermo

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#### Introduction

Multidrug-resistant organisms are a serious public health problem, particularly in critical hospital wards, such as Neonatal Intensive Care Units (NICUs). Hospitalized neonates are at high risk for healthcare-associated infections leading to higher morbidity and mortality rates, because of their poor immune defenses, frequent exposure to antibiotics, invasive procedures and close contact with healthcare workers.

Our study aimed to evaluate the prevalence of colonization by methicillin-resistant *Staphylococcus aureus* (MRSA), multidrug-resistant Gram-negatives (MDRGNs) and fungi in the five NICUs of the city of Palermo.

#### Methods

From February 2014 to January 2015, an active surveillance culture (ACS) program was set up in the five NICUs of Palermo (ARNAS Civico-NICU1, Ingrassia Hospital-NICU2, Villa Sofia-Cervello Hospital-NICU3, Buccheri La Ferla Hospital-NICU4 and AOUP "Paolo Giaccone"-NICU5). From each patient, nasal and rectal swabs were collected monthly to look for MRSA, MDRGNs and fungi.

Swabs were pre-incubated at 37°C overnight in BHI broth, and cultured on selective media. Suspected *S. aureus* colonies

were confirmed by ceftazidime susceptibility testing.

MDRGNs were selected by antibiotic disk screening and tested to detect extended-spectrum beta-lactamase (ESBL) and carbapenemase-producing isolates. For fungal detection, swabs were directly inoculated on chloramphenicol-Sabouraud dextrose agar plates and incubated at 30°C for 72 hrs. Yeast-like colonies were identified by subculturing on CHROMagar *Candida* and eventually confirmed by the API20CAUX test.

Prevalence rates of colonization of the different NICUs were compared by the chi-square test.

#### Results

The average daily number of hospitalized patients was 16 in NICU1, 9 in NICU2, 21 in NICU3, 15 in NICU4 and 11 in NICU5. Prevalence of MRSA colonization ranged between 3.6% in NICU3 and 28.8% in NICU4, showing statistically significant differences between the NICUs. Prevalence of colonization by MDRGN ranged between 53.9% for NICU1 and 14% for NICU4, with statistically significant differences between the NICUs. The most frequently isolated MDRGN organisms were *Klebsiella pneumoniae*, *Escherichia coli* and *Enterobacter* spp., with a prevalence between 1.9% and 57.2% for ESBL-producing and between 0% and 3.5% for carbapenemase-producing isolates. Fungal colonization was never detected in NICU2, whilst the highest prevalence values were 7.2% for *C. albicans* in NICU4 and 5.9% for non-*albicans* *Candida* spp. in NICU5. Statistically significant differences were found.

#### Discussion

Spread of multidrug-resistant organisms proved to affect all the NICUs under investigation, with a higher prevalence of MRSA in NICUs 4 and 2, and a higher prevalence of MDRGN in NICUs 1 and 5. Fungal colonization prevalence was divergent between the NICUs, with NICU4 being more affected by *C. albicans* and NICU5 by non-*albicans* spp. These differences could be attributable to the diverse structural and organizational characteristics and the recurrent epidemic spread of some organisms by cross-transmission.

The widespread dissemination of MRSA and ESBL-producing isolates, and the emergence of carbapenem-resistant *Enterobacteriaceae* require a continuous effort in implementing preventive measures, control interventions and staff training.

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#### 111. Indicators of Intensive Care Unit-acquired infections and mortality: trends in five ICUs in Catania

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#### Background

Hospital-acquired infections (HAI) are a significant clinical and economical burden worldwide. Reporting and analyzing HAI surveillance data, with subsequent changes to infection control measures, can prevent HAIs. Conducting surveillance has been associated with a reduction in HAI rates in intensive care unit (ICU) patients, although the precise reasons for this decrease are still difficult to determine.

#### Aims

The present study was conducted in order to: i) report HAI surveillance data during an eight-year period (from 2006 to 2013) in five ICUs in Catania; ii) explore changes in HAI incidence and mortality; iii) perform a mortality analysis, estimating the risk of death for infected patients.

#### Methods

Patient-based HAI surveillance was conducted within the framework of the first four surveys conducted by the Italian Nosocomial Infections Surveillance in the ICU network (SPIN-UTI), GISIO-SitI. Each survey consisted of six months of active surveillance, conducted between

the last quarter of each year and the first quarter of the following year. Specifically, the four surveys were conducted in 2006-2007; 2008-2009; 2010-2011; and 2012-2013. A web-based data collection procedure was used. During the study period, cumulative incidence of HAI (number of infections or number of patients infected per 100 patients), incidence density (number of infections per 1000 patient-days) and mortality were calculated overall, for each survey, and for each participating ICU.

#### *Findings*

From 2006 to 2013, a total of 2070 patients admitted to the five participating ICUs were enrolled in the study. The mean number of patients for each survey was 517.5 (range: 411-720). The cumulative incidences of infected patients for each survey were: 13.3, 17.0, 18.9 and 8.9 per 100 patients, respectively. Accordingly, the risk of ICU-acquired infections increased in the third survey compared with the first (RR: 1.43; 95%CI: 1.06-1.92) but decreased in the fourth survey compared to the second (RR: 0.64; 95%CI: 0.47-0.86) and the third surveys (RR: 0.57; 95%CI: 0.43-0.76). A similar trend was observed concerning the incidence of infections and incidence density. Although mortality did not show a significant trend between the four surveys, the risk of death increased for infected patients in the first (RR: 2.72; 95%CI: 1.83-4.10), the second (RR: 4.08; 95%CI: 2.79-5.96), the third (RR: 3.34; 95%CI: 2.37-4.70) and the fourth survey (RR: 3.10; 95%CI: 2.39-4.04).

#### *Conclusions*

The patient-based cohort design allowed us to analyze HAI indicators during an eight-year period in five ICUs in Catania. Particularly, the risk of ICU-acquired infections increased in the third survey compared to the first, whereas it decreased in the fourth survey compared to the second and third surveys. Furthermore, mortality remained unchanged; however, the risk of death significantly increased among the infected patients compared to the non-infected patients in each survey. Surveillance data are a useful aid for policymakers and health leaders for making evidence-based deci-

sions to plan and improve programs, services and interventions for preventing, managing and treating HAIs.

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#### **I12. Differences in the incidence and severity of Ventilator-Associated Pneumonia in two Intensive Care Units in the Abruzzo Region. Preliminary analysis of the SPIN-UTI 2012-13 data**

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#### *Introduction*

From October 2012 to March 2013, two hospitals in the Abruzzo Region (in Teramo and L'Aquila) took part in a multicenter prospective study (SPIN-UTI) about active surveillance of nosocomial infections in intensive care units (ICU). The Italian SPIN-UTI network adopted a surveillance protocol based on the European HELICS -ICU methods. The study aim is to assess the incidence of hospital-acquired infections (HAI), especially ventilator-associated pneumonia (VAP), and monitor antimicrobial resistance. Scientific literature has shown that surveillance is associated with a reduction of HAIs in intensive care unit patients, particularly infections caused by multidrug-resistant microbial agents (MDR).

#### *Methods*

All patients with a hospitalization of over two days were enrolled in the study. The cases of Infection were defined following the SPIN-UTI criteria: BSI - blood stream, CRI1-3 - central venous catheter-related; PN1-5 - pneumonia, and UTI AB - urinary tract. This study focuses on pneumonia, since in our sample, its incidence was greater than other infectious diseases. A descriptive statistical analysis was performed by means of incidence rate calculation and distribution analysis of the cases detected.

#### *Results*

The patients observed in the two ICUs possessed different age and initial health

condition characteristics: patients from the L'Aquila ICU were older and less healthy than those from the Teramo ICU. Cumulative incidence of pneumonia was higher in Teramo (25.3 cases per 100 patients) than in L'Aquila (19.7); both rates are considerably higher than the national average (9.8). Microorganisms responsible for pneumonia vary between the two hospitals: in L'Aquila, the proportion of Gram-Bacilli (e.g. *Pseudomonas aeruginosa* or *Acinetobacter baumannii*) is higher than in Teramo (30.8% vs. 13.6%), while that of Gram+Cocci (e.g. *Staphylococcus aureus*) is lower (15.4% and 59.1%, respectively). Almost half of the microbial agents detected were Enterobacteriaceae (e.g. *Escherichia coli*, *Klebsiella pneumoniae*) in both ICUs. The diagnostic criteria (and thus the diagnostic procedures) also varied between the two hospitals: in L'Aquila the PN1 criterion (more severe) was adopted less often (in only 14.3% of pneumonia cases) than PN2 (less severe, 57.1%); on the contrary, in Teramo, PN1 prevailed (83.3% of pneumonia cases) and no PN2 diagnosis was established. All pneumonia cases resulted associated with invasive procedures (occurring in patients within 48 hours following intubation) apart from just three cases in L'Aquila. The VAP incidence was 16.9 cases per 1000 days of intubation in L'Aquila, and 20.6 cases in Teramo. There are further differences regarding the patients' conditions and antibiotic therapy management between the two hospitals: in L'Aquila, pneumonia was more frequent the less healthy patients and the antibiotics were more frequently administered before entry into the ICU, compared to Teramo. Moreover, in L'Aquila, 42.9% of pneumonia cases resulted in death at the time of hospital discharge, compared to 12.5% in Teramo.

#### Conclusions

Preliminary analysis of the SPIN-UTI data in the Abruzzo Region confirmed the importance of VAP as a cause of HAI in ICUs, and revealed potential influence by factors related to patient characteristics and healthcare facilities. However, more accurate (i.e. multivariate) statistical

analyses are needed to reach more conclusive results.

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#### I13. A population-based study to estimate the trend of hospitalization for pneumonia in Friuli Venezia Giulia

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#### Background

Pneumonia is an important cause of illness and death, particularly in elderly adults. This retrospective study was conducted to estimate the trend of hospitalization for pneumonia in the Friuli Venezia Giulia Region from the records of all hospitals (serving a population of 1.22 million people) from 2000 to 2011.

#### Methods

Cases of pneumonia were ascertained from a primary discharge diagnosis of pneumonia, or a primary discharge diagnosis of meningitis, septicemia or empyema associated with pneumonia. The annual total and age-specific hospitalization rates and trends were calculated. Total costs were also estimated.

#### Results

42,134 discharges were identified, adding up to an annual pneumonia-related hospitalization rate of 288.0/100,000 people, and with a hospitalization trend that increases with age. The primary diagnosis was pneumonia in 41,258 (97.9%) cases; among the pneumonia-associated cases, the primary diagnosis was septicemia in 756 (1.8%), empyema in 90 (0.2%) and meningitis in 30 cases (0.1%). The overall pneumonia-related hospitalization rate did not change significantly during the study period (AAPC: 0.3% [95% CI: -0.5, 1.2]). For the 15- to 64-year-olds and for the 65- to 79-year-olds age groups, the rate dropped significantly from 100.6/100,000 in 2000 to 66.1/100,000 in 2011 (AAPC: -3.3%

[95% CI: -4.6; -2.0]) and from 555.1/100,000 in 2000 to 461.7/100,000 in 2011 (AAPC: -1.3% [95% CI: -2.5; 0.1]), respectively. In adults aged 80 or over, the incidence increased significantly from 1,637/100,000 in 2000 to 2,293.7/100,000 in 2011 (AAPC: 3.0% [95% CI: 2.1; 3.9]). The overall pneumonia-related mortality rate was 24.5% and increased with age, peaking in people over 80 (32.1%). One comorbidity was present at least in 36,049 (85.6%) subjects, with the most common comorbidities being heart disease in 10,473 (24.9%), COPD and asthma in 6,324 (15%), diabetes mellitus in 4,941 (11.7%), stroke in 4,415 (10.5%), dementia in 3,640 (8.6%), renal disease in 3,188 (7.6%) and cancer in 3,068 cases (7.3%).

The estimated overall annual costs of pneumonia-related hospitalizations was around €11 million, with an estimated cost per patient of €3,197. People aged 65 or over accounted for 75% of the estimated overall cost. The overall average hospital stay was 12.6 days.

#### *Conclusions*

This study shows that hospitalization for pneumonia has a considerable impact on the health services, especially for the elderly. The availability of new-generation pneumococcal conjugate vaccines with a broader antigenic spectrum suitable for all ages offers interesting new opportunities for a better control of pneumococcal disease in the whole population.

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## P. PRIMARY HEALTH CARE AND NON-COMMUNICABLE DISEASES

### **P01. Telemedicine in chronic disease management: a Public Health perspective**

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#### *Introduction*

In 2014, the School of Hygiene of the University of Padua carried out an evaluation of home telemonitoring (HTM) programs for the management of chronic diseases. Our aims were to verify their efficacy, and to identify a model of care that could be integrated into the current health system. Our analysis addressed both organizational and clinical matters.

#### *Methods*

Our evaluation involved 19 reviews and 53 randomized controlled trials (RCT). Main selection criteria were: papers published over the last 15 years, HTM performed through a sensor system, data sent remotely to physicians, health outcomes and monitored parameters clearly stated. Included diseases were: heart failure, hypertension, COPD, asthma and diabetes.

#### *Results*

Several critical issues were highlighted. Due to the general tendency in the scientific literature to report HTM efficacy, there is a lack of conclusive evidence whether telemedicine actually improves both clinical (e.g. decreased disease/all-cause mortality, drop in disease/all-cause hospitalization rates, improvement in biological parameters and quality of life) and organizational (decreased length of hospital stay, decreased emergency room/other service use, decreased costs) outcomes or not.

#### *Discussion*

From a Public Health perspective, discrepancies and weaknesses may affect published results, since the best method for organizing and delivering telemedicine programs has not yet been identified. There is still no consensus on the following topics:

- setting: which context expresses the potential of technology best? No studies were found comparing, e.g., rural with urban communities. Within urban scenarios, samples do not discriminate users by their capability to access the healthcare network (e.g. residents in peripheral areas with limited transportation resources, rather than users with reduced mobility);
- target: it is unclear which demographic or socioeconomic characteristics users

should possess to gain most benefit from HTM;

- duration and frequency: there are significant differences in RCT (and HTM program) duration. It has not been established whether HTM is more effective when permanently implemented, or only in the early stages of disease (i.e. until stabilization). There is no agreement on the optimal HTM implementation frequency, nor whether the patients should also receive traditional interventions (e.g. nurse home visits);
- scope: it has not been determined whether measurements should be disclosed to patients as educational means to improve disease management. However, past literature does include some indications that the effectiveness of HTM programs may be attributable to care intensification (or to a perceived intensification by the patient, as per the "Hawthorne effect" described in sociology) or to the empowerment process.

#### *Conclusions*

HTM management of chronic diseases is a promising and remarkable strategy, still flawed by the lack of evidence. Reported efficacy, although modest, probably has a multifactorial origin. Our hypothesis is that it may not result from the technology itself, but from the impact of such process on multiple components of care, emphasizing patients' involvement and autonomy, and improving monitoring intensity. Further studies are needed to clarify the role played by the different HTM components (target, setting, etc.). The application of HTM as a tool for prevention, empowerment and reduction of healthcare access remains little explored.

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#### **P02. Thirty-day mortality after colorectal cancer surgery in Umbria**

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#### *Introduction*

Colorectal cancer (CRC) is the third most common malignancy in Italy in both sexes. Surgery is the mainstay of colorectal cancer treatment. Thirty-day mortality following CRC surgery has conventionally been used to assess perioperative outcome.

Our study aimed to investigate 30-day mortality following CRC surgery.

#### *Methods*

Cases were obtained from the Umbrian Population Cancer Registry (RTUP). Data related to patient characteristics and treatment were extracted from pathological reports, medical records and hospital discharge abstracts. Postoperative 30-day mortality data were obtained from the regional death cause registry. The study sample consisted of patients who underwent major CRC surgery (i.e. procedures performed with open or laparoscopic approach, excluding local procedures) in the period between January 2002 and December 2010.

The variables assessed were gender, age (<65 years, 65-74 years, 75-84 years and ≥85 years), tumor stage, intent of surgery (curative or palliative), type of presentation (emergency or elective), surgery procedure group and hospital surgical volume (low volume <30, intermediate volume 30-100, high volume > 100). Moreover, we investigated mortality in relation to the patients' socioeconomic status (SES) measured by the national census-tract deprivation index. SES was categorized into four levels (most deprived, deprived, middle and affluent). Data were analyzed using a multilevel logistic regression model.

#### *Results*

Our study included 5864 patients (mean age 71 years) who underwent major surgery for CRC. Overall, 231 patients died within 30 days (mortality risk 3.94%, 95% CI 3.0-4.6).

Postoperative mortality was significantly associated with presentation type (OR 1.6, 95% CI 1.18-2.17 vs. elective surgery): 6.59% emergency patients died within 30 days, compared to only 3.33% of those who underwent elective surgery. Increased mortality was also significantly associated with age (OR 5.77, 95% CI

3.38-9.85 for the 75-84 age group and OR 19.16, 95% CI 10.92-33.62  $\geq$ 85 age group) and tumor stage (OR 1.54, 95% CI 0.97-2.43 for stage IV vs. I). Total colectomy and palliative surgery were also associated with significantly elevated mortality. Deprivation index was associated with 30-day mortality. The most deprived group showed a 12% increase in risk of death (95% CI 1.08-1.15) compared to the affluent group, whereas the deprived group showed a 8% increase (95% CI 1.04-1.11). Hospital volume was not a predictor of 30-day mortality.

#### *Discussion*

The overall mortality rate in our study was low compared to other similar studies. However, the perioperative risk was higher than what has been previously reported by the AGENAS in a national quality assessment report.

Deprivation was associated with older age at surgery, emergency presentation, and a more advanced stage of the tumor at diagnosis. Such clustering of unfavourable factors probably characterizes a population subgroup with reduced access to care, which could be the target of specific intervention in the future. In disagreement with other studies, hospital volume was not a predictor of 30-day mortality in our study. This discrepancy could be related both to the effective organization of surgery access in our small region, or to the preferential referral of complicated cases to higher volume hospitals.

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### **P03. REHABIL AID, REDucing the HArm and the Burden of Injuries and human Loss caused by road traffic crashes and Addressing Injury Demands through effective interventions: preliminary results**

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#### *Introduction and importance*

Worldwide, an estimated 1.24 million people are killed each year in road traffic crashes (RTC).<sup>1</sup> Road accidents have significant consequences, for both the victim and the society. Many families are driven into poverty by the loss of the breadwinner or the prolonged health and social care required by family members with disabilities caused by RTCs. The consequences in terms of care, rehabilitation and societal expenses are therefore considerable.

Despite the magnitude of the problem, the socioeconomic costs of this phenomenon, and its long-term effects on individuals and national resources are not yet fully understood.

#### *Objectives*

The REHABIL AID study aims to assess the physical and psycho-socio-economic effects of RTCs on severely injured individuals, and to identify factors that affect the rehabilitation process. Our specific objective was to evaluate the individuals' health status following a road accident. Design, setting, and participants An observational and longitudinal multi-centre international study in subjects who have sustained injuries from RTCs. The study was conducted in three European countries: Germany, Greece and Italy.

All participating centres enrolled subjects meeting the inclusion criteria who had been involved in a road crash, admitted to the selected hospitals and treated in intensive and/or sub-intensive care units within a one-year period. Subjects were asked to agree to a face-to-face interview and to participate in a 12-month follow-up study (first follow-up 6 months after hospitalization; with a second one 12 months after baseline).

#### *Inclusion criteria*

Subjects involved in a RTC who sustained an injury; male or female  $\geq$  18 years; sufficient ability to read, write, communicate and understand research questionnaires. Informed consent was obtained from all subjects according to the regulations of each country.

We analyzed the data concerning 40 Italian patients, who were admitted to a

sub-intensive or intensive care unit at the *Policlinico San Matteo* in Pavia.

Main outcomes and measures  
Variables were derived from two sources: a self-report questionnaire and the patient's medical records. Medical records were used to assess the AIS/MAIS score: affected body area and type of injury. Socio-demographic information, driving and lifestyle characteristics, accident-related information, quality of life, well-being/psychological state, direct and indirect costs, patient satisfaction and morbidity indicators were recorded.

#### *Statistical methods*

Data were analyzed using descriptive statistics and inferential statistics methods (Chi square test, Fisher's exact test and Mann-Whitney test). The subjects' state of health and presence of pain were evaluated.

#### *Results and conclusions*

The individuals of the sample analyzed (n=40) were 30 males (75%) and 10 females (25%); 18 (45%) reported alcohol use, while 23 (57.5%) declared use of medicines, drugs or stimulants. Regarding driving habits, 31 subjects (77.5%) stated they used seatbelts, while 27 (67.5 %) reported previous road traffic crash involvement. In 36 cases (90%), the road crash took place in an area with light traffic congestion levels; 20 individuals (50%) were involved in a road crash in a semi-urban area, while 15 crashes (37.5%) occurred in an urban area and only 5 (12.5%) in a rural area; 18 subjects (45%) were driving a two-wheeled vehicle.

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#### **P04. Health-Related Quality of Life (HRQoL), a measure of pain and physical function in patients with hip replacement surgery**

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#### *Objectives*

The aim of this study was to collect data about patients' quality of life and to compare the responsiveness of the HOOS (Hip disability and Osteoarthritis Outcome Score) subscales in patients aged ≤ 66 years and over 66 years undergoing hip replacement.

#### *Methods*

The HOOS questionnaire, aimed at assessing patient-relevant outcomes within five separate subscales (pain, symptoms, activity of daily life, sport and recreation, hip-related quality of life) was distributed to 127 patients (mean age 68±12, range 49–85, 59% females) with primary hip osteoarthritis, undergoing elective total hip replacement, preoperatively and at the six-month follow-up. This study was a prospective cohort study.

The values were loaded into a database and analysed (prevalence) with the statistical software STATA 11.

#### *Results*

During 2013, the Regional Epidemiological Observatory recorded 4.092 prosthetic hip implantology procedures. 93% (118 subjects) of the patients underwent a primary arthroplasty (arthroplasty or hemiarthroplasty).

The HOOS detected the change in the patients' health status following hip replacement. Patients ≤ 66 years of age reported a higher responsiveness in all five subscales than patients >66 years of age (pain mean 2.60 vs. 1.97, other symptoms mean 3.0 vs. 1.60, activity of daily living mean 2.51 vs. 1.52, sport and recreation function mean 1.53 vs. 1.21 and hip related quality of life mean 1.95 vs. 1.57).

The quality of live changed after hip replacement surgery. Statistically significant improvements were seen regarding the EuroQol-5d (EQ-5D), the HOOS sports, pain, symptoms and activities of daily living subscales and VAS. The proportions of patients reporting to be satisfied ranged from 79 to 98%.

#### *Conclusions*

The data collected on patients' quality of life confirmed the indication for surgery. The study confirmed that HOOS is a useful tool for the evaluation of outcomes, especially in young patients undergoing elective hip replacement. In fact, in this

group, the measured responsiveness was higher in all the scales.

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#### **P05. Factors influencing rehabilitation of hip and knee arthroprosthetics**

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##### *Background*

Over the last years, hip and knee joint replacements have increased significantly; consequently, the rehabilitation process has undergone important developments. Growing interest has been directed towards documenting outcomes, mainly in relation to pain, function, health status, employment skills, level of participation in family and social activities.

Our aim was to measure short-term post-operative rehabilitation outcomes and identify variables that can influence them.

##### *Materials and methods*

This retrospective study was conducted in January-April 2014 in a sample of 289 hip and knee arthroplasty patients admitted to a nursing home specializing in intensive rehabilitation. The following data were obtained: age, gender, Body Mass Index (BMI), Comorbidity Index (CI), Severity Index (SI), Mini-mental test (MMT), surgery date, rehabilitation center admission date, discharge date (and hospitalization length), Functional Independence Measure (FIM), and Barthel and Tinetti scores. The last three were also obtained at discharge. The STATA 12.0 software was used for statistical analysis, dividing patients into two groups (hip vs. knee prosthesis). We considered as outcomes; end-point at discharge from the center, difference between FIM, Barthel and Tinetti at rehabilitation center admission (1), 3-4 days

from surgery, and at discharge (2). We performed univariate analyses for each variable using a logistic regression approach, since the outcome distribution was not regular. A multivariate analysis was then performed using the same approach.

##### *Results*

The present article reports the end-points of the two groups, which will be discussed more extensively elsewhere. In the hip prosthesis group:

- considering FIM2-FIM1, older patients showed better recovery at univariate analysis ( $p < 0.05$ ). Multivariate analysis revealed that patients with high SI ( $p < 0.05$ ) and CI ( $p < 0.05$ ) obtained more benefits;

- considering Barthel2-Barthel1, female patients had a better recovery ( $p < 0.05$ );
- considering Tinetti2-Tinetti1, patients with greater CI and greater number of rehabilitation days had a better recovery ( $p < 0.05$ ) at univariate analysis. This was not confirmed by multivariate analysis.

In the knee prosthesis group:

- considering FIM2-FIM1, univariate analysis showed that older patients had a better recovery ( $p < 0.05$ ). This was not confirmed by multivariate analysis;
- considering Barthel2-Barthel1, patients with high CI ( $p < 0.05$ ) and SI ( $p < 0.05$ ) had a better recovery.

- considering Tinetti2-Tinetti1, patients with higher CI and SI and older patients had a better recovery ( $p < 0.05$ ) at univariate analysis. Multivariate analysis did not confirm these results.

Patients admitted at the rehabilitation center on the third day after surgery had a better recovery, compared to those admitted on the fourth day, in both groups ( $p < 0.05$ ) and for all three outcomes.

BMI and MMT did not show any correlation with the outcomes studied.

##### *Conclusions*

Regarding the end-point, our sample shows outcomes similar to those reported in the best international experiences. Here, we report our results regarding factors which influence rehabilitation outcome.

Older patients and those with a more complex clinical condition (higher CI and

SI) seem to obtain greater health gains during the first days of intensive rehabilitation.

It can be economically beneficial to transfer patients to rehabilitation centers on the third day from intervention, and this does not seem to have negative effects on recovery.

####

**P06. Use of telemedicine in European penitentiaries: a survey of the current situation**

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*Background*

Today, technological improvements have rendered telemedicine more efficient and affordable, and its application is increasing among healthcare practitioners. Telemedicine has been shown to improve access and quality of health services in underserved areas, as well as decreasing healthcare costs. Therefore, its application in prison healthcare could be advantageous. Despite the widespread and successful adoption of telemedicine as a routine service in prison healthcare in the USA, little is known about its application across European correctional facilities. Our study aimed to explore the use of telemedicine among European penitentiaries, in order to provide an up-to-date overview of the current situation, and to estimate the potential for a more extensive adoption of this approach.

*Methods*

To maximize data availability, we used two different and complementary approaches. A bottom-up approach was used to gather information directly from the directors of every single penal institution of the 28 European Union member countries, while a top-down approach was used to collect information from personnel involved in prison administration or healthcare, or from project lead-

ers at a national level. For both approaches, questions were sent by e-mail. Prison directors were asked about the use of telemedicine services in their establishment, and eventually the type of service. Contact persons were asked to convey their knowledge about the application of telemedicine at a national level, the type of services used, and projects underway.

*Results*

Data gathered by contacting the penal institutions and/or personnel in charge came from all the 28 EU member countries. For each country, more than one project leader at a national level was contacted. In total, 116 such figures were contacted, and 85 of answered (73%). We found the addresses of penal institutions only from 11 countries. In total, we contacted 190 prison directors, receiving answers from 134 (71%). We found that telemedicine is used as an additional healthcare delivery model only in 11 countries, especially among countries in northern and Western Europe (50% of the countries in both areas). The most commonly used services are telecardiology, especially ECG, and telepsychiatry, both used by six countries. The use of teleradiology was reported by five countries, whilst teledermatology was used only in two countries. Just one project involving teleassistance for diabetes, and one pilot project for teleophthalmology were reported. Of the remaining countries, just four declared to be interested in implementing prison telemedicine in the future. Only Romania reported having launched a nationwide telemedicine pilot project.

*Conclusions*

Despite the proven benefits of telemedicine, including better healthcare for prisoners with a substantial reduction of expenditure, the use of telemedicine services among European penitentiaries is still poorly developed. Given the numerous and proven advantages of this technology, its implementation would be desirable as a healthcare delivery model for correctional facilities, together with its integration into healthcare systems, to benefit not just prison environments but

also for general community of each country.

####

**P07. Prevalence and risk factors of chronic Post-Traumatic Stress Disorder in children and adolescents after the 2012 earthquake affecting the Modena province: preliminary results of a cross-sectional study**

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*Background*

Post-traumatic stress disorder (PTSD) is the most frequently occurring psychological disorder after natural disasters (with a prevalence of 5-60% in the first 1-2 years after the event). Many cases remit within 12 months, but nearly one third have a chronic, unremitting course determining long-term negative health repercussions and significant social costs. On May 2012, two high-magnitude earthquakes hit the province of Modena, causing 27 deaths, as well as leaving several hundred citizens injured and over 15000 homeless. The aim of this study was to investigate the prevalence of chronic PTSD in children and adolescents, two particularly sensitive subpopulations, following the earthquake, and to identify individual and social risk factors, as well as protective factors potentially related to PTSD to be addressed in future preventive interventions.

*Methods*

A cross-sectional study approved by the local Ethical Committee was conducted between May 2013 and May 2014. Subjects aged 9-14 were recruited from randomly selected primary and secondary schools in the Modena province, assigned to two areas: earthquake area (19 mu-

nicipalities most affected by the earthquake; EA) and extra-earthquake area (EEA). The two areas had similar demographic and geographic characteristics. Only subjects who provided a written informed consent from their parents were included in the study. The Italian version of the UCLA PTSD Index for DSM-IV (UPID) was used to assess PTSD in students from primary (face-to-face interviews) and secondary (self-reported) schools, while risk/protective factors for the development and persistence of PTSD were investigated using the traumatic exposure checklist on objective/subjective experiences during the earthquake and the Strengths and Difficulties Questionnaire (SDQ). This questionnaire was also administered to subjects' parents along with the Symptom Checklist-90-R (SCL-90), which aimed to assess parental psychopathology.

*Findings*

682 subjects (male: 349, 51%; mean age: 11,2 ±1,4; 1,8% of the total residents of the same age in the two areas) were included in our study. The prevalence of individuals directly affected by the earthquake (damage to property or people) and forced to leave their homes was significantly higher in the EA than in the EEA (78% vs. 14% and 54% vs. 2%, respectively: p<0.001). Overall, 9 subjects (1.3 %) reported symptoms of chronic PTSD. Most (8) were living in the EA. In this area, the prevalence of chronic PTSD was 1.9% and appeared particularly high in girls (2.4%) and in secondary school students (2.2%).

*Discussion*

A higher prevalence of chronic PTSD was observed in children and adolescents living in the area most affected by the earthquake. However, the prevalence of PTSD in our study appeared lower than what has been observed in previous studies: specific protective factors related to the social context, together with differences in the time elapsed between the traumatic event and PTSD evaluation could partially explain these findings. Further research aimed at pointing out potentially protective individual, familiar and social factors will be performed in the near future. We believe that any

potential significant findings will provide an effective contribution to the planning of future preventive and protective interventions in similar distressing situations.

####

#### **P08. Information about breast cancer screening on Italian websites**

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##### *Introduction*

Despite the large number of studies on breast cancer screening, there is still a lack of consensus within the scientific community about the efficacy and the appropriateness of this intervention. Conversely, the public knowledge appears to be generally oriented towards overestimating its benefits, and unaware of the possible disadvantages of the screening. The main cause of this lack of knowledge is the scarce information conveyed to the general public directly by healthcare operators or through written documents (leaflets, brochures, pamphlets). In this context, two antithetical issues arise. On one hand, more accurate information about the risks and benefits of screening may reduce compliance. On the other hand, overcoming the classic paternalistic paradigm calls for providing complete and correct information to the public. According to the European guidelines for quality assurance in mammography screening, women should be aware of the risks and benefits related to the screening program to make a decision based on an "informed choice". Even if the current scientific standard supports the latter point of view, in many cases the paternalistic approach still persists.

##### *Methods*

We focused our study on any documents specifically addressed to the general female public and posted online by the National Health Service, Regions, Local Health Authorities (ASL) and independent Hospitals. Only data involving hospital communications are ready to be described at the moment. For each docu-

ment, the presence of the following information was verified: potential disadvantages, such as false positive results, false positive after biopsy, false negative, interval cancer, and overdiagnosis; and potential benefits, such as mortality reduction.

##### *Results*

We examined the websites of 91 Italian hospitals from the 1st of September to the 31st of December 2014. 11 websites with documents related to breast cancer screening were identified. Four (36.4%) documents discussed false positive results, while one (9%) contained information on the incidence of false positive results, one (9%) on false positive after biopsy, four (36.4%) on false negative results, two (18.2%) on interval breast cancer, four (36.4%) on overdiagnosis, and five (45.5%) on mortality reduction.

##### *Conclusions*

After a primary evaluation, awaiting the analysis of the data on the communications by the ASL and Regions, it appears that most of these documents lack, or contain unclear information. The most recent scientific debate on mammography concerns overdiagnosis and the resulting overtreatment. Overdiagnosis, that is the issue most recently recognized by the scientific community, and therefore less known among healthcare operators, is probably the most harmful result of mammography screening. In our study, it appears only in 36.4% of the documents published. Our results are a typical example of the conflict between what is considered the right to do and what is actually done in practice. Indeed, on one hand the current cultural and scientific paradigm highlights the need to provide correct and complete information to women undergoing mammography screening, while on the other hand, most of the information provided by public institutions in Italy and other countries does not comply with these requirements.

####

## L. LIFESTYLE, FOOD AND NUTRITION

### L01. Impact of blogging and social networks on teenagers' behaviour: preliminary surveys

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#### Introduction

Social networks offer an important opportunity for self-expression, sociability, learning, creativity, participation and communication. The aim of the cognitive tests carried out for this study was to assess the awareness, perceptions and risks of children and teenagers with regard to electronic cigarettes and social network challenges, as well their health-related consequences. The popularity of these phenomena, often underestimated by educators, has led to an increase in traumatic injuries and emergency department admissions. Portable and multifunctional devices (smart phones, tablets, text messages, network sites, maps, videos, blogging) can be connected to the internet at any time and anywhere.

#### Methods

This report presents the initial findings of a survey on adolescent behaviours that involved 450 students aged 9-20 from six different schools. The first part of the questionnaire administered to the sample population included empirical research on "e-cigarette use", while the second was about "neknomination", challenges and "planking" (Likes on Facebook). In the third part of the questionnaire, the same questions were incorporated in a random stratified online survey involving a sample of 450 children and teenagers (9-20 years old). The fourth part consisted in a face-to-face survey completed with parents, educators, school social assistants,

professionals, physicians or university hospital nurses (a total of 850 interviews), in order to compare the perceptions of children, teenagers and adults regarding the use of the internet, the range of online activities (schoolwork, playing games, Twitter, Facebook, watching movies, listening to music, messaging tools, such as Skype, purchased apps, creating websites and blogs).

#### Results

An accurate and complete reporting of the clinical information regarding teenagers admitted to hospitals due to accidents or intoxication following internet challenges is an essential element of a prevention program.

Our preliminary results showed that 58% of children and teenagers do not understand the serious consequences of these online games, challenges or nominations. The anonymous survey of adults confirmed the necessity of highlighting their lack of knowledge on such issues by the healthcare community through a multidisciplinary approach.

#### Discussion

Educational materials should be distributed in classrooms (by parents, teachers and/or health educators who plan preventive activities in order to reduce injuries, illness and intoxication cases). In our opinion, it is very important for the adults to be able to assess the perceived health among the adolescent population through measures, such as questionnaires, and stage adequate interventions.

#### Conclusions

The use of social networks and blogs varies considerably by age. Online activities and observations are a crucial part of questionnaires like the one used in this study, and surveys may represent a useful tool for evaluating and addressing issues related to the use of internet by children and teenagers. Future studies could be carried out to evaluate the usefulness of our retrospective database. In fact, there seems to be some discrepancy between the modern realities of teenagers, with the consequent health impacts, and the awareness about their behaviours of educators and public healthcare workers.

####

## L02. Experience of gambling in late childhood and early adolescence: the implications vis-à-vis substance abuse behaviors

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### Introduction

Large-scale international prevalence surveys have revealed high gambling rates among adolescents. Previous research among late adolescents suggests an additive association between levels of engagement in gambling and vulnerability to substance use disorders. This is the first study conducted in Europe to investigate the association between gambling and alcohol and energy drink consumption in childhood and early adolescence (11-13 years old).

### Methods

The "Pinocchio" study was conducted during the 2013-2014 school year at primary and secondary schools in Padua (north-eastern Italy), on a sample of 1325 students in 6th-8th grade. Students attending the schools completed an anonymous ad hoc baseline questionnaire with 106 multiple choice questions covering all domains known to be associated with behavioral health risk factors, i.e. socio-demographic factors, and family- peer-, personality- and behavior-related risk factors. Multilevel analysis, taking into account school-level variance, established an adjusted association between gambling and attitude to risk-taking among early adolescents. The statistical analyses were performed using the STATA ver.12 software.

### Results

We enrolled 1325 students, slightly more than half of them males (51.4%), and mostly Italian (76.5%). The mean age of the sample was 12.4 years (SD=0.97 years). Among the 8th graders, more

than one in three males and one in four females had experimented with smoking, and more than half the boys and nearly half the girls had experience with alcohol. In the same age group, almost two in three males and one in three females had consumed energy drinks, and nearly 5% of the boys had experimented with marijuana and/or stimulant drugs. In addition, almost one in four male students had experimented with three of these substances. Among the 8th graders, 45.8% of the males and 35.4% of the females reported having tried at least one type of gambling. In a fully-adjusted model, having experience with gambling confers a higher likelihood of being regular consumers (at least once per month) of energy drinks (OR 2.77, 95% CI 1.60-4.82) and alcohol (OR 1.89, 95% CI 1.14 - 3.14), but not of being regular smokers (OR 1.88, 95% CI 0.79- 4.45).

### Conclusions

Gambling behavior is widespread among adolescents. Our study showed an association between gambling per se in early adolescence, and alcohol and energy drink consumption, indicating that young people who with experience in gambling (having played video poker, bought a scratch card, or placed bets online) have a higher likelihood of being regular alcohol and energy drink consumers (at least once per month), but not of being smokers. It is important for healthcare professionals, teachers, and parents to recognize this problem and take it seriously. Our findings highlight the need to implement strategies to prevent gambling in adolescents.

####

## L03. Cyberbullying, an emerging phenomenon: depiction of a school situation in the city of Bari

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### *Introduction*

Young Italians are increasingly using the internet, and while there are undoubted advantages to this technology, it can also be dangerous. Intimidation, harassment or exclusion - aka "cyberbullying" - are major risks related to new technology use (mobile phone calls, text messages, chat, social networks etc.) by young people.

Pilot projects focusing on these issues increase awareness and help children and adolescents manage cyberbullying.

### *Methods*

A project was carried out during the 2013-2014 school year in the Bari province. It involved about 1300 primary and secondary school students. The program begun with training aimed at teachers, who subsequently taught the students how to identify the dangers of the internet and to deal with them. At the beginning and end of the program, an anonymous questionnaire was administered to students to assess their attitude towards such dangers.

### *Results*

In a sample of 911 students (51.2% male, 48.8% female), nearly 54% was in the 14-16 age group (range 10-19 years), and about 33% attended primary school. 92.2% had browsed the internet (74.1% with smart phone/mobile phone); 58.4%, in particular those in the 15-19 age group and females (61.3% and 56%, respectively), had spoken with others online. 46.1% had been reprimanded by parents for spending too much time online; 26.6% stated that they use the internet under parental supervision, while 17.3% browse together with parents, and 29.6% reported that their parents do not care about what they do online. Only 35.3% believed that they risk receiving threats while online. 23% had communicated with strangers online, while 59.8% had communicated only with people they know. 1.3% stated they had been a cyberbully (2.9% of 13-15-year-olds), while 4.8% said they had been a cyberbullying victim (9.1% of 13-year-olds) and 13.3% had been involved in cyberbullying episodes. Victims were more commonly females (6.4% vs. 3.3%), while there was a male preva-

lence among cyberbullies (2% vs. 0.7%). 40.2% of episodes had occurred in a public place. 8% stated they had witnessed or received violent messages, 6.4% threats, 5.6% physical and verbal aggression, 5% publication of personal photos without consent. Only 15.9% stated that they would not react to such episodes, while 13.4% would argue verbally, 2.6% would bother the sender anonymously, and the same percentage would do it in person; 22.9% (especially girls) would report the sender, while 11.3% (especially males) would use physical force, and 25.9% would report the episode to parents, and 9.5% to friends; 33.6% would ignore the sender. 49.6% of students stated they believe that arrogance is an important cause for cyberbullying, and more than 50% is aware that cyberbullying is punishable by law.

### *Discussion*

Results show young people are aware of the cyberbullying phenomenon and highlight the need for further studies on the risk and protective factors determining involvement in such episodes, either as victims or as cyberbullies, in order to identify potential warning signs and intervene early.

####

### **L04. Effects of vegetarian diet on health: first descriptive results from the first systematic review of the available medical literature**

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### *Introduction*

In the last decades, vegetarian and vegan diets have become increasingly widespread worldwide. Although clear estimates are difficult to obtain, it is thought that there are approximately 75 million vegetarians by choice worldwide, whereas 1,450 million people are vegetarian by

necessity, meaning that almost 25% of the world population is currently consuming a largely or entirely vegetarian diet. Several studies, often strongly debated by the scientific community and media, have investigated the possible association between dietary habits and common acute and chronic diseases, and, more recently, the therapeutic potential of vegetarian diets. Nevertheless, existing scientific literature in this field is often confusing and low in quality, while several fundamental aspects remain to be investigated. The aim of this study was to carry out the first systematic assessment of existing evidence-based medical literature investigating etiological associations between vegetarian diets and health outcomes.

#### *Materials and methods*

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed to systematically review published studies on the effects of vegetarian diets on health outcomes. Only original articles, systematic reviews and meta-analyses, written in English, involving humans, and with an abstract available, were included in this review. Studies had to contain at least one clinical outcome and/or a diagnostic parameter or test carried out and measured in the population. Diet could not be considered as a therapy nor evaluated for its therapeutic effects.

The PubMed database was searched for studies published up to May 31st, 2014, using a specifically formulated search string. The same criteria were used to search the Cochrane Library, [clinicaltrials.gov](http://clinicaltrials.gov) and the main international guidelines using the Trip database. Two pairs of readers independently and blindly reviewed and classified the abstracts. In case of discordance, pertinence of the article was assessed by a third reader. The full article was reviewed in case of discordance. Reference lists of systematic reviews and meta-analyses were examined to identify additional studies. The “snowballing” technique was also used.

#### *Results*

The search based on the abovementioned criteria identified 4,162 entries

from PubMed, 166 from Cochrane Library, 91 from [clinicaltrials.gov](http://clinicaltrials.gov), and 242 from other sources. 948 entries, 816 on vegetarian and 132 on vegan diet, were ultimately included. The main topics of articles related to vegetarian diets were cardiovascular disease (CVD) and vitamin deficiencies, which accounted for almost half of the articles (47.6%). Other important fields of research included cancer, diabetes, fetal growth and neonatal health. Vegan diet-related articles mainly concerned cardiovascular disease (CVD) and vitamin deficiencies that accounted for the majority of the articles (62.9%). Other important fields of research included diabetes and hormone disturbances.

#### *Conclusions*

We present here the first descriptive analysis of the existing literature in this field. The possible effects of vegetarian dietary patterns on the most common and important acute and chronic diseases (CVD, cancer, diabetes, etc.) are the main focus of the existing literature. Further evaluation of the quality of the studies is needed, along with a detailed assessment of the different outcomes reported.

####

#### **L05. Lifestyle and diet: nutrition education in childhood for obesity prevention. Pilot project in an elementary school in San Giuseppe Vesuviano (Naples)**

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#### *Introduction*

Overweight and obesity caused by poor nutritional habits are a growing phenomenon, especially in children. Their negative effects on population health and future sustainability of the healthcare

system are particularly worrying. Considering the importance of this phenomenon, defined by the WHO as a silent global epidemic, we wanted to explore its possible diet- and lifestyle-related causes. Family environment is highly influential in the development of nutritional habits. Schools represent another central contributor for shaping the nutritional culture in children, given their potential for influencing nutritional habits in an early age. Therefore, schools can play an important role in prevention through helping to direct children and families towards more correct nutritional habits. Parents and educators should contribute to the development of a nutritional conscience in children to encourage the adoption of an appropriate diet. They should also promote regular physical activity.

#### *Materials and Methods*

The first phase of our project involved conducting an initial survey on the nutritional habits of a sample population of 143 children (80 boys and 63 girls, aged 6-10) from one primary school in San Giuseppe Vesuviano (Naples). Children were classified according to growth percentiles, which are directly correlated to their weight. An ad hoc questionnaire (11 questions) was administered to the children, providing data for a preliminary analysis of their nutritional habits.

#### *Results*

Most of the children were distributed among the higher growth percentile classes (>95° for 7-year-old boys, 75°-90° for 8-year-old girls, >95° for 8-year-old boys, 50°-75° and 75°-90° for 9-year-old boys and girls and 75°-90° for 10 year-old girls). Most of the children reported they have breakfast (58% and 42% of boys and girls, respectively), with milk being most frequently consumed food (54% and 46% of boys and girls, respectively). Interesting data were revealed by the question "Do you watch TV or play computer games during snack-time?", showing a correlation between the higher growth percentile classes (75°-90°, 90°-95°, >95°) and a positive answer to the question (63% of the boys). Both sexes (77% and 60% of boys and girls, respectively) answered positively to

the question "Do you like the food you eat?" and this was directly associated with higher growth percentile classes (75°-90°, 90°-95°, >95°). Answers related to the consumption of different types of food for lunch were equally distributed between the sexes, with the highest percentage for pasta (20%) and meat (14%). In the afternoon, 54% of the children consumed home-made snacks. Boys in higher growth percentile classes mainly ate pasta (24%), bread (42%) and vegetables (17%) for dinner.

#### *Discussion and conclusions*

It is necessary to enhance people's awareness of the individual and social impacts of this epidemic. Promoting a multi-stakeholder initiative with the involvement of the whole community in long-term projects and encouraging significant changes to nutritional behaviors is the best solution for controlling this phenomenon. Thus hygienists play a key role in the prevention of weight-related diseases. The next phase of our project will involve distributing the questionnaires in other schools and possible comparison between children, families and teachers.

####

#### **L06. From directive to practice: are pictorial warnings and plain packaging effective in combating tobacco use?**

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#### *Aim*

In Italy, tobacco packaging are currently branded with textual warnings. Following the ban on tobacco product advertisements on mass media and event sponsorship, the packaging has become the only form of advertisement for tobacco products. For this reason, the enforcement of plain packaging (PP) is an additional tobacco use control measure, whose effectiveness needs to be thoroughly tested. The aim of this study was to investigate the perception of PP with pictorial warnings (PPW) and textual warnings (PPTW) among the Italian population.

#### *Methods*

A cross-sectional study was conducted. 1065 adults, classified into current, former, and non-smokers, viewed three types of packages: current tobacco product packaging, PPTWs and PPPWs. They were requested to identify the most effective packaging in: avoiding to start smoking, motivating smokers to quit and motivating smokers to reduce consumption.

#### *Results*

The PPPWs resulted most effective (range 83.4%-96.1%) in motivating to quit, reduce and prevent smoking habits in all tobacco users and age groups ( $\leq 40 / > 40$  years) ( $p < 0.005$ ). The PP did not seemed to motivate quitting for three fourths of the smokers, and 60% declared that they would, however, start to smoke if this packaging was used. The younger subjects were less convinced than the older group that PP would motivate smokers to quit (29.4% vs. 39.1%,  $p = 0.002$ ).

#### *Conclusions*

Placing textual warnings on tobacco products can now be considered an outdated control measure. The countries still utilizing these warnings need to consider the idea of introducing pictorial warnings and combining such warnings with PPs (PPPWs), as done in Australia in 2012. In agreement with the international literature, our findings suggest that the first

step for governments of countries that do not currently use pictorial health warnings on tobacco products would be to introduce them as soon as possible. Furthermore, PP with textual message do not have a strong impact on tobacco consumption. The policymakers of countries where the warnings on tobacco product are still text-based, like in Italy, should be advised to consider the idea of introducing pictograms and, in the future, increasing the effectiveness by standardizing the appearance of the PP.

####

#### **L07. Costs and benefits of physical activity interventions: cardiovascular health in the EUR-A sub-region**

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#### *Background*

Physical inactivity is responsible for 3.2 million deaths and 69.3 million DALYs per year worldwide. Numerous programs promoting physical activity have been undertaken, but their costs and benefits have not been conclusively assessed; moreover, the cost of inaction is rarely evaluated. The aim of this study was to perform a cost-benefit analysis of large-scale interventions intended to increase the level of physical activity among the population in high-income European Countries (EUR-A).

#### *Methods*

A cost-benefit model was set up to compare baseline and intervention-gained exposure to physical activity, consequent cardiovascular and cerebrovascular protection over time, related intervention costs and resulting total social costs. It included cardiovascular epidemiological variables and disease models, with data on relative risk, risk reversibility, long-term compliance, achievement and maintenance of cardiovascular protection over time. These parameters were used

to estimate the number of DALYs attributable to physical inactivity for each control option (do nothing, point of decision prompts, individual intervention, social support). Attributable DALYs and intervention costs determined the total social cost. Sensitivity analysis was performed for two different parameters, value of DALY (low, nominal, high) and type of DALY (no discount, time discount, age and time discount). The model was built with the Analytica software (version 4.2), Lumina Decision Systems.

#### *Results*

Physical inactivity was responsible for 3.496 million DALYs [0.03,0,0]/yr (2.791 million due to ischemic heart disease and 704,800 due to ischemic stroke). Total effective DALYs [0.03,0,0] over a 5 year-timeframe were 16.251 million if doing nothing, and decreased to 16.248, 15.458 and 15.348 million applying one of the three intervention types. Total costs, in billion EUR, resulted in 0.005 for decision prompts, 22.5 for individual intervention and 66.8 for social support. Total social cost estimates were 593.99 (CV 6%), 593.85 (CV 6%), 587.55 (CV 40%) and 627.75 (CV 31%) billion. The sensitivity analysis showed that for high value of DALY and time and age discounting, the lowest social cost was achieved by decision prompts.

#### *Conclusions*

Over a 5-year timeframe, individual interventions to increase the level of physical activity among the population maximize the expected net benefits; the extent of indication depends on the economical situation and social perception of the target population, which determine the value and type of DALY, respectively. Our results, which support the investment of public resources to increase the level of physical activity in the population, should be of interest to the health authorities in charge of planning health promotion campaigns; our methodology could also be of interest for the pre- and post- intervention evaluation phases.

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#### **L08. Analysis of variables associated with overweight and obesity in Italian workers**

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#### *Introduction*

Overweight and obesity represent an important issue in western societies due to their high prevalence and correlation with cardiovascular and metabolic diseases.

Working activities seem to play a critical role in the development and aggravation of this pathology, with severe consequences on workers' health, due to lifestyle- and diet-related changes.

A thorough assessment of the health-related and social implications of this problem is required to safeguard workers' wellness.

The present study aimed to reinvestigate and confirm the positive association between shiftwork and BMI gain, and analyze variables related to overweight/obesity in Italian workers.

#### *Methods*

This cross-sectional study was conducted by reviewing data from the 2012 "Aspects of daily life" survey, carried out by ISTAT. A description of the sampling strategy employed has been previously summarized elsewhere. Each participant completed a self-administered questionnaire and a face-to-face interview with data collectors. The present edition gathered data on 16725 individuals; for the present study, a smaller sample of people aged 15-64 was selected, as representative of the active Italian population. Subsequently, a further selection was carried out to include participants who declared they had been working during the previous week as shift- or as daytime workers, and had been in the same working position for at least 5 years at the time of the survey. BMI was calculated from the self-reported body weight and height, and participants were classified as healthy-weight or overweight/obese according to the WHO definition.

*Results*

16725 surveyed individuals (aged 18-64) met the inclusion criteria; 44.28% of workers were overweight or obese (56.36% prevalence in males vs. 27.24% in females,  $p < 0.001$ ). Older age (overweight/obese prevalence from 21.55% in the <25 years old to 63.85% in the <64 years old group), limited Occupational Physical Activity (42.19%) and not walking to work (47.47%) were associated with overweight/obesity. Furthermore, 42.73% of participants who weighed themselves every day were overweight/obese.

Logistic regression analysis underlined the importance of gender and education in overweight/obesity; in fact, females showed 72% less risk of being overweight/obese compared to males (OR 0.28, 95% CI 0.26-0.31), while highly educated workers were 30% less likely to be overweight/obese in comparison with less educated workers (OR 0.70, 95% CI 0.65-0.75). Moreover, age was associated with an elevated risk (workers aged >64 years showed an OR 4.02, 95% CI 2.91-5.58), and artisan workers had a higher risk compared to employees (OR 1.11, 95% CI 1.01-1.23), as did shift-workers compared to daytime works (OR 1.14, 95% CI 1.03-1.26).

*Discussion*

Our analysis in the Italian context is consistent with the existing knowledge, suggesting that being overweight is significantly associated with shiftwork. The association remains significant even when considering other important covariates, such as education, age, gender, civil status, BMI, weight control habits, level of occupational physical activity, walking to work, and diet. Moreover, our results highlight the effect of age on BMI; in fact, previous studies have reached contrasting conclusions on the correlation between weight gain and increasing age, reporting an increase in BMI until early old age, followed by a decrease with further aging.

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**G GLOBAL HEALTH AND HEALTH INEQUALITY**
**G01. Health Inequality and Perceived Well-being in Abruzzo, a Region in Central Italy: a Preliminary Observational Analysis**

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*Background*

The World Health Organization defines the social determinants of health as "complex, integrated, and overlapping social structures and economic systems" that are responsible for most health inequalities. Besides individual-level risk factors, such as behavioral and biological factors, social determinants of health, such as income distribution, wealth, influence and power should also be considered as risk factors for disease. However, the current scientific paradigms do not adequately capture the complexity of the relationship between environment, personal health and population-level disparities. The aim of this study was to analyze health inequalities among the resident population of the Local Health Service Unit 01 - Avezzano, Sulmona and L'Aquila, Abruzzo, Italy.

*Materials and methods*

Data was obtained from a population-based cross-sectional study of a sample of Local Health Service Unit 01 patients. 215 consecutive volunteers were recruited from different Primary Care centers. Information, including socio-demographic data, pathways to public and private healthcare, consumption of medications, and perceived well-being, were collected using an ad hoc questionnaire validated by a previous pilot study. Written informed consent was obtained from all participants. All data were recorded in an electronic database. Statistical analysis was carried out using the STATA/IC 12.1

software package.

### *Results*

59.8% (128/215) of participants were women, 53% (N=116) were employed and had a good annual income ranging from 18,000 to 36,000 Euros (51%, N=110); mean age was 47.11 years. Only six subjects were not Italian nationals. As for the perceived well-being, 41% (N=89) reported being in good health and 26% (N=56) considered to be "not in good health". 76% of participants had seen a doctor within the previous year and 56% had undergone a diagnostic procedure, both predominantly at public facilities, which reportedly inspired greater confidence. In relation to the consumption of medication, 73% of participants reported paying the full price for their drugs (mainly painkillers and anti-pyretics); 64% stated that they did not try to save money on medications, while 20% declared that they bought generic medication to save money.

### *Conclusions*

"Health disparities" and "health equality" have become increasingly familiar terms in the context of public health, but are rarely clearly defined. Our findings, although preliminary and obtained from a limited population sample, revealed a good general perception of physical and mental health, and document a large number of clinical examinations and diagnostic procedures; a strong drug consumption tendency that does not appear to be limited by income was also evidenced. Additional data and analysis of the differences among the study population from the different areas of Abruzzo are required to gain further insights into health inequality and disparities.

####

## **G02. Public health and e-health: Health communications in five major Italian newspapers**

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### *Introduction*

Health-related topics currently represent one of the main themes covered by mass media. Scientific literature reports on the radio, television, internet and press are an important means for spreading information and health education. For example, news reports on public health emergencies, such as Severe Acute Respiratory Syndrome or avian flu, represent an example of how media information can generate good results in the context of health education and disease prevention. Our study aims to describe and quantify articles related to public health published in the five main Italian newspapers (online edition), in order to address the lack of scientific literature regarding this public health concern.

### *Methods*

We reviewed the online editions of the five most read Italian newspapers from December 9th, 2013 to March 9th, 2014. Articles concerning public health issues, such as prevention, vaccinations, infectious diseases, epidemiology, nutrition, food hygiene, health economy and medical malpractice were included in this study. In order to evaluate the readability of the text, we used the "Gulpease index" statistical method that assesses the difficulty of a text according to two linguistic variables: the average sentence length and the average word length. The categories of the articles were inserted into a database created with Microsoft Excel. Absolute and relative frequencies were calculated and reported for the qualitative variables. Moreover, the Chi Square test was used to assess the differences between qualitative variables. The STATA statistical software (v.13.0) was used for the analysis and statistical significance was set at p-value  $\leq 0.05$

### *Results*

A total of 641 articles were retrieved. The most prevalent topic was nutrition and food hygiene (36.7%), and such articles were mainly published in the specific "health" section of each newspaper (95.3%), while articles on vaccinations were the least common (6.2%). Using the Gulpease index, all articles resulted difficult to understand for readers with lower secondary education level, as per

the International Standard Classification of Education. Health advice was offered by most analyzed articles, in particular those on vaccines and infectious diseases (75%). The role of public health professionals was underestimated, in particular by articles on topics such as vaccination (7.5%), primary prevention (14.3%), and epidemiology (2.9%), in which a specialist opinion should be considered relevant.

#### *Conclusions*

Given our findings, comprehensible and simplified journalism is required for articles on public health topics. It should be considered necessary to disseminate not only "newsworthy" reports, but also positive news, such as healthy behaviour practices, vaccination campaigns and vaccine benefits. One of the barriers of medical journalism is finding experts willing to assist the media and to explain scientific jargon to journalists. It is important to provide health-related news disseminated through institutional and certified sites or sources reporting evidence-based information, in order to encourage a more evidence-based journalism. Finally, it would be beneficial to include the opinion of public health experts in public health-related reports.

####

### **G03. Can immigrants transmit infectious diseases to the general population? A survey of high school students in western Sicily**

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#### *Background*

The migration of people has always been a part of the history of mankind, and it has produced a gradual but constant reorganization of the coordinates of the ethnic and cultural world. Today, this process continues to gather pace, taking aback the often unprepared governments

and general population, at the same time generating fears caused by mostly unfounded concerns and prejudices that make a peaceful and indispensable integration more complex. The purpose of this study was to analyze the perception of a sample of students who live in Western Sicily of immigrants.

#### *Methods*

A cross-sectional survey was carried out through an anonymous questionnaire administered to all high school students in Castellammare del Golfo, Sicily, located close to an Acceptance Center for Asylum Seekers (CARA). The questionnaire contained a series of questions concerning different aspects of immigration (socio-demographic and health-related aspects).

#### *Results*

The sample consisted of 253 Sicilian high school students, of which 176 (69.6%) were females. 187 students (73.9%) thought that there are too many immigrants in Italy. The reasons that push migrants to come to Italy, in their opinion, included economic motives (204, 80.6%) and logistic ones (ease of entry) (71, 28.1%). Half of the sample (136, 53.8%) was aware of the CARA facility in their town. 106 (41.9%) of respondents tended to agree with the notion that immigration promotes the spread of terrorism and crime. Considering the health-related aspects, 61 students (24.1%) believed that the most frequent pathology in a CARA facility is tuberculosis (tb), while 66 (26.1%) thought about respiratory illness. 106 of respondents (41.9%) believed that immigrants can transmit specific diseases, such as tb (36, 33.9%) and all pathologies included in the questionnaire (gastroenteritis, tuberculosis, respiratory illness with fever, meningitis) (34, 32.1%).

Furthermore, a multivariate logistic analysis was performed to assess differences between the students who thought that immigrants can transmit infectious diseases and the ones who did not. The results showed that this variable was directly associated with the belief that the main cause of hospitalization among male immigrants are such infectious diseases (OR= 3.15 p=0.007). On the

other hand, this variable was found to be inversely associated with being little (OR=0.04 p=0.009) and not at all (OR=0.27 p=0.02) in agreement with the notion that immigrants can promote the spread of terrorism.

#### *Conclusion*

These data suggest that the knowledge on immigration is still inadequate, and that the perception of foreigners is still marked by prejudices. This study aimed to investigate the perception of the sample population of adolescents of immigrants, an indispensable prerequisite for providing tools for properly informing the general population on immigration, in particular in relation to health-related issues, and for contrasting prejudices and stereotypes in healthcare.

####

#### **G04. Determinants of health and inequality: prevalence trends in mammography participation across socio-economic groups. The PASSI Surveillance data from the Lazio region from 2008 to 2013**

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#### *Introduction*

The Italian Behavioral Risk Factor Surveillance System (PASSI – *Progressi delle Aziende Sanitarie per la Salute in Italia*) collects useful and representative data on health behaviors at different levels. Data collected in the Lazio region from 2008 to 2013 has been analyzed with a focus on inequality in some relevant public healthcare fields. The results obtained have been used to produce regional communication materials.

In the Lazio region, the PASSI data collection activity has been fully operational since 2008, resulting in more than 19000 interviews.

#### *Materials and methods*

In PASSI, a sample of 25 individuals aged 18-69 per health unit/month is extracted from the lists of residents, stratified by sex and age. In the regional 2008-2013 dataset, 18678 interviews were analyzed.

The analysis of inequalities related to the variables under investigation was performed by matching each interviewee to one of three socio-economic levels, considering their age group and geographical aggregation.

The evolution of the variables over time was assessed through a time series analysis to evaluate the possibility of time-dependency.

Dedicated methodologies for trend and seasonality testing were also implemented.

The trend analysis of the variables was performed only for the two extremes of socio-economic distribution. In this paper, we will focus on the results related to the prevalence of mammography screening in the two years preceding the interview. For this variable, weighted data of 3641 telephone interviews administered to 50-69-year-old women between 2008 and 2013 were analyzed.

#### *Results*

Considering the whole Lazio region, the trend in prevalence of women who underwent mammography according to the guidelines between 2008 and 2013 was substantially stable.

In the trend analysis by socio-economic level, over the target period, there was a significant increase in the prevalence of women who underwent mammography in the high socio-economic level group (on average 64.3-77.4%; p=0.005), compared to a stable prevalence in the low-level group.

The trend for the prevalence of women who paid for mammography testing increased significantly in the high socio-economic group (from 35.5% to 45.6%; p=0.032), whereas it was stable in the low socio-economic group.

Among 50-69-year-old women resident in Rome, the prevalence of undergoing mammography according to the guideline recommendations is similar across the three socio-economic levels; in the other provinces of Lazio, there is a significant

gap between the two extreme strata, with a higher prevalence in women with a high socio-economic level.

#### Conclusions

The results show that during the time period under study, the use of mammography testing for early breast cancer diagnosis increased among 50-69-year-old women with a high socio-economic level.

This highlights an increasing inequality in the Lazio region over the last six years. The results also imply a differential coverage of the female population, depending on the area of residence.

The inequalities described above suggest the need for targeted policies promoting mammography as a preventive measure.

In conclusion, the PASSI surveillance enables complex reflections on healthcare policies and their outcomes, thus representing a powerful tool for public healthcare management.

####

#### G05. Threat to health by organized crime: findings from a correlation study

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#### Background

Organized crime is a relevant socio-economic issue not only in the southern parts of Italy, but also in some provinces of the Central and Northern Italy. Recent studies have suggested that the incidence of neoplastic diseases, chronic respiratory diseases and congenital malformations is increased in the areas of the country more affected by organized crime.

The aim of this study was to underline a likely association between organized crime infiltration and citizens' health outcomes in Italy.

#### Methods

A cross-sectional study was conducted in all 110 Italian provinces. The presence of

organized crime was estimated through the mafia presence index (IPM - *Indice di Presenza Mafiosa*) developed by the "Transcrime Research Center" for each of the 110 provinces.

For health outcomes, the overall mortality rates, cancer mortality rates and cardiovascular mortality rates reported in 2011 by the Italian Institute of Statistics (ISTAT) for each Italian province were analyzed.

The associations between the different health outcomes and IPM were assessed using Spearman's rank correlation. Moreover, we analyzed various exogenous factors, such as pollution (PM10 exceedance), unemployment rate and per capita income, that could be potential confounders, through a multiple regression model using the overall mortality rate as a dependent variable.

#### Results

Spearman's rank correlation index showed a direct association between IPM and overall mortality rate ( $\rho=0.22$ ;  $p=0.02$ ), as well as cancer mortality rate ( $\rho=-0.19$ ;  $p=0.03$ ) and cardiovascular mortality rate ( $\rho=0.40$ ;  $p<0.001$ ). Moreover, the adjusted multiple regression analysis confirmed that only IPM ( $\beta=0.15$ ;  $p<0.0001$ ) and per capita income ( $\beta=-0.0006$ ;  $p=0.034$ ) were significantly associated with overall mortality rate, and showed that other exogenous factors, such as PM10 exceedance and unemployment rate, did not act as confounders.

#### Conclusions

Even though other studies have already shown that toxic waste disposal managed by the mafia in some parts of southern Italy is linked to an increased incidence of cancer and respiratory diseases, our findings suggest that the presence of organized crime seems to act as a health outcome determinant, representing a threat to public health; this association should be addressed by policy makers. Understanding the complexity of the dynamics involved could lead to an improved awareness of these issues and their consequences. Further research, possibly at a local level, is needed to better define the impact of organized crime on the citizens' health.

####

**G06. Avoidable mortality and political epidemiology**Spataro G.<sup>1</sup>, Ceriale E.<sup>1</sup>, F.Moirano F.<sup>1</sup>, Messina G.<sup>1</sup>, Nante N.<sup>1</sup>*1 School of Specialization in Hygiene and Preventive Medicine, University of Siena, Italy**Background*

In 1976, Rutstein included avoidable mortality among the "sentinel events", as an indicator of poor quality of healthcare. Other authors have since considered mortality "amenable" (with early and effective healthcare) and "preventable" (with preventive measures). In the latter context, some deaths are related to health system issues and others to more general policies. In 1999, the first assessment report (initially called "Prometeo", later becoming "Atlas ERA" and more recently, the "MEV(i)" portal) of the Italian Regions and Local Health Units was released, analyzing avoidable mortality rates by gender and major intervention targets: primary prevention, early diagnosis and healthcare treatment. We aimed to identify more areas of intervention and expand the assessment to non-healthcare-related fields.

*Materials and methods*

Using the literature (Rutstein; Charlton; Tobias & Jackson; Poikolainen & Eskola; Holland; Mackenbach; Westerling; Simonato; Nolte & Mckee; Cislighi; Nante & Quercioli) as reference material, our team of epidemiologist, general practitioners, and health service managers identified 579 specific causes of avoidable mortality, attributable to different areas:

- Prevention and health promotion NOT of Sanitary competence (traffic accidents, neglect, aggression, etc.);
- Health promotion by the public health service (smoking-related cancers, sexually transmitted diseases, illness from alcohol abuse, etc.);
- Collective prevention and public hygiene (food intoxication, pneumoconiosis and other occupational diseases, infectious encephalitis, etc.);

- Early diagnosis and therapy (cancer of the stomach, rectum, skin, breast, cervix, etc.);

- Basic healthcare (diabetes mellitus, hypertension, influenza, COPD etc.);

- Hospital care (pneumonia, gastric ulcer, hernia etc.);

- Healthcare "in toto" (all causes of death, excluding those not of sanitary competence, and other critical aspects of public health (acute myocardial infarction, stroke, esophageal varices, etc.).

The 2006-2010 mortality data from the Italian National Institute of Statistics (ISTAT) was used, stratified by region and age group, and standardized with the direct method (census 2011).

*Results*

In almost all areas considered, Trentino Alto Adige showed the best performance. Liguria and Campania have the best non-sanitary competence prevention and health promotion, but not sanitary performance.

We identified some distinctive patterns: in particular some regions (Central, North-East and Sardinia) show "*in medio stat virtus*" performance; while other regions (South and Sicily) are characterized for poor hospital performance; in the northern regions there is evidence of weaknesses in the preventive health sector, and Lombardy had better performance in several areas compared to Piedmont and Friuli Venezia Giulia.

*Conclusions*

The identification of areas of intervention for "avoidable mortality" (though perfectible) leads to a more accurate distribution of responsibilities on the outcomes of the various sectors.

The division of the activities of prevention and health promotion into areas of sanitary and non-sanitary competence allowed us to observe some peculiarities little explored in the past (e.g. in Campania).

We detected patterns with seemingly geographical backgrounds, in which the identification of outlier situations can aid programming decisions.

We believe that avoidable mortality, more specifically divided between areas of activity, as proposed here, is an important component of the "toolbox" of

the emerging discipline of Political Epidemiology (Mackenbach 2014).

####

**G07. Perception of risk in travelers: preliminary study at three travel medicine centers**

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*Background*

The perception of the risks run by travelers to tropical or subtropical countries is changing, influenced by information from the media, social, political and economical factors and, not least, the experience of the traveler and his acquaintances. This perception influences the degree of exposure to risk during the various trips of an individual.

*Aims*

To assess risk perception in travelers in relation to diseases and adverse events according to the destination.

*Methods*

An evaluation form of the perceived risk was developed in which the travelers expressed their opinion, using the Likert scale, with values from 1 (very unlikely) to 7 (almost certain).

The areas evaluated were: gastro-intestinal disorders, insect bites, malaria, traffic accidents, sexually transmitted diseases, rabies, terrorist attacks, side effects of vaccines and overall risk. This form was administered, starting from March 1st, 2013, to subjects aged 16 years or over, visiting the Travel Clinic of the Centre for Tropical Diseases, "Sacro Cuore - Don Calabria Hospital", Negrar, Verona, the Travel Clinic of the Prevention Department, ULSS 20, Verona and the Travel Clinic of the Prevention Department, ASL 2, Lucca. Upon return, the same questionnaire was administered via

a telephone interview, in order to determine whether the pre-departure score given to each item changed after the trip or not.

*Results*

Data were obtained from a population of 861 individuals (466 males, 395 females) with a mean age of 40 years (SD 14). About 40% of the sample had a degree or higher qualification. The three main reasons for travel were tourism (64.1%), volunteering (17.9%) and work (14.9%). The average duration of the trip was 41 days. The most frequent destinations were Africa (66.9%), Asia (21.2%) and Central and South America (11.9%). The perceived overall risk got a mean score of 3.21 in the pre-trip questionnaire and 2.7 in the post-trip interview. The specific risk scores were higher for the perceived risk of insect bites (4.58 pre vs. 3.1 post) and gastro-intestinal problems (4.38 pre vs. 3.31 post), followed by malaria (3.1 pre vs. 1.9 post), accidents (2.65 pre vs. 2.98 post), vaccines side effects (pre 2.5 vs. 1.6 post), terrorist attacks (pre 1.9 vs. 1.6 post), rabies (pre 1.8 vs. 1.7 post) and STDs (1.58 pre and post).

*Conclusions*

- On average, travelers are aware that visiting tropical countries poses a higher risk of adverse events compared to traditional destinations, such as Europe or North America.
- The risk of rabies and sexually transmitted diseases are still underestimated.
- The perception of risk decreases in all areas upon return, except for "accidents".
- The perception of risk for malaria is never high and further decreases upon return.
- Therefore, the rationale of customizing pre-travel advice as much as possible is backed by our results, especially focusing on the areas most prone to erroneous risk perceptions.

####

**G08. Educational Level and Adherence to Breast and Cervical Cancer Screening: a Meta-analysis**

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#### *Background*

Breast and cervical cancer are two important causes of morbidity and mortality among women worldwide, and result in a substantial economic burden due to the costs related to the necessary treatments. Regular screening is an important strategy to reduce the incidence of the more severe forms of these cancers, and subsequently the mortality rates and related costs. Educational level seems to be an important predictor of adherence to cancer screening.

#### *Aim*

To assess inequalities in adherence to breast and cervical cancer screening according to educational level, synthesizing the findings of published studies using a meta-analytic approach.

#### *Methods*

A systematic review was carried out by querying electronic databases using specific keywords. In order to assess literature, the Population Intervention Comparison and Outcomes (PICO) model and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement were used. Methodological quality of selected studies was also evaluated. In order to synthesize findings, a meta-analytic approach was used. Two separate meta-analyses were performed: one for breast cancer screening and the other one for cervical cancer screening. Odds ratios (ORs) of adherence to the two screening programs were computed for women with the highest level of education compared with women with the lowest level of education. The I<sup>2</sup> index was calculated to investigate the presence of heterogeneity.

#### *Results*

A total of 8 cross-sectional studies were included in the meta-analyses. Selected studies were published between 2000 and 2011. The first meta-analysis

showed that women with the highest level of education were more likely to adhere to breast cancer screening than those with the lowest educational level (OR 1.81, 95% CI 1.67-1.96). A positive association between the highest level of education and the level of adherence to cervical cancer screening was also highlighted by the second meta-analysis (OR 2.14, 95% CI 1.75, 2.62).

#### *Conclusions*

This study suggests that inequalities occur in breast and cervical cancer screening adherence according to the educational level of the subjects but further researches are necessary to confirm these results.

####

#### **G09. University Exchange Experience: Vietnam, a country in rapid transition**

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#### *Introduction*

Vietnam has become a middle-income country within the last two decades, shifting from one of the poorest nations to one of the fastest growing economies. Remarkable progress has been made in improving the health status of the population, achieving or exceeding most health-related UN Millennium Development Goals, e.g. the under-five mortality rate, reduced from 58/1,000 births in 1990 to 16 in 2011. However, the healthcare system still faces many challenges, such as epidemiological transition, health inequalities, universal health insurance, and the double burden of infection and Non-Communicable Diseases (NCDs) (which have increased from

56% of total deaths in 1990 to 72% in 2010).

In accordance with the international university cooperation protocol stipulated between the University of Parma and the Hanoi Medical University (HMU), a 1-month exchange was carried out in November 2013 to explore the Vietnamese Health System (VHS), focusing on the Primary Healthcare system (PHC) and NCD prevention and control strategies.

#### *Methods*

Data was collected through literature review, involving policies and research papers, visits to district- and community-level healthcare facilities, consultations with HMU professors, and traditional and modern physicians.

#### *Results*

The VHS is a mixed public/private-provider-system, based on four levels of service delivery: central (central/regional hospitals, research institutes), managed by the Ministry of Health (MoH); provincial (general/specialized hospitals and preventive care centers) and district (general district hospitals and preventive care centers), managed by Provincial Health Departments (PHD); and community, managed by district health centers. The PHC includes community health stations and district health centers, and the PHD and the MoH have programs and offices which support primary care delivery at district and community levels. The Five-Year Health Sector Development Plan 2011-2015 identifies, as one of its objectives, PHC strengthening through prevention and management of NCDs to ensure access to quality basic healthcare services, as well as continuity and comprehensiveness of care, to all citizens. Five national target projects on the prevention and control of NCDs (hypertension, diabetes, cancer, COPD, asthma, and mental health) have been implemented. Family physicians have been asked to play a key role in the PHC in order to improve the quality of medical examinations and treatment at the primary level, following the March 2001 MOH Decree which established family medicine as a first-degree medical specialty with the aim of staffing every community health center with a family

physician. To date, the "grassroots" healthcare network (district and community) has been upgraded with improved medical equipment and manpower, although the primary care capacity for NCD prevention and management is still poor, causing overcrowding at higher-level hospitals and inequity in healthcare.

#### *Conclusions*

Although the VHS has progressed significantly, further PHC-oriented strategies are required in line with the WHO guidelines to improve the effectiveness and efficiency of the healthcare system. Our experience highlights the importance of international exchange initiatives from a professional and human perspective, to gain a global view of Public Health issues, view future challenges differently and solve problems from a different perspective. Such experience should be routinely included in the Public Health specialist curricula.

####

#### **G10. Students for the right to health: participatory action-research to evaluate irregular migrants' healthcare services**

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The primary objective of this project was to create a map of healthcare services aimed at irregular migrants provided by the local health units (ASL) in Rome, and to promote its use.

The project was coordinated by the Sapienza University and the *Caritas Diocesana* of Rome.

Our secondary goal was training and increase the awareness of medical and social work students on migration medicine (MM) and Global Health (GH). The project was conducted from 2012 to 2014 and involved 22 students. The participants were asked to visit the ASLs and interview the healthcare workers. We chose a participatory approach based on field experience. Students were the main researchers and through this ap-

proach, they learnt the meaning of right to health; inequality and the social determinants of health.

Students used a semi-structured questionnaire to interview healthcare workers. They also used a diary in which they wrote about their experiences. The subsequent analysis of the collected data was used to create a map of the healthcare services available to irregular migrants in Rome. This map includes addresses and opening hours of healthcare services considered useful to facilitate the access of foreigners to such services. At the end of 2014, the map was presented and distributed to the healthcare workers involved. In the current global scenario, in which a key role is played by the phenomenon of migration, social issues are gaining more and more importance in health- and disease-related processes (social determinants of health).

A sociologic analysis of the personal diaries highlighted the large portion of health education that is still based on a biologically-centered medical practice, characterized by professional individualism and more geared towards taking care of diseases rather than the affected people.

The students involved in this study learned how protecting migrants' health means, first and foremost, to defend the inalienable right to health, and to enhance their own awareness through empowerment.

####

#### **G11. Towards multi-local and trans-disciplinary networks to act on complexity. The experience of the It-Br Laboratory for Education, Research and Practices in Collective Health**

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Within the present scenario, characterized by a close interconnection of global and local processes, it is important to train health professionals able to act in a situation of complexity, intertwining networks and implementing innovative technical assistance models, designed to promote health and integrated care. In the current context of economic crisis, increasing social vulnerability, inequalities and caring needs are associated with a decrease of health expenditures. For this reason, it is fundamental for health professionals to acquire new tools for analyzing and acting within challenging situations, as well as building shared health paths, in line with ethical and equity values.

This paradigm change is even more necessary in the present moment of transition within the public health system, characterized by a progressive strengthening of the territorial model involving “*Case della Salute*”: services based on Primary Health Care principles, and organized into multidisciplinary teams working within a logic of global care of health needs.

Taking into account these premises, groups of researchers from Brazil and the Italian region of Emilia-Romagna, in collaboration with the Centre for International and Intercultural Health (CSI-DIMEC-Unibo), started a partnership aiming at the creation of international and multi-local networks of cooperation, action-research and training in Community and Primary Health Care.

This partnership, based on exchange and direct collaboration between professionals working in different local contexts, led to the Conference on Working tools and methods between the Emilia-Romagna Region and Brazil: towards local communities' health and wellbeing, held in Bologna in February 2014. The second edition (Chronic conditions, work in the health field and primary care implications) will be held in February 2015.

In 2014, the *Agenzia Sanitaria e Sociale Regionale* of Emilia-Romagna, the Emilia-Romagna Region, the *Rede Governo Colaborativo em Saúde da Universidade Federal do Rio Grande do Sul* (UFRGS), and the *Departamento de Atenção Básica*

do Ministério da Saúde do Brasil, in collaboration with the CSI, signed a Cooperation Agreement, which later led to the involvement of other partners and the birth of the Italian-Brazilian Laboratory of training, research and practices in Community Health.

The objective of the Laboratory is to improve the cooperation between Italy and Brazil, with the aim to develop: 1) transdisciplinary tools of knowledge and analysis; 2) integrated practices within universities, health services and communities in different local areas; 3) new global and local action strategies through joined activities of training, research and experimentation of organisational models in both countries.

The challenge is to build a transdisciplinary research and training network between the Italian and Brazilian Healthcare Systems, in order to achieve a growing social participation and the production of “integrated care networks” for meeting healthcare needs.

This challenge leads to an effective “re-classification” of the concept of health, as a possibility of generating a common knowledge within and outside of health institutions, thus endorsing the active role of individuals and networks for the promotion of wellbeing.

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## E. ENVIRONMENTAL AND OCCUPATIONAL HEALTH

### E01. Radiation protection awareness among physicians of the Pavia District, Italy

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#### *Background*

Radiological examinations are the main sources of ionizing radiation exposure to the population caused by human activities. The annual number of medical procedures is still increasing, and conse-

quently, collective radiation doses are increasing, in particular due to medical practices, such as computed tomography, subjecting patients to significant radiation doses. On these grounds, radiation protection should be considered as a public health concern.

Increasing the awareness and specific training programs for directly and indirectly involved physicians are therefore needed. However, a review of recent publications underlines the inadequate knowledge of physicians about the radiation doses involved in medical practices and about patient protection. This knowledge gap might explain the unnecessary radiological examinations frequently required by physicians. The aim of our study was to assess the knowledge of the physicians of the Pavia District (Italy) on the risks of radiation exposure.

#### *Methods*

A cross-sectional study was performed from March to May 2013, involving the Order of Physicians, Surgeons and Dentists of the Pavia District. All physicians belonging to the Order were eligible for the study. The Ethics Board of the University of Pavia approved the study. Data were collected through a self-administered questionnaire, available on a specific online platform with private login credentials. Statistical analyses were performed using the STATA 12 software. A p value  $\leq 0.05$  was considered significant.

#### *Results*

419 physicians filled out the questionnaire; The mean age was 44.76 years ( $\pm 12.33$ ) and 59.43% of participants had been practicing medicine for more than 10 years. 202 participants (48%) stated that they had undergone training on radiation protection. The average percentage of correct answers to questions on ionizing radiation was 62.29%, with a significantly higher result among radiologists; 88% of the participants answered almost half of the questions correctly. Around 5% and 13% of the responders did not know that Ultrasonography and Magnetic Resonance, respectively, do not expose patients to ionizing radiations. Only 5% of the physicians reported the correct the cancer risk rate associated

with abdominal Computed Tomography, and only 3% correctly assessed the effective dose (in terms of equivalent number of chest X-ray exams) of five types of common radiodiagnostic procedures.

#### *Conclusions*

The findings show a relatively good level of general knowledge on ionizing radiations, higher than reported in previous literature, although prominent knowledge gaps were observed for specific topics. Nevertheless, we believe in the usefulness of sensitization program for physicians employed in all medical areas, focused on the risks linked to radiation exposure in medicine.

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#### **E02. Work-related stress outpatient clinic: experience of the "Azienda USL Roma B" preSAL service.**

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#### *Background*

Work-related stress involves a pattern of physiological, emotional, cognitive and behavioural reactions to some extremely taxing aspects of work content, organization and environment. In Europe, occupational stress is experienced by 22% of workers and causes costs of €20 billion each year, in terms of lost working days and development of related diseases, in particular cardiovascular diseases and depression. In Italy, the attention to work-related stress has grown following the Legislative Decree 81/2008 and release of the National Prevention Plans, whose priorities include the reduction of occupational diseases. This preface set the background to the establishment, in 2012, of the work-related stress outpatient clinic, or the PreSAL service, at the "Azienda USL Roma B". Workers who contact the outpatient clinic follow a five-step evaluation program, involving examinations by psychologists, psychiatrists, and occupational physicians. At the end

of this process, a final report is prepared with a global assessment of possible associations between the symptoms exhibited and workplace conditions.

#### *Methods*

From 2012 to 2013, workers' medical records were collected and imported into an Excel database. Workers who suspended the evaluation process before the final report were excluded from the study.

#### *Results*

During the study period, 199 workers were evaluated: 82 in 2012 and 117 in 2013. Individuals attending the outpatient clinic were mainly women (55.28%), aged 23-67, with a mean age of 46.78 years and a median age of 47. Most workers (73.87%) had a high educational level (high school diploma or above). Almost half (45.23%) were married. Nearly 70% of workers were occupied in the private sector, and one out of three (36.68%) worked as a clerk. Almost all subjects (91.46%) reported that they had suffered disciplinary measures at work, including downgrades, transfers and repercussions on family management. For the most part, the workers were also affected by relevant variations to the main physical and behavioural variables examined: circadian rhythm (89.45% had variations), bowel movement (76.88%), diuresis (83.92%), cigarette smoking (16.58%) and alcohol intake (4.02%). A number of people had also radically altered their daily drug intake: 25.63% had started to take anti-depressive drugs, 43.22% drugs acting on the nervous system and 10.1% anti-hypertensive or gastroprotective drugs. Among the 199 patients who completed the evaluation program, around half (55.27%) were deemed to suffer from a workplace-related physical or psychological condition. In 154 cases (77.39%), the trigger event was identifiable: change of management, health problems, transfer of work location, salary problems and excessive workload were the most frequent causes.

#### *Conclusions*

Work-related stress is a social burden worldwide, to the point that it was included by the last Italian National Prevention

Plan among the priority interventions. The typical affected worker asking for help is a 40-50-year-old woman with a high educational level. Because occupational stress is preventable through cost-effective interventions, combined actions, focused on both organisational and individual factors, should be implemented.

####

### **E03. A pilot environmental education project in the MAPEC study**

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Project Founded by LIFE+2012 Environment Policy and Governance. LIFE12 ENV/IT/000614

#### *Background*

The MAPEC-LIFE project aims to recruit around 1000 children to provide information about air pollution and its effects on health to teachers, children and families, in order to encourage healthy lifestyles.

By teaching children how to establish healthy lifestyles and prevent exposure to air pollutants, we empower and encourage them to be healthy and take responsibility for their own health. Furthermore, exercise and beneficial dietary habits are also valuable tools for preventing the negative effects of other environmental factors.

An educational package was designed to reach the abovementioned goals. This package contains lesson plans and video-games involving the main topics of the project: air pollution, health effects, cellular effects, environmental policies, and healthy lifestyles.

The package, tested on teachers and children for understandability, usability and usefulness, is available for download online (<http://gioco.mapec-life.eu/>). The pilot study involved primary school second- and third-graders and their teachers.

The aims of this pilot study were to: § evaluate improvements in children's knowledge following educational activities;

§ assess how children perceived the educational games and activities, and whether teachers consider the educational package to be useful and enjoyable for children.

The study was conducted in schools that are taking part in the MAPEC project. The activities were carried out with the use of an Interactive Whiteboard connected to the Internet.

#### *Methods*

The pilot study testing procedure was structured in several stages: 1. Pre-questionnaire: every child filled out a questionnaire to verify his/her initial knowledge. The questionnaire was based on the content of the educational package.

2. Educational lesson: the children were explained the key topics of the educational boards.

3. Educational video: we showed to the children the storyboard of the educational package.

4. Educational games: the children were paired up to play educational video games.

5. Post-questionnaire: every child filled out the initial questionnaire again to test for improved knowledge.

6. Satisfaction questionnaires: the children and teachers filled out a satisfaction questionnaire involving some questions about the teaching activities.

#### *Results*

Seventy-five children (two second and two third classes) from Brescia were involved in this project.

Between the first and second questionnaire, children showed an improvement in knowledge about environmental pollution.

In particular, even questions that can be considered more difficult to understand

for children in this age group, such as the definition of passive smoking and free radicals, showed an improved understanding following the lesson (passive smoking: 61% vs. 80%, free radicals: 31% vs. 40%, before and after lesson, respectively).

During the lesson, the children paid attention and participated with enthusiasm. The use of video games as a challenge and educational play instrument allowed to further enforce the knowledge acquired by the children.

#### *Conclusions*

This environmental education intervention has been proven to be very useful to both well-informed children and to those with a poor prior knowledge on these issues.

Both children and teachers enjoyed the activity as evidenced by the satisfaction questionnaires.

####

#### **E04. The GIS methodology and its application in exposure assessment – Experience of the University of Modena and Reggio Emilia**

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#### *Introduction*

The need for simultaneously assessing multiple exposures is being increasingly acknowledged in the field of environmental epidemiology. Geographic Information System (GIS) is a new computer-based system designed to collect, integrate, analyze and display multiple different data in a spatially referenced environment. GIS can be viewed in several different layers, where each layer holds specific environment-based data. This study focused on multiple environmental

exposures and risk of amyotrophic lateral sclerosis (ALS).

#### *Methods*

With a case-control population-based study approach, the first step was the identification of suitable cases through the Regional Disease Registry, Hospital Discharged Records, death certificates, etc. For each case, we randomly selected four population controls matched for age, sex, and province of residence. Data collection included residential address at time of diagnosis and, where possible, residential history, in order to link each case with individualized geographic coordinates in the Gauss-Boaga reference system using the ARCGIS-10 software. The GIS database was also enriched with data on potential environmental risk factors including the following: type and proportion of different crops/cultivations associated with the use of pesticides (through the Land Use Regression Model); location of water bodies to link contamination by cyanobacteria; distribution of air pollutants using a monitoring data network for air quality control and a validated dispersion model; and location of high-voltage power lines associated with exposure to magnetic fields.

#### *Results*

We identified 499 cases of ALS and 1932 controls in the three provinces of Modena, Reggio Emilia and Parma in the 1998-2011 time period. Using a logistic regression analysis model, odds ratios (ORs) were calculated for the ALS, including in the model, in addition to matching variables, the potential multiple risk factors.

#### *Discussion*

Using GIS and other methods not requiring direct involvement of the subjects makes it possible to minimize exposure misclassification and selection bias. Moreover, GIS may expand the horizons of environmental exposure assessment by allowing the simultaneous evaluation of numerous confounding and risk factors in a regression model to quantify their weight, while offering an improved statistical stability of risk estimates, identification of independent risk factors and implementation of public health interventions. In conclusion, GIS-based assessment and analysis could be applied to

several other non-infectious and infectious diseases.

####

**E05. Continuing medical education for occupational health physicians according to the Legislative degree 81/08, art. 38, and occupational safety training. Experience of the Public Health Department of the Federico II University Hospital, Naples**

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*Introduction*

Training has a central role in the development of occupational safety awareness. It is important to train workers on safety, in order to enable them to adopt the necessary skills to minimize the risks and to protect personal safety.

*Methods*

The Public Health Department of the Federico II University Hospital developed two continuing medical education models for occupational health physicians and one training model for all hospital staff. The first model was carried out in collaboration with the Company Training Department as a traditional training course. The course was divided in 6 modules, with a 24-day total duration and accredited with 138 credits. 18 occupational health physicians participated to the course.

The second model was organized in collaboration with the Public Health Department and Italian Society of Hygiene as two distance learning courses. The first one titled "Regulations development and safety actors. Risk evaluation document and biological risk in healthcare setting"

was accredited with 50 credits and the second one "Chemical risk and surveillance report" with 24 credits.

The third model, also carried out in collaboration with the Company Training Department, was a distance learning course on occupational safety for all hospital staff, including residents.

All training methods, devised by the Public Health Department, were conceived based on an approach involving a process with four basic training steps: 1) planning and development of the training program, 2) delivery of the training program 3) evaluation of the results of the training program, and 4) documenting the training program. In the first phase, the Training Plan was formulated. The Training Plan was structured in sessions, which addressed subjects of great importance for healthcare worker training, including practical examples. The second training phase was organized as a traditional course, which included theory and practical examples. The third training phase of the course was reserved for questionnaire compilation at the end of each training day. The fourth training phase of the occupational health physicians' course, was aimed at producing specific guidelines based on the procedures addressed during the course, while in the other two courses, this phase was used to compile a set of regulations related to the course subjects in order to create an archive which will be available for all hospital staff.

*Conclusions*

Continuing education acts on workers' behavior. It directs them towards more effective personal health monitoring and prevention practices, and offers concrete support for ensuring occupational safety. The residents of Hygiene and Prevention Medicine had central role in the organization of the courses. In addition to the organization and preparation of the materials for the course, they acted as tutors during the traditional course, gaining experience and competence in process management.

####

**E06. The Framingham risk score as a risk assessment tool in health surveillance**

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*Introduction*

Cardiovascular diseases (CVD) are a major global health concern. Across Europe, they are responsible for over 4 million deaths per year, or around 47% of all deaths. Therefore, CVD prevention and risk assessment should be key goals for promoting and evaluating workers' health. The aim of this study was to evaluate the risk of working limitations or unfitness for work by using the Framingham risk score (FR), an individualized percentage risk score estimating the 10-year likelihood of cardiovascular events.

*Methods*

A cohort of workers undergoing periodical targeted medical examinations for health surveillance was followed from January 2006 to March 2014. Subjects' age, gender, smoking status, body mass index (BMI), systolic blood pressure, type II diabetes, and use of antihypertensive medications were recorded. Workers affected by concomitant illnesses (i.e. cancer or severe depression) or undergoing medical treatment (i.e. chemotherapy) with the potential of interfering with the evaluation and fitness for work were excluded. To classify workers into different risk categories, frequency of scheduled medical visits was used, in accordance to a previous risk assessment evaluation (low>high risk: every one, two, three, and five years). Health surveillance diagnosis of limited fitness or unfitness for work was identified as binary outcome, using age and sex as covariates. Mann-Whitney, t-test or ANOVA with subsequent Bonferroni correction, as applicable, were used to assess differences among subgroups. Logistic regres-

sion was used to explore the correlates of health surveillance diagnosis during the first visit. Multilevel analysis for repeated measures was employed to assess explanatory factors of FR changes over time. The Cox regression model was used to study the association between FR at first visit and health surveillance diagnoses over time.

*Results*

10,005 subjects (59% male) met the inclusion criteria (mean age 52.5±7.9). At first visit, 43.1% of the subjects were smokers, 3.1% had diabetes, 19.3% were taking antihypertensive medications, 42.6% were overweight or obese, and mean systolic blood pressure was 127 mmHg (±15.6). Men had a higher FR than women (21.9%, 8.0%, p<0.001), and male subjects in the higher risk category had a FR 4% higher than those in the lower risk category (25.2%, 20.8%, p<0.001), while there was no significant difference among women (p=0.07). Logistic regression model adjusted for age, sex and risk category showed that an increased FR at first visit was more likely to be associated with diagnosis of limited fitness or unfitness for work (AOR 8.05 p=0.009). Multilevel modeling showed that factors influencing the increase of FR over time were age (p<0.001), sex (p<0.001) and risk category (p<0.001). A fully adjusted Cox model showed that an increased FR was more likely to be associated with a higher rate of diagnoses of limited fitness or unfitness for work (HR 11.5 p=0.003) over time.

*Conclusions*

FR is a strong predictor of health impairment in workers, especially those considered to be at a higher occupational risk. Therefore, it should be used as common tool during targeted medical examinations for health surveillance, as well as a long-term predictor for occupational risk assessment.

####

**E07. Legionella spp. colonization in water systems of residential buildings in the province of Pisa**

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Despite the increase in community-acquired cases of legionellosis in Italy in the last few years, the current Italian guidelines do not provide indications for the prevention and management of *Legionella* in hot water systems (or centralized conditioning systems) of residential buildings. We performed a survey on eight medium-sized apartments building in the Pisa province to assess the prevalence of *Legionella* spp. in the water systems and water quality at the point of use, according to the parameters established in the current Italian legislation (Legislative Decree 31/2001). For each building, we obtained two hot water and three cold water samples (at entry into the building pipework, at exit from autoclave, and at the tap) for the evaluation of potability parameters, and in particular, for *Legionella* spp analysis. We detected the presence of *Legionella* in several samples from residential buildings, especially those with a central water heating system. This highlights a situation of potential risk for susceptible categories of the general population, and demonstrates the need for control and risk assessment measures.

####

**E08. Legionella spp. contamination control in hospital water systems with chlorine dioxide treatment: determining the effective output concentration in the Operating Units of the Ravenna Hospital**

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**Introduction**

The epidemiological link between the presence of *Legionella* spp. in hospital water systems and the onset of nosocomial legionellosis was described for the first time in the early 1980s; since it is almost impossible to completely eliminate this pathogen, the current objective remains risk containment with preventive interventions.

In order to prevent nosocomial legionnaires' disease, since 2007, Ravenna's Public Hospital "Santa Maria delle Croci" has adopted as a main preventive measure the disinfection of the its water system with chlorine dioxide (ClO<sub>2</sub>). The efficacy of ClO<sub>2</sub> is attributable to the high water solubility of its gaseous compound, its high biocide oxidation capacity and ability to remove biofilm, which is an ideal environment for microbial growth, and the natural habitat of *Legionella*.

**Materials and methods**

This study assessed the period between June 2007 and June 2014, when 661 samples of ClO<sub>2</sub>-treated water from the hospital were analyzed. Sampling of the water, when positive for *Legionella*, is essential in order to determine what type of intervention should be carried out in the water system, because the recommended course of action varies depending on the concentration levels of the bacteria.

Every two months, samples were collected by Hospital Hygiene staff from all the Operating Units after flushing the outlet for about 5 minutes. The water was stored in 1 liter glass bottles and sent for *Legionella* testing to the Arpa Laboratories in Bologna, Emilia Romagna, within the same day.

At time of collection, the concentration of ClO<sub>2</sub> was measured by a photometer. The data were registered in a database with the date and site of sampling, ClO<sub>2</sub> concentration and *Legionella* concentration (colony-forming units per liter (CFU/l)) obtained from the microbiological culture.

**Results**

The analyses showed that [ClO<sub>2</sub>] = 0.24

mg/l produced the lowest number of water samples defined as "positive" (UFC $\geq$  100 CFU/l), and highlighted a good contamination control in these sampling locations. Where [ClO<sub>2</sub>] was in general >0.2 mg/l, a concentration considered effective by previous literature, the presence of *Legionella* spp. exceeded 1.000 CFU/l in 6.0% of samples, whereas with [ClO<sub>2</sub>] >0.3 mg/l, it dropped to 5.7%. Considering the most high-risk contamination values (>10.000 CFU/l), we found that with a [ClO<sub>2</sub>]  $\leq$  0.2 mg/l, 2.1% of samples was positive. Furthermore, where [ClO<sub>2</sub>] was  $\leq$  0.10 mg/l, in 45.9% of samples *Legionella* concentration was >1.000 CFU/l, and such values should be addressed with great attention.

#### *Discussion and conclusions*

This study shows that ClO<sub>2</sub> is a good method for controlling *Legionella* infections in the hospital, even though high contamination levels are still occasionally detected in the peripheral branches of the hospital water system, despite the ClO<sub>2</sub> concentration being within previously accepted safety values. The best results are obtained when [ClO<sub>2</sub>] is >0.24 mg/l, and this target should be pursued in the future in the entire water system, with particular attention to the peripheral branches.

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#### **E09. Management of an influenza vaccination plan in healthcare workers of the Messina University General Hospital**

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#### *Background*

Influenza is one of the most important causes of absence from work, and National Health System expenditure, including direct costs related to the care of infected patients (healthcare costs) and indirect costs, such as costs for care and

productivity losses. For these reasons, the influenza vaccination remains one of the best prevention methods for both the disease and the related costs. The Ministry of Health considers healthcare workers as a category for which influenza vaccination is recommended in order to protect the workers themselves, their families, and, above all, the patients with whom they come into contact in their profession. Although vaccines are widely available, free and effective, their acceptance by healthcare workers continues to be a critical element.

#### *Objectives*

The aim of our study was to determine the degree of adherence to influenza vaccination by healthcare workers at the "G. Martino" University General Hospital of Messina, and, at the same time, to increase the participation rate to the vaccination campaign through a combination of educational and promotional interventions and setting up vaccination points in the various wards to satisfy the needs of healthcare personnel.

#### *Methods*

The analysed population consisted of doctors, biologists, nurses, postgraduates, pharmacists, laboratory technicians and administrative personnel, working in the wards, laboratories and offices of the "G. Martino" University General Hospital of Messina. The study consisted of two phases. The first phase involved the administration of an anonymous *vis-à-vis* questionnaire, which was conducted during the months of September and October 2014, in order to identify workers who normally comply with the vaccination, those who are contrary, and the relative causes. During the subsequent phase, to guarantee a greater adherence to the vaccination, we instituted some vaccination points in various wards, at times and dates established with the Health Department.

#### *Results*

The questionnaire highlighted a lack of knowledge and trust of healthcare workers towards the influenza vaccination. The second phase, during which we emphasized the importance of this practice in the prevention of nosocomial influenza outbreaks and related complications in patients, determined a slight increase in

adhesion rates compared to previous years.

*Conclusions*

Our work shows the importance of providing correct information about the importance of influenza vaccination and meeting the needs of healthcare workers. This may be, in the future, a key solution to increase healthcare workers' adhesion to vaccination campaigns in order to prevent the nosocomial spread of influenza and, consequently, protect the patients' and workers' health, thus minimizing work absences and economic losses.

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