Gemeinsame Jahrestagung 2015
Schweizerische Gesellschaft für Intensivmedizin
Schweizerische Gesellschaft für Infektiologie
Schweizerische Gesellschaft für Notfall- und Rettungsmedizin
Schweizerische Gesellschaft für Spitalhygiene

Interlaken, 2.–4. September 2015
Inhalt | Sommaire

Freie Mitteilungen | Communications libres 2-18

FM 01 – FM 05 2–6
SGI Ärzte - SGNOR | SSMI Médecins - SSMUS

FM 06 – FM 10 7–11
SGInf – SGSH | SSInf - SSSH

FM 11 – FM 15 12–18
SGI Pflege | SSI Soins

Vorträge Diplomarbeiten NDS Intensivpflege
Exposés travaux de diplôme en Etudes postdiplôme ES en soins intensifs 19-21

SGSH Session I : Implementation/Innovation 22-27

Poster 28-152

Gruppen | Groupes Posterviewing

SGI Pflege | SSMI Soins P00-P18
SGI Ärztenschaft | SSMI Médecins P16-P29
SGInf | SSInf  P18; P29-P99; P118
SGSH | SSSH P85-P115
SGNOR | SSMUS P30; P116; P117

Autorenverzeichnis | Index des auteurs 153-154
FM 01

A simplified Acute Physiology Score (SAPS II) below 60 underestimate hospital mortality of patients admitted for ST-elevation myocardial infarction.

D Radovanovic [1], P Erne [3], M Maggiorini [2]

[1] University of Zurich, Zurich, Switzerland
[2] University Hospital Zurich, Zurich, Switzerland
[3] Kantonsspital Luzern, Luzern, Switzerland

Aim

Acute ST-elevation myocardial infarction (STEMI) is a frequent diagnosis in the intensive care and intermediate care units. The hospital mortality of STEMI is low, but varies depending on associated complications. A Simplified Acute Physiology Score (SAPS II) was developed and validated for critically ill surgical and medical patients, however little is known about its ability to predict outcome in patients admitted for STEMI.

Methods

We evaluated the applicability of SAPS II in 3450 STEMI patients enrolled in the AMIS Plus Registry between 2005 and 2014. In-hospital mortality was analysed using a multivariate logistic regression model.

Results

The patients who died in hospital had significantly higher SAPS II scores of 58.6 (±24) (median 38.0, IQR 27, 59) compared to the survivors’ scores of 23.7 (±14) (median 21, IQR 15, 27) (p<0.001). For SAPS II scores between 30 and 60, the crude in hospital mortality was higher than predicted but for SAPS II scores above 60 the predicted mortality was higher than the crude mortality (Figure 1). After adjusting for age and gender, each one point increase of SAPS II increased mortality by 8% (OR 1.08 (95%CI 1.07-1.09; p<0.001). Of our patients population 11% were resuscitated prior to admission, 3.6% had pulmonary oedema and 7.4% presented with cardiogenic shock. Almost half of the patients (48%) had outcome relevant comorbidities: 16.4% had diabetes mellitus, 13.3% a prior MI, 5.4% moderate to severe renal disease, 5% cancer, 4.8% chronic lung disease and 1.9% had heart failure.

Conclusion

The SAPS II score is a suitable tool for predicting mortality in STEMI patients. The higher crude mortality compared to predicted mortality in STEMI patients with lower SAPS II scores suggest the presence of a mortality relevant confounders not assessed by the SAPS II score within the first 24 hours after admission. Further study is needed to evaluate outcome relevant predictors in patients admitted with STEMI in the lower SAPS II score range.
Impact of a major cardiovascular surgical procedure on patients’ interests for advance care planning

F Gigon [1, 2], C Combescure [1], P Merlani [1, 3], B Ricou [1, 2]

[1] University Hospitals of Geneva, Geneva, Switzerland
[3] Ospedale Regionale di Lugano, Lugano, Switzerland, Lugano, Switzerland

Aims:
Advance directives (AD) and/or a health care surrogate decision maker (HCS) are potentially helpful for caregivers to respect the patients’ autonomy whenever their competence is affected. To investigate whether a planned major cardiovascular surgical procedure requiring intensive care impacts on patients’ interests for AD/HCS, as they may consider it as important or necessary because of the coming exposure to a potential life-threatening situation.

Methods:
Patients planned for major cardiovascular surgical procedure were randomized either to a group A (gA) met the day before and after ICU discharge, or to a group B (gB) met only after ICU discharge. At each meeting, they were interviewed according to the same questionnaire.

Results:
361 (89%) patients (of 405 eligible) were interviewed. Male: 256 (71%); age (mean±SD): 68±15 years. 95 (27%) had a last will, 77 (21%) a life insurance, 119 (33%) a funeral plan and 43 (12%) an organ donor card. 181 (50%) patients were randomized in the gA, 180 (50%) in the gB. Further results are given in the attached table (pdf document). After surgery, 164 (91%) of the gA patients remembered the interview - before, 90 (50%) what AD are and 61 (34%) could give a correct definition of AD.

Conclusion:
Few patients, even when scheduled for major surgical procedure, knew what AD or HCS are and even fewer had AD/HCS. Their incidence was much lower than other plans for the future (last will, life insurance, etc.). Undergoing major surgery requiring intensive care modified significantly the attitudes of patients towards AD/HCS, decreasing their interest. Further analyses regarding these patients’ reasons for or against AD/HCS will provide more information to understand the rarity of advance care planning.

Acknowledgment:
This study is sustained by the FNRS (CR3113_127135/1)
Outcome among patients hospitalized for acute coronary syndromes on a Swiss ICU

A Müller [1], D Meyer [1], E.-M. Kleinert [1], D Radovanovic [2], M Maggiorini [1]

[1] 1Medical Intensive Care Unit, University Hospital Zurich, Zurich, Switzerland
[2] 2AMIS PLUS Data Centre, Institute of Social and Preventive Medicine, University of Zurich, Zurich, Switzerland

Aim:
Insight from the National AMIS PLUS Registry 2013/2014. Acute coronary syndromes (ACS) are a common cause of intensive care unit (ICU) admission. The aim of this study was to evaluate the all-cause mortality, the main causes of death and the associated complications among patients admitted to an ICU compared to patients hospitalized on intermediate care units or general wards due to ACS.

Methods:
In our study we analysed data of AMIS Plus Registry patients with ACS (STEMI / NSTEMI) admitted to institutions with continuous (24 hour /7d) cardiac catheterization facilities (A-hospitals) and a cardiac surgery department between January 1, 2013 and December 31, 2014. For our analyses we compared patients admitted to an intensive care unit (ICU) to those admitted in general wards or intermediate care unit (IMC) of the same hospitals. The primary outcome was all-cause mortality. Secondary outcome measures were the rates of in-hospital major adverse events and the main causes of death.

Results:
In the predefined time period, 2020 ACS patients with complete data sets were enrolled in the AMIS Plus Registry. 1270 patients (62.8 %) of which were treated on an ICU. The median SAPS II was 25 (IRQ 18-42). The all-cause mortality was 9.1 % in ICU-patients vs. 2.4 % in non-ICU patients (p< 0.01), the mortality among ICU patients with STEMI being 9.2 % vs. 3.1 %, (p< 0.001) and NSTEMI 9.1 % vs. 1.7 %, (p<0.001), respectively. The mortality among ICU patients admitted for STEMI or NSTEMI were similar (9.2 % vs. 9.1 %), whereas it was lower in those with NSTEMI in general wards or IMC. ICU patients had more in-hospital complications such as post-admission onset of cardiogenic shock (6.5 % vs. 0.3 %, p<0.001), cerebrovascular events (2.0 % vs. 0.3 %, p< 0.001), acute renal failure (5.4 % vs. 0.5 %, p<0.001) and SIRS/Sepsis/MOF ( 3.9 % vs. 0.4 %, p<0.001). The main causes of death were significantly different between the two groups. Patients admitted to an ICU died mainly of pump failure (31%) or hypoxic encephalopathy (31%) mainly due to out of hospital reanimation.

Conclusion:
Among Swiss institutions with continuous (24 hour /7d) cardiac catheterization facilities and a cardiac surgery department, patients admitted to an ICU compared to those treated in ward or IMC are at a high risk of death. This is mainly
Low-Dose Acetylsalicylic Acid Treatment and Impact on Short-Term Mortality in Staphylococcus aureus Bloodstream Infection. A Propensity Score-Matched Case-Control Study.

M Osthoff [1], J Sidler [1], B Lakatos [1], R Frei [1], M Dangel [1], M Weisser [1], M Battegay [1], AF Widmer [1]

[1] Universitätsspital Basel, Basel, Switzerland

Aim:
Staphylococcus aureus bloodstream infection (BSI) is associated with considerable morbidity and mortality. Low-dose acetylsalicylic acid (ASA) modulates host inflammatory pathways in sepsis. In addition, experimental models suggest a direct antistaphylococcal effect but evidence from human studies is scarce. We aimed to estimate the effect of low-dose ASA therapy on mortality in BSIs caused by S. aureus compared to BSIs caused by Escherichia coli.

Methods:
This was a retrospective, propensity score-matched, case-control study performed at the University Hospital Basel based on observational data from 838 and 602 episodes of S. aureus and E. coli BSI, respectively. 30-day all-cause mortality and inflammatory markers were analyzed in a total of 296 propensity score-matched S. aureus BSI and 268 E. coli BSI patients, respectively (1:1 match of low-dose ASA users and non-users). Censored survival analyses were performed using bivariate comparison of Kaplan Meier curves (log rank test) or a time-dependent cox-regression model with stepwise adjustment for confounding variables.

Results:
S. aureus BSI cases (n=148) and controls (n=148) were equally matched for relevant confounders except treatment with statins which significantly correlated with low-dose ASA use (r = 0.46, P < 0.0001). At day 30, 12.8% of S. aureus BSI cases and 27.0% of controls had died (hazard ratio (HR), 0.43; P = 0.002, Figure 1). Low-dose ASA use was associated with a reduced 30-day all-cause mortality in multivariate analysis (HR, 0.48; 95% confidence interval (CI), 0.27–0.86; P = 0.01). There were no significant differences in inflammatory markers at BSI onset and on subsequent days two and seven. In contrast, low-dose ASA use was not associated with the primary endpoint in E. coli BSI patients (HR, 0.78; 95% CI 0.40–1.55; P = 0.8).

Conclusions:
Low-dose ASA at the time of BSI was associated with a lower short-term mortality only in patients with S. aureus BSI, which might indicate a pathogen specific effect of low-dose ASA in sepsis. This study provides evidence to justify the effort of a randomized-controlled trial of early low-dose ASA therapy in patients with S. aureus BSI.
Transfert de la voie "fast-track" (Notfallpraxis) au service des urgences: qui et pourquoi.

M Lepori [1], I Jermini-Gianinazzi [2], R Spinelli [2]

[1] Ente ospedaliero cantonale, Bellinzona, Switzerland
[2] Emergenze e pronto soccorso, Bellinzona, Switzerland

Background:
Pour réduire les temps d'attente et soulager son service des Urgences, l'Hôpital de Bellinzona à ouvert en 2012 une consultation ambulatoire, gérée par des médecins hospitaliers et des médecins de famille, destinée aux patients moins graves qui se présentent spontanément aux urgences. Ce modèle de prise en charge est inspiré par le concept de Notfallpraxis, actif depuis plusieurs années dans d'autres Cantons. Après avoir subi un triage infirmier, selon l'échelle SETS (Swiss Emergency Triage Scale), les patients éligibles selon un protocole spécifique sont adressées à cette consultation. Si, après la première visite médicale, la situation s'avère trop grave pour y être gérée, les patients sont réorientés vers le service des urgences.

Aim:
But de l'étude était de moniter le taux de retour aux urgences pour vérifier de la pertinence du protocole de triage adopté

Methodology:
Nous avons étudié de manière prospective sur une période de trois mois, le nombre de patients adressés à la consultation ambulatoire et ensuite réorientés aux urgences, ainsi que les raisons de leur retour.

Results:
Durant la période étudiée 5690 pts ont subi un triage aux urgences dont 1290 (21.7%) ont été orientés à la consultations ambulatoire. Seulement 14 (1.1%) ont dû faire retour aux urgences. Parmi eux 11 pts avaient un grade 3 de l'échelle SETS e 3 un grade 4 ; 4 pts avaient des symptômes respiratoires, 8 un problème abdominale et 2 une pathologie musculo-squelettique. Pour tous ces pts. la raison du retour aux urgences était la nécessité de procéder à un hospitalisation. 10 pts ont été hospitalisés dans un service de médecine, 1 en médecine intensive e 3 ont été opérés avant une hospitalisation en chirurgie.

Conclusion:
Le faible taux de retour aux urgence témoigne de la pertinence du protocole de triage utilisé, basé sur l'échelle SETS, pour déterminer quelles patients peuvent être adressé à une consultation ambulatoire. Le retour aux urgences semble être plus fréquents pour les patients avec des douleurs abdominales comme symptôme principal à l'admission.
HIV-1 Transmission During Recent Infection and During Treatment Interruptions are Major Drivers of New Infections in the Swiss HIV Cohort Study (SHCS)

A Marzel [1, 2], M Shilaih [1, 2], WL Yang [1, 2], J Böni [2], S Yerly [3], T Klimkait [4], V Aubert [5], DL Braun [1, 2], A Calmy [6], H Furrer [7], M Cavassini [8], M Battegay [9], P Vernazza [10], E Bernasconi [11], HF Günthard [1, 2], RD Kouyouos [1, 2], SHCS Swiss HIV Cohort Study (SHCS) [12]

[1] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, University of Zurich, Zurich, Switzerland
[2] Institute of Medical Virology, Swiss National Center for Retroviruses, Zurich, Switzerland
[3] Geneva University Hospital, Laboratory of Virology, Geneva, Switzerland
[4] University of Basel, Molecular Virology, Department of Biomedicine–Petersplatz, Basel, Switzerland
[5] University Hospital Lausanne, Division of Immunology and Allergy, Lausanne, Switzerland
[6] Division of Infectious Diseases, Geneva University Hospital, Geneva, Switzerland
[7] Department of Infectious Diseases, Bern University Hospital and University of Bern, Bern, Switzerland
[8] Service of Infectious Diseases, Lausanne University Hospital, Lausanne, Switzerland
[9] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Basel, Basel, Switzerland
[10] Division of Infectious Diseases, Cantonal Hospital St. Gallen, St. Gallen, Switzerland
[11] Division of Infectious Diseases, Regional Hospital Lugano, Lugano, Switzerland
[12] The Swiss HIV Cohort Study, Zurich, Switzerland

Background:
Limiting the fraction of transmissions which occurs during recent HIV infection is essential for the success of Treatment-as-Prevention as an HIV "Endgame" strategy, because many recently infected patients are yet unaware of their HIV serostatus and thus remain untreated and infectious. The aims of this study were: (i) Determining the fraction and the risk factors associated with HIV transmissions during early infection. (ii) To examine transmission in relation to time of antiretroviral therapy initiation.

Methods and Findings:
A phylogenetic tree was constructed with 19,604 Swiss sequences and 90,994 non-Swiss background sequences. Swiss transmission pairs were identified using 104 combinations of genetic distance (1%-2.5%) and bootstrap (50%-100%) thresholds, to examine the effect of those criteria. Monophyletic pairs were classified as recent (<6 or <12 months post seroconversion) or chronic transmission based on the time interval between the estimated seroconversion dates. Logistic regression with adjustment for clinical and demographic characteristics was used to identify risk factors associated with having transmitted during recent or chronic infection. Seroconversion dates could be estimated for 4,079 patients on the phylogeny, which comprised between 64 (distance 1%, bootstrap 100%) to 342 transmission pairs (distance 2.5%, bootstrap 50%). We found that, 43.1% (range 41%-58%) of the transmissions occurred during the first year of infection. Stricter phylogenetic definition of transmission pairs was associated with higher recent transmission fraction. Chronic phase viral load area under the curve (AUC) (adjusted-OR 3.76, 95% CI 1.74-8.09) and time-to-ART-start (adjusted-OR 1.37/year, 95% CI 1.07-1.76) were associated with chronic-phase transmission as opposed to recent transmission. Importantly, at least 16% of the chronic-phase transmission events occurred after the transmitter had interrupted ART. The main limitation of this study is that the phylogenetic linkage between the transmission pairs is probabilistic and depends on the sampling density of the target population.

Conclusions:
We demonstrate a very high fraction of transmission during recent HIV infection but also chronic transmission after interruption of ART in Switzerland. Both represent key challenges for Treatment as Prevention and under line the importance of early HIV diagnosis and of early and continuous treatment.
Modelling the Impact of Deferring HCV Treatment on Liver-Related Events in HIV+ Patients

C Zahnd [1], L Salazar-Vizcaya [1], JP Dufour [2], B Müllhaupt [4], G Wandeler [1, 2, 3], R Kouyos [4], J Estill [1], B Bertisch [1, 5], A Rauch [2], O Keiser [1]

[1] University of Bern, Bern, Switzerland
[2] University Hospital of Bern, Bern, Switzerland
[3] University of Dakar, Dakar, Senegal
[4] University Hospital of Zurich, Zurich, Switzerland
[5] Cantonal Hospital of St Gallen, St Gallen, Switzerland

Background:
Successful treatment of HCV infections substantially reduces the risk of liver-related complications. However, cost considerations and the availability of better treatment options in the future often leads to the deferral of treatment of HCV infection in patients with limited liver fibrosis. In this study, we modelled the impact of different treatment strategies on liver fibrosis progression among HIV-infected patients with incident HCV infection.

Methods:
We developed an individual-based model of liver disease progression. We parameterized it with observed data on incident HCV infections among men who have sex with men from the Swiss HIV Cohort Study (SHCS) and with published data. We simulated patients from HCV infection through stages of liver disease: from fibrosis grade F0 to F4, decompensated cirrhosis, hepatocellular carcinoma and death. Liver disease progression was affected by age at HCV infection and alcohol consumption. Patients also progressed through the care cascade: they could be diagnosed, treated and succeed or fail treatment. We assumed treatment efficacy with Interferon (IFN)-free regimens was 90%. Successfully treated patients had a residual liver fibrosis progression of 0.1 times the rate of patients with detectable HCV. We compared liver-related events and duration of infectiousness (ie. detectable viral load) between the following strategies: treatment of all patients one month after diagnosis, one year after diagnosis or as they reach F2, F3 or F4.

Results:
Delaying treatment until 1 year after diagnosis or until F2, F3 or F4 led to 3, 16, 65 and 203 additional cases of liver-related deaths per 1000 HCV infections as compared with treating all patients one month after diagnosis. The average time people were infectious increased from 5 years with early (one month after diagnosis) to 21 years with late (F4) treatment (Figure).

Conclusions:
Our model suggests that timely treatment of HCV infection is important: Patients can progress to end-stage liver disease after HCV clearance if treatment is delayed until later stages of liver disease due to imperfect treatment responses and residual fibrosis progression in HIV-infected patients. Delaying treatment also increases the risk of HCV transmission: the average time during which patients are infectious is four times higher if patients are treated in F4 than if they are treated one month after diagnosis.
Are there really breakthrough tick borne encephalitides despite vaccination?

M Crisinel [1], E Alpeter [2], P Meylan [1]

[1] CHUV, Lausanne, Switzerland [2] FOPH, Bern, Switzerland

Aim:
Tick borne encephalitis virus (TBEV) is a growing cause of encephalitis in Switzerland. With enlarging endemic foci, and the availability of highly immunogenic vaccines, the recommendation has been made to vaccinate all residents of endemic areas. Cases brought to our attention and the literature suggest that breakthrough TBEV encephalitis may occur despite vaccination (Rydgard Andersson et al, Vaccine, 2010;28:2827). In an attempt to assess the incidence of such cases in Switzerland, we retrieved from the mandatory case declaration system of the Federal Office of Public Health (FOPH) cases of TBEV encephalitis with a history of complete vaccination from 2008 to 2013.

Methods:
Thirty four such cases were identified. For 21 of those, we could obtain the patients consent to retrieve their medical and laboratory data. We report on these cases. There were 16 males and 5 females, median age 66 (6-78). All patients had had at least 3 vaccine doses, one with an accelerated scheme, and 3 with a slower than recommended scheme. Two patients reported respectively 4 and 5 doses. The time lapse between the last dose and the encephalitis episode was > 5 years in 5 patients, 1-5 years in 12 patients and <1 year in 4 patients.

Results:
The diagnosis of TBEV encephalitis was based on serological data: for 9 patients we had access to paired acute/convalescent samples, results allowing to compute a titer ratio: of those, only 3 had a ratio >2, showing a significant rise of IgG titer. For 19 patients we had access to acute IgM data: qualitative data: positive (n=8), limit (n=2) and negative (n=1). In seven cases, we had access to quantitative IgM index data (from 0.8 to 10.3 fold positivity threshold), 5 of whom had >2 fold positivity threshold. There were no data from CSF serological or PCR testing. Out of these 21 cases, only 8 had relatively convincing evidence of recent TBEV infection (significant IgG rise (more than 2 fold)) and/or significant positive IgM acute index (>2x fold positivity threshold).

Conclusion:
In view of the fact that the cause of encephalitis remains unknown in about 50% of patients enrolled in studies including careful etiological agent studies, the diagnosis of TBEV cannot be made by exclusion of known causes. Hence, more than 50% of TBEV cases declared to FOPH are not supported by hard laboratory evidence. A more stringent definition of breakthrough TBEV encephalitis is required.
High frequency of prophylactic antibiotic and carbapenem use in hospitalised paediatric patients in Switzerland

C Kahlert [1, 2], C Berger [3], J Bielicki & Pediatric Infectious Disease Group of Switzerland (PIGS) [4, 5]

[1] Ostschweizer Kinderspital, Infektiologie und Spitalhygiene, St. Gallen, Switzerland
[3] Universitäts Kinderspital, Infektiologie und Spitalhygiene, Zürich, Switzerland
[4] Universitäts-Kinderspital, Infektiologie und Vakzinologie, Basel, Switzerland
[5] St George’s University, London, United Kingdom

Background:
Unnecessary prescribing of broad-spectrum antibiotics is regarded as a crucial factor in promoting the selection of multidrug resistant bacteria. There are very limited data on antimicrobial prescribing for hospitalised paediatric patients in Switzerland. This pilot project evaluated the use of antimicrobials given for prophylaxis of bacterial infections and carbapenems in these patients to identify areas, where a reduction might be feasible.

Method:
We conducted a multi-centre, hospital-wide antimicrobial use point prevalence survey (PPS) on a single day in March 2015. All neonates and children <18 years of age admitted at 8 am on the survey day were surveyed and detailed data on antimicrobial prescriptions captured from patients with at least one such active prescription. The main outcome measure was identification of reasons for the prescription of prophylactic antibiotics and/or carbapenems.

Results:
The PPS included 7 Swiss hospitals with participation of all tertiary centres. There were 558 inpatients on the day of survey. In total 178 (32%) patients were prescribed 258 antimicrobials, of which 92% were antibacterials. Of these, 76% (159/237) were therapeutic prescriptions, with suspected sepsis in 43/112 patients being the most common single therapeutic indication. 8% of patients treated for infection received carbapenems (12/112) with febrile neutropenia (5/12) as the most common indication for this. 33% (78/237) of the prescriptions patients were for prophylaxis with a predominance of co-trimoxazole (51%), mostly prescribed for prophylaxis of urinary tract infection in children with vesicoureteral reflux. 4% (3/78) of all antibiotics given for prophylaxis were 3rd or 4th generation cephalosporins.

Conclusion:
In this multi-centre paediatric PPS the most frequent reason for prescribing antibiotics was prophylaxis, which in some instances included the use of broad-spectrum antibiotics. Surprisingly, a high usage of carbapenems was detected. Although the overall antimicrobial use is rather low compared to the literature, targeting the reduction of prophylactic use of antibiotics and optimising carbapenem prescribing in hospitalised paediatric patients is justified. Broad-spectrum antibiotics are generally not recommended as prophylactic agents.
Evaluation of surgical site infections (SSI) after colon surgery - comparing apples and oranges?

CA Fux [1, 1], M Rossi [1, 2], S. Kuster [1, 3], E Bucheli Laffer [1], M Schlegel [4]

[1] Kantonsspital Aarau, Aarau, Switzerland
[2] Kantonsspital Luzern, Luzern, Switzerland
[3] Universitätsspital Zürich, Zürich, Switzerland

Aim:
Swiss hospitals monitor SSI of selected interventions according to Swissnoso standards. Since 2014 results are published, stimulating discussions on comparability. SSI rates strongly depend on case complexity, potentially disadvantaging referral centers with a high proportion of polymorbid patients, combined and emergency interventions. We aimed at 1) Evaluating NNIS-adjustment (National Nosocomial Infections Surveillance) of SSI rates used by Swissnoso to ascertain comparability between hospitals 2) Discussing disregarded factors explaining potential differences. NNIS adjusts for (I) ASA-score (=patient morbidity) (II) contamination class and (III) duration of surgery.

Methods:
Compare SSI rates after colon surgery 2009-13 of the Kantonsspital Aarau (KSA) with swiss average and 2 non-university tertiary care hospitals with a similar profile (Luzern and St. Gallen).

Results:
SSI rates after colon surgery were 21.1% (95% CI 17.8-24.8) for KSA; 13.6% (13.1-14.1) on swiss average (p<0.001); and 21.0% (17.7-24.7) and 16.2% (13.9-18.8) for the 2 peers. Expected infection rates based on NNIS-adjusted swiss average were 15.1% (14.6-15.6), 13.8% (13.3-14.3) and 14.4% (13.9-14.9) for the 3 peers (p≤0.03 each). Contamination class III and IV were associated with infection rates of 18.4% (17.5-19.4) on swiss average vs. 26.9% (20.9-33.6), 27.4% (21.6-33.9) and 20.1% (16.2-24.4). The proportion of patients in NNIS category ≥2 was 33.3% on swiss average vs. 36.7%, 39.3% and 50.5% for the peers. Among the peers, infections correlated with emergency surgery (occurring in 31-42%) in 3, with night-shift (occurring in 16-20%) and combined interventions (occurring in 27-44%) in 2 centers. Comparing the 4 Swissnoso analysis periods between 06/10 and 09/14, the difference between the highest and lowest yearly infection rate was 2.5% on swiss average vs. 8.2%, 13.7% and 11.1% for the peers, with 95% confidence intervals per center ranging from 12.4-21.3%.

Conclusions:
SSI rates in 3 tertiary care non-university hospitals were consistently higher than swiss average – despite NNIS adaptation. Additional sensitivity analyses including the rates of emergency, nighttime and combined interventions (data collected, but currently not analysed), proportion of interventions included, hospital size, teaching hospital status should be considered in the Swissnoso/ANQ assessment. Also, important year-by-year changes due to low event rates warrant careful interpretation.
Hintergrund:
Der Begriff des Post intensive care syndrome (PICS) wird in der intensivmedizinischen Fachliteratur erst seit wenigen Jahren verwendet. In einer intensivmedizinischen Stakeholder-Konferenz der Society of Critical Care Medicine in den USA im Jahr 2012 definierte man PICS als „neue oder schlimmere Beeinträchtigungen im physischen, psychischen oder kognitiven Gesundheitszustand, die im Rahmen einer kritischen Erkrankung mit Aufenthalt auf der Intensivstation entstanden sind und nach dem Spitalaufenthalt fortbestehen. Der Begriff kann sich auf den Patienten beziehen (PICS) oder auch auf ein Familienmitglied (PICS-F)“. 

Fragenstellung: Welche pflegerischen Interventionen können einen Patient mit PICS bei der Rückkehr in den Alltag unterstützen?

Methoden:

Ergebnis:
PICS ist ein relativ neues, bisher wenig erforschtes Thema. Viele Interventionen finden präventiv im Rahmen des Aufenthaltes auf der Intensivstation statt. Im Rahmen der Fallstudie konnten anhand des Leit-Themas PICS und dem CFAM/CFIM zahlreiche Themen aufgedeckt werden, die den Patient nachhaltig beeinträchtigen und insgesamt 11 hilfreiche Interventionen dazu angeboten werden.

Schlussfolgerung:
Die im Rahmen der Fallstudie und der Literaturrecherche gewonnenen Erkenntnisse zeigen, dass PICS ein relevantes und relativ neues Thema im Bereich der Intensivpflege ist. Es ist mehr Forschung in diesem Bereich nötig, um herauszufinden, wie Risikopatienten besser identifiziert werden können und um aufzuzeigen, welche Interventionen in der Zeit nach dem Intensivaufenthalt sinnvoll und wirksam sind.
Implementierung des Passy – Muir Sprechventils auf der Intensivstation – erste Resultate und Erfahrungen aus einem multiprofessionellen Praxisentwicklungsprojekt

M. R. Fröhlich [1], H. Boksberger [1], C. Barfuss - Schneider [1], M. Roch [1]

[1] UniversitätsSpital Zürich, Zürich, Switzerland

Auszugsarbeitsstätte:

Zielstellung:
Systematische und zielgerichtete Implementierung des PMVs auf der Intensivstation für Viszeral-, Thorax- und Transplantationschirurgie zur Verbesserung der Patientensituation in Bezug auf verbale Kommunikation, individuelles Wohlbefinden und Minderung der durch die Trachealkanüle bedingten Effekte auf die pharyngo – laryngeale Funktion.

Methodik:

Erste Resultate:

Schlussfolgerungen:
Durch die koordinierte und zielgerichtete Zusammenarbeit der Berufsgruppen und die Vernetzung mit anderen Informationsstellen inner- und ausserhalb des USZ konnten die anfänglichen, vielfältigen Herausforderungen erfolgreich bewältigt werden. Die Motivation aller Beteiligten war die Aussicht auf eine verbesserte Kommunikation mit tracheotomierten Intensivpatienten, ihr gesteigertes Wohlbefinden und das Entgegenwirken auf die durch die Trachealkanüle beeinflusste Atem- und Schluckfunktion. Die geplante Evaluation nach der klinischen Testphase wird die Anwendung und Wirksamkeit des PMV überprüfen, um über die Nutzung auf allen Intensivabteilungen zu entscheiden.

Literaturverzeichnis


Universitätsspital Zürich, "Professionelle Pflege auf der Intensivstation", Management, Fach und Bildung (Intensivmedizin), 16.01.2014.
Einleitung:
Zwischen 5-10% der Patienten, entwickeln im Verlauf ihres Aufenthaltes auf der Intensivstation eine Chronic critical illness. Eine lange Abhängigkeit von der Beatmung, funktionale sowie kognitive Beeinträchtigung und eine hohe Mortalität sind wesentliche Merkmale dieser Patientengruppe, welche das interprofessionelle Team vor grosse Herausforderungen stellen. Die interprofessionelle Visite bildet einen idealen Rahmen, um Fachwissen, Erfahrungen und Beobachtungen der beteiligten Disziplinen zusammenzuführen und dadurch den Behandlungsplan des Patienten optimal zu gestalten.

Ziel:
Einführung und Etablierung einer interprofessionellen Visite auf der Intensivstation. Methode Ein interprofessionelles Praxisentwicklungsprojekt.

Ergebnisse:
Multiprofessionelles Praxisentwicklungsprojekt: Entwicklung eines pflegerischen Gesprächsleitfadens zur Betreuung von Patienten mit Ventricular Assist Device (VAD) und ihren Angehörigen auf der Intensivstation

I. Weber [1], C. Karde [1], G. Brenner [1], M. Fröhlich [1]

[1] Universitätsspital, Zürich, Switzerland

Hintergrund:
Auf der Intensivstation für Herz- und Gefässchirurgie am UniversitätsSpital Zürich werden Patienten nach Implantation eines Herzunterstützungssystem der Herzkammer (Ventricular Assist Device = VAD) postoperativ versorgt. Durch die notfallmässige Einlage wird die Hälfte von ihnen damit unmittelbar auf der Intensivstation konfrontiert. Patienten und Angehörige sind auf die neue Situation nicht vorbereitet und emotional sehr belastet. Intensivpflegende sind gefordert, individuelle Betreuungsbedürfnisse zu erfragen, sowie gezielt Informationen und Unterstützung anzubieten.

Ziel:
Entwicklung eines pflegerischen Gesprächsleitfadens zur individuellen und bedürfnisorientierten Information und professionellen Unterstützung von Patienten und Angehörigen zur Reduktion emotionaler Belastung und Angst.

Methoden:

Erste Ergebnisse:

Schlussfolgerung:

Literaturverzeichnis


UniversitätsSpital Zürich, “Professionelle Pflege auf der Intensivstation “, Management, Fach und Bildung (Intensivmedizin), 16.01.2014.
Emergence Delirium nach Herzkatheteruntersuchungen – Pflegerische Schwerpunkte

Y Kröger [1], D Schmid [1]

[1] University Children’s Hospital, Zürich, Switzerland

Ausgangslage:

Methode:
Eine Literaturrecherche wurde durchgeführt und Guidelines für die Intensivpflegestation erarbeitet. Danach erfolgten Schulung des Pflege- und Ärzteteams zum Messinstrument Pediatric Anesthesia Emergence Delirium (PAED) Scale und dem therapeutischen Algorithmus.

Ergebnisse:

Schlussfolgerungen:
Ein nicht zu schnelles, schmerzfreies Erwachen nach einer Narkose in ruhiger und nicht zu heller Umgebung kann ein Auftreten des Emergence Delir reduzieren. Wichtig ist das Emergence Delir frühzeitig zu erkennen, das Kind zunächst vor Selbstverletzungen und Dislokationen von notwendigen Installationen zu schützen sowie Schmerzen unverzüglich zu behandeln. Die erfolgreichste therapeutische Intervention ist der Einbezug von im Voraus gut informierten Eltern.
**Vortrag Diplomarbeit NDS Intensivpflege**  
**Alarm Fatigue – the „crying wolf“ Syndrome**

H Willner [1]

[1] Universitätsspital Basel, Basel, Switzerland

**Aim:**  

**Methods:**  
Unsystematische Literaturarbeit.

**Results:**  

**Conclusions:**  
Es zeigt sich, dass zu der Problematik der Alarm Fatigue noch erheblicher Forschungsbedarf besteht. Aktuell wird der Erstellung eines individuellen Alarmmanagements und der kontinuierlichen Personalschulung ein hoher Stellenwert beigemessen, um der Problematik der Alarm Fatigue zu begegnen und damit die Patientensicherheit zu verbessern.

**Acknowledgments:**  
Für die Unterstützung bei der Erstellung der Diplomarbeit gebührt folgenden Personen mein ganz besonderer Dank: Ursi Barandun Schäfer, Pflegeexpertin OIB; Dr. Ulrike Fessel-Denk; Dr. Roman Denk
Vortrag Diplomarbeit NDS Intensivpflege
„Sehen heisst glauben“ Anwesenheit von Angehörigen während einer kardiopulmonalen Reanimation

K. Weber [1]

[1] Kinderspital Zürich, Zürich, Switzerland

Hintergrund:
Auf der pädiatrischen Intensivstation sind die Eltern häufig in der Gegenwart ihrer Kinder. Sie werden in die Pflege instruiert und kennen ihr Kind bestens. Doch bei Reanimationssituationen stellt sich häufig die Frage, ob die Eltern ebenfalls im Behandlungsraum bleiben dürfen.

Fragestellung:
Welche Bedeutung hat die Anwesenheit für Angehörige während einer kardiopulmonalen Reanimationssituation für ihren Verarbeitungsprozess? Wie können Pflegenden die Angehörigen in dieser Situation optimal unterstützen und begleiten?

Methode:

Ergebnisse:
Während es in angloamerikanischen Ländern seit über 30 Jahren üblich ist, bei der Reanimation seiner Liebsten dabei zu sein, tut man sich mit der Einführung in unseren Breitengeraden, aber auch in Afrika und Asien schwer (1,2). Aufgrund paternalistischer Einstellungen wird die Anwesenheit häufig verweigert (3). Die Gründe beziehen sich einerseits auf die Angehörigen, die man schützen will, andererseits möchte das Behandlungsteam nicht gestört werden (4,5). Die meisten Angehörigen schätzen es aber, die Wahl zu haben bei der Reanimation ihrer Liebsten dabei zu sein oder draussen zu warten (3). Es werden in der Literatur viele positive Aspekte der Angehörigenanwesenheit beschrieben. Die wichtigsten sind: Der Patient muss nicht alleine sterben, Angehörige haben gesehen, dass alles Mögliche, getan wurde und der Tod kann besser begriffen werden. Es kann positive Auswirkungen auf den Verarbeitungsprozess haben, da die Verleugnungsphase kürzer ist (5). In der Studie von Belanger et al. (1997) geben 100 % der Befragten an, dank ihrer Anwesenheit mit der Trauer besser umgehen zu können (6). Zu Bedenken sind auch mögliche negative Auswirkungen. Dabei zu sein kann für die Angehörigen ein traumatisches Erlebnis sein, mit dementsprechend negativen Folgen (3). Es ist umso wichtiger, dass während dieser Zeit eine Betreuungsperson für sie da ist (7). Sie muss die Angehörigen auf die Situation vorbereiten und ihnen Sicherheit und Trost spenden. Es ist wichtig, dass die Betreuungsperson sich ihrer Aufgabe gewachsen fühlt und diese gewissenhaft durchführt.

Schlussfolgerung:
Die Anwesenheit Angehöriger hat positive und negative Aspekte. Wichtiger ist jedoch, das Behandlungsteam dafür zu sensibilisieren und mit Hilfe von Merkblättern und Weiterbildungen zu schulen (8).

Danksagung

Quellen
7. Böhmer, Schneider & Wolfe. Taschenatlas Notfall & Rettungsmedizin 2010:4
8. Von Arx. Kinderspital Zürich 2008:1

Quellen:
Netty F. et al., Kind und Spital, Newsletter, 2012:Oktober:2
Objective:
Catheter-associated urinary tract infections (CAUTI) are the most common nosocomial infections. We used a multi-modal interdisciplinary intervention to reduce CAUTI with three key elements: stringent indications for UC insertion, shifting the task to decide on urinary catheter (UC) removal from physicians to nurses and an automatic electronic alert for catheter removal as key elements.

Methods:
Non-randomized intervention study. Patients and methods: We included all patients with a newly inserted UC at any time during hospitalization. The 13-months study comprised a baseline and 2 intervention phases. Clinical endpoints included the number of catheter days per 1’000 hospital days, the duration of catheterization as well as the rates of inserted catheters and CAUTI. Process endpoints compared changes in attitudes and knowledge about UC and CAUTI between physicians and nurses.

Results:
Overall, 9’306 patients were screened for newly inserted UC, of them 513 (5.5%) were included. In these 513 patients, the number of catheter days was reduced from 88.5 to 31.9 days per 1’000 hospital days (p<0.001) with a mean and median reduction of the duration of catheterization from 7.2 to 3.8 and 5 to 3 days, respectively (p<0.001). The number of overall CAUTI was reduced with a risk ratio of 0.31 (95% CI 0.19-0.49) per 1’000 hospital days and of 0.35 (95% CI 0.21-0.57) per 1’000 hospital admissions. Significant changes in task-shifting from physicians to nurses and in indications for UC were documented.

Conclusions:
Behavioral changes including the empowerment of nurses resulted in significant reductions in the rate and duration of urinary catheterization as well as CAUTI.
Background:
The CDC recommendations on Isolation Precautions are intended to prevent transmission of infectious agents, yet healthcare worker (HCW) compliance with such guidelines remains suboptimal. This may be due to ambiguity regarding the required precautions or cognitive overload of HCWs. In response to the challenge of changing HCW behaviour, increasing attention should be paid to the role of engineering controls and facility design that incorporate human factors design elements.

Aims:
We employed a participatory design approach to generate an Isolation Precaution Signage System. The goal was to increase HCW adherence to Isolation Precautions by introducing visual cues, serving as a cognitive aid at the point of care and removing ambiguity regarding which precautions are necessary. Different exclusive

Methods:
Front-end HCWs were actively involved throughout the participatory design process. Interviews and observations were conducted to identify barriers to use of the current signage and to establish design requirements. This was followed by ideation design workshops and development of prototypes, which then underwent iterative cycles of evaluation. Graphical symbols were also developed and tested for comprehensibility according to ISO 9186 methodology. HCWs were purposefully sampled for each stage of the project to include a representative sample of potential system users.

Results:
A comprehensive list of design requirements was generated. Front-end analysis revealed several barriers to use of the current signage system such as unclear target audience, low signal-to-noise ratio, insufficient information, and ambiguity regarding the applicable precautions. The project ultimately resulted in a collection of validated, comprehensible symbols and three Isolation Precaution signs for the categories of Contact, Droplet, and Airborne Isolation, as well as the identification of several systems-level solutions for work re-organization to improve compliance with Isolation Precautions.

Conclusions:
The introduction of visual cues in the form of signage offers a promising opportunity to make guidelines available directly at the frontline. Anecdotal evidence based on observations and interviews with HCW have shown that the current solution is superior to previous isolation signage. The effect of this new signage on HCW compliance with Isolation Precautions is currently being further quantitatively examined through a controlled experimental study.
Ausgangslage:

Methoden:

Resultate:

Konklusion:
SGSH Session I: Implementation/Innovation
Innovation GuckBox - besseren Händehygienetechnik durch intensiviertes Feedback

M Dunic (1); L Clack (1); R Sommerstein (2); H Sax (1)

(1) Klinik für Infektiologie und Spitalhygiene, Universitätsspital Zürich,
(2) Universitätsklinik für Infektiologie, Inselspital Bern

**Hintergrund**

**Zielsetzung**
Die Innovation soll folgenden Anforderungen genügen:

1. Schulungen und Motivation
   - Erhöhte Nachhaltigkeit durch interaktives Erlebnis mit emotionaler Qualität
   - Erhöhte Glaubhaftigkeit durch unmittelbares numerisches Feedback
   - Erhöhter Effekt durch sozialen Norm-Aktivierung
   - Ausbildung von mentalen Modellen durch Visualisierung einer sonst unsichtbaren Qualität

2. Qualitätsmanagement
   - Anwendung als individueller und kollektiver Qualitätsindikator durch numerisches Ergebnis

3. Forschung
   - Anwendung als Forschungsinstrument

4. Die Innovation soll kostengünstig nachgebaut werden können

**Methode**
*Design Prozess*

*Use case*

**Fragestellung:** Quantitativ (als Forschungsinstrument): Auswirkung von Instruktion die hygienische Händedesinfektion nach ISO Norm EN1500? Qualitativ: Wie wird die Innovation von Benutzern beurteilt?

**Population und Setting:** Neue Mitarbeitende (Pflege, Ärzte, Hausdienst, Technischer Dienst) an Instruktionsveranstaltung am ersten Arbeitstag.

**Vorgehen:** Die Population wurde in Interventions- und Kontrollgruppe geteilt und getrennt angehalten, die Hände mit Hilfe eines Schautafel gemäss EN1500 Norm (Intervention), r. wie gewohnt korrekt zu desinfizieren ohne Anleitung (Kontrolle). Die relative Benetzungsläche von Handfläche rsp. Handrücken s. gesamte Handoberfläche wurde durch die Software ermittelt. Die Median von beider Gruppen wurde verglichen und mit Kuskal-Wallis auf Signifikanz geprüft. Zusätzlich wurden die Benetzung von Handfläche versus Handrücken verglichen und mittels Wilcoxon signed-rank test geprüft. P-Werte <.05 wurden als signifikant angesehen.

Zusätzlich wurde die Reaktionen der Benutzer qualitativ erfasst und beschrieben.

**Resultate**
*Beschreibung der Innovation*
Die aktuelle Version der Innovation besteht aus einer Box mit UV-Licht (UV-Box), einer Webcam, einem Laptop Computer mit Windows 7 und einer spezifischen open-access Software und einem digitalen Projektionsgerät (Beamer).
**Ablauf der Benutzung**

Der Mitarbeitende benutzt für eine Händehygiene eine mit fluoreszierender Flüssigkeit versetzte Händedesinfektionsmittel durch und hält dann ihre Hände in die UV-Box. Durch das UV-Licht wird die Benetzungsfäche von Handrücken und -fläche sichtbar und von der Webcam erfasst. Die spezifische Software wertet das Verhältnis der benetzten zur gesamten Handfläche aus. Das Bild als auch der Anteil der benetzten Fläche als numerischer Prozentwert wird durch den Beamer grossflächig auf eine geeignete Leinwand projiziert.

**Quantitative Resultate Use Case**

Insgesamt nahmen 60 Mitarbeiter am Use Case teil, 30 pro Gruppe. Gesamthaft war die Handfläche mit im Median 100% besser benetzt als der Handrücken mit 89% (p=0.0015). Die weiteren detaillierten Resultate pro Gruppe erscheinen in der Tabelle.

<table>
<thead>
<tr>
<th>Gesamtpopulation</th>
<th>Intervention</th>
<th>Kontrolle</th>
<th>p-Wert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handfläche</td>
<td>Median % (range)</td>
<td>Median % (range)</td>
<td>Median % (range)</td>
</tr>
<tr>
<td>100 (21-100)</td>
<td>100 (74-100)</td>
<td>91 (21-100)</td>
<td>.0085</td>
</tr>
<tr>
<td>Handrücken</td>
<td>89 (25-100)</td>
<td>99 (49-100)</td>
<td>81 (25-100)</td>
</tr>
<tr>
<td>Gesamte Handoberfläche</td>
<td>92 (61-100)</td>
<td>97 (62-100)</td>
<td>82 (61-100)</td>
</tr>
</tbody>
</table>

**Qualitative Beurteilung Use Case**

Die Teilnehmer waren auf unser Projekt sehr neugierig, haben diesbezüglich viele Fragen gestellt und mit Freude mitgemacht. Die Stimmung war entspannt, zudem ergaben sich interaktive Gespräche und die Händehygiene als Thema war sehr präsent. Positiv beurteilt wurde einerseits die Gelegenheit zur Überprüfung der Händehygiene, als auch das unmittelbare optische und numerische Feedback. Die Messung dauerte pro Person nur einige Minuten; auch dies wurde als positiv erwähnt. Es gab keine Funktionsstörungen, die Position der Hände war jedoch kritisch und muss noch besser hardwareseitig noch verbessert werden.

**Schlussfolgerungen**


(Partiel unterstellt durch Swiss National Science Foundation Grant 32003B_149474)
Introduction:
In most cases, hands of caregivers are the vehicle for the transmission of germs to the patient. Therefore, it is crucial to help medical staff and healthcare workers acquiring the skills necessary for optimal hand hygiene (HH) in order to ensure quality of care and patient safety.

Objective:
To give the caregivers a training tool well adapted to their needs and integrated into a blended learning (class and distance). Method The Hygiene Prevention and Infection Control (HPCI) Unit - Vaud, the Preventive Medicine Service of Center Hospital Universitary of Vaud (SMPH) in partnership with the collective of the Federation of Vaud Hospital, the Commission e-learning of University to Lausanne, the Center for Education and Audiovisual Communication, have developed an interactive training module of HH in 3 steps. Conception - Identification of the academic content - Development of a teaching strategy fitted to any learning styles - Selection of the interactive teaching resources Development - Development of academic learning content - Development of practical content (care situations cut out in various interactive e-lessons) - Tutorial construction (integration of multimedia elements and interactivity) Implementation - Module overview by infection control professionals in Vaud institutions - Module provision through training platforms (Moodle, MyTeacher) - The Module is freely accessible on the Internet Results After a brief theoretical reminder (common to all healthcare workers), the module content covers aspects of skills through simulation exercises. Care situations are specific for each category of professionals (doctors, nurses). Throughout the course, a knowledge assessment evaluates the benefits of training.

Conclusion:
The training module meets the predefined goals. This e-learning module broadens infection control class offer and is part of the five areas of the WHO multimodal HH strategy. This type of training, accessible at any time, allows the professional to become an actor of his learning and the institution can provide continuous training of his staff. The educational effectiveness will be evaluated after 9-12 months by a query filled up by the caregivers, by the participation rate, and by reality in practice (assessed during audits). A module adapted to the no-nursing healthcare workers is under development.
Ebola! Was nun? Herausforderungen beim Aufbau einer Isolationseinheit am UniversitätsSpital Zürich

G Brenner [1], R Sauer [1]

[1] UniversitätsSpital, Zürich, Switzerland

Hintergrund:

Ziel:
Aufbau einer geeigneten Infrastruktur am UniversitätsSpital Zürich sowie Erstellung eines Schulungskonzeptes für die Mitarbeiter zur Versorgung von Ebolapatienten.

Methode:

Ergebnisse:

Schlussfolgerung:
Differenzierung von Dekubitus und feuchtigkeitsassoziierten Hautveränderungen im Gesäßbereich: Eine pflegerische Herausforderung.

O. Rohrer [1], M. Stieger [1], MM. Jeitziner [1]

[1] Universitätsklinik für Intensivmedizin, Bern, Switzerland

Hintergrund:

Ziel:

Methode:
In einer pflegerischen Fachgruppe im Bereich Wundmanagement werden Expertenwissen und Erkenntnisse aus der Literatur regelmäßig aufbereitet und in Form von Schulungen und Praxisbegleitungen an die Pflegenden weiter vermittelt.

Resultat:

Schlussfolgerungen:

Literatur:
Gastrointestinale Motilitätsstörungen bei kritisch kranken Patienten und die nachhaltige Anwendung evidenz-basierter Massnahmen

MM. Jeitziner [1], B. Jenni [1], I. Warmuth [1], O. Rohrer [1]

[1] Universitätsklinik Insel, Bern, Switzerland

Hintergrund:

Ziele:
1. Ein Protokoll zu gastrointestinalem Motilitätsstörungen soll evaluiert werden und
2. Jene Faktoren sollen identifiziert werden, die eine nachhaltige Anwendung evidenzbasierter Protokolle beeinflussen.

Methode und Design:

Resultat:
Die Präsentation wird die Erkenntnisse der Evaluation vorstellen.

Schlussfolgerungen:

Referenz: Knowles S, McInnes E, Elliott D, Hard
Kinaesthetics: Förderung der Bewegungskompetenz im Intensivpflege-Alltag

S Hübsch [1], W Stehlin [1], S Woodtl [1]

[1] Universitätsspital Basel, Basel, Switzerland

Ziel:

Methode:
Vor mehr als 10 Jahren wurden auf beiden Intensivstationen Massnahmen getroffen, um das Konzept Kinaesthetics bekannt zu machen und dessen Umsetzung für die Bewegungszentürzung der Patienten/-innen zu nutzen: Grundkurse für alle Pflegefachpersonen des Teams, Aufbaukurse für etwa die Hälfte des Teams, Ausbildung mehrerer Tutoren aus den Teams. Seither findet alle 2-4 Wochen ein Kinaesthetics-Praxistag statt, an dem ein bis drei Tutoren/-innen und eine Trainerin Stufe 2 die Teams darin unterstützen, Kinaesthetics im Alltag umzusetzen.

Resultate:

Schlussfolgerung:
Einleitung/ Ziel:

Methode:
Es wurde eine Literaturrecherche in den Datenbanken CINAHL und Pubmed der Jahre 2004 bis 2014 durchgeführt. Es wurde ausschliesslich Literatur berücksichtigt, die sich auf die Erwachsenenintensivbehandlung bezog und die sich mit der Lebensqualität nach der Intensivbehandlung und mögliche Interventionen befasst.

Ergebnisse:

Schlussfolgerung:
Es gibt zahlreiche Massnahmen, die schon auf der Intensivstation begon-nen werden können um die Spätfolgen zu reduzieren.

Literatur:
Unveröffentlichte Diplomarbeit von Evelyn Weidner, 2014, Lebensqualität kritisch kranker Patienten nach der Spitalentlassung
Kompetenzen und Anforderungen an Mitarbeitende einer Intermediate-Care-Station

Beatrice Jenni Moser, MNS; Marie-Madlen Jeitziner, MNS
Universitätsklinik für Intensivmedizin, Inselspital Bern

Hintergrund:

Ziel:
Prozessoptimierung durch die Entwicklung eines Einführungskonzepts mit Wissensangeboten und einem Evaluationstools sowie mit einem fachlichen Kompetenzkatalog.

Methode:
Mittels Projektmanagement haben 5 IMC-Experten in einem strukturierten Gruppenprozess Folgendes entwickelt: ein Einführungskonzept, Schulungsgrundlagen und einen Kompetenzkatalog. Führungs- und Fachpersonen haben die Inhalte validiert.

Resultate:

Schlussfolgerungen:
Tracheostoma: Wie Eltern lernen ihr Kind zu pflegen

L. Fenske [1]

[1] Ostschweizer Kinderspital, St. Gallen, Switzerland


Die Autorin stellte in der Diplomarbeit folgende Fragestellungen:
1. Was sind organisatorische Schwerpunkte, bis die Eltern die notwendige Selbstständigkeit in der Tracheostomapflege erlangen?
2. Wie gestalte ich den Lernprozess der Eltern in der Tracheostomapflege?


Postoperative Pflegeschwerpunkte nach Aufrichtespondylodese

J Rütsche [1]

[1] Ostschweizer Kinderspital, St. Gallen, Switzerland

**Hintergrund:**
Mit den Fragestellungen, was eine Aufrichtespondylodese ist und welches die postoperativen Pflegeschwerpunkte bei der Betreuung eines Kindes nach Aufrichtespondylodese auf der Intensivstation sind, wollte die Autorin folgende Ziele erreichen: Das Wissen über die Aufrichtespondylodese erweitern, um Patienten nach diesem Eingriff kompetent und sicher pflegen und betreuen zu können. Die Diplomarbeit soll dem Team als Nachschlagewerk zur Verfügung stehen und mittels einer Checkliste die Betreuung solcher Patienten vereinfachen.

**Methode:**

**Schlussfolgerungen:**

**Literatur:**
Rütsche, J., Diplomarbeit – Postoperative Pflegeschwerpunkte nach Aufrichtespondylodese, 2014
Elaboration d'un programme de formation destiné à des infirmiers référents pour la gestion pratique et la sécurisation de l'épuration extra rénale (EER)

P Machado [1, 1], J Garcia [1, 1], I Dubant [1, 1], S Denié [1, 1], B Tiquet [1, 1], A Fouque [1, 1], M Maus [1, 1], C Tschanz [1, 1], F Taalba [1, 1], H Ksouri [1, 1]

[1] hôpital fribourgeois, Fribourg, Switzerland

Introduction:
L'épuration extra rénale (EER) est une technique de suppléance, parmi les plus complexes et les plus invasives, utilisée aux soins intensifs (SI). La sécurisation de cette technique inclut la formation des équipes de soins à la gestion de l'interface patient-machine (abord vasculaire, gestion des alarmes) et l'établissement de procédures écrites servant de guide à l'utilisation de cette technique. Mais de nombreux incidents sont observés en pratique du fait de facteurs humains (implication variable des collaborateurs) et d'encadrement médico-infirmier. Du fait de l'introduction de l'anticoagulation régionale au citrate et les risques qui en découlent, nous avons formé un groupe référents en EER.

Méthode:
Constitution d'un groupe référents (8) dont 6 ont participé à la formation (8,5h). Les outils didactiques utilisés sont : e-learning, simulation procédurale (conception d'une circulation extra corporelle), cas cliniques. Validation du cursus par un test écrit (QCM >80% réponses correctes /60% du barème fédéral). Les référents sont autonomes dans l'organisation et la planification de la formation face à leurs pairs (atteindre >80% des experts EPD-ES SI).

Résultats:
4 indicateurs sont choisis pour démontrer la pertinence de ce programme de formation : 1/l'expertise des référents (score QCM) -aucun atteint les 80% mais d'après le barème fédéral 2 personne sont au-dessus des 60% ; 2/investissement des référents-12 sessions de formation (=12h) ; 3/taux de participation-85% des collaborateurs ; 4/taux de satisfaction des collaborateurs-85% réponses dont 100% recommandent la formation. Après la formation les cadres médico-infirmiers du service ont relevé : meilleure gestion de l'interface patient/machine (gestion des alarmes, détection des dysfonctions), diminution de la consommation des filtres, applications des recommandations de bonnes pratiques et sensibilisation sur le monitoring de la dose de dialyse.

Conclusion:
Cette méthode de travail est encourageante et facilement transférable pour les unités de SI. En effet, elle contribue à utiliser les evidence based practice (EBN, EBM), à réactualiser les protocoles et stimule l'interdisciplinarité. La formation d'un groupe référents permet d’améliorer la motivation et l’implication des collaborateurs.
Développement professionnel continu (DPC): mise en évidence des trajectoires des soignants dans une unité de soins intensifs (SI) ?

C Tschanz [1], I Dubant [1], G Jegou [1], M Maus [1], JF Menoud [1]

[1] HFR, Fribourg, Switzerland

Introduction:
La médecine intensive a considérablement évolué ces vingt dernières années et a recourt actuellement à des technologies très sophistiquées. Ceci demande aux soignants de mobiliser des connaissances et des compétences techniques et relationnelles de haut niveau. La formation EPD-ES SI permet dans un premier temps de répondre à ce besoin. Plus tard, le maintien des connaissances et des compétences varie d’un individu à l’autre et dépend de différents facteurs : autoformation / responsabilisation, exigences législatives et institutionnelles. C’est dans ce contexte que l’unité de SI de l’HFR a développé ce projet pour le développement professionnel continu des soignants.

Méthode:

Résultats:
Chaque collaborateur reçoit semestriellement un relevé de son DPC. Parallèlement, deux tableaux récapitulatifs (global/par catégorie) sont publiés pour rendre visible les différentes trajectoires. En 2014, le service comptabilise 1447.5 heures réparties ainsi : PS 175h, AP 65h, FT 653h, AR 64h, FE 504h. Ceci représente une moyenne de 16.4 heures / pers. Trajectoire individuelle : 0-5h 21.6% ; 6-10h 11.4% ; 11-20h 34% ; 21-30h 20.5% ; ≥30h 11.36%. Les collaborateurs qui comptabilisent le plus d’heures exercent une fonction d’encadrement et/ou de formation.

Conclusion:
Ce projet permet une vision globale du DPC et met en évidence les trajectoires individuelles. Celles-ci peuvent être utiles dans la planification et le développement de formations. Le recensement reste toutefois chronophage et la documentation individuelle dans un outil approprié semble opportune. La mise en visibilité du suivi a réussi à déclencher chez les collaborateurs l’envie de se former. Le développement professionnel continu joue un rôle primordial pour l’économie, la société et l’individu. La loi fédérale sur la formation continue tient compte de l’importance de l’apprentissage tout au long de la vie.
Encourager la mobilisation pour prévenir les complications liées à l’alitement prolongé.

A Marazzo [1], A Kocher [1]

[1] Hôpital du Jura, Delémont, Switzerland

Introduction:
Les effets délétères de l’alitement prolongé sont connus (1) et les données favorisant le lever précoce des patients atteints de maladies aiguës s’accumulent (2). Dans notre service, la mobilisation précoce se heurte à toute une série de difficultés et nous pensons que nos pratiques actuelles sont insuffisantes. Nous avons donc décidé de les étudier, de mettre sur pied un programme associant protocole pluridisciplinaire et cours de formation et finalement d’évaluer les résultats de ces actions.

Protocole:
Pour cette étude, le terme mobilisation est défini comme toute activité effectuée hors du lit, comme la position assise au fauteuil et la marche, indépendamment de l’aide nécessaire pour accomplir ces tâches. Dans une première phase nous récoltons chez tous les patients admis, et par horaire, le temps de mobilisation en minutes. Pour tous les patients sont, en outre, récoltées des données sur leurs diagnostic, la gravité de la maladie à l’admission (SAPS 2) et, pour chaque horaire de soins (8h) les défaitances d’organes (SOFA), la charge de travail infirmier pour le patient et pour le service (NEMS). Les équipements et les éléments qui peuvent potentiellement empêcher une mobilisation précoce (ordre médical, immobilisations nécessaires, …) sont également considérés. Parallèlement à cette récolte de données initiale, nous élaborons un protocole de soins et un programme de formation à l’intention du personnel médical et soignant. Les mêmes données seront récoltées suite à la période de formation et seront comparées à celles de la phase initiale. Afin d’évaluer la rétention des informations fournies, les récoltes de données seront répétées 6 mois et un an après la formation.

Résultats:
Les résultats de l’étude ne sont pas encore disponibles.

Références:
Etude sur l'anémie des patients aux soins intensifs de l'HNE-CDF

R Simon [1]

[1] HNE, La Chaux de Fonds, Switzerland

Contexte:
Selon la littérature, l'anémie est l'anomalie biologique la plus fréquente aux soins intensifs (SI). Elle résulte de la conjonction de plusieurs facteurs et notamment d'une part d'un état inflammatoire et d'autre part suite aux spoliations sanguines. L'anémie est responsable de la mise en place de mécanismes de compensation qui ont des conséquences directes sur le devenir des patients. Le traitement de l'anémie au sein de la communauté médicale fait encore l'objet de nombreux débats. Buts: Evaluer la variation du taux d'hémoglobine (Hb) au cours du séjour aux SI. Proposer des mesures pour tenter d'améliorer le taux d'Hb des patients à la sortie des SI.

Méthode:
Etude 1: Etude rétrospective de dossiers (patients de médecine ayant séjourné plus de 48h aux SI, ne présentant pas de saignement actif ou de suspicion de saignement actif, ni d'insuffisance rénale chronique, ni de maladie hématologique), effectuée par une seule infirmière relevant le sexe, l'âge, le motif d'admission, l'équipement, la durée de séjour, la variation du taux d'Hb et les transfusions sanguines. Etude 2: Etude prospective, par l'infirmier en charge du patient, relevant les prélèvements sanguins sur 24h, le site de prélèvement, les analyses demandées et la quantité de sang prélevé liée à la purge des cathéters.

Résultats:
Etude 1: 62 patients (39♂, 23♀, âge moyen 66 ans). ♂: Hb d'entrée 137 g/l (36% Hb ≤ 130 g/l); Hb de sortie 121 g/l (64% Hb ≤ 130 g/l). ♀: Hb d'entrée 131 g/l (35% Hb ≤ 120 g/l); Hb de sortie 110 g/l (74% Hb ≤ 120 g/l). Variation quotidienne du taux d'Hb: baisse moyenne de l'Hb de 6 g/l pendant les 3 premiers jours. Etude 2: 5 patients; quantité moyenne prélevée: 30 ml/patient/24h; la purge des cathéters représente à elle seule 44 % des quantités prélevées. Méconnaissance des protocoles institutionnels.

Conclusions:
La baisse du taux d'Hb au cours du séjour aux SI est présente pour tous les patients (non transfusés) quelque soit le motif d'entrée ou la catégorie SSMI. Le séjour aux SI ne conduit que rarement à la transfusion de culot érythrocytaire dans cet échantillon de patients non chirurgicaux. Il existe des lacunes dans la gestion médico-infirmière des pertes sanguines liées aux prélèvements sanguins itératifs. Des mesures ont été proposées pour tenter d'améliorer le taux d'Hb des patients et leur assurer un meilleur devenir à leur sortie du service.

Bibliographie:
Fitness of use of BIOPATCH® and TEGADERM-TM-CHG for protecting central venous catheters and arterial lines in critically ill patients

C Joseph [1], MJ Thévenin [1], P Eggimann [1]

[1] CHUV, Lausanne, Switzerland

Introduction:
Catheter bundle significantly reduces the rate of catheter-associated bloodstream infections. By continuous release of chlorhexidine around the insertion site, the use of antimicrobial devices demonstrated further decrease of the rate of infection below 1 episodes/1000 catheter-days.

Objectives:
To compared the fitness of use of (Biopatch®) and (TegadermTM CHG). Methods: All central venous catheters and arterial lines, inserted and handled according to a written protocol in all patients admitted to a mixed ICU of 5 units of 7 beds (2000 admissions and 11’000 patients-days yearly) were protected with antimicrobial devices. Biopatch® was used over a 60 month period from 2009. Tegaderm™-CHG was introduced in August 2011 for patients housed in 2 out 5 units and 18 months later replaced Biopatch® in all units. Their fitness of use was compared using a structured questionnaire. The study design did not aim to compare infection rates, which was about 0.3 episodes of infections/1000 catheter days over the period of switch of the devices.

Results:
Health care workers answering the questionnaires were specifically trained to provide care for ICU patients and had followed internal training for catheter handling and care, including specific sessions for the use of antimicrobial devices. Experience captured by the questionnaire run on several tens of individual catheter dressings in all possible insertion sites. Compared to those reported after 60 months of Biotpatch® use (n=24), the overall satisfaction significantly increases after 14 months of Tegaderm™-CHG use (n=42).Categories (in%) very good; good; average, bad increased from 13, 46, 42, 0 to 74, 26, 0 and 0, respectively; p<0.001. This was related to a significant improvement of the ease of installation and of the ability of Tegaderm™-CHG to cover beyond the insertion site protecting in most cases also the area of fixation of the catheter to the skin.

Conclusion:
Based on the significant improvement of fitness of use by the healthcare workers, we decided to replace the Biopatch® by the Tegaderm-CHG™ in the dressing of all central venous catheters and arterial lines for all ICU patients.
La chlorhexidine partenaire indispensable des soins

C Joseph [1], M.-J. Thévenin [1], P. Maravic [1], P Eggimann [1]

[1] CHUV, Lausanne, Switzerland

Introduction:
Dans le but de réduire les infections nosocomiales dans un service de soins intensifs (35 lits hôpital tertiaire), une politique multimodale et pluridisciplinaire est développée depuis plusieurs années. Divers produits à base de chlorhexidine, associés à de nouvelles recommandations de techniques de soins et de l'enseignement au lit du patient ont permis de réduire le taux d'infections nosocomiales.

Méthode:
A ce jour, nous utilisons de la chlorhexidine pour plusieurs soins: désinfection de la peau et préparation du site opératoire (chlorhexidine 2%), pansements de cathéters ( gluconate de chlorhexidine 2% pour les cathéters artériel et VVC), soins ORL chez le patient intubé ( solution de chlorhexidine à 0.2%), toilette quotidienne (gants imprégnés de chlorhexidine à 2%), et lors de certains pansements de plaie à risque d'infection (chlorhexidine 0.5%). Dans une démarche de qualité des soins: des procédures ont été mises en place pour chaque type d’utilisation, une formation (apport théorique et pratique), un suivi et une évaluation des pratiques (mini audit) sont faits au lit du patient, et en collaboration avec le service d’hygiène hospitalière (hygiène des mains, contrôle MRSA, bactériémie).

Résultats:
Pansements: de 2006 à 2014 une diminution des infections de cathéters (de 22 épisodes/1000VVC-jours à 2 épisodes) Toilette: de 2010 à 2014 une diminution de cas nosocomiaux MRSA attribué au service (de 64 à 7 ). Soins ORL chez patient ventilé: une amélioration de la qualité de l'hygiène orale et une stabilisation des pneumonies malgré une augmentation du nombre de journées de ventilation.

Conclusion:
Ces résultats prometteurs associés à un encadrement, une politique multimodale et multidisciplinaire, nous incitent à continuer dans cette direction. Ceci d'autant plus que les effets indésirables liés à la chlorhexidine sont minimes : 2 cas d'allergies cutanées sur 11306 toilettes /patient /an et des problèmes de macération dans les plis inguinaux résolus par un changement de pratique. Le produit en utilisation seule, sans accompagnement, ne garantit pas le succès escompté, mais favorise les résultats de cette stratégie multimodale et multidisciplinaire!
La douleur induite aux soins intensifs : Oser l'hypnose

S'Ory [1]


Résumé Contexte :
En dépit d’une prise de conscience récente des douleurs liées aux soins, les données épidémiologiques nous révèlent sa prévalence conséquente dans notre pratique quotidienne. Les avancées en neurosciences apportent des éléments nouveaux sur le processus physiopathologique de la douleur à travers sa composante émotionnelle. On sait à présent qu’au-delà d’un mauvais moment à passer pour le patient et le soignant, la mémoire de la douleur vient réorganiser les aspects bio-psycho-sociaux de sa perception, transformer un symptôme douloureux aigu en un syndrome douloureux indélébile pouvant détériorer la qualité de vie de nos patients "long séjour", avec une incidence sur leur pronostic. L’utilisation de l’hypnose alliée aux moyens pharmacologiques est initiée par le caractère multifactoriel et subjectif de la douleur. Elle permettrait de considérer la douleur à travers chacune de ses composantes et venir compléter nos capacités à soulager de manière efficace nos patients en effectuant une médecine de "la personne". Ce travail a été réalisé afin d’expliquer aux soignants comment l’utilisation de cette méthode a des bénéfices sur la prévention de la douleur induite.

Méthode :
La recherche documentaire sur l’utilisation de l’hypnose dans le cadre de la prise en charge de la douleur compte 10 publications, articles fondamentaux et scientifiques. L’analyse de ces écrits propose de faire le point sur l’état actuel des connaissances concernant l’utilisation de l’hypnose dans la prise en charge de la douleur induite. L’entretien à l’expert apporte les aspects bénéfiques ainsi que les limites de la méthode en lien avec la population de patient long séjour.

Résultats :
L’hypnose représente un moyen thérapeutique et relationnel agissant sur les composantes sensori-discriminatives de la douleur, permettant de moduler l’intensité de sa perception. Elle agit sur les composantes émotionnelles et affectives en améliorant le vécu du soin. Elle assure une prise en charge de la douleur dans sa dimension biopsychosocial offrant un accès différent et complémentaire aux moyens pharmacologiques. Elle offre une prise en charge global du patient par le biais d’une relation soignant/soigné de qualité basée sur des principes et outils de communication simples issue de la méthode.

Perspective :
L’utilisation de l’hypnose, ainsi que la sensibilisation des soignants aux poids des mots et à la force du langage viendrait optimiser la prise en charge de la douleur induite.
Le rôle infirmier à la première installation de la ventilation non invasive (VNI)

Z Koyluk Tomsuk [1]

[1] Hopitaux universitaires de Geneve, geneve, Switzerland

Le sujet fait suite à une situation où le patient durant sa séance de VNI se désynchronise du ventilateur, ses paramètres hémodynamiques augmentent, les courbes du ventilateur deviennent anarchiques, enfin les alarmes sonnent. Le patient semble entendre les consignes de l’exercice tout en étant inconfortable. J’essaie alors de comprendre ses sources d’inconfort et ce qui rend difficile la poursuite de la séance. Ainsi j’explore la littérature afin d’identifier dans le rôle infirmier les déterminants relationnels et techniques à la première installation de la VNI.

Comments:
Ma recherche s’est basée sur 3 moteurs de recherches : Google, Google scholar et Pub Med, les articles étaient très nombreux, je les ai sélectionnés parmi ceux explorés par ordre de découverte et pertinence au regard de ma recherche et me suis arrêtée à 15 publications dont 3 recommandations, 10 revues de littérature, 2 articles scientifiques, 2 ouvrages, chacun publié entre 1991 et 2013. Aussi j’ai réalisé 2 entretiens avec des experts en thérapie respiratoire dans le but de mieux « décomposer une séance de VNI » et bénéficier d’une expérience plus fine de la pratique sur le terrain. A revue de littérature met en évidence que cette méthode de ventilation a largement montré ses avantages sur plusieurs cas cliniques et sa pratique tend à être une thérapeutique « usuelle » et non « exceptionnelle ». Le succès de sa mise en route passe par une préparation de la séance, avec une explication de qualité, une adaptation du masque pour une meilleure gestion des fuites et un confort du patient. Son acceptation est influencée par les réglages et certaines asynchronies, qui peuvent perturber le travail respiratoire et créer plus de réticence à l’exercice. Les auteurs préconisent une montée des pressions progressives pour une meilleure tolérance, et une attention plus particulière des équipes dans les premières heures de l’installation. Les perspectives d’amélioration s’articulent autour d’une explication plus structurée et persuasive afin d’obtenir une meilleure collaboration, d’une adaptation des réglages progressive avec un temps de mise en route considérable nécessitant une remise en question de la distribution des charges de travail, sachant qu’une première installation, dans ses 6 à 8 premières heures nécessite une présence constante et plus longue au lit du patient. Pour améliorer le confort en lien avec les interactions patient ventilateurs, certains auteurs préconisent le Neurally Adjusted Ventilation Assist et la ventilation assistée proportionnelle.
P16
Etat de mal très réfractaire : description d’un cas et revue de la prise en charge

C Pessoa [1], J Niederhauser [2], T Fumeaux [1]


Objectifs :
Après description d’un cas d’état de mal très réfractaire, une revue de la littérature a été conduite, afin de décrire cette pathologie et sa prise en charge

Description du cas : un patient éthylique actif de 72 ans est admis pour des crises d’épilepsie généralisées récidivantes, dans un contexte de sevrage partiel pour un état infectieux aigu. La récidive des crises sans reprise de l’état de conscience pose le diagnostic d’état de mal. Le bilan montre un foyer irritatif postérieur droit à l’EEG, sans lésion cérébrale à l’imagerie. Malgré un traitement anti-épileptique intraveineux (midazolam - levetiracetam), puis une anesthésie de propofol associée à un traitement de lacosamide, les crises persistent au-delà de 24 heures, posant le diagnostic d’état de mal très réfractaire. L’évolution est défavorable, amenant au décès du patient.

L’ETAT DE MAL TRES REFRACTAIRE :
- Définition :
L’état de mal très réfractaire est un état de mal persistant 24 heures après instauration d’une anesthésie générale. - Epidémiologie : > 10 % des patients avec état de mal réfractaire évoluent vers un état très réfractaire - Physiopathologie : dysfonctionnement membranaire (canaux sodiques et calciques voltage-dépendants) et synaptique (système inhibiteur GABA-ergique et excipitant glutamatergique), amenant à une diminution fonctionnelle du système GABA. On regroupe sous le terme d’excitotoxicité d’autres dysfonctionnements cellulaires, comme la dysfonction mitochondriale et la nécrose/apoptose neuronale. - Pronostic : la mortalité est probablement supérieure à 50 %, selon la durée de l’état de mal et les co-morbidités. - Prise en charge thérapeutique : les buts sont l’interruption la crise, la prévention des récidives, et la neuroprotection, en limitant les effets délétères des traitements. Les modalités sont mal étudiées, une seule étude randomisée étant publiée, avec un petit collectif de patients (Rossetti 2011). Cependant, le consensus propose de corriger les causes déclenchantes et d’induire une anesthésie générale, préférentiellement au propofol. La place des thérapies de secours (magnesium, stéroïdes, hypothermie, diète kétogénique) n’est pas bien définie.

Conclusion :
Ce cas illustre la difficulté de la prise en charge de l’état de mal très réfractaire, dont l’évolution défavorable est malheureusement fréquente. Une recherche clinique basée sur des études bien conduites incluant un nombre suffisant de patients, d’améliorer le pronostic de cette affection rare.
Evaluation du confort des patients admis aux soins intensifs d'un hôpital régional par le questionnaire IPREA

TFumeaux [1], S Wizen [1], C Sermet [1]

[1] Soins Intensifs - GHOL - Hôpital de Nyon, Nyon, Switzerland

Objectif:
Les patients des soins intensifs sont exposés à des sources potentielles d'inconfort, à cause de leur affection aigue, mais également de l'environnement et de l'organisation du travail. Ce phénomène connu depuis les années 70 amplifie le stress auquel les patient sont soumis, avec des conséquences significatives pour eux et leurs proches. L'évaluation subjective du confort des patients peut permettre des mesures correctives diminuant ces conséquences. Le questionnaire IPREA (1) a été développé et validé dans ce but, et permet de grader sur une échelle de Likert de 1 à 10 16 items différents en lien avec le confort physique et psychique des patients.

Méthode:
Le questionnaire IPREA a été proposé aux patients à la fin du séjour à tous les patients admis aux soins intensifs de l'hôpital de Nyon, dès janvier 2011 (Figure 1). Les réponses anonymisées ont été récoltées, ainsi que les caractéristiques basiques des patients (âge, sexe, date de l'admission). Ces données ont été analysées, pour mettre en évidence les items associées le plus fréquemment associés à un inconfort par nos patients.

Résultats:
Entre janvier 2011 et mars 2015, 755 malades ont accepté de répondre au questionnaire, ce qui représente 25 % des malades admis. L'âge moyen (63 ans) est comparable à celui de la totalité des patients admis, avec une la répartition des sexes déséquilibrée (56 % femmes). Le questionnaire met en évidence de manière globale que les patients jugent le confort durant le séjour plutôt satisfaisant, sans variations significatives dans le temps, et sans corrélation significative avec le sexe ou l'âge des patients. Deux items sont associés de manière prépondérante à une altération du confort : la qualité du sommeil et les dérangements en lien avec les sondes et cathéters.

Discussion:
De nombreuses limites méthodologiques peuvent être discutées, et notamment le taux de réponse faible, le remplissage du questionnaire à la fin du séjour seulement, et de ce fait la sélection des patients survivants uniquement. Cependant, cette enquête permet de constater que le confort global des patients dans notre unité est satisfaisant. Deux axes d'amélioration sont à proposer, concernant la qualité du sommeil et les inconforts associés aux cathéters et sondes. Sur cette base, des interventions seront mise en place dans le but d'améliorer le sommeil des patients, avec une mesure de l'effet grâce au questionnaire IPREA.

Référence :
1- Kalfon – Intens Care Med 2010;36:1751
**INCONFORT DES PATIENTS AUX SOINS INTENSIFS**

*Questionnaire au patient (IPREA)*

**dito**

**Merci d’évaluer chaque question avec le patient**

**EN UTILISANT L’ECHELLE analogique visuelle ou chiffrée ci-dessous**

---

**QUESTIONNAIRE À REMPLIR LE JOUR DU DEPART DU PATIENT**

Noter des chiffres seulement

1. Avez-vous souffert du **bruit** (alarmes, sonneries, conversations) ?
2. Avez-vous souffert de la **lumière** (éclairage de la chambre ou du couloir, y.c. la nuit) ?
3. Avez-vous souffert du **lit** (matelas trop dur ou mou, dossier ou oreillers inconfortables) ?
4. Avez-vous souffert du manque de **sommeil** par rapport à vos habitudes ?
5. Avez-vous souffert de la **soif** ?
6. Avez-vous souffert de la **faim** ?
7. Avez-vous souffert du **froid** ?
8. Avez-vous souffert de la **chaleur** ?
9. Avez-vous eu des **douleurs**, y compris dues aux piqûres et à la toilette ou aux soins ?
10. Avez-vous souffert du fait d’être entouré et équipé de **tuyaux et sondes** ?
11. Avez-vous été géné du **manque d’intimité**, lors de la toilette ou des visites ?
12. Avez-vous souffert d’**angoisse**, d’anxiété ou de panique ?
13. Vous êtes-vous senti **tout** ou mal entouré durant votre séjour ?
14. Avez-vous été géné par la limitation des **visites** de vos proches ?
15. Avez-vous été géné par la limitation de l’utilisation d’un **téléphone** ?
16. Avez-vous souffert du manque d’**information** de la part de l’équipe (médecins/infirmières) ?

---

**Echelle visuelle analogique (à présenter au patient)**

<table>
<thead>
<tr>
<th>NON</th>
<th>BEAUCOUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

---

Figure 1
Table of results

<table>
<thead>
<tr>
<th>HEARD OF...</th>
<th>gA - Before</th>
<th>gA - After</th>
<th>gB - After</th>
<th>After (gA vs gB)</th>
<th>gA (Before vs After)</th>
</tr>
</thead>
<tbody>
<tr>
<td>... AD</td>
<td>24 (13.3%)</td>
<td>28 (15.6%)</td>
<td>p^ = 0.6375</td>
<td>\</td>
<td>\</td>
</tr>
<tr>
<td>... the HCS</td>
<td>3 (1.7%)</td>
<td>6 (3.3%)</td>
<td>p^ = 0.3369</td>
<td>\</td>
<td>\</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COULD GIVE A DEFINITION OF...</th>
<th>gA - Before</th>
<th>gA - After</th>
<th>gB - After</th>
<th>After (gA vs gB)</th>
<th>gA (Before vs After)</th>
</tr>
</thead>
<tbody>
<tr>
<td>... AD</td>
<td>20 (11.0%)</td>
<td>27 (15.0%)</td>
<td>p^ = 0.2606</td>
<td>\</td>
<td>\</td>
</tr>
<tr>
<td>... HCS</td>
<td>3 (1.7%)</td>
<td>1 (0.5%)</td>
<td>p^ = 0.0969</td>
<td>\</td>
<td>\</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USEFULNESS</th>
<th>gA - Before</th>
<th>gA - After</th>
<th>gB - After</th>
<th>After (gA vs gB)</th>
<th>gA (Before vs After)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>128 (70.7%)</td>
<td>121 (66.9%)</td>
<td>127 (70.6%)</td>
<td>p^ = 0.8056</td>
<td>0.0134</td>
</tr>
<tr>
<td></td>
<td>13 (7.2%)</td>
<td>25 (13.8%)</td>
<td>19 (10.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 (8.3%)</td>
<td>24 (13.3%)</td>
<td>23 (12.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 (13.8%)</td>
<td>11 (6.1%)</td>
<td>11 (6.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>True/somehow true</td>
<td>140 (77.8%)</td>
<td>130 (72.6%)</td>
<td>127 (70.6%)</td>
<td>0.1178</td>
</tr>
<tr>
<td></td>
<td>Neither true nor false</td>
<td>11 (6.1%)</td>
<td>23 (12.8%)</td>
<td>13 (7.2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>False/somehow false</td>
<td>22 (12.2%)</td>
<td>21 (11.7%)</td>
<td>31 (17.2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don't know</td>
<td>7 (3.9%)</td>
<td>5 (2.8%)</td>
<td>9 (5%)</td>
<td></td>
</tr>
<tr>
<td>HCS</td>
<td>128 (70.7%)</td>
<td>121 (66.9%)</td>
<td>127 (70.6%)</td>
<td>p^ = 0.8056</td>
<td>0.0134</td>
</tr>
<tr>
<td></td>
<td>13 (7.2%)</td>
<td>25 (13.8%)</td>
<td>19 (10.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 (8.3%)</td>
<td>24 (13.3%)</td>
<td>23 (12.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 (13.8%)</td>
<td>11 (6.1%)</td>
<td>11 (6.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>True/somehow true</td>
<td>140 (77.8%)</td>
<td>130 (72.6%)</td>
<td>127 (70.6%)</td>
<td>0.1178</td>
</tr>
<tr>
<td></td>
<td>Neither true nor false</td>
<td>11 (6.1%)</td>
<td>23 (12.8%)</td>
<td>13 (7.2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>False/somehow false</td>
<td>22 (12.2%)</td>
<td>21 (11.7%)</td>
<td>31 (17.2%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don't know</td>
<td>7 (3.9%)</td>
<td>5 (2.8%)</td>
<td>9 (5%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OWNING</th>
<th>gA - Before</th>
<th>gA - After</th>
<th>gB - After</th>
<th>After (gA vs gB)</th>
<th>gA (Before vs After)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has AD</td>
<td>10 (5.5%)</td>
<td>6 (3.3%)</td>
<td>p^ = 0.326</td>
<td>\</td>
<td>\</td>
</tr>
<tr>
<td>Has a HCS</td>
<td>8 (4.4%)</td>
<td>5 (2.8%)</td>
<td>p^ = 0.5739</td>
<td>\</td>
<td>\</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERESTS...</th>
<th>gA - Before</th>
<th>gA - After</th>
<th>gB - After</th>
<th>After (gA vs gB)</th>
<th>gA (Before vs After)</th>
</tr>
</thead>
<tbody>
<tr>
<td>... in AD</td>
<td>60 (33.1%)</td>
<td>46 (25.4%)</td>
<td>59 (32.8%)</td>
<td>p^ = 0.1383</td>
<td>0.1124</td>
</tr>
<tr>
<td>... in a HCS</td>
<td>64 (37.2%)</td>
<td>46 (27.2%)</td>
<td>62 (35.6%)</td>
<td>p^ = 0.1185</td>
<td>0.0147</td>
</tr>
<tr>
<td>... in writing AD</td>
<td>\</td>
<td>12 (6.7%)</td>
<td>8 (4.4%)</td>
<td>0.4821</td>
<td>\</td>
</tr>
</tbody>
</table>

p^: Chi^2, p*: McNemar, \: NA
prévenir les infections de cathéter dans une unité de soins intensifs de petit taille.

Introduction:
L'utilisation de cathéters aux soins intensifs peut se compliquer d'une infection avec des conséquences sur la morbidité et la mortalité. Pour diminuer ces complications, les recommandations actuelles associent des mesures à appliquer à la pose et au cours du maintien du cathéter, le plus souvent dans des 'bundles of care'. Dans notre service, une stratégie regroupant ces mesures est déployée depuis plus de 5 ans. Afin mesurer l'efficacité de cette check-list, tous les cathéters articulés ou veineux centraux posés ou utilisés dans notre service sont tracés. Sur une période de 31 mois (2012-2014), nous avons comparés ces données aux analyses microbiologiques pour mesurer le taux d'infections associées aux cathéters dans notre service.

Méthode:
Tous les cathéters veineux centraux et artériels utilisés dans notre service (y compris pose hors du service) sont reportés dans une base de données incluant le type de cathéter, l'identité du patient et les dates d'utilisation du cathéter. La culture systématique des cathéters n'est pas effectuée au retrait dans notre service, les prélèvements étant prescrits en fonction de la situation clinique. Pour tous les patients porteurs de cathéters, tous les prélèvements microbiologiques (hémocultures, urines, prélèvements pulmonaires, etc...) ont été analysés. En appliquant les critères du CDC, les infections associées à un cathéter en place depuis plus de 48 heures ont été identifiées.

Résultats:
750 cathéters (40 % de cathéters veineux) ont été surveillés, correspondant à 4’201 jours-cathéter. Sur la base des hémocultures, 18 épisodes suspects ont ainsi été identifiés (tableau 1). L'analyse des dossiers permet de retenir deux infections associées à des cathéters : dans les deux cas, une infection de cathéter veineux central jugulaire à S. epidermidis est survenue dans les suites de la prise en charge d’un choc septique, respectivement au 3ème et au 7ème jour après la pose du cathéter. L'évolution sous traitement antibiotique adapté a été positive dans les deux situations. Ceci permet de calculer un taux d'infection inférieur à 0.5 infection par 1000-jours-cathéter.

Discussion:
malgré des limitations méthodologiques importantes, notamment l'absence de prélèvements systématique, cette surveillance nous permet de vérifier l'efficacité de l'application d'une check-list systématique visant à prévenir les infections de cathéter dans une unité de soins intensifs de petite taille.
Capnia can be controlled using a closed-loop ventilation system based on end-tidal CO2 signal (Intellivent-ASV®) in brain-injured patients: Preliminary results of a prospective interventional study.

L Piquilloud [1], A Polupan [2], I Matskovskiy [2], A Oshorov [2], D Novotni [3], T Laubscher [3], M Oddo [1], P Jolliet [1], JP Revelly [1]

[1] CHUV, Lausanne, Switzerland
[2] Burdenko Neurosurgical Institute, Moscow, Russia
[3] Hamilton Medical Research, Bonaduz, Switzerland

Aim:
Hypo- and hypercapnia can be deleterious to brain injured patients. Due to CO2 production and elimination variability and to the unpredictable effects of ventilator settings changes, strict arterial CO2 partial pressure (PaCO2) control is difficult to obtain. Conceivably, using expired (end-tidal) CO2 as the input signal of closed-loop ventilation (Intellivent-ASV®) should optimize CO2 control compared to manual ventilator setting changes based on PaCO2 measurements. The aim of this study was to compare PaCO2 evolution over time during standard controlled ventilation (SCV) and Intellivent-ASV®.

Methods:
Prospective interventional randomized study with a crossover design. Comparison of PaCO2 evolution during two sequential 2-hour periods of ventilation (SCV and Intellivent-ASV® in the “brain injury setting”), applied in random-order with a one-hour washout period inbetween. Arterial blood gas analysis was performed every 30 minutes. The number of manual settings adjustments made on the ventilator and actions performed to reduce intracranial pressure (ICP) were also recorded. Due to the small number of patients in this preliminary dataset, no statistical differences were tested.

Results:
(medians [IQR]):11 patients included (6 severe traumatic brain injury, 4 subarachnoid hemorrhage and 1 intra-cerebral hematoma). Age: 52 [42-54] years, GCS at admission: 6 [4-6.5]. SAPS 2 score: 42 [32-50]. PaCO2 was 36 [33-37] mmHg (range: 28-43 mmHg) during SCV and 36 [34-37] (range: 30-43 mmHg) during Intellivent-ASV®. DeltaPaCO2 between two consecutive PaCO2 measurements are illustrated in Figure 1. During standard ventilation, 22 settings adaptations were performed whereas only two manual adjustments were made during Intellivent-ASV®. Four (2 increase in sedation and 2 hypertonic saline administration) and 2 (increase in sedation) actions were performed in order to decrease ICP during SCV and Intellivent-ASV® respectively.

Conclusions:
The Intellivent-ASV® CO2-regulated closed-loop ventilation mode can be safely used to deliver automated ventilation in brain injured patients. PaCO2 never reached extreme values and delta PaCO2 were very low during Intellivent-ASV®. Accordingly, fewer ventilator settings adaptations were required during Intellivent-ASV®. These preliminary results are promising and more patients must be included to evaluate the potential advantage of using Intellivent-ASV® to optimize the control of capnia during neuro-resuscitation.

Figure 1. DeltaPaCO2 between two consecutive PaCO2 measurements
Critical incident reporting system: registration of adverse events in transplantation medicine. The Swiss experience

P Schauenburg [1], L Martinolli [1], F Beyeler [1], F Immer [1]

[1] Swisstransplant, Bern, Switzerland

Aim:
Since 2013, Swisstransplant has adopted a new method to signal, document and process critical incidents and adverse events during the process of organ donation. Improve organ donation process and guarantee quality in the different phases.

Material and methods:
Creation of an electronic portal (SLIDS Incident tools: Swisstransplant logistics and invoice documentation system) accessible to every hospital and transplantation centre through a website allows signalization of adverse and critical events. Complexity in organ donation process requires to structure the fields of reporting in five categories and to define their content: allocation (beginning of organ donation process until definitive allocation), documentation (laboratory tests, HLA reports, serology, bacteriology), organ harvesting (intraoperative phases of harvesting, packaging...), transport (all transport types for blood, organs, team) and donor management (taking care of donor in ICU).

Results:
In 2014, 59 adverse events were reported of a total of 117 organ donations: allocation 14 (23.7%), organ harvesting 36 (61%), documentation 6 (10.2%), transport 3 (5.1%). According to reports collected, the most critical phase is organ harvesting in operating room.

Conclusions:
It has not been possible yet to establish a score to define the severity of an reported event (mild, moderate, severe), however, reporting events has allowed to implement improved measures in a short period of time and to define future goals.
Cytokine adsorption in severe systemic inflammation - an option for the future?

A Hutter [1], A Müller [1], D Meyer [1], E Kleinert [1], M Maggiorini [1]

[1] Medical Intensive Care Unit, University Hospital of Zurich, Zurich, Switzerland

Aim:
Several disorders are associated with a systemic inflammation that can lead to organ dysfunction. CytoSorb® is a new treatment option that enables blood purification by hemoperfusion via an extracorporeal circulation. It contains highly porous polymer beads, which are able to adsorb cytokines and other molecules with a range of 10-50kDA. Some animal studies1 and one clinical trial2 showed a significant removal of high cytokine plasma levels. Our aim is to report efficiency and safety of this new device in a series of 5 consecutive patients with severe systemic inflammatory response and high dose vasopressor-therapy.

Methods:
We used the CytoSorb® therapy in 5 patients with an exaggerated inflammation ('vasopressor index' > 3 and elevated interleukin 6) due to different sources like infection, ischemia-reperfusion injury or liver failure. We installed the CytoSorb® cartridge in a renal replacement therapy- or a hemoperfusion system and treated the patients during 48-72 hours with a change of the cartridge every 24 hours. Pre- and post treatment we assessed changes in hemodynamics, markers of inflammation and coagulation as well as the SOFA score.

Results:
Our five patients had a mean SAPS II Score of 70 and SOFA Score of 17. The mean initial interleukin 6 was 12'613ng/l and declined during therapy to 2849ng/l. CRP levels decreased from 181 to 110mg/l and PCT levels from 29 to 16µg/l. The mean noradrenaline dosage could be reduced from 40 to 27µg/min (0.57 to 0.37µg/kg/min) during 72h therapy. But we saw in every patient a transient increase in noradrenalin demand after starting the CytoSorb® therapy. This negative effect on hemodynamics could be limited by flushing the cartridge with 2 liters of Ringer Lactate solution before use. In patient with liver dysfunction CytoSorb® decreased bilirubin levels from 126 to 73µmol/l. The level of ammonia did not improve during therapy. There are reports of a favourable effect of myoglobin in rhabdomyolysis which we did not see in our five patients. Regarding safety didn’t we observe any serious adverse event. Platelets fell from 72 to 52 G/l and fibrinogen declined from 3.4 to 2.2mmol/l without relevant bleeding complication.

Conclusions:
CytoSorb® is a new option to limit the impact of systemic inflammatory response on our patients via cytokine adsorption, but outcome benefit has to be proven by a future randomized trial.

References:
Effekte und Nutzen eines interprofessionellen Simulationstrainings auf einer Intensivstation – eine pre- und post-Analyse

B Zante [1], P Venetz [1], B Affolter-Baumberger [1], J Boettcher [1], S Scher [1], R Dietler [1]

[1] Universitätsklinik für Intensivmedizin, Bern, Switzerland

Aim:

Methods:

Results:
Frage 1: Vorteile eines Simulationstrainings (p<0.001; 40 positive Differenzen, 3 negative Differenzen). Frage 2: Besseres Verständnis von Patientensicherheit in Abhängigkeit von Teamkommunikation (p<0.001; 30 pos. Differenzen, 3 neg. Differenzen). Frage 3: Vorteile von der Nutzung der CRM-Leitsätze (p<0.001; 46 pos. Differenzen, 0 neg. Differenzen). Frage 4: Besseres Verständnis, wie Informationen effektiv im Team mitgeteilt werden können (p<0.001; 40 pos. Differenzen, 0 neg. Differenzen). Frage 5: Besseres Verständnis dafür, dass Team sollte eine gemeinsame Vorstellung von dem gemeinsamen Behandlungsplan haben (p<0.05; 35 pos. Differenzen, 1 neg. Differenz). Frage 6: Besseres Verständnis, wie wichtig es ist, im Team Hilfe und Unterstützung anzubieten (p<0.001; 15 pos. Differenzen, 2 neg. Differenzen). Frage 7: Besseres Verständnis für Teamkommunikation und deren Hilfsmittel (p<0.001; 37 pos. Differenzen, 1 neg. Differenz).

Conclusion:
Durch das durchgeführte Simulationstraining konnte das Verständnis für die Vorteile eines Simulationstrainings gesteigert werden. Ebenso konnte ein signifikant besseres Verständnis für Teamarbeit, Teamkommunikation erreicht werden. Somit dient ein interprofessionelles Simulationstraining das Verständnis von Teamarbeit und Teamkommunikation und Crisis Ressource Management zu steigern um damit, sensibilisiert für dieses Thema, dies in der täglichen Arbeit anwenden zu können.
Interprofessionelles Simulationstraining an einer Universitätsklinik für Intensivmedizin zum Erlernen von Kommunikations-Skills

B Zante [1], P Venetz [1], B Affolter-Baumberger [1], J Boettcher [1], S Schaer [1], R Dietler [1]

[1] Universitätsklinik für Intensivmedizin, Bern, Switzerland

Aim:

Methods:
An der Universitätsklinik für Intensivmedizin wurde ein interprofessionelles Simulationstraining im 2-Wochen-Rhythmus etabliert. Lernziel für die Teilnehmer wurde definiert als: Kennen und anwenden von CRM, NTS. Kernstück sind Simulationsszenarien mit einem „high-fidelity“-Manikin. Im videobasierten Debriefing der Szenarien wurden Handlung und Kommunikation der Teilnehmer (TN) konstruktiv analysiert. Mittels eines Evaluation-Fragebogens (Ranking-Frage auf der Likert-Skala) erfolgte anschließend die Befragung der Teilnehmer.

Results:
Im 2. Halbjahr 2014 nahmen 10 Oberärzte, 10 Assistenzärzte und 40 Fachpflegekräfte am Simulationstraining teil. 97% der TN stuften die Teilnahme als relevant für die zukünftige Arbeit ein. Mit anderen an einem Simulationstraining teilzunehmen hilft 86% der TN ein effektiveres Teammitglied zu sein. 97% der TN stimmten zu, nach dem Simulationstraining die andere Berufsgruppe besser zu verstehen.

Conclusion:
Ein interprofessionelles Simulationstraining ist nach Einschätzung der TN relevant für die tägliche Arbeit auf einer Intensivstation, hilft dabei ein effektiveres Teammitglied bei der Lösung von Patientenproblemen zu sein, indem vermittelte NTS angewendet werden. Ebenso steigert ein Simulationstraining das Verständnis gegenüber anderen Berufsgruppen aus Ärzten und Pflegekräften.
Lethal lactic acidosis with multi organ failure due to cobalt intoxication

D Meyer [1], A Hutter [1], M Auer [2], K Landau [3], M Maggiorini [1], K.P. Weber [2, 3]

[1] Medical Intensive Care Unit, University Hospital Zurich and University of Zurich, Zurich, Switzerland
[2] Department of Neurology, University Hospital Zurich and University of Zurich, Zurich, Switzerland
[3] Department of Ophthalmology, University Hospital Zurich and University of Zurich, Zurich, Switzerland

Introduction:
Cobalt (Co) intoxication is an extremely rare reason for ICU admission. We present a case of Co intoxication with severe lactic acidosis and multi organ failure. Case report: A 66 year old woman was admitted to the neurologic ward with a chronic history of unexplained visual and hearing loss as well as hypothyroidism and cardiomyopathy. On day 14 on the regular ward her condition worsened and she was admitted to the ICU with severe lactic acidosis (24 mmol/l). Multi organ failure with cardiogenic shock, acute liver failure, acute renal failure and encephalopathy was diagnosed. In addition hypoalbuminemia was noted. Despite maximum intensive care support her condition aggravated and she died shortly after ICU admission.

Discussion:
The cause for her deterioration was an extraordinary high Co level in the serum of 13’885 nmol/l (normal range < 17 nmol/l). The Co source was found in an artificial hip from 1999, which was revised 2006. The first head was a ceramic one, which was replaced with a standard metal head, paired with a polyethylene inlay. Fine ceramic particles left behind from the broken head adhered to the polyethylene inlay and grinded down the new metal head, releasing Co into the tissue. Unlike albumin-bound Co (usually 90-95%), free ionic Co (II) is toxic. Co intoxication typically presents with polycythemia and hypothyroidism as early signs, while cardiomyopathy (biventricular hypertrophy) and neurologic disorders are late manifestations. Among direct toxic effects in retinal photoreceptors and retinal ganglion cells, Co stimulates erythropoiesis and inhibits thyroidal iodine uptake. In addition Co generates reactive oxygen species and interrupts the mitochondrial function by blocking cellular respiration in the citric acid cycle. Due to this interference with the cellular respiration and mitochondrial function, Co intoxication can rapidly lead to a systemic disease with lactic acidosis and multi organ failure in patients prone to oxidative stress and/or hypoalbuminemic state, shifting the Co equilibrium from albumin bound towards free toxic Co (II).

Conclusion:
This case highlights that chronic metallosis can suddenly become a devastating systemic disease. In patients with otherwise unexplained lactic acidosis, or unexplained cardiomyopathy and hypothyroidism, the medical history should be reviewed for possible metallosis.
P25
Organ transports in Switzerland: an analysis of ischemia times in relation to means of transportation

M Häfliger [1], J Weiss [1], L Martinolli [1], F Immer [1]

[1] Swisstransplant, Bern, Switzerland

Aim:
Since July 2012 organ transport for transplantations in Switzerland is organized in a centralistic way. This prospective data analysis compares transport distances and ischemia times of hearts, lungs and livers before and after the implementation of the centralistic organization. The aim of this comparison is to determine if the new process in transport logistics has an effect on ischemia times and if transport modalities are chosen in a medically and economically reasonable way.

Methods:
Two same-sized data sets were extracted from the Swiss Organ Allocation System (SOAS), containing data of a period before and a period after the change in transport organization. Transport modalities, transport distances and ischemia times were analysed separately for hearts, lungs and livers.

Results:
In the second period fewer organs were transported, however the total of transport distances was slightly longer. A shift from air to ground transports has been seen in each organ group. Recommended mean ischemia times were respected in each group except in ground transported lungs in the second period.

Conclusion:
The change of transport modalities led to a more economical situation with no negative effect on ischemia times in hearts and livers. In ground transported lungs the recommended mean ischemia time was exceeded.

Acknowledgments:
Therefore this group must be monitored carefully in the future and necessary adjustments in the modalities have to be made if the observed tendency lasts.
Prolonged elimination of apixaban in patients with acute liver and/or kidney insufficiency

D Meyer [1, 1], A Müller [1], N Corti [2], M Maggiorini [1]

[1] Medical Intensive Care Unit, University hospital Zurich and University of Zurich, Zurich, Switzerland
[2] Department of Clinical Pharmacology and Toxicology, University hospital Zurich and University of Zurich, Zurich, Switzerland

Introduction:
The use of the new oral anticoagulants (NAOC) is increasing due to their simple application and relative safety. To date there is no specific antidote or any specific treatment with proven efficacy to nullify their anticoagulant effect. We present two cases in which we were faced with a persistent high apixaban serum level over several days in patients where a rapid correction of the coagulation was essential.

Case 1
A 46 year old man treated with apixaban 5mg twice daily due to atrial flutter was admitted to our intensive care unit (ICU) with a cardiac tamponade with thus congestion of the liver and deterioration of the renal function over the following days. On admission we measured an excessive high Apixaban serum level with only protracted decline, what forced us to postpone the urgent needed pericardiocentesis for several days.

Case 2
A 66 year old woman treated with apixaban 5mg twice daily due to atrial fibrillation was admitted to our ICU with multi organ failure due to a mitochondriopathy. She had acute kidney and liver failure with consecutive coagulopathy, which was aggravated by a persistent high apixaban serum level.

Discussion:
Apixaban is mainly metabolized by the liver and 27% are eliminated unchanged via renal pathway. The Swiss product information (Eliquis®) states that apixaban administration is safe even in moderate renal and liver insufficiency. Based on the mean apixaban half-life of 12h in healthy subjects the anticoagulant effect is usually greatly reduced 48h after the last dose, with little if any effect remaining after 72h. We observed a significantly impaired apixaban elimination in our two patients. We attributed this phenomenon to the congested liver and hence impaired hepatic metabolism in the first patient and to the acute liver and kidney failure in the second patient. As expected, the start of CRRT did not enhance the elimination since apixaban is highly protein bound.

Conclusion:
Despite the often claimed safety of apixaban even with kidney and liver insufficiency we observed an essential deceleration in the decline of apixaban levels in our patients with acute liver, respectively kidney failure. Since liver and renal failure are common features in the ICU the NOAC confront us with an emerging problem, as no antidote is available so far.
The new medical training platform in transplantation for healthcare professionals. A project from Swisstransplant and CNDO

L Martinolli [1], D Vernet [1], I Not [1], S Mädler [2], C Delalay-Marti [2], P Bischoff [2], S Regenscheit [2], F Immer [1], CNDO [2]

[1] Swisstransplant, Bern, Switzerland
[2] CNDO (Committee National for Organ Donation), Bern, Switzerland

Aims:
Switzerland detects a high rate of failure to consent to organ donation. In the last few years, a number of causes have been identified as well as the lack of health professional training at the hospital level have been pointed out as determining factors. This has motivated the idea to create a training concept to be implemented nationwide.

Material:
Thanks to the support of a firm specialized in e-learning, 10 training modules have been elaborated. Modules have the following contents: basic information about organ donation, organ harvesting, brain death diagnosis, medical and health professional communication, breaking bad news, communication during the process of organ donation (part I + II), processes and quality, recognition of a donor, donor processing. Each module ends with a final test and participant must have 80% of correct answers to pass the module. After e-learning courses, two formal education sessions are planned with practical exercises.

Methods:
After enrollment, professionals involved in the process of organ donation will receive access to undergo the different modules. Each module conclusion will guarantee a number of credits and processing all modules including formal education sessions will allow a national certification.

Conclusions:
The training platform will serve to provide specific, standardized and high-quality training to healthcare professionals involved in the process of organ donation.
Hemophagocytic lymphohistiocytosis as a cause for severe systemic inflammatory response syndrome

Mélanie Carmen Huser1, Matthias Hilty3, Stefan Balabanov2, Christian Trachsel1, Esther Bächli3, Marco Maggiorini1

1 Medical Intensive Care Unit, University Hospital of Zurich, Zurich, Switzerland
2 Division of Hematology, University Hospital of Zurich, Zurich, Switzerland
3 Department of Internal Medicine, Uster Regional Hospital, Uster, Switzerland

Systemic inflammatory response syndrome (SIRS) is a major cause for ICU admission, most commonly associated with sepsis. However, it is a unspecific and heterogeneous (2). In atypical presentation or unresolving SIRS the differential diagnosis (DD) includes haematological diseases such as lymphomas and hemophagocytic lymphohistiocytosis (HLH) as well as autoimmune diseases and metastatic solid neoplasia. Due to significant therapeutic consequences a timely diagnosis is crucial.

A 19-year old man was admitted to a regional hospital due to general weakness, fever and cough. He presented with SIRS, but also with splenomegaly, cervico-thoraco-lumbar lymphadenopathy and pancytopenia. Furthermore, active replication of EBV was identified. The patient developed multi-organ dysfunction syndrome (MODS) with disseminated intravasal coagulation (DIC), respiratory failure, kidney failure and encephalopathy, necessitating mechanical ventilation and renal replacement therapy. Under initial empirical antibiotic treatment, SIRS and pancytopenia persisted, warranting reassessment of the DD. No sign of lymphoma was detected in bone marrow and cerebrospinal fluid analysis, as well as lymph node histology. With seven out of eight diagnostic criteria for HLH being met (fever, splenomegaly, cytopenia, hypofibrinogenemia, elevated ferritin, elevated soluble interleukin-2 receptor and hemophagocytosis in bone marrow), therapy with dexamethasone and etoposid was initiated according to HLH-94 protocol (1). Following initial decline of viral load and ferritin levels, progression of encephalopathy with triphasic waves in EEG and cerebral hemosiderin deposition in susceptibility weighted MRI were noted. Eventually massive intracerebral hemorrhage led to cerebral herniation and death.

The case illustrates SIRS unresponsive to antibiotic therapy with atypical presentation, hence not associated with sepsis. HLH is a scarce but life-threatening syndrome of excessive immune activation which can occur as familial or sporadic disorder. Symptoms initially resemble viral infection with splenomegaly and cytopenia but progress to SIRS and MODS. The prognosis is dependent on rapid initiation of specific therapy, warranting a high index of suspicion. Definite remission can often only be attained following hematopoietic stem cell transplantation. While intracerebral microhemorrhage is commonly seen as the result of cell migration and DIC, massive intracerebral bleeding is rarely associated with HLH.

References:

M Osthoff [1], A Wojtowicz [2], F Tissot [1], U Flückiger [1, 3], M Siegemund [1], S Zimmerli [4], T Calandra [2], P Eggimann [2], O Marchetti [2], N Khanna [1], PY Bochud [2], MTrendelenburg [1]

[1] University Hospital Basel, Basel, Switzerland
[2] Lausanne University Hospital, Lausanne, Switzerland
[3] Hirslunden Klinik, Aarau, Switzerland
[4] Inselspital Bern, Bern, Switzerland

Aim:
Intra-abdominal candidiasis (IAC) is a life-threatening complication of gastrointestinal (GI) tract perforation or acute necrotizing pancreatitis. Mannose-binding lectin (MBL) has been shown to bind to Candida albicans leading to enhanced complement activation and augmented opsonisation in vitro. However, human studies on the role of MBL in patients with invasive candidiasis have yielded conflicting results. We investigated the influence of MBL and other lectin pathway proteins on Candida colonization and IAC in a cohort of high-risk intensive-care unit (ICU) patients.

Methods:
Prospective observational cohort study (Fungal Infection Network of Switzerland) of 89 patients with recurrent GI perforation or acute necrotizing pancreatitis. Levels of lectin pathway proteins at study entry and six MBL2 single-nucleotide polymorphisms (SNP) were analysed by ELISA and genotyping (Illumina Veracode genotyping platform or KASP™ system, LGC Genomics), respectively, and correlated with 1,3-β-D-glucan levels, development of heavy Candida colonization (corrected colonization index (CCI) >0.4), occurrence of IAC, and mortality during a 4-week period. Patients with pre-emptive antifungal therapy were excluded from the analysis of IAC.

Results:
Within 4 weeks after inclusion a CCI>0.4 and IAC was observed in 42/89 (47%) and 27/69 (39%) patients, respectively, and 30-day mortality was 8%. Neither serum levels of MBL, ficolin-1,2,3 or MASP2 nor MBL2 genotypes or haplotypes were associated with elevated 1,3-β-D-glucan levels, development of heavy Candida colonization or 30-day mortality (p>0.05 for all analyses). Similarly, none of the analysed proteins was found to be significantly associated with IAC with the exception of lower MBL levels (median 0.87 (IQR 0.21-1.93) vs. 1.90 (IQR 0.19-3.44), p=0.03) at study entry. However, there was no difference in MBL deficiency (<0.5 µg/ml), MBL2 haplo- or genotypes in patients with and without IAC.

Conclusion:
Lectin pathway protein levels and MBL2 SNPs investigated in this study were not associated with heavy Candida colonization or IAC in a small cohort of high-risk ICU patients. The lectin pathway of complement appears to have limited influence on the susceptibility to invasive Candida infections in high-risk surgical ICU patients.
Introduction:
Influenza is a major concern for emergency medical services (EMS). EMS-Workers’ (EMS-W) vaccination rates remain low. Determinants of vaccination for seasonal (SI) or pandemic influenza (PI) are unknown in this setting. We investigated influence of the H1N1 pandemic on EMS-W vaccination rates, differences between PI and SI vaccination rates, determinants of influenza vaccination, and influence of a new mandatory mask wearing policy.

Methods:
A survey conducted in 2011, involving 65 EMS-W of the city of Lausanne, Switzerland. Demography, self-declared SI and PI vaccination status, motives for vaccine refusal or acceptation were collected.

Results:
Response rate was 95.4% (n=62). 72.5% were young male, in good health; with more than 6 years of work experience in 74 %. Vaccination rates were 40.3% for both SI and PI (PI+/SI+), 19.3% for PI only (PI+/SI-), 1.6% for SI only (PI-/SI+), and 38.8% were not vaccinated at all (PI-/SI-). Women’s vaccination rates (n=17) were lower for all categories (not statistically significant). 92% of PI+/SI+ EMS-W received at least one SI vaccination during the previous 3 years, 8.3% of the PI-/SI- (p = 0.001), and 25% for the PI+/SI- EMS-W (p=0.001). During the H1N1 pandemic, the SI vaccination rate increased from 25.8% during the preceding year to 41.9% (+62.4%)(p = 0.001). 30% of the PI+/SI+ EMS-W declared that they would not get vaccination during the following year, while this proportion was null for the PI-/SI- and PI+/SI- EMS-W was groups. Altruism and the discomfort induced by the mandatory mask wearing policy were the main motivations to get vaccination against PI. Factors limiting PI or SI vaccination included the option to wear a mask, avoidance of medication in general, fear of vaccine adverse effects and concerns about vaccine safety and efficiency.

Discussion:
Average vaccination rate in our EMS-W was low, particularly in women, and not sufficient to prevent the spread of influenza. Previous vaccination status was a significant determinant of PI and future influenza vaccinations. The mandatory surgical-mask wearing policy played a dual role, and its net impact on vaccination rate is probably limited. Our population was mixed and could be divided in 3 groups: favourable to all vaccinations, against all vaccination even in a pandemic context, and ambivalent towards vaccination with a “pandemic effect”. These results suggest a consistent vaccination pattern only altered by exceptional circumstances.
A case of renal infarct complicating a syphilitic aortitis

F Humbert [1], G John [2], D-L Vu [1], I Uckay [1]

[1] University hospital of Geneva, Geneva, Switzerland
[2] Hôpitaux neuchâtelois, La Chaux-de-Fonds, Switzerland

Background:
When untreated, Treponema pallidum can disseminate in many organs. In late manifestation of syphilis, neurologic or cardiac involvement can result in threatening conditions.

Methods/Results:
We describe the case of a 27-years-old male from Mali, known for an untreated chronic hepatitis B, who was admitted to the emergency room for sudden abdominal pain. Physical exam revealed right side flank tenderness. Macular pigmented lesions were seen on palms and soles (figure 1). Blood test revealed high leucocytes count (15 G/L), elevated C reactive protein (179 mg/l) and acute kidney failure (125 mcmol/l of creatinine). The CT-scan showed a right renal infarct and a non-circular thickening of the aortic wall of the descending thoracic aorta associated to an intra-luminal thrombus (figure 2). Serology confirmed the diagnosis of syphilis (treponema antibodies index 14.3 (N < 0.80), RPR 4 (N <1 titer), TPHA 2560 (N < 80 titer). Human immunodeficiency virus and work-up for autoimmune disease were all negative. Therapeutic anticoagulation and penicillin G 4 Mio UI every 4 hours during two weeks resulted in a good outcome. Two weeks later, the PET-MRI showed resolution of the thrombus with a residual thin atheromatous plaque without metabolic activity.

Conclusion:
This is the first report of a case of syphilitic aortitis discovered in the work-up of a renal infarct.
Aim:
Scheduled orthopedic interventions are considered as "clean surgery", unless the intervention follows open fracture injury-related conditions or in the presence of spontaneous soft tissue infection. Thus, 1st and 2nd generation cephalosporins are usually recommended and selected for perioperative prophylaxis and do not cover anaerobes. The objective of the current study was to investigate whether some patient populations and types of surgery would be at particular risk for anaerobic infections and might thus benefit from an adapted prophylaxis regimen.

Methods:
Retrospective cohort study of adult in-patients operated for orthopedic infections from 2004-2014. We assessed obligate anaerobes and considered only first clinical infection episodes; thus possible recurrent infections were excluded. For this study, Propionibacterium acnes was not considered as anaerobe.

Results:
Anaerobes, isolated from intraoperative samples, were identified in 65 (2.4%) of a total of 2740 surgical procedures. Anaerobes were identified in half (33/65; 51%) as responsible for monomicrobial infections. Anaerobic co-infections were particularly related to plates, mostly in the lower extremities and to open fractures (8/150 vs. 57/2590; p=0.01) and polymicrobial infections (33/572 vs. 32/1853; p<0.01). In contrast, anaerobes were never documented in septic bursitis, and less likely in native bone or prosthetic joint infections (7/321; 2%). Anaerobic infection was also less frequent in immune-suppressed patients, including diabetic patients, with overall incidence of infection of 1.0% and 0.9%, respectively. The serum C-reactive protein level at admission was lower for infections involving anaerobes (median 61 mg/L vs. 77 mg/L, p=0.04) than for infections that did not involve anaerobes. By multivariate analysis adjusting for the case-mix, the presence of fracture-devices such as plates (odds ratio 2.1, 95%CI 1.3-3.5) was the only variable positively associated with anaerobic infection, while underlying immune suppression yielded to be formally protective (OR 0.4, 0.2-0.8). Sex, age, the presence of abscess formation, type of material, and exposure to antibiotic therapy prior to intraoperative sampling showed no association.

Conclusion:
Obligate anaerobes in orthopedic surgery are co-pathogens in half of the cases and mostly encountered in infections of the are not classical surgical site infections, but often related to open fractures or severe trauma.
Antibiotic consumption to early detect epidemics of *P. aeruginosa* in a burn center: a paradigm shift in the epidemiological surveillance of nosocomial infections

A Fournier [1], P Eggimann [1], O Pantet [1], M Krähenbühl [1], CL Bonnemain [1], C Fournier [1], JL Pagani [1], JP Revelly [1], E Dupuis-Lozeron [2], F Sadeghipour [1], A Pannatier [1], P Voirol [1], YA Que [1]

[1] CHUV, Lausanne, Switzerland

Introduction:
The control of antibiotic resistance and nosocomial infections are major challenges for specialized burn centers. Early detection of those epidemic outbreaks is crucial to limit the human and financial burden. We hypothesize that data collected by antibiotic consumption medico-economic surveys could be used as a warning signal to detect early nosocomial outbreaks.

Methods:
A retrospective analysis was conducted that included all burn patients staying >48 h on the Lausanne BICU (Burn Intensive Care Unit) between January 2001 and October 2012 who received systemic therapeutic antibiotics. Infection episodes were characterized according to predefined criteria. Antibiotic consumption data, obtained from the quarterly surveillance of drug consumption surveys, were translated into defined daily doses (DDDs).

Results:
In total, 297 out of 414 burn patients stayed >48 h, giving a total of 7458 ‘burn-days’. We identified 610 infection episodes (burn wound [32.0%], respiratory [31.1%], and catheter [21.8%]), from 774 microorganisms. *Pseudomonas aeruginosa* (26.2%), *Staphylococcus aureus* (11.5%), and *Candida albicans* (7.0%) were the main pathogens. We observed three distinct outbreaks of *P. aeruginosa* infections in 2002-2003, 2006, and 2009-2011. These outbreaks correlated with an increase in the DDDs of anti-*Pseudomonas* antibiotics.

Conclusion:
Our data support a paradigm shift in the epidemiological surveillance of nosocomial *P. aeruginosa* epidemics in burn centers, using the rise in antibiotic consumption as an early trigger to initiate the molecular typing of *P. aeruginosa* strains and the reinforcement of standard infection control procedures.
Antiretroviral Drugs Associated with Chronic ALT Elevations in Persons without HCV and HBV Infection

H Kovari [1,1], C Sabin [1,2], B Ledergerber [1,1], L Ryom [1,3], A d’Arminio Monforte [1,4], MG Law [1,5], S De Wit [1,6], A Phillips [1,2], JD Lundgren [1,3], R Weber [1,1]

[1] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, Zurich, Switzerland
[2] UCL, London, United Kingdom
[3] Copenhagen HIV Programme, University of Copenhagen, Copenhagen, Denmark
[4] Hospital San Paolo, University of Milan, Milan, Italy
[5] Kirby Institute, University of New South Wales, Sidney, Australia
[6] Department of Infectious Diseases, St Pierre University Hospital, Brussels, Belgium

Background:
Whilst HIV-positive persons on ART frequently have chronic liver enzyme elevation (LEE), the underlying cause is often unclear.

Methods:
D:A:D participants without HBV/HCV infection, with ≥3 alanine aminotransferase (ALT) measurements and normal baseline ALT, were followed from study entry to the earliest of chronic LEE, death, 1st Feb 2013, or last follow-up. Chronic LEE was defined as ALT >50/-35 U/L (males/females) at ≥2 visits spanning at least 6 months within 2 years. ART exposure was categorized as follows: no exposure; ongoing exposure either for < or ≥2yrs after initiation; and discontinued < or ≥2yrs earlier. Poisson regression was used to analyze LEE and its’ association with ART and traditional risk factors (details see footnote in figure).

Results:
18,060 participants were followed over a total of 92,059 person-years (PY). During follow-up, 5412 participants developed chronic LEE (incidence 5.88/100 PY [95% CI 5.72-6.04]). Chronic LEE was associated with ongoing exposure to regimens containing didanosine (<2yrs RR 1.26 [1.08-1.45], >2yrs 1.27 [1.14-1.43]); stavudine (<2yrs 1.51 [1.26-1.82], >2yrs 1.17 [1.04-1.33]); tenofovir (<2yrs 1.57 [1.41-1.75], >2yrs 1.17 [1.04-1.33]); emtricitabine (<2yrs 1.17 [1.03-1.32], >2yrs 1.0 [0.86-1.18]); nevirapine (<2yrs 1.41 [1.25-1.58], >2yrs 1.01 [0.91-1.13]); and efavirenz (<2yrs 1.13 [1.02-1.25], >2yrs 0.81 [0.73-0.90]). Because the association of tenofovir with LEE was unexpected, we further analysed commonly used tenofovir-containing regimens. The results are depicted in the figure. No evidence for an association with increased risk was found for lamivudine (<2yrs 0.88 [0.75-1.02], >2yrs 0.98 [0.87-1.11]); abacavir (<2yrs 1.08 [0.97-1.21], >2yrs 0.91 [0.83-1.01]); and all tested PIs, including lopinavir (<2yrs 0.81 [0.67-0.97], >2yrs 0.83 [0.70-0.99]), atazanavir (<2yrs 1.10 [0.94-1.28], >2yrs 0.72 [0.60-0.86]), darunavir (<2yrs 0.65 [0.51-0.84], >2yrs 0.53 [0.37-0.76]) and ritonavir (<2yrs 0.58 [0.49-0.68], >2yrs 0.79 [0.68-0.91]).

Conclusion:
Whilst didanosine, stavudine, nevirapine and efavirenz have been described to be hepatotoxic, we additionally observed an association between tenofovir and chronic LEE emerging within first 2 years after drug initiation. The results are consistent with other small case studies. The reasons for and clinical implications from this novel tenofovir-LEE signal should be investigated.

(P34)
Anévrismes mycotiques de la main: description et prise en charge chirurgicale de 3 cas
C Bouvet [1], J-Y Beaulieu [1]

[1] HUG, Genève, Switzerland

Introduction:
Les anévrismes mycotiques à la main restent une pathologie rare faiblement décrite dans la littérature. Ils peuvent être d'origine hématogène comme dans les cas d'endocardite ou exogène comme l'utilisation des seringues dans la mise en place des cathéters artériels ou chez les toxicomanes. Nous rapportons une série de 3 cas pris en charge dans notre centre.

Description Des Cas:
Le premier cas concerne un homme de 39 ans, qui 3 ans suite à un traumatisme avec un clou et un abcès qui avait été traité avec des antibiotiques, présente une masse sur l’artère collatérale ulnaire du pouce. Le bilan radiologique montre un anévrisme de cette artère et une prise en charge chirurgicale est planifiée avec excision de l’anévrisme. Le deuxième cas concerne un homme de 62 ans, qui a présenté une cellulite de la main à streptocoque β-hémolytique dans un contexte d’endocardite. Un traitement par antibiotique est alors instauré et une semaine plus tard le patient développe une douleur à la paume de la main associée à une masse pulsatile. Le bilan radiologique met en évidence un anévrisme de l’arcade palmaire superficielle. Une résection chirurgicale est effectuée avec reconstruction vasculaire à l’aide d’un greffon veineux. Le troisième cas concerne une femme de 45 ans qui s’est présenté aux urgences pour une masse pulsatile douloureuse de la paume de la main. On retrouve une notion d’endocardite dans l’enfance. Le bilan radiologique montre un anévrisme de l’arcade palmaire superficielle. Une prise en charge chirurgicale est effectuée avec résection de l’anévrisme et suture directe. Chez les 3 patients l’analyse pathologique a confirmé le diagnostic d’anévrisme mycotique.

Résultat:
Dans tous les cas les sutures ont permis de conserver la vascularisation des doigts. Un contrôle des zones anastomotiques fut réalisé dans tous les cas à 6 mois, permettant de confirmer la perméabilité vasculaire (ultra-sonographie et angio IRM) et l’absence de récidive anévrismale. Les patients ont pu reprendre une activité professionnelle.

Conclusion:
La prise en charge des anévrismes mycotiques à la main reste exceptionnelle et seuls quelques cas sont décrits dans la littérature, dans tous les cas il faut privilégier la mobilisation artérielle pour réaliser une suture directe et si la perte de substance artérielle est trop important il faut alors envisager une reconstruction vasculaire.
**P36**  
**Association of anti-tuberculosis drug levels with drug-related adverse events in TB/HIV co-infected patients in Uganda**

C Sekagya [1], A von Braun [1], B Ledergerber [2], A Buzibye [1], AU Scherrer [1], M Lamorde [1], D Nalwanga [1], L Henning [2], D Müller [2], U Gütteck [2], B Castelnuovo [1], A Kambugu [1], J Fehr [2]

[1] Infectious Diseases Institute, College of Health Sciences, Makerere University, Kampala, Uganda  
[2] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

**Aims:**  
Anti-tuberculosis (TB) drugs are generally well tolerated; however mild, severe or life threatening adverse events (AEs) may occur. There is not much data on the association between anti-TB drug levels and drug-related adverse events in sub-Saharan Africa. We aimed to assess the correlation between anti-TB drug levels and the incidence of anti-TB drug-related adverse events in TB/HIV co-infected adults.

**Methods:**  
The SOUTH study is an ongoing study conducted at the TB/HIV integrated clinic at the Infectious Diseases Institute in Kampala, Uganda. A cohort of TB/HIV co-infected patients were evaluated for AEs every two weeks during the first two months and monthly subsequently between May 2013 and May 2014. Pharmacokinetic blood sampling of isoniazid, rifampicin, ethambutol, and pyrazinamide was done 1 hour, 2 hours and 4 hours post dose at 2 weeks, 8 weeks and 24 weeks after initiation of anti-TB treatment using ultra violet high - performance liquid chromatography. Potential toxicities were assessed by patient interview for arthralgia and peripheral neuropathy; clinical examination for vibration sensation; and serum alanine transferase (ALT) measurements. AEs were graded according to the National Institute of Health Division of AIDS toxicity tables. Logistic regression accounting for repeated measures was used to determine associations between tertiles of anti-TB drug serum concentrations and AEs. We further compared continuous TB drug levels of patients with and without AEs using Wilcoxon rank-sum and Kruskal-Wallis tests.

**Results:**  
Of 149 patients, 103 (69%) experienced at least one AE. Patients with/without AE did not differ with regards to gender (51% vs. 57% male), median age (33 vs. 34 years), median BMI (19.2 vs. 19.2 kg/m2) and median CD4 cell count (160 vs. 188 cells/µL) (all P>0.6). Contrary to clinical assumptions, there was no evidence of an association between the serum levels of anti-TB drugs and the prevalence of their most common AE (all P>0.05, Figure). We did, however, observe a reduction over time of arthralgia and peripheral neuropathy but not liver toxicity. At weeks 2, 8 and 24 the prevalence of arthralgia was 57%, 53%, 15%, (P<0.001); peripheral neuropathy: 63%, 43% and 47% (P<0.015); and elevated ALT levels: 21%, 24%, 15% (P=0.82).

**Conclusion:**  
In these preliminary analyses there is no evidence of associations between serum anti-TB drug levels and the prevalence of drug-related AEs in TB/HIV co-infected individuals.
Associations of diabetes mellitus with orthopaedic infections: epidemiological experience from Geneva

I Uçkay [1], S Malacarne [1], I Uçkay [1], P Rohner [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Clinical experience suggests that a high proportion of orthopaedic infections occur in persons with diabetes. Surprisingly, there is little epidemiologic data (other than for diabetic foot infection) concerning this issue.

Methods:
We analysed several databases that we have compiled on adult patients hospitalised for orthopaedic infections at Geneva University Hospitals from 2004-2014. Group comparisons were done with the χ2 or the Wilcoxon-ranksum-test.

Results:
We retrieved 2632 episodes of infection for which there were data about the presence of concomitant diabetes mellitus. Overall, diabetes was noted in the medical record for 637 (24%) of these cases. The patients with, compared to those without, diabetes had >5 times more foot infections (263/637 [41.3%] vs. 150/1995 [7.5%]; p<0.01) and a significantly higher serum CRP level at admission (median 102 vs. 70 mg/L; p<0.01). Diabetic patients were older (median 67 vs. 52 years; p<0.01), more often male (456/637 vs. 181/1995; p=0.06), had more frequent polymicrobial infections (208/537 [38.7%] vs. 329/1753 [18.8%]; p<0.01), more isolates of gram-negative non-fermenting rods (85/241 [35.3%] vs. 156/1753 [8.9%]; p<0.01) and skin commensals (53/265 [20.0%] vs. 212/1753 [12.1%]; p=0.06). Excluding foot infections from these analyses did not change the statistically significant differences. Diabetes was present in 17% of all infected orthopaedic patients without foot involvement. In Geneva the overall prevalence of diabetes is estimated at 5.1% while we have found that the prevalence is 13% in our hospitalised adults.

Conclusion:
In Geneva, diabetes is present in 24% of all adult patients hospitalised for surgery for an orthopaedic infection, a prevalence that is several times higher than in the general population and at least 1.5 times higher than for the population of hospitalised patients. Compared to non-diabetics, patients with diabetes have significantly more infections that are polymicrobial, contain gram-negative rods and skin commensals.
Clinical and epidemiological differences between implant-associated and implant-free orthopaedic infections

I Uçkay [1], M Abbas [1], D Lew [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
The presence of an implanted foreign body is a major risk for infection. Although there have been many publications regarding the epidemiology and risk factors for implant-associated orthopaedic infections, few studies have investigated how clinical presentations may differ between infections with and without osteosynthethic material.

Methods:
We pooled clinical data from several databases of adult patients with orthopaedic infections hospitalised at Geneva University Hospitals from 2004 and 2014. We compared groups using the Pearson-χ²-test or the Wilcoxon-ranksum-test.

Results:
Among 2632 episodes of orthopaedic infection, 76% were implant-free osteoarticular or soft tissue infections. Among the 636 (24%) infections that involved osteosynthetic material, 312 (49%) were total joint arthroplasties, 143 single plates, and 50 single nails. The remainders were mixed implant infections, e.g., pins, wires, screws, spondylodeses, or cerclages. The implant-associated, compared to the implant-free, infections were significantly more frequently associated with: male sex (403/636 vs. 595/1996; p<0.01); older age (median 57 vs. 54 years; p<0.01); and, infections caused by skin commensal pathogens, e.g., coagulase-negative staphylococci, corynebacteria, propionibacteria (131/636 vs. 466/1599; p<0.01). In contrast, implant-associated infections were significantly less frequently associated with: bacteraemia (99/636 vs. 212/1996; p<0.01); immune suppression (177/636 vs. 803/1996; p<0.01); abscess formation (79/636 vs. 917/1996; p<0.01); polymicrobial pathogens (103/597 vs. 434/1733; p<0.01); and, foot infections (25/636 vs. 388/1996; p<0.01). The serum CRP levels at admission were similar (median 77 mg/L vs. 75 mg/L; p=0.21).

Conclusions:
Compared to implant-free infections, implant-associated orthopaedic infections are more likely monomicrobial and due to skin commensals, but less often associated with bacteraemia, immune suppression, or abscesses.
Cluster of leptospirosis acquired through river surfing in Switzerland

P Schreiber [1, 1, 2], L Aceto [2, 3], R Korach [3, 4], N Marreros [1, 5], M Ryser-Degiorgis [1, 5], H Günthard [1, 1, 2]

[1] University Hospital Zurich, Division of Infectious Diseases and Hospital Epidemiology, Zurich, Switzerland
[2] University of Zurich, Institute of Medical Virology, Zurich, Switzerland
[3] Triemli Hospital Zurich, Division of Infectious Diseases, Zurich, Switzerland
[4] Waid City Hospital Zurich, Department of Internal Medicine, Zurich, Switzerland
[5] University of Bern, Vetsuisse Faculty, Centre for Fish and Wildlife Health, Bern, Switzerland

Aim:
In Switzerland leptospirosis is still considered as a travel-associated disease. After the surprising diagnosis of leptospirosis in a patient with initially suspected primary HIV-infection we recognized acquisition through recreational activities and identified further affected individuals.

Method:
Detailed anamnesis excluding occupational exposure, acquisition abroad and pet contacts enabled detection of the source of infection and identification of a cluster of leptospirosis. Convalescent sera testing was performed to confirm Leptospira infection. Microscopic agglutination tests were used for Serovar determination.

Results:
Acquisition of leptospirosis was traced back to a surfing spot on a river in Switzerland (Reuss, Aargau). Clinical presentation was indistinct. Two of the three reported cases required hospitalization, one case even suffered from meningitis. Serologic tests indicated infection with the serovar Grippotyphosa in all cases. With exception of the case with meningitis no antibiotics were administered, as leptospirosis was just diagnosed after spontaneous resolution of most symptoms.

Discussion:
Despite a prolonged period of convalescence in two cases, full recovery was achieved. Recent reports on beavers suffering from leptospirosis of this region underline the possible water-borne infection of the three cases and raise the question of potential wildlife reservoirs. Insufficient awareness of caregivers - which might be promoted by the missing obligation to report human leptospirosis - in combination with the multifaceted presentation of the disease results in relevant underdiagnosis. More frequent consideration of leptospirosis as differential diagnosis is inevitable, particularly as veterinary data suggest reemergence.
Clustering of HIV Patients not Enrolled in the Swiss HIV Cohort Study (SHCS)

M Shilaih [1, 2], A Marzel [1, 2], WL Yang [1], AU Scherrer [1], J Schüpbach [2], J Böni [2], S Yerly [3], TKlimkait [4], V Aubert [5], M Cavassini [5], HH Hirsch [6], PL Vernazza [7], E Bernasconi [8], H Furrer [9], HF Günthard [1, 2], R Kouyos [1, 2]

[1] University Hospital Zurich, Zurich, Switzerland
[2] Institute of Medical Virology, University of Zurich, Zurich, Switzerland
[3] Laboratory of Virology, Geneva University Hospital, Geneva, Switzerland
[4] Department of Biomedicine–Petersplatz, University of Basel, Basel, Switzerland
[5] Division of Immunology, University Hospital Lausanne, Lausanne, Switzerland
[6] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Basel, Basel, Switzerland
[7] Division of Infectious Diseases, Cantonal Hospital St. Gallen, St. Gallen, Switzerland
[8] Division of Infectious Diseases, Regional Hospital Lugano, Lugano, Switzerland
[9] Department of Infectious Diseases, Bern University Hospital, Bern, Switzerland

Aim:
One of the central challenges in HIV surveillance is that the surveyed population might not be representative of the entire HIV-infected population, especially with respect to marginalized populations. The SHCS is exceptionally representative (75% of HIV patients on ART), however the possibility remains that entire sub-epidemics might be missed by the cohort. A unique opportunity to assess the presence of such “under the radar” populations is provided by a database of all genotypic resistance tests performed in Switzerland, which includes both cohort and non-cohort patients.

Methods:
Phylogenetic cluster analysis was used to assess the presence of a hidden sub-epidemic. 11338 SHCS and 3099 Swiss non-SHCS sequences were pooled with 27803 background sequences from the Los Alamos database (10 best BLAST hits for each Swiss sequence). A maximum likelihood phylogenetic tree was built using FastTree. Clusters that were dominated by Swiss sequences (>=80%) were interpreted as Swiss transmission clusters.

Results:
Non-B subtypes were strongly overrepresented in the non-SHCS compared to the SHCS (OR 3.0, 95% CI 2.8-3.3). Moreover, non-SHCS patients were more likely to be female (OR 1.4, 95% CI 1.3-1.6). Transmission groups were assigned to non-cohort sequences based on phylogenetic proximity. This revealed that heterosexuals were more present among non-SHCS patients (OR 2.0, 95% CI 1.8-2.2; compared to MSM). Associations remained significant after adjusting for sex, test date, and subtype. We found 301 transmission clusters purely of non-SHCS patients. However, these clusters were small (median 4.5, IQR 3.25-5.75, max 9) compared to those consisting only of SHCS patients (median 7.5, IQR 4.75-10.2, max 17). Non-SHCS patients were more likely to be part of a transmission cluster compared to SHCS patients (OR 1.9, 95% CI 1.8-2.1). However, sample date diminished said clustering preference of non-SHCS when included in the model (1.1, 95%CI 0.99-1.2).

Conclusion:
In this work we evaluated the coverage of the SHCS, one of the most representative HIV cohorts. We found an overrepresentation of non-B subtypes among non-SHCS patients suggesting that migrants might be underrepresented in the SHCS. We also observed transmission chains among non-SHCS patients, yet their limited size and frequency suggest that no major HIV outbreak in Switzerland is missed by the SHCS. More generally, this work shows the potential of sequence data to assess the representativeness of cohort studies.
Comparative genomics to investigate the emergence of Community-Associated Methicillin-resistant Staphylococcus aureus (CA-MRSA) USA300 clone in Geneva, Switzerland

E. von Dach [1], S.M. Diene [1], C Fankhauser [1], E.-J. Bonetti [1], J. Schrenzel [1], S. Harbarth [1], P. François [1]

[1] University Hospitals, Geneva, Switzerland

Introduction:
Molecular epidemiological surveys of CA-MRSA revealed a wide diversity of genetic backgrounds with only sporadic identification of USA300 isolates during the period 1994-2012.

Objectives:
We conducted a comparative genomics approach to trace origin, spreading and diversity of CA-MRSA USA300 clones accounting for 50% of CA-MRSA isolates identified in 2013.

Methods:
Solexa-Illumina was used for whole genome sequencing (WGS) of all USA300 isolated in 2013. Comparative genomics identified genomic alterations in this "clonal" population. All features including single-nucleotide polymorphisms (SNPs), ACME gene cluster, SCCmec structure, and mobile elements were documented and enriched with patient information. Published genomes of USA300 were used for comparison purposes and for investigating the relationship between isolates.

Results:
From 1994 to 2005, only 4 USA300 strains were identified in our institution. In 2013, among the 46 cases of CA-MRSA, USA300 were found in 22 patients (. 12 out of these 22 CA-MRSA were responsible for clinical infections whereas , 10 isolates were carriage cases of asymptomatic carriage) isolates. WGS allows allowed identifying two groups: (i) ACME positive (n=12) and (ii) ACME negative (n=10). Distinguishly In contrast to ACME-neg, the ACME-pos strains were resistant to ciprofloxacin and erythromycin. Comparison with a reference genome revealed that the ACME-pos group was more homogeneous than ACME-neg showing reduced genome plasticity. Two clusters of 2 strains were identified describing familial transmission events. The vast majority of ACME neg strains were isolated from patients traveling in to South America in the 12 last months. SNP position allows allowed tracing the geographical origin of strains and to observe that ACME-neg group is composed by strains harboring a SCCmec IVc element.

Conclusion:
In 2013, we observe a sudden and worrisome increase in CA-MRSA USA300 isolates in Geneva. WGS showed that acquisition of mobile elements and smaller genomic alterations are signatures of strain origin, probably related to antibiotic utilization. Our epidemiology is rapidly changing. Considering that most of USA300 result from importation events, its emergence coincides probably with loss of fitness of ancient clones.
P42
Cushing’s Syndrome of an HIV-Positive Patient Treated with a Ritonavir-Boosted Protease-Inhibitor under Intravitreal Triamcinolone Acetonide Therapy

V Gisler [1], J Garweg [2], K Feller [3], C Hauser [1]

[1] Klinik für Infektiologie, Inselspital, Bern, Switzerland
[2] Berner Augenklinik Lindenhofspital, Bern, Switzerland
[3] Klinik für Endokrinologie, Inselspital, Bern, Switzerland

Aim:
First description of a case of Cushing’s syndrome induced by intravitreal triamcinolone acetonide (TA) therapy in an HIV-positive patient on a ritonavir-boosted protease inhibitor.

Methods:
Case report and review of literature.

Results/Case Description:
In a treatment experienced 54 year old woman with HIV on antiretroviral therapy (ART) with ritonavir-boosted darunavir, raltegravir, emtricitabine and tenofovir, retinal detachment after a bilateral CMV-retinitis and secondary immune recovery uveitis with chronic cystoid macular edema was treated by bilateral vitrectomy. In 2008, three monthly intravitreal TA injections were required to maintain reading vision in both eyes. By 2014, easy bruising, arterial hypertension and osteoporosis were noted. Cushing’s syndrome was confirmed by plasma levels of cortisol (24nmol/L, normal range 171–536 nmol/l) and ACTH (1.8 ng/l, normal range 7.2 – 63.3 ng/L). A positive trough serum (HPLC) essay for TA 13 weeks after injection verified systemic presence of the intravitreally applied corticosteroid.

Conclusion:
Contrary to the findings of multiple pharmacological and clinical studies(1-3), intravitreally applied TA may have systemic effects. In our case, the potent CYP3A-inhibitors ritonavir and darunavir may have added to the development of hypercortisolism by a delay of the hepatic metabolic pathway of the corticosteroid(4). We assume that this drug-drug interaction has resulted in an iatrogenic Cushing’s syndrome. To our knowledge, this is the first case describing Cushing’s syndrome caused by a pharmaceutical interaction between protease inhibitors and TA after intravitreal application. Similar cases have been reported after intra-articular, epidural or orbital floor application of TA(5-7). However, in those settings the injection was applied to body compartments not strictly separated from the blood circulation. In our case, retinitic scars and vitrectomy may have contributed to a faster wash out of TA from the eye. Based on this case we state that intravitreal TA injections and protease inhibitors, notably after vitrectomy, deserve cautious follow up.

References:
Diagnosis of an Enterovirus C104 strain in a Lung Transplant Recipient by High-Throughput Sequencing

D Lewandowska [1, 1], O Zagordi [1, 1], A Zbinden [1, 1], M Schuurmans [1, 2], P Schreiber [1, 1, 3], B Ruehe [1, 1], FD Geissberger [1, 1], J Huder [1, 1], J Böni [1, 1], C Benden [1, 2], N Müller [1, 3], A Trkola [1, 1], M Huber [1, 1]

[1] University of Zurich, Institute of Medical Virology, Zurich, Switzerland
[2] University Hospital Zurich, Department of Pulmonology, Zurich, Switzerland
[3] University Hospital Zurich, Division of Infectious Diseases and Hospital Epidemiology, Zurich, Switzerland

Aims:
Primary or acquired immunodeficiency renders individuals prone to a broad range of infections with often unknown etiology causing a major challenge for conventional virus diagnostics. A metagenomic approach using high-throughput sequencing may overcome these limitations. To probe this, we designed a clinical trial to evaluate the entire virus population in immunocompromised patients after lung transplantation. We so far collected samples from 79 lung transplant patients and identified 24 patients that developed respiratory symptoms of unresolved etiology after routine virological and microbiological tests proved negative. Here, we report a first case of a 51-year old individual with a protracted respiratory tract infection 4 months after lung transplantation for respiratory failure related to cystic fibrosis.

Methods:
Sampling (blood, urine, stool, throat swab) is performed at the time of transplantation, 4 - 6 weeks and one year post transplant, or in case of presentation with symptoms suggestive of a viral infection. Respiratory samples were analyzed by a commercial multiplex real-time PCR assay (FTD Respiratory pathogens 21). Metagenomic virus profiles of throat swabs from several time points were determined by random amplification of whole nucleic acids combined with high-throughput sequencing.

Results:
In this particular patient, a commercial multiplex PCR assay produced ambiguous results due to cross-reactivity between Human Enterovirus (HEV) and Human Rhinovirus (HRV). Metagenomic sequencing analysis revealed though infection with Human Enterovirus C104 (HEV C104). HRV infection as the source of the highly positive PCR signal could be ruled out, as no HRV sequences were detected. Using reference-based alignment we were able to recover full-length genomes. We identified sequence variation characteristic in the C104 strains likely responsible for the low sensitivity of the multiplex PCR against this particular isolate. Additionally, metagenomic analysis identified co-infections with Polyomavirus KI and Torque Teno viruses in some of the samples.

Conclusions:
The metagenomic approach proved to be successful in both supporting the HEV diagnosis and clarifying potential viral co-infections. High-throughput sequencing combined with metagenomic analysis holds great promise for adaptation in routine diagnostic use, hence opening the door for a new area in virus diagnostics and management of viral infections in immunodeficient patients.
Does administration of antibiotic agents before intraoperative sampling in orthopedic infections alter culture results?

IUçkay [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Clinicians frequently withhold antibiotic agents before intraoperative sampling for infection, presuming that this will increase the likelihood of culturing pathogens.

Methods:
We performed a case-control study of adult patients hospitalised with orthopaedic infections 2000-2014. No sonication performed. Preoperative exposure was arbitrarily defined as any antibiotic consumption during the 14 days prior to surgical sampling, including patients with prophylactic exposure and those with an antibiotic-free window of some days (e.g. 10 days of pre-incision therapy, but pause during the two days prior to sampling).

Results:
Among 2400 episodes of orthopaedic infections (1059 osteoarticular, 302 prosthetic joint, 588 implant-associated, 435 septic bursitis), 1001 (42%) had received some antibiotic therapy before surgical sampling. Among these, 191 (19%) grew no pathogens while the proportion of culture-negative results in the 1399 who had no preoperative antibiotic therapy was only 6%. Of all positive intraoperative cultures, 38% exposed to pre-operative antimicrobial agents had a resistant pathogen isolated, although the clinical course was favorable in the majority of cases. By multivariate analyses, pre-operative antibiotic exposure was associated with more culture-negative results (odds ratio 2.6, 95% confidence intervals [CI] 1.2,6.0) and to the isolation of more antibiotic-resistant pathogens (OR 3.1 for the "emergence" or detection in non-fermenting gram-negative rods; OR 3.3 for skin commensals). The proportion of culture-negative results was not significantly lower when the antibiotic-free window was longer than 4 days.

Conclusion:
Exposure to pre-operative antibiotics, including single-dose prophylaxis, is associated with a three-fold increase in culture-negative intraoperative sampling results and selection of antibiotic-resistant non-fermenting rods and skin commensals. An antibiotic-free window of 4 days is associated with the same proportion of culture-negative results as a longer window.
Drug-Drug Interactions between anti-HCV Regimen Ledipasvir/Sofosbuvir and Antiretrovirals

P German [1], J Gaiha [2], K Garrison [1], PS Pang [1], LM Stamm [1], A Ray [1], G Shen [1], M Buacharern [1], A Mathias [1]


Introduction:
Use of some anti-HCV agents with antiretrovirals (ARVs) in coinfected patients may be complicated by drug-drug interactions (DDIs). A fixed-dose combination tablet composed of the NS5A inhibitor ledipasvir (LDV) 90 mg and NS5B inhibitor sofosbuvir (SOF) 400 mg is indicated for the treatment of chronic hepatitis C (CHC) genotype 1 infection in adults. We conducted a Phase 1 study to evaluate the potential DDI between LDV/SOF and protease-inhibitor (PI)-containing ARV regimens: ritonavir [RTV, r] boosted atazanavir (ATV/r) or darunavir (DRV/r) plus emtricitabine/tenofovir DF (FTC/TDF; TVD).

Methods:
This was a multiple-dose, randomized, cross-over study in healthy volunteers. In Part A (simultaneous dosing), subjects received LDV/SOF, ARVs (Cohort [CH] 1: ATV/r (300 mg/100 mg)+TVD (200 mg/300 mg); CH 2: DRV/r (800 mg/100 mg)+TVD), and LDV/SOF+ARVs each for 10 days. In Part B (CH 3 and CH4), an evaluation of staggered (12 hour) dosing of LDV/SOF and ARVs was conducted. LDV, SOF, GS-331007 (predominant circulating metabolite of SOF), and ARV plasma concentrations were analyzed and PK parameters were calculated. 90% CIs for the geometric least squares means ratios (%; combination vs. alone) for analytes’ AUCtau, Cmax and Ctau were estimated by a linear mixed effect model and compared to lack of PK alteration boundaries of 70-143%. Safety assessments were conducted during the study.

Results:
Ninety-five of 96 subjects (N=24/CH) completed the study; one CH 2 subject withdrew consent. Most adverse events (AEs) were Grade 1 or 2. Most commonly reported AEs were ocular icterus with ATV (22%, N=21; CH 1 and 3), headache (19%, N=18; all CH), and nausea (18%, N=17; all CH). One SAE of abdominal pain (Grade 3) was concluded related to ATV/r+TVD by the investigator. Modest increases in LDV and GS-331007 with ATV/r+TVD and a small reduction in SOF with DRV/r+TVD were observed. Increases in ATV and RTV were also observed, and TFV exposures were elevated with both ARV regimens, following either simultaneous or staggered administration of LDV/SOF.

Conclusion:
Study treatments were generally well tolerated. LDV/SOF increases TFV exposure within RTV-boosted ATV- or DRV-based regimens. The safety of higher TFV concentrations in this setting has not been established. Consider alternative HCV or ARV therapy to avoid increases in TFV. Patients should be monitored for TFV-associated adverse reactions if coadministered
<table>
<thead>
<tr>
<th>Change in PK Parameter</th>
<th>Simultaneous</th>
<th>12-Hour Stagger</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effect of LDV/SOF on ARVs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATV/RTV+TVD + LDV/SOF vs. ATV/RTV+TVD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATV</td>
<td>RTV</td>
<td>FTC</td>
</tr>
<tr>
<td>AUC&lt;sub&gt;tau&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C&lt;sub&gt;max&lt;/sub&gt;</td>
<td>47%</td>
<td>47%</td>
</tr>
<tr>
<td>C&lt;sub&gt;tau&lt;/sub&gt;</td>
<td>63%</td>
<td>45%</td>
</tr>
</tbody>
</table>

| DRV/RTV+TVD + LDV/SOF vs. DRV/RTV +TVD | | |
| DRV | RTV | FTC | TFV | DRV | RTV | FTC | TFV |
| AUC<sub>tau</sub> | 50% | 38% |
| C<sub>max</sub> | 64% | 46% |
| C<sub>tau</sub> | 48% | 59% |

| **Effect of ARVs on LDV/SOF** | | |
| ATV/RTV+TVD+LDV/SOF vs. LDV/SOF | | |
| LDV | SOF | GS-331007 | LDV | SOF | GS-331007 |
| AUC<sub>tau</sub> | 96% | 134% | 50% |
| C<sub>max</sub> | 68% | 75% |
| C<sub>tau</sub> | 118% | NA | 42% | 164% | NA |

| DRV/RTV+TVD+ LDV/SOF vs. LDV/SOF | | |
| LDV | SOF | GS-331007 | LDV | SOF | GS-331007 |
| AUC<sub>tau</sub> | 27% | 37% |
| C<sub>max</sub> | 37% | 31% |
| C<sub>tau</sub> | NA | NA |

Note: 90% CI of the GLSM ratio were within ( ), extended above ( ), or extended below ( ) the predetermined lack of PK alteration boundaries of 70% to 143%; NA: not estimated
Aim:
We aimed to analyze hip (THA) and knee total joint prostheses (TKA) with regard to late and/or haematogenous infections.

Methods:

Results:
In our institution, prosthetic joint infections (PJI) occurred in 112 patients; 72 patients with THA and 40 with TKA (incidence 1.9/1000 person-years for both groups). Infections within 3 months after arthroplasty occurred more frequently in the THA group (23.8 vs. 5.8/1000 person-years, incidence rate ratio (IRR) 4.1; 95% confidence interval 1.6-10.4). Late infections (defined as ≥ 100 months after prosthesis implantation) were more frequent in the TKA group (0.4 versus 2.1/1000 P-yrs, IRR 0.2, 95%CI 0.1-0.8). Primary sources of infection were mostly unknown. Our literature review revealed another 12 articles which could not confirm our observed trend of more frequent late/haematogenous PJI for TKA.

Conclusions:
Our single-center study revealed that patients with total knee arthroplasty witnessed more late and hematogenous prosthetic infection than patients with hip arthroplasties. Larger national analyses are needed in order to draw further conclusions.
Enterococci in orthopedic infections: who is at risk?

IUçkay [1], C Landelle [1], D Lew [1], D Pittet [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Orthopedic and trauma surgery is most frequently a clean surgery, unless injury-related or in the presence of spontaneous soft tissue infection. International guidelines recommend 1st and 2nd generation cephalosporins for perioperative prophylaxis; the later do not cover enterococci. The objective of the current study was to investigate whether some patient populations/types of surgery would be particularly at risk for enterococcal infections.

Methods:
Single-center, retrospective cohort study of adult patients operated for orthopedic infections at the University of Geneva Hospitals from 2004-2014. Only intraoperative microbiological samples and first clinical infectious episodes were considered for analysis. We excluded recurrent infections and pediatric cases.

Results:
Among 2740 surgical interventions, enterococci were identified in 100 (3.6%) intraoperative samples. Only 33/100 (33%) infections were monomicrobial. Overall, 665 surgeries (24%) involved osteosynthesis material. Enterococcal infections were particularly related to the foot (29/429 vs. 71/2311; p<0.01), associated with abscesses (25/1070 vs. 75/1670; p<0.01), polymicrobial infections (67/572 vs. 33/1853; p<0.01) and underlying osteosynthesis material (35/665 vs. 55/2075; p<0.01). All hardware (total joint arthroplasties, plates, nails) were equally infected without predilection for a particular material. The proportion of enterococci among all pathogens in diabetic foot infections was 7%. Enterococci significantly more often responsible for diabetic foot infections (48/659 vs. 52/2081; p<0.01) and infections among elderly people (median age 65 years vs. 56 years, p<0.01). In contrast, enterococci were almost never identified in septic bursitis and native bone or joint infections. By multivariate analysis adjusting for case-mix and age, the presence of diabetic foot (odds ratio 1.9, 95%CI 1.2-2.9) and polymicrobial infection (OR 6, 95%CI 3.9-9.4) were the only variables significantly associated with enterococcal infection; while sex, age, type of material, and the exposure to antibiotic therapy prior to intraoperative sampling were not.

Conclusion:
Enterococci in orthopedic surgery are rare and mostly encountered as co-pathogens in polymicrobial infections of the ulcerating diabetic foot. There is no indication to change our antibiotic prophylaxis policy. However, in terms of antimicrobial treatment of established infections in the diabetic foot population.
Epidemiology of Invasive Fungal Infections in Patients after Allogeneic Hematopoietic Stem Cell Transplantation from 2008 until 2013 in the Swiss Transplant Cohort Study

S Kuster [1], S Stampf [8], M Weiss [1], V Bättig [1], S Gerull [5], J Passweg [5], N Mueller [2], U Schanz [6], B Gerber [6], Ch Berger [4], Ch Van Delden [3], Y Chalondon [7], N Khanna [1]

[1] Division of Infectious Diseases and Hospital Epidemiology, University Hospital of Basel, Basel, Switzerland
[2] Division of Infectious Diseases and Hospital Epidemiology, University Hospital of Zurich, Zurich, Switzerland
[3] Division of Infectious Diseases and Hospital Epidemiology, University Hospital of Geneva, Geneva, Switzerland
[4] Division of Infectious Diseases and Hospital Epidemiology, University Childrens Hospital of Zurich, Zurich, Switzerland
[5] Hematology, University Hospital of Basel, Basel, Switzerland
[6] Hematology, University Hospital of Zurich, Zurich, Switzerland
[7] Hematology, University Hospital of Geneva, Geneva, Switzerland
[8] Basel Institute for Clinical Epidemiology and Biostatistics, Basel, Switzerland

Aims:
Invasive fungal infections (IFI) in particular caused by molds are a main cause of morbidity and mortality after allogeneic hematopoietic stem cell transplantation (HSCT). Pre-emptive or prophylactic treatments with efficacious anti-mold drugs might have influenced incidence and outcome of these infections. Here, we investigated the epidemiology, risk factors and outcomes of IFI and describe treatment modalities in all patients after HSCT within the Swiss Transplant Cohort Study (STCS).

Methods:
The STCS is a prospective, observational study initiated in 2009 for HSCT, including >95% of allogeneic HSCT recipients from three University Hospitals of Switzerland. We collected data regarding IFI after HSCT, risk factors, antifungal treatment, outcome and resistance patterns of fungal isolates by retrospective chart review. We calculated incidence rates and survival patterns of IFI, performed risk factor analysis for the development and outcome of probable/proven IFI post-transplant considering age, sex, epidemiology, transplant type, underlying diseases, graft-versus-host diseases (GvHD) and CMV reactivation.

Results:
From September 2009 to August 2013, 498 allogeneic HSCT conducted in 479 patients were included in the STCS. Following HSCT, 44 (9.0 %) probable/proven and 49 (10 %) possible IFI occurred. Cumulative 1-year incidence rate for probable/proven and possible IFI after HSCT were 7.9% and 10.1% (95% confidence interval [CI], 5.6-10.6, 7.6-13.4), respectively. Molds caused 22 (50%) and yeasts 10 (43.5%) of probable/proven IFI. Referring to multivariate analysis unrelated HLA-matched donor, receipt of myeloablative chemotherapy, lower Karnofsky-Score and any previous anti-fungal treatment were associated with higher risk of IFI, whereas GvHD and CMV were not. At last follow-up, 53.1% of patients were cured from IFI, 4.2% had a stable disease, whereas 42.7% had a treatment failure most often due to death (39.3%). The 1-year all-cause mortality rate was 24.7% (CI 20.5-28.6).

Conclusion:
In this large national cohort study of IFIs in HSCT recipients, the cumulative 1-year incidence was comparable to the literature and highest for mold infections followed by Candida infections. The incidence for probable/proven IFI is higher in the late post-HSCT phase compared to possible IFI that mainly occurred in the early post-HSCT phase. Further studies will analyse variables with the outcome and correlate the incidence with different treatment modalities.
Epidemiology, and clinical influence, of clinical obligate anaerobic isolates in diabetic foot infections

I Uçkay [1], B Kressmann [1], D Lew [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland [2], Switzerland

Aim:
The importance of isolates of anaerobes from wounds of DF is controversial.

Methods:
We performed a literature search of DFI studies published from 2004-2014 seeking all papers that reported data on causative pathogens and compared the results to our own cohort study of DFI patients at Geneva University Hospitals. We excluded papers reporting on colonization or clinically uninfected ulcers, case reports, animal or human in vitro studies, review papers, abstracts, and those that failed to specify cultures were processed for anaerobic pathogens.

Results:
Our search revealed 42 large-scale epidemiologic or interventional trials. In virtually all, the presence of anaerobes was not a major study question and mentioned in only a few lines. The unweighted mean percentage of patients who had at least one anaerobic pathogen in was 10% (range, 0% to 67%). There were large discrepancies among the studies both over time and within a same country, suggesting a lack of completeness of reporting results. The details of reporting varied regarding whether anaerobic pathogens were reported as a group or as individual microorganisms. None of the studies described what proportion of patients was receiving antimicrobial therapy. The main reported isolates in almost all studies were Bacteroides spp and Peptostreptococcus spp. Randomized trials of both soft tissue and bone infections reported similar rates of clinical success with all organisms, and with drugs having a large or small anaerobic coverage spectrum. In our hospital, among 517 DFI episodes we detected anaerobes in only 14 cases (3%), always as part of a mixed infection with aerobes. In three cases anaerobes were the main pathogens, in four a second pathogen and in seven the third pathogen on “semi-quantitative ranking”. The presence of anaerobic pathogens did appear to influence the risk of infectious treatment failure (7/14 vs. 237/517; Pearson-χ2-test; p=0.15) but was highly associated with the need for minor amputations clinically performed for ischemia (9/14 vs. 100/517; p<0.01). There were no episodes of anaerobic bacteraemia.

Conclusion:
The available literature and own experience do not reveal a clinically important role for obligate anaerobic (co)infections in the diabetic foot.
P50
Fever and its association with infection in polytrauma patients

S Abrassart [1], I Uçkay [1], S Steinmetz [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Polytrauma patients often receive preemptive or prophylactic antibiotic therapy because of the high risk of infection and long-lasting posttraumatic fever. We investigated factors associated with proven infection and its association with fever.

Methods:
Using a prospectively maintained database of patients hospitalised for severe polytrauma in our intensive care unit we conducted a case-control study with outcome infection. We did not count preoperative single-dose antibiotic prophylaxis as antibiotic therapy. We investigated the overall and daily occurrence of fever (defined as any temperature ≥38°C axillary) during the first 15 days of hospitalisation.

Results:
Among 155 patients with an episode of polytrauma (median age 38 years, 9 diabetic), fewer occurred in 80 (54%) despite the prescription of anti-inflammatory drugs in all cases and also corticosteroids in 15 cases. Overall, 120 patients (80%) underwent surgery, including for open fractures in 30 cases. The percentage of patients who were febrile was 48% on day 2 of hospitalization 52% on day 7 and 40% on day 15. Among 90 patients (58%) who were receiving antibiotic treatment (median 2 days) during the two-week window, infection was proven microbiologically and clinically in 25 patients (16%), of whom 6 (4%) fulfilled the criteria for sepsis. There were 10 episodes of pneumonia, 2 urinary tract infections, 2 bloodstream infections, 10 abdominal infections and 1 soft tissue infection. Overall, 22 of 80 (27.5%) febrile patients developed infection in contrast to 3 of 65 (4.6%) non-febrile patients (Pearson-χ²-test; p<0.01). In predicting infection, fever had a sensitivity of 88%, specificity of 57%, positive-predictive value of 28% and negative predictive values of 96%. Using daily stratified analyses with categorical and continuous temperature variables confirmed the statistical association of fever with infection for each day (all p values <0.01). By multivariate analysis, fever had an independent significant associated with infection (odds ratio 9.2, 95%CI 2.5-34.5); while surgery, open fractures, compartment syndrome pelvic trauma, facial trauma, abdominal trauma, and use of urinary catheters did not. The goodness-of-fit-value was 0.37 and the ROC value 0.85, indicating a high accuracy of our final model.

Conclusion:
Fever is significantly associated with infection both overall and stratified upon individual days, with no apparent time threshold.
Background:
Patients infected with HIV-1 viruses carrying drug resistance mutations have limited treatment options. Therefore it is important to monitor time trends of emergence of HIV-1 drug resistance at a population level.

Methods:
We studied the presence of HIV-1 drug resistance among 11,148 patients from the Swiss HIV Cohort Study (SHCS) who were treated with antiretroviral treatment (ART) between 1999 and 2013. A total of 8,152 genotypic resistance tests were performed among 3947 ART-experienced patients. Patients were categorized in 3 groups based on their first-line ART: 1) historic ART included single class therapies or dual class therapies with one NRTI, 2) historic combination ART (cART) included unboosted PI and at least two NRTIs and 3) potent cART included treatments with ≥3 drugs which contained NRTIs, NNRTIs, ritonavir-boosted PIs, entry inhibitors or integrase inhibitors. HIV-drug resistance was defined as the presence of ≥1 major mutation.

Results:
The number of ART-experienced patients in the SHCS increased from 4621 in 1999 to 8105 in 2013. The number of patients with historic first-line ART/cART steadily decreased due to loss-of-follow-up or death whereas the percentage of actively participating patients with potent first-line cART increased from 5.9% in 1999 to 61.0% in 2013 [Figure A]. The number of patients detected with ≥1 drug resistance mutation remained stable within the last 10 years (about 2000 patients) [Figure B] but the proportion of ART-experienced patients detected with a mutation decreased substantially from 34.7% in 2003 to 24.2% in 2013 (p<0.001). In 2013, 974 patients had single-class drug resistance (12.0%), 721 (8.9%) dual-class drug resistance and 265 (3.3%) triple-class drug resistance. Most patients with dual and triple-class drug resistance started their treatment with historic ART, 52.3% and 71.1%, respectively. Triple-class resistance was very rarely detected among patients who started with potent first-line cART (0.4% in 2013) but was increasing among patients with first-line historic ART (0.1% in 1999 to 10.8% in 2013, p<0.001).

Conclusion:
Our study demonstrates that the emergence of drug resistance can be minimized in a setting with new potent therapies and close monitoring. Multiple-class resistance remains mainly a problem for patients who have once received historic ART. This population has limited treatment options and should be observed carefully to avoid the transmission of drug-resistant viruses.
High Procalcitonin levels despite no apparent Infection in a Patient with multicentric Castleman disease Is PCT production triggered by CD20 positive Lymphocytes?

R.J. Piso [1, 1], W. Mingrone [1, 1], I. Griesshammer [1, 1]

[1] Kantonsspital, Olten, Switzerland

Background:
Castleman disease is a rare illness, in patients with HIV-Infection seen with a close association with HHV 8. Procalcitonin is mainly a marker for bacterial infection, but while it can be produced in many cells, the main production in case of sepsis is not clear.

Methods:
In a 51 year old male with an advanced HIV infection (42 CD4 cells), antiretroviral treatment was started. While he responded well to treatment with suppression of viral load a rise in CD4 cell to 194/ul, two episodes of multicentric Castleman disease evolved one and five month after start of ART. The first episode was seen as sepsis without proven cause, treated with ceftriaxon followed by levofloxacin. At the second episode, again marked with fever, severe thrombocytemia and leucocytemia, multicentric Castleman disease was diagnosed histologically in lymph nodes, with high HHV (titer 6.9 log/ml) in blood. The patient was initially treated with levofloxacin, followed by ertapenem, but no infection could be found in multiple investigations (serology, blood cultures, CT scans). After diagnosis of Castleman disease, the patient was treated with corticosteroids, etopophos and rituximab. However, the situation deteriorated and the patient died by multi organ failure. Interestingly, high titer of Procalcitonin (up to 36.6 ng/ml) where measured in the first as well as in the second episode.

Conclusion:
As multicentric Castleman disease is seen as a proliferation of CD20 positive cells, it may be hypothesised that these cells have an important function in the production of procalcitonin.
Impact of subinhibitory concentrations of clindamycin on biofilm formation and matrix composition in Staphylococcus aureus

K Schilcher [1], AS Zinkernagel [1]

[1] University Hospital Zurich and University of Zurich, Zurich, Switzerland

Aims:
Staphylococcus aureus is a Gram-positive bacterium responsible for acute life threatening infections as well as chronic infections associated with foreign bodies. Foreign body infections are characterized by biofilms which are very difficult to treat since antibiotics barely penetrate through the biofilm matrix. This results in an antibiotic diffusion gradient and subsequently in subinhibitory antibiotic concentrations within the biofilm. S. aureus biofilms consist of polysaccharides, proteins and extracellular DNA (eDNA). The S. aureus nuclease Nuc1 as well as amyloid fibres phenol soluble modulins (PSMs) are crucial for structuring mature biofilms. It was previously shown that subinhibitory concentrations (sub-MICs) of clindamycin lead to up- or downregulation of certain bacterial virulence factors such as Nuc1. We aimed to investigate whether sub-MICs of clindamycin affect the matrix composition of S. aureus biofilms.

Methods:
S. aureus strains were grown in 96-well plates for static biofilm assays in the presence and absence of sub-MICs of clindamycin. Biofilm mass was measured with a photometer after crystal violet staining. eDNA was isolated from sonicated biofilms by enzymatic digestion and phenol:chloroform extraction and quantified using spectrophotometry. Altered gene expression of psmβ upon exposure to sub-MICs of clindamycin was assessed by quantitative RT-PCR.

Results:
S. aureus biofilms grown in the presence of sub-MICs of clindamycin formed a thicker biofilm compared to biofilms grown without sub-MICs of clindamycin. The observed difference correlated with increased levels of eDNA. The increase in biofilm production was independent of the Nuc1 repression by sub-MICs of clindamycin. We observed an approximately 40-fold upregulation of psmβ gene expression in biofilms grown in presence of sub-MICs of clindamycin.

Conclusion:
Exposure to sub-MICs of clindamycin, which is routinely used to treat foreign body infections, lead to increased S. aureus biofilm formation. The increased biofilm mass correlated with increased eDNA levels in the biofilm. However we clearly showed that this was not due to Nuc1 repression by sub-MICs of clindamycin. The observed upregulation of psmβ upon exposure to sub-MICs of clindamycin is a potential mechanism for the increase in biofilm mass. This study provides the basis for further research on PSMs and eDNA as potential drug targets against biofilm-associated staphylococcal infections.
P55
Importance of continuous monitoring of HIV-infected patients screened for pulmonary tuberculosis - independently of screening results

A von Braun [1], C Sekagyya [1], L Henning [2], R Nakijoba [1], I Ariko [1], J Mayito [1], D Nalwanga [1], S Okware [1], B Castelnuovo [1], J Fehr [2], A Kambugu [1]

[1] Infectious Diseases Institute, College of Health Sciences, Makerere University, Kampala, Uganda
[2] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

Aim:
In this study, we aimed to assess the clinical outcome of patients classified as having “no pulmonary TB” (PTB) after screening according to the WHO algorithm at the TB-HIV integrated clinic of the Infectious Diseases Institute (IDI) in Kampala, Uganda.

Methods:
Patients presenting at IDI with cough for more than two weeks are referred to the TB-HIV integrated clinic and screened for PTB according to the WHO algorithm. We retrospectively analysed data on all patients screened for PTB between April 29 and July 9 2013 in which screening results were negative. Information was collected from the screening log, the clinic files and the electronic medical records from the time of screening up to October 2014. Patients not seen at the IDI at least every 3 months since the initial screening visit were additionally contacted by telephone for information on their outcome.

Results:
During the analysed period 73 HIV-infected adults were screened for PTB (Figure). Of these, 41 (56%) patients with negative results for microscopy (33/41; 80.5%) and/or GeneXpert MTB/RIF (11/41; 26.8%) were classified as “no PTB” on the basis of clinical and radiological findings. Female patients accounted for 68.3% (28/41) and the median age was 36 years (range: 20–65, IQR). Median CD4 cell count of all subjects was 312/ul (IQR: 224–435), and 48.8% (20/41) were on antiretroviral treatment (ART) at the time of TB screening. All patients with negative screening results were treated with antibiotics for presumed lower respiratory tract infection. The majority of these patients (29/41; 70.1%) experienced complete resolution of symptoms. Due to lack of clinical improvement on antibiotic treatment 6/41(14.6%) were re-assessed and diagnosed with TB within 3 months, which puts the rate of delayed TB cases after initial screening at 15.8% (6/38). Our analysis further revealed that 14.6% (6/41) were lost to follow-up after screening; 2 patients (33%) were not reachable by phone while the remaining 4 (66%) were reported to have died by family members.

Conclusions:
Our findings emphasize the importance of active tracking and equally close monitoring of HIV-infected patients independently of TB screening results. The integrated TB-HIV clinic at the IDI therefore plans to adapt internal standard operating procedures accordingly. Patients screened for TB will be followed up two weekly for three months and actively tracked through phone calls and home visits if they do not return for appointments.

Figure 1: Outcome of HIV-infected patients screened for tuberculosis from April 29 to July 9 2013 at the Infectious Disease Institute in Kampala, Uganda

Screened: 73
Cough: 73 (100%)
Fever: 30 (41.1%)
Sweats: 23 (31.5%)
Weight loss: 19 (25.6%)

PTB: 32 (43.3%)

No PTB: 41 (56.2%)
Antibiotics for treatment of LTBI

Full recovery: 29 (79.1%)

No improvement

TB treatment started: 6/38 (15.8%)

Diagnosed:
Culture-positive: 1
GeneXpert MTB/RIF positive: 1
Chest x-ray and ultrasound: 3
Histology of lymph nodes: 1

Lost to follow-up: 6 (15.8%)
Phone call: 4
Died: 4
Unknown outcome: 2

*PTB = pulmonary tuberculosis
**LTBI = latent tuberculosis infection
Incidence of Propionibacterium acnes infection in orthopedic and trauma surgery

IUçkay [1], D Landelle [1], E Coppens [1], D Pittet [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
P. acnes has been associated with late, smoldering and healthcare-associated infections of the shoulder and spine. However, the epidemiology of P. acnes with respect of other orthopedic locations and patient populations remains largely unknown.

Methods:
Retrospective, single-center, descriptive and case-control studies of adult patients hospitalized for orthopedic infections at the University of Geneva Hospitals from 2004-2014. We used only intraoperative microbiological samples and first clinical infection episodes. We excluded recurrences, colonization and pediatric cases. Cefuroxime (or vancomycin) was used for perioperative prophylaxis. Microbiological samples were incubated for a median of 5 days.

Results:
P. acnes was isolated intraoperatively in only 37/2740 (1.35%) surgical procedures. A total of 22/37 infections were monomicrobial. The median age of all patients was 57 years; 871 were females and 1021 were immune-suppressed. Overall, 665 surgical procedures (24%) involved hardware/osteosynthesis material. P. acnes was more frequently identified during procedures in the presence compared with the absence (24/665 vs. 13/2075; p<0.01) of hardware/foreign material. P. acnes was frequently associated with other skin commensals (12/291 vs. 25/2134; p<0.01) and involved the lumbar and shoulder regions. The proportion of P. acnes among all pathogens in the spine and shoulder were 8% and 6%, respectively. In contrast, P. acnes was almost never identified (3/1021 vs. 334/1719; p<0.01) among immune-suppressed patients, in foot infections, septic bursitis, native bone and joint infections, soft tissue abscesses, prosthetic joints, and tibia nails. The median admission C-reactive protein serum level was lower for P. acnes than for infections caused by other pathogens (24 mg/L vs. 77 mg/L, p<0.01). By multivariate analysis adjusting for case-mix, the lumbar region (odds ratio 7.4, 95%CI 1.2-46.3), the shoulder (OR 9.9, 1.6-60.1) and the presence of hardware (OR 8.2, 2.4-28.4) were significantly associated with P. acnes infection; while sex, age, immune-suppression and the administration of antibiotic therapy prior to intraoperative sampling were not. The goodness-of-fit-value of the model was 0.99 and the ROC-value 0.85, indicating a high accuracy.

Conclusion:
In our institution, P. acnes is very rarely associated with clinical orthopedic infections. It is almost never responsible for infection below the lumbar spine level. P. acnes infections are asso
Aim:
Obesity is highly prevalent in patients undergoing Total Knee Arthroplasty (TKA). Previous studies assessing the influence of obesity on revision and infection rates after primary TKA have led to controversial results. Our objective was to assess the effect of different categories of BMI on revision and infection after primary TKA. We studied the effect in all patients as well as in women and men separately.

Material and Methods:
We conducted a prospective cohort study at the Geneva University Hospitals including all primary TKAs performed in our institution between April 1998 and December 2011. Outcomes were all-cause revision and deep infection as a function of BMI categorized according to WHO classification. Effects were measured using incidence rates and rate ratios (IRR). Adjustment for baseline imbalances was performed using a propensity score.

Results:
A total of 2,816 TKAs performed in 2,346 patients were included (mean age 72, 69% women). Mean follow-up was 86 months (range 2-183). Baseline characteristics showed that increasing BMI was associated with a higher proportion of women, decreasing age and more frequent comorbidities. Sex stratification assessment of these characteristics revealed that men undergoing TKA were younger and that their health was poorer in terms of comorbidities. Over the study period, we observed 70 (2.5%) revisions and 33 (1.2%) infections. Comparing BMI ≥ 35 with BMI < 35, there were 7.0 vs. 3.3 revisions/1000 Person-years and 3.5 vs. 1.5 infections/1000 Person-years. Adjusted IRRs were 2.1 (95% CI 1.2-3.5) for revision and 2.3 (95% CI 1.1-5.1) for infection. Stratification according to sex showed that both men and women with a BMI ≥ 35 were more at risk for revision and infection than those < 35. This difference was more pronounced in men.

Conclusion:
A BMI ≥ 35 as compared to < 35 was associated with a two times higher rate of all-cause revision and deep infection. The effect was stronger in men than in women.
Is there an association between smoking status and prosthetic joint infection following primary total joint arthroplasty

I Uçkay [1], A Gonzalez [1], A Lübbeke [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Smoking has been associated with lower tissue oxygenation, poorer vascularisation and altered immune response, predisposing smokers to a higher risk for postsurgical infections. The aim of this study is to estimate the influence of smoking status on the incidence of prosthetic joint infection following primary total joint arthroplasty (TJA).

Methods:
We performed a prospective hospital-registry based cohort study including all primary total knee and hip arthroplasties performed between March 1996 and December 2013 and following them until June 2014. Smoking status at time of surgery obtained from the anesthesiology report was classified in never, former and current smoker. Incidence rates and incidence rate ratios (IRR) for prosthetic joint infection according to smoking status were assessed within the first year and over the whole study period. Adjusted IRRs were obtained using competing risks regression. Adjustment using the propensity score method was performed for the following baseline characteristics: age, sex, BMI, ASA score, diabetes, diagnosis, surgery duration and site of arthroplasty. Kaplan-Meier survival analysis was also employed.

Results:
We included 7,876 TJAs, 3,103 knee (39.4%) and 4,773 hip arthroplasties. Mean age was 70 years, 61% were women, mean follow-up time was 80 months (range 6-216). 5,290 (67.2%) were never smokers (group 1), 1,215 (15.4%) former smokers (group 2) and 1,371 (17.4%) current smokers (group 3). Over the study period, 108 prosthetic joint infection occurred, 57 in never-smokers, 28 in current, and 23 in former smokers. Incidence rates of infection within one year were for group 1, 2 and 3, respectively as follows: 7.0, 13.0 and 15.2 cases/1000 person-year. Comparing ever- vs. never-smokers, the crude IRR was 2.0 (95% CI 1.3-3.2), and the adjusted IRR 1.7 (95% CI 1.01-2.8). Incidence rates for infection over the whole study period were 1.6, 3.2 and 3.2 cases/1000 person-years for group 1, 2 and 3, respectively. Crude IRR for ever- vs. never-smokers was 2.0 (95% CI 1.3-2.9) and after adjustment 1.6 (95% CI 1.02-2.4). Results were similar for current and former smokers (vs. never-smokers) and following hip and knee arthroplasty.

Conclusions:
Smoking (both current and former) was associated with an about 1.5 times higher incidence rate of prosthetic joint infection following TJA. The difference was established already in the first year after surgery and did not change thereafter.
Ledipasvir/sofosbuvir for 12 weeks in patients co-infected with HCV and HIV-1

S Naggie [1], C Cooper [2], M Saag [3], J Gaiha [4], LM Stamm [5], JC Yang [5], PS Pang [5], JG McHutchison [5], D Dieterich [6], M Sulkowski [7]

[1] Duke Clinical Reserach Institute, Durham, NC, United States
[2] University of Ottawa, The Ottawa Hospital, Ottawa, ON, United States
[3] University of Alabama at Birmingham, Birmingham, AL, United States
[5] Gilead Sciences, Foster City, United States
[6] Icahn School of Medicine at Mount Sinai, New York, NY, United States
[7] Johns Hopkins University School of Medicine, Baltimore, United States

Aim:
Historically HIV co-infection was considered a negative predictor of HCV response to treatment with interferon/ribavirin (IFN/RBV). For sofosbuvir-based regimens, HIV/HCV patients have achieved similar sustained virologic response (SVR) rates as HCV monoinfected patients. We evaluated the safety and efficacy of the IFN-free, RBV-free, single tablet regimen of ledipasvir/sofosbuvir (LDV/SOF) in HCV genotype 1 or 4 patients co-infected with HIV-1 in the Phase 3 ION-4 study.

Methods:
HCV treatment naïve and experienced HIV co-infected patients on stable, approved antiretroviral (ARV) regimens were enrolled and received LDV/SOF (90mg/400mg) once daily for 12 weeks. Patients with compensated cirrhosis were eligible. Permitted concomitant ARVs included tenofovir and emtricitabine (TDF+FTC) with raltegravir (RAL), efavirenz (EFV) or rilpivirine (RPV). Safety evaluations included adverse event (AE) and standard laboratory parameter monitoring in addition to enhanced renal toxicity monitoring, CD4 count and HIV-1 RNA levels. The primary efficacy endpoint was SVR12.

Results:
335 patients with GT1a (75%), GT1b (23%) and GT4 (2%) were enrolled; 82% were male, 61% were white, mean age was 52 (range 26-72), mean baseline HCV RNA was 6.7 log10 IU/mL (range 4.1-7.8), median baseline CD4 count was 662 cells/ul (Q1, Q3=469, 823), 20% had cirrhosis, 24% were IL28B CC genotype and 55% had not responded to prior HCV treatment. Patients were taking EFV (48%) or RAL (44%) or RPV (9%). The table shows SVR12 by ARV regimen. Overall, the SVR12 rate was 96% (321/335); 2 patients had on-treatment virologic failure likely due to non-compliance and 10 had virologic relapse after discontinuing treatment. SVR12 was similar among non-cirrhotic (96%) and cirrhotic (94%) patients and also among treatment naïve (95%) and treatment experienced (97%) patients. No patient had confirmed HIV virologic rebound (HIV-1 RNA≥400 copies/mL). No patients discontinued study drug due to an AE. AEs occurring in ≥10% of patients were headache (25%), fatigue (21%) and diarrhea (11%). No significant lab abnormalities were observed.

Conclusions:
The IFN-free, RBV-free, single tablet regimen of LDV/SOF administered once daily for 12 weeks is highly effective and well tolerated in treatment-naïve and experienced, genotype 1 or 4 HCV-infected patients with HIV-1 co-infection, including those with cirrhosis.

<table>
<thead>
<tr>
<th>Virologic Response</th>
<th>TDF+FTC+EFV (N=160)</th>
<th>TDF+FTC+RAL (N=146)</th>
<th>TDF+FTC+RPV (N=29)</th>
<th>Overall (N=335)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVR12, n (%)</td>
<td>151 (94)</td>
<td>142 (97)</td>
<td>28 (97)</td>
<td>321 (96)</td>
</tr>
<tr>
<td>On-Treatment Failure, n (%)</td>
<td>1 (&lt;1)</td>
<td>0</td>
<td>1 (3)</td>
<td>2 (&lt;1)</td>
</tr>
<tr>
<td>Relapse, n (%)</td>
<td>8 (5)</td>
<td>2 (1)</td>
<td>0</td>
<td>10 (3)</td>
</tr>
<tr>
<td>Other, n (%)</td>
<td>0</td>
<td>2 (1)</td>
<td>0</td>
<td>2 (&lt;1)</td>
</tr>
</tbody>
</table>

Table 1: SVR12 by HIV ARV regimen and Overall
Late presentation to HIV-care of sub-Saharan Africans living in Switzerland

A Hachfeld [1], B Ledergerber [2], K Darling [3], R Weber [2], A Calmy [4], M Battegay [5], K Sugimoto [6], C Benedetto [7], C Fux [8], P Tarr [9], R Kouyos [2], HJ Furrer [1], G Wandeler [1]

[1] Department of Infectious Diseases, Bern University Hospital and University of Bern, Bern, Switzerland
[2] University Hospital Lausanne, Lausanne, Switzerland
[3] University Hospital Geneve, Geneva, Switzerland
[4] University Hospital Basel, Basel, Switzerland
[5] Canton Hospital, St.Gallen, St. Gallen, Switzerland
[6] Regional Hospital, Lugano, Lugano, Switzerland
[7] Canton Hospital Aargau, Aarau, Switzerland
[8] Canton Hospital Bruderholz, University of Basel, Basel, Switzerland

Aims:
To better understand individual reasons for late presentation to HIV care in patients of African origin followed in the Swiss HIV Cohort Study (SHCS).

Methods:
All adult patients enrolled in the SHCS between July 2009 and June 2012 were classified as late presenters (LP) in the presence of an initial CD4 count <350 cells/µL or an AIDS-defining illness, or as non-late presenters (NLP). Patients were classified into three groups according to their region of origin: Western Europe (WE), sub-Saharan Africa (SSA) and other. Information on the circumstances of HIV-testing and individual reasons for deferring testing were obtained during structured interviews. Reasons for late testing were grouped into i) low risk perception, ii) fear and iii) lack of information/awareness, and were compared between LP from WE and SSA.

Results:
Among 1,366 patients enrolled in the SHCS during the study period, 680 (49.8%) were LP and 501 (73.7%) of them took part in the survey. The proportion of LP was 45.8% (435/950) in patients from WE, 64.6% (126/195) in those from SSA and 54.1% (118/218) in others (p<0.001). Whereas women and low educated patients from WE had higher proportions of LP than NLP this was not true for SSA. Compared to LP from WE, those from SSA were more likely to be diagnosed during pregnancy and less likely by a GP or in the context of relevant symptoms. Self-reported reasons for late HIV testing associated with low risk perception, fear and lack of information/awareness were reported by 88.1%, 81.5% and 77.3% of LP, respectively. 46.4% of LP from SSA was not aware of anonymous testing possibilities. LP from SSA were most likely to report fear-related reasons for late testing, especially fear from relatives’ and friends’ reactions and from being expelled from Switzerland (39.3%, 50.0% and 26.1%).

Conclusions:
The majority of patients from SSA followed in the SHCS are LP, independently of sex or education level. Difficulties in accessing medical care are reflected by the higher proportion of HIV diagnoses during pregnancy and the reduced number of infections diagnosed by GPs. Not feeling at risk, lack of knowledge about HIV-testing and treatment possibilities as well as fear-related issues seem to be the most important self-reported reasons for late presentation to HIV care in patients from SSA. Acknowledgments: We thank all patients, doctors and nurses associated with the Swiss HIV Cohort Study (SHCS). We also thank Katharina Küchler and Marion Schlau.
<table>
<thead>
<tr>
<th>Reason</th>
<th>SSA</th>
<th>WE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn't see benefit of knowing HIV status</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Didn't know anonymous testing facilities</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Not aware of treatment possibilities</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Didn't know HIV symptoms</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>Didn't feel ill</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Didn't feel at risk</td>
<td></td>
<td>80%</td>
</tr>
<tr>
<td>Fear of relatives reactions</td>
<td></td>
<td>40%</td>
</tr>
<tr>
<td>Fear of friends reactions</td>
<td></td>
<td>40%</td>
</tr>
<tr>
<td>Afraid of finding out</td>
<td></td>
<td>40%</td>
</tr>
<tr>
<td>Fear of expulsion*</td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td><strong>Percentage (%)</strong></td>
<td><strong>0</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Figure 1: Reasons for late testing in sub-Saharan compared to West European Late Presenters*
P61
Lentivector knock-down of CCR5 in hematopoietic stem cells confers functional and persistent HIV-1 resistance in humanized mice

R Myburgh [1, 2], S Ivic [1], MS Pepper [2], G Gers-Huber [1], D Li [1], A Audige [1], MA Rochat [1], V Jaquet [3], S Regenass [4], P Salmon [5], KH Krause [3], RF Speck [1]

[1] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, Zurich, Switzerland
[2] Department of Immunology, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa
[3] Department of Pathology and Immunology, Faculty of Medicine, University of Geneva, Geneva, Switzerland
[4] Clinic of Immunology, University Hospital Zurich, Zurich, Switzerland
[5] Department of Neurosciences, Faculty of Medicine, University of Geneva, Geneva, Switzerland

Aim:
Gene engineered CD34+ hematopoietic stem cells (HSCs) can be used to generate an HIV-1 resistant immune system.

Methods:
In this study, we combine CCR5 knock-down from a highly efficient miRNA lentivector and pre-transplantation selection of transduced HSCs.

Results:
Low level transduction of HSCs and subsequent sorting by flow cytometry yielded >90% transduced cells. Mice transplanted with these cells showed functional and persistent resistance to a CCR5-tropic HIV strain (YU-2): viral load was significantly decreased over months, and human CD4+ T cells were preserved. In one mouse, viral mutations, presumably to a CXCR4-tropic strain, overcame HIV resistance.

Conclusion:
Our results suggest that HSC-based CCR5 knock-down may lead to efficient control of HIV in vivo. As a certain threshold of transduced HSCs is required, improved transduction procedures or in vitro/in vivo selection strategies might be necessary if this is to be translated to clinics. We overcome a major limitation of previous HIV gene therapy humanized mice studies, namely the generation of chimeric mice in which only a proportion of the cells in vivo are anti-HIV engineered. We produce mice where practically all CD4+ T-cells are transduced resulting in long-term suppression of HIV. This underlines the promising future of gene engineering HIV resistant CD34+ cells which produce a constant supply of HIV resistant progeny.
Low incidence and favourable outcome of Clostridium difficile Infections in Solid Organ Transplant Recipients of the Swiss Transplant Cohort Study

A Cusini [1], C Béguelin [1], S Stampf [9], K Boggian [3], C Garzoni [4], O Manuel [5], P.R.A. Meylan [5], N Mueller [6], M Weisser [2], C Berger [7], M.T. Koller [9], C Van Delden [8]

[1] Clinic of Infectious Diseases, Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland
[2] Division of Infectious Diseases & Hospital Epidemiology, University Hospital Basel, Basel, Switzerland
[3] Division of Infectious Diseases & Hospital Hygiene, Cantonal Hospital St. Gallen, St. Gallen, Switzerland
[4] Clinic of Internal Medicine & Infectious Diseases, Clinica Luganese, Lugano, Switzerland
[5] Infectious Diseases Service, University Hospital of Lausanne (CHUV), Lausanne, Switzerland
[6] Division of Infectious Diseases & Hospital Epidemiology, University Hospital, University of Zürich, Zürich, Switzerland
[7] Division of Infectious Diseases and Hospital Epidemiology, University Children’s Hospital Zürich, Zürich, Switzerland
[8] Service of Transplantation, Department of Surgery, University Hospital Geneva, Geneva, Switzerland
[9] Institute for Clinical Epidemiology & Biostatistics, University Hospital Basel, Basel, Switzerland

Aims:
Clostridium difficile infection (CDI) is a leading cause of nosocomial diarrhoea in solid organ transplant (SOT) recipients. We aimed to assess the incidence and outcome of CDI within the Swiss Transplant Cohort Study (STCS).

Methods:
We performed an observational study calculating the incidence rates of CDI according to transplanted organ in the STCS between May 2008 and August 2013. We used the cumulative incidence approach where death is considered as the competing event. Clinical data of the CDIs were assessed by a detailed chart review.

Results:
During the 64-months observational period, 2158 SOT recipients with informed consent were included in the STCS among whom 87 developed a CDI. The overall CDI infection rate per 10000 patient days was 0.47 (95% CI: 0.38 – 0.58), highest in lung transplant recipients [1.48 (95% CI: 0.93 – 2.24)] and lowest in kidney transplant recipients [0.30 (95% CI: 0.21 – 0.41)]. Overall the median time-lag from transplantation to diagnosis of CDI was 70 (IQR: 21 - 189) days. The shortest time-lag was in lung transplant recipients with 31 (IQR 7 - 129) days and the longest in kidney transplant recipients with 115 (IQR: 38 - 308) days. In a multivariate analysis, the occurrence of “specific infections” and the intake of antibiotics during the three months preceding the CDI were significant risk factors for developing CDI. Out of 87 patients 65 (74.7 %) had a mild to moderate, 19 (21.8%) a severe and 3 (3.4%) a severe complicated course of CDI. 17 (19.5%) patients required hospitalization and one patient ICU admission for treatment of CDI. 71 (83.5%) patients were treated with metronidazole for a median of 11 days (IQR: 10-15), 10 (11.8%) patients were treated with oral vancomycin for a median of 11 days (IQR: 10-13) and 4 (4.7%) patients received a combined treatment with metronidazole and vancomycin. 14 of 87 (16.1 %) patients experienced more than one C. difficile event. Of these, 13 had two events and 1 three events. The median time between the first and the second episode was 56 days (IQR: 29 - 203). No death due to CDI occurred in our study population.

Conclusions:
Despite the severe underlying diseases and immunosuppressed condition of our patient collective, we found a low incidence rate of CDI, a favourable course and good response to the standard treatment with metronidazole and vancomycin. The most important risk factors were “specific infections” and intake of antibiotics in the 3 months preceding the CDI.
Low isoniazid and rifampicin concentrations in TB/HIV co-infected patients in Uganda

C Sekaggya [1], M Lamorde [1], AU Scherrer [2], J Musaazi [1], N Corti [2], A Buzibye [1], L Henning [2], A von Braun [1], S Okware [1], B Castelnuovo [1], A Kambugu [1], J Fehr [2]

[1] Infectious Diseases Institute, College of Health Sciences, Makerere University, Kampala, Uganda
[2] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, University of Zurich, Zurich, Switzerland

Aims:
There is limited data on exposure to anti-tuberculosis (TB) drugs in this region. Charles Peloquin et al (2002) have described reference ranges; however some studies demonstrated that patients actually achieve concentrations below these ranges. There is limited data about exposure to anti-TB drugs in the TB/HIV co-infected population in Sub-Saharan Africa. Our objective is to describe the concentration of anti-TB drug levels in a well characterized prospective cohort of adult patients starting treatment for pulmonary TB.

Methods:
This study is an ongoing study being carried out in the TB/HIV integrated clinic at the Infectious Diseases Institute (IDI) in Kampala, Uganda. Sputum culture and microscopy was done for all patients. Pharmacokinetic blood sampling of anti-TB drugs was done 1 hour, 2 hours and 4 hours post dose 2 weeks, 8 weeks and 24 weeks after initiation of anti-TB treatment using ultra violet high - performance liquid chromatography (UV-HPLC). We describe the maximum concentration (Cmax) of isoniazid (H), rifampicin (R), ethambutol (E) and pyrazinamide (Z) and compare them with the values observed by Peloquin et al referenced in other studies.

Results:
We started 113 HIV infected adults on a fixed dose combination of HREZ. The median age of our population was 33 years. 52% were male with a median BMI of 19kg/m2 and a median CD4 cell count of 142cells/µL. In 90% of the participants, the diagnosis of TB was based on microscopy and/or cultures. The boxplot graph shows the median Cmax and interquartile range (IQR) of H and R. Levels of H were found to be below the reference ranges (3-6µg/mL) in 54/77(70.1%), 38/59(64.4%) and 15/24(62.5%) participants at weeks 2, 8 and 24. R levels were also found to be below the reference ranges (8-24ug/mL) in 41/66(62.1%), 26/48(54.2%) and 8/10(8%) participants at weeks 2, 8, and 24 respectively. The mean Cmax of E and Z were within the reference range at week 2 and 8; mean Cmax of 3.2±SD2.1ug/mL and 4.0±SD3.1ug/mL for E and 41.6±SD13.1ug/mL and 42.6±SD16.4ug/mL for Z.

Conclusion:
We observed lower concentrations of isoniazid and rifampicin in our study population of TB/HIV co-infected patients. The implications of these findings are not yet clear. We therefore plan to correlate our findings with the response to TB treatment.
Aim:
To depict the current state of HCV management in the decentralised drug substitution program of the canton Aargau.

Methods:
For a cross-sectional study, questionnaires and free rapid tests for HIV (Determine®) and HCV (OraQuick®) using capillary blood (fingerstick) were sent to all 161 physicians providing drug substitution treatment for 631 patients. Liver fibrosis was measured with a mobile Fibroscan® by a member of the study team.

Results:
Between 07/2013 and 02/2015, 166 patients could be enrolled: 78% male; median age 39 years; 77% reported past or present i.v. drug use. Drug substitution was in 72% methadone, 11% heroin, 15% buprenorphine. 45% had depression, 21% suicide attempts and 27% current alcohol consumption >40g/d. Seroprevalence for HIV and HCV was 9% and 56%, respectively (14 co-infections: 0 HIV but 76 HCV monoinfections). 45% were both HIV and HCV negative. HIV/HCV rapid tests were performed in 152 (92%) patients and revealed 0 new HIV diagnoses (0 false negative) and 13 new HCV diagnoses. Of the 9 false HCV-negatives, all had undetectable RNA. 125 patients (75%) had a Fibroscan® examination, whereof 118 were of sufficient quality. Overall, 68% had no/mild fibrosis (Metavir F0/1), 11% significant fibrosis (F2), 8% severe fibrosis (F3) and 13% cirrhosis (F4). F3/4 prevalence was 5fold higher in HCV antibody positives (32 vs. 6%, p<0.001) and 2.5fold higher with current alcohol consumption >40g/d (38 vs. 15%, p<0.01). It was highest in HIV/HCV co-infected (54%) and HCV infected with current alcohol consumption >40g/d (48%). Hepatitis A/B serostatus was unknown in >50%. Of the 149 HIV negatives, only 13% had a HIV test ≤1 year ago (31% never tested before). Of the 73 HCV negatives, only 16% had a HCV test ≤1 year ago (44% never tested before). Of the 91 HCV seropositives, RNA was available in 64 (70%): 29 (45%) were currently positive: 15 gt1, 1 gt2, 7 gt3, 3 gt4. Spontaneous clearance was documented in 18 (29%). HCV treatment uptake was 49% with SVR in 70% (16/23).

Conclusions:
In our decentralised setting, recruitment of patients was difficult. Screening for HIV, hepatitis A, B and C according to guidelines was insufficient. The rate of false-negative HCV rapid tests was 10%, but might be restricted to patients with cleared infection. HIV-coinfection and alcohol consumption significantly increase the risk of severe fibrosis in HCV-positives. HCV rapid test and Fibroscan® are convenient methods to enhance HCV diagnosis and treatment.
Aim:
It is suggested, but heretofore not proven, that body colonisation or infection caused by multiresistant microorganisms is associated with a higher failure rate in patients treated for a DFI.

Methods:
We conducted an epidemiologic survey in our hospital to determine the rate of successful treatment of DFIs in patients with, versus without, concomitant colonisation or infection with methicillin-resistant S. aureus (MRSA) or extended-spectrum-lactamase (ESBL) carrying bacilli. In our hospital, the overall prevalence of MRSA or ESBL colonisation on admission is 5% for each. We defined colonisation as a swab yielding one of these organisms during the two weeks before or after the start of antibiotic therapy for the DFI. MRSA carriage was swabbed in the nares, wound and the groin. ESBL was swabbed perianally and in the wound. All statistical tests of comparisons are with Pearson-χ2-tests.

Results:
Among 517 episodes of DFI from 2008-2014, 244 (47%) recurred after a median surveillance period of 2.4 years (range 60 days-5 years). The median duration of antibiotic therapy overall was 14 days (range, 0 to 315 days) and almost all had at least one surgical intervention. Among all DFI episodes, MRSA was isolated from 80 (15%), 77 of which were from clinical samples. Colonisation/infection with MRSA tended to be associated with prior antibiotic exposure for a DFI (14/80 vs. 55/517; p=0.08), and significantly lowered treatment success of the current episode (28/80 vs. 244/517; p=0.04). In 24 (5%) of the DFI episodes patients had rectal or urinary colonisation with ESBL. There was no association of ESBL colonisation/infection with prior antibiotic treatment for DFI (14/24 vs. 65/517; p=0.56), nor did it affect the success of DFI treatment (10/24 vs. 234/517; p=0.73).

Conclusion:
In patients with a diabetic foot wound, MRSA is usually considered to be a pathogen, and it is three times more prevalent than ESBL carriage in our DFI patients. The rate of ESBL carriage among patients with DFI is similar to that among the general patient population in our hospital. Infection or colonization with MRSA, but not ESBL, may be associated with failure of treatment of DFI.
Overtreatment of Asymptomatic Bacteriuria: A Qualitative Study

M Eyer [1, 2], M Läng [1], D Aujesky [3], J Marschall [1]

[1] Department of Infectious Diseases, Bern University Hospital, Bern, Switzerland
[2] Division of Infectious Diseases, Valais Hospital, Sion, Switzerland
[3] Division of General Internal Medicine, Bern University Hospital, Bern, Switzerland

Objectives:
Overtreatment of asymptomatic bacteriuria (ASB) is common and can result in antibiotic side effects, excess costs to the healthcare system, and potentially trigger antimicrobial resistance. According to international management guidelines, ASB is not an indication for antibiotic treatment (with few exceptions). Our objective was to determine reasons for using antibiotics to treat ASB in the absence of a treatment indication.

Methods:
We conducted a qualitative study at a tertiary care hospital in Switzerland during 2011. We interviewed 21 internal medicine residents and attending physicians selected by purposive sampling, using a semi-structured questionnaire. Responses were analyzed in an inductive thematic content approach using dedicated software (MAXQDA®).

Results:
In the 21 interviews, the following thematic rationales for antibiotic overtreatment of ASB were reported (in order of reporting frequency): 1) Treating laboratory findings without taking the clinical picture into account (n=17); 2) Psychological factors such as anxiousness, overcautiousness or anticipated positive impact on patient outcomes (n=13); 3) External pressors such as institutional culture, peer pressure, patient expectation, and excessive workload that interferes with proper decision-making (n=9); 4) Difficulty with interpreting clinical signs and symptoms (n=8).

Conclusions:
In this qualitative study we identified both physician-centered factors (e.g., overcautiousness) and external pressors (e.g., excessive workload) as motivators for prescribing unnecessary antibiotics. Also, we interpreted the frequently cited practice of treating asymptomatic patients based on laboratory findings alone as lack of awareness of evidence-based best practices.
Phenotypic Characterization of Transmitted/Founder Virus in HIV-1 Transmission Pairs

CS Oberle [1, 2, 3], B Joos [1, 2], NK Campbell [1, 2, 3], D Beauparlant [1, 2, 3], H Kuster [1, 2], C Schenkel [1, 2], P Rusert [2], A Trkola [2], KJ Metzner [1, 2], HF Günthard [1, 2]

[1] University Hospital Zurich, Division of Infectious Diseases and Hospital Epidemiology, Zurich, Switzerland
[2] University of Zurich, Institute of Medical Virology, Zurich, Switzerland
[3] University of Zurich, Life Science Graduate School, Zurich, Switzerland

Aim:
In 60-90% of mucosal HIV-1 transmissions a single transmitted/ founder (T/F) virus from a genetically diverse virus population of the transmitter infects the recipient. Whether HIV-1 transmission is a stochastic process or the T/F viruses have beneficial features facilitating transmission and infection is controversially discussed.

Methods:
Here, we investigated the phenotypes of viruses isolated from transmission pairs in order to discover properties that might favor transmission. Based on phylogenetic analyses of HIV-1 polymerase and envelope sequences and clinical data from patients enrolled in the Zurich Primary HIV-1 Infection Study (ZPHI) and Swiss HIV Cohort Study (SHCS), 9 potential transmission pairs of subtype B were identified and primary virus isolates of transmitter and recipient (acutely infected patients with single T/F virus) at the nearest time point of transmission were generated. Virus isolates were characterized in respect to replication capacity in peripheral blood mononuclear cells (PBMCs) in the absence and presence of IFN-α and in monocyte-derived macrophages (MDMs). Furthermore, sensitivity to different entry inhibitors (Maraviroc, DARPin 57.2, soluble CD4, T-20) and neutralizing antibodies (b12, 2G12, 4E10, 2F5), and the entry kinetics of these virus isolates were studied.

Results:
All virus isolates replicated efficiently in PBMCs and 15 of 18 virus isolates were capable to replicate in MDMs, however, to a lesser extent. No clear pattern could be observed: In some transmission pairs, the virus isolate from the transmitter replicated more efficiently in MDMs and/or PBMCs and vice versa in other pairs. All virus isolates were sensitive to IFN-α; yet the degree to which replication was reduced varied within and between transmission pairs. In terms of entry, virus isolates from the same transmission pair were inhibited to similar degrees by different entry inhibitors and neutralizing antibodies. Moreover, virus obtained from transmitter and recipient showed similar entry kinetics. For some transmission pairs, differences in replication capacities in both PBMCs in the absence or presence of IFN-α and MDMs were detected, yet we could not identify a common property shared by T/F viruses. T/F viruses and the virus population of the transmitter showed similar sensitivity to entry inhibitors/neutralizing antibodies and similar entry kinetics.

Conclusion:
Hence, according to the investigated parameters no significant phenotypic pattern could be attributed to T/F viruses.
Prospective surveillance of daptomycin and intravenous colistin use after implementation of new guidelines

C Pluess-Suard [1], J-C Devaud [1], G Zanetti [1, 2], L Senn [1]

[1] Lausanne University Hospital (CHUV), Lausanne, Switzerland
[2] Lausanne University (UNIL), Lausanne, Switzerland

Aim:
Antimicrobial restriction is an effective strategy to control antibiotic use and limit the spread of bacterial resistance. Due to the progressive increase in daptomycin and intravenous colistin use in our hospital, local guidelines were implemented in 2013. We aimed to evaluate the appropriateness of daptomycin and intravenous colistin prescriptions according to new guidelines.

Method:
We performed a prospective observational study by reviewing all prescriptions of daptomycin (09/2013 – 01/2015) and intravenous colistin (01/2014 – 01/2015). We used specific order forms received at the pharmacy to identify prescriptions. Clinical and bacteriological data were retrieved from patients’ electronic charts. Antimicrobial appropriateness was appraised according to guidelines: accepted indications and dosage for both antibiotics, follow up of creatine kinase (CK) levels for daptomycin and use in combination therapy for intravenous colistin.

Results:
In total, 25 daptomycin and 18 intravenous colistin prescriptions were evaluated. Of the 25 daptomycin prescriptions, 21 (84%) met the accepted indications: 10 cases planned for outpatient parenteral antibiotic therapy (OPAT), 7 cases of severe allergy to vancomycin, 2 MRSA bacteremia/endocarditis not responding to vancomycin, 2 vancomycin-induced nephrotoxicity. Two (8%) prescriptions did not meet accepted indications but were nevertheless considered justified. Only 2 (8%) prescriptions were considered unjustified. Dosage was adequate in 92% of patients and CK levels were followed up in 88%. Orders were validated by infectious diseases (ID) specialists in 92% of cases. Of the 18 intravenous colistin prescriptions, 17 (95%) met the accepted indications. 12/18 (63%) dosages were adequate; 6 (32%) were not because of lack of loading dose in cystic fibrosis patients or lack of adaptation to renal function. Another antibiotic was associated in 100% of cases. Orders were validated by ID specialists in 8/18 cases (44%).

Conclusions:
This prospective surveillance allowed us to observe that the appropriateness of prescriptions of 2 restricted antibiotics was satisfactory. Dosages for intravenous colistin in cystic fibrosis patients will be reevaluated. The collaboration between the pharmacy and the antibiotic stewardship team is needed as the number of restricted antibiotics tends to increase.

References:
Background:
Integrase inhibitors (INSTIs) are increasingly used in first-line and salvage treatment of HIV-1 infected patients in Switzerland. The broader use of INSTIs might lead to a higher prevalence of INSTI transmitted drug resistance (TDR).

Methods:
We studied the prevalence of INSTI TDR mutations (as defined by IAS-USA 2014) among treatment-naïve patients in the Swiss HIV Cohort Study (SHCS) who had a genotypic resistance test done before 2014. We differentiated between minor (T66AK, L74M, E92G, T97A, F121Y, E138AK, G140A) and major (T66I, E92Q, G140S, Y143CHR, S147G, Q148HKR, N155H) mutations. We performed logistic regression models to analyse the association of INSTI TDR mutations with the calendar year and the approval of the first INSTI in Switzerland (28 February 2008). Models were adjusted for subtype (B vs. non-B infections). To analyse the time trend of number of patients failing a treatment containing INSTIs, we did a Poisson regression.

Treatment failure was defined as follows: ≥1 viral load >500 copies HIV-1 RNA/mL after more than 120 days on INSTI-containing treatment.

Results:
We detected INSTI TDR mutations among 19 of 758 (2.5%) treatment-naïve patients. Only one major mutation (1/758, 0.1%) was found (N155H, date of sampling: 19 April 2013). Minor mutations were more common: L74M (n=8, 1.1%), T97A (n=9, 1.2%) and E138K (n=2, 0.3%). Minor mutations were more frequently among non-B subtype infections (13/251 [5.2%] vs. 6/507 [1.2%], p-exact=0.002). No difference in prevalence was found before and after the approval of INSTIs (3/61 [4.9%] vs. 16/697 [2.3%], p-exact=0.191). The odds ratio (OR) adjusted for subtype was 2.3 (95% CI 0.6-8.1). Thus, minor mutations are most likely polymorphic. Despite broader use of INSTIs, the prevalence of INSTI TDR mutations did not increase over time (OR per calendar year adjusted for subtype: 0.8 [95% CI: 0.6-1.1]). Patients failing a treatment containing INSTIs have the highest chance to transmit INSTI mutations. The number of these patients steadily increased from 13 patients in 2008 to 43 in 2013 (incidence risk ratio/calendaryear: 1.2 [95% CI: 1.1-1.3]).

Conclusions:
Major INSTI TDR mutations are very rare in the SHCS. The increasing use of INSTI did not yet influence the rate of INSTI TDR mutations. However, baseline resistance testing on integrase is warranted for early detection of a potential increase as the number of patients failing treatments containing INSTIs is increasing.
**P70**

**Rhinocerebral mucormycosis: a rare but devastating complication in diabetic patients**

A Conen [1], B Jakopp [1], C Ottiger [2], HP Killer [3], I Fischer [4], A Arnoux [5], CA Fux [1]

[1] Division of Infectious Diseases and Hospital Epidemiology, Kantonssspital Aarau, Aarau, Switzerland
[2] Department of Laboratory Medicine, Clinical Microbiology, Kantonssspital Aarau, Aarau, Switzerland
[3] Department of Ophthalmology, Kantonssspital Aarau, Aarau, Switzerland
[4] Department of Pathology, Kantonssspital Aarau, Aarau, Switzerland
[5] Department of Otorynilaryngology - Head and Neck Surgery, Kantonsspital Aarau, Aarau, Switzerland

**Background:**
Mucormycosis is an emerging invasive fungal infection (IFI) with mortality rates of 20-50% in localized, 70-90% in disseminated disease. In diabetic patients sinuses are commonly involved with rapid spread into adjacent tissues. We report on 2 patients with delayed diagnosis. Case reports: A 66-year old woman with newly detected diabetes mellitus (DM) complained headache, progressive left visual loss and palsy of cranial nerves (II, III, IV, VI, VII). Bacterial sinusitis with orbital cellulitis and meningitis was diagnosed; sinuses were drained and treatment with ceftriaxon and steroids started. After 5 days, a new palatal necrosis led to the transfer to our hospital. High-dose liposomal amphotericin B (LamB) was initiated and radical excision surgery performed. Histology and microbiology confirmed IFI with Rhizopus oryzae. The patient suffered an acute amB-related renal tubulopathy and was unable to swallow; therefore compassionate use intravenous isavuconazol was initiated and later changed to oral posaconazol. After one year, she was clinically well under posaconazol, but brain MRI showed intracranial fungal spread across foramen ovale, possibly favored by iron infusion. A 61-year old man presented with headache, left orbital swelling and progressive visual loss despite amoxicillin/clavulanate for suspected sinusitis. His DM was poorly controlled (blood sugar 26.3 mmol/l, HbA1c 9.3%). CT scan revealed ethmoidal sinusitis with orbital cellulitis and CSF analysis detected meningitis. Cefepime was initiated and ethmoidectomy performed. Histology and microbiology (culture and PCR for bacteria and fungi) revealed no microorganism. On day 7, high-dose steroids were started for suspected arteriitis leading to rapid disease progression. A large palatal necrosis stimulated treatment with high-dose LamB and radical surgery. Repeated histological/microbiological analysis revealed IFI with R. oryzae. The patient died 2 days later.

**Conclusions:**
Poorly controlled DM is a major risk factor for rhinocerebral mucormycosis in 36-88% of cases. IFI may be its first manifestation. Steroids can enhance fungal spread. Initial presentation (sinusitis and periorbital cellulitis) is nonspecific. A high index of suspicion is important to avoid diagnostic delay and improve outcome. Beside the control of risk factors and antifungal treatment radical surgery is key. Oral or intravenous isavuconazol is a new broad-spectrum antifungal agent, also penetrating into CSF.
Aim: Infected neuropathic sacral ulcers are difficult to treat and have a high risk of recurrence because the underlying cause of infection often cannot be corrected. There is little in the published literature.

Methods: This is a single-centre epidemiologic study of spinal cord injured adults 1995-2014 with an infected sacral ulcer who had a minimal follow-up of 3 months. Statistical analyses included cluster-controlled (at the level of the patient) Cox regression analysis with emphasis on surgery and the duration of antibiotic therapy. We included only infections accompanied by purulent secretions or proven osteomyelitis; we infections associated with osteosynthetic material.

Results: We found 70 eligible episodes in 31 patients (median age 60 years; 21 immune-compromised) with a median follow-up of 2.7 years (range, 3 months to 19 years). Underlying osteomyelitis (proven by histology and/or microbiology) was present in 52 cases. The median duration of hospitalization was 3 months; the patients had a median of 1 surgical intervention (with concomitant flap used in 25 cases) and a median duration of 6 weeks of targeted antibiotic therapy (1 week given intravenously. Overall, in 44 episodes (63%) there was a clinical recurrence after a median interval of 1 year, in 85% of these recurrences culture of the wound yielded a different organism than the index infection, suggesting re-infection rather than relapse. In various multivariate analyses, no variable was significantly associated with clinical failure. The number of surgical interventions (hazard ratio [HR] 1.1, 95%CI 0.8-1.6), use of flap, bone involvement (HR 1.5; 0.7-3.1), immune suppression, prior sacral infections, duration of total antibiotic prescription (HR 0.9; 0.5-1.4) or use of parenteral antibiotic therapy were not associated with failure. Specifically, antibiotic treatment for <6 weeks had the same risk as >12 weeks. Similarly, duration of antibiotic therapy did not alter the risk of recurrence with the same pathogen (Pearson-χ2-test; p=0.90).

Conclusions: Our retrospective study of spinal cord injured patients with an infected sacral neuropathic ulcer demonstrated that infection recurrence occurs in almost two-thirds of patients, but in only a minority with the same pathogens. The number of surgical debridements, performance of a skin flap, or duration of antibiotic therapy was not associated with recurrence, suggesting recurrences are re-infections caused by other extrahospital causes.
Background:
Understanding how to achieve efficient transduction of hematopoietic stem cells (HSCs), while preserving their self-renewing capacity, is key for applying lentivirus-based gene engineering methods in Phase I/II clinical trials. The sterile alpha motif (SAM) domain and HD domain-containing protein 1 (SAMHD1) was recently identified as a HIV-1 restriction factor in myeloid cells and resting CD4+ T cells that interferes with reverse transcription by decreasing the nucleotide pools or by its RNase activity. HIV-2 and SIV have evolved to counteract the effects of SAMHD1 by their accessory protein Vpx, which targets SAMHD1 for proteasomal degradation. We hypothesized that SAMHD1 also interferes with HIV-1 vector-based HSCs transduction.

Methods:
Expression of SAMHD1 in HSCs was quantified by western blotting and real-time quantitative PCR (qPCR). For HSCs transduction, we used HR-GFP-Vpx+/+ lentivirus, which carries Vpx and encodes GFP. Integrated provirus and viral DNA intermediates in HSCs and monocyte-derived macrophages (MDMs) were quantified by qPCR. Transduction efficiency was assessed by flow cytometry.

Results:
Our results show that SAMHD1 is highly expressed in HSCs already at 2 hours culturing in a medium enriched with cytokines conventionally used for transduction of HSCs. In contrast, fresh HSCs have poor SAMHD1 expression. Expression levels of SAMHD1 in cultured HSCs are comparable to those found in MDMs. Following lentiviral based transduction with HR-GFP-Vpx+, we did not observe any increase of proviral DNA in HSCs while there was a significant one in MDMs which served as positive control for the assay. Similarly, there was a less than 3-fold increase of DNA intermediates in HSCs a vigorous one in MDMs. HSCs exposed to HR-GFP-Vpx+ showed a minor but significant increase in the number of GFP+ cells which was associated with a decrease in SAMHD1 expression. GFP+ cells were detected mostly within the population of cells containing low amounts of SAMHD1. There was an significant increase of the percentage of GFP+SAMHD1- cells, while GFP+SAMHD1+ cells decreased 7 days post infection when compared to cells exposed to HR-GFP-Vpx- viral like particles.

Conclusions:
1. HSCs cultured in cytokine-enriched medium, unlike uncultured cells, express high levels of SAMHD1. Vpx-mediated decreases of SAMHD1 expression levels enhances transduction rate in a minor sub-population of HSCs. The data imply that blocks mainly at cell entry are the major limiti
P73
Significance of urine cultures as a diagnostic tool in patients with neutropenic fever

J Steinrücken [1], T Wendland [2], T Pabst [3], S Zimmerli [1], T Kaspar [1], J Marschall [1]

[1] Infektiologie, Inselspital Bern, Bern, Switzerland
[2] Innere Medizin, Inselspital Bern, Bern, Switzerland
[3] Hämatonkologie, Inselspital Bern, Bern, Switzerland

Objectives:
Current guidelines recommend obtaining a urine culture during the diagnostic work-up of a patient with neutropenic fever (NF). There is limited evidence to support this recommendation. We suspected that urine culture results have minimal influence on the management of neutropenic fever.

Methods:
We retrospectively reviewed the medical records of hospitalized patients with acute leukemia who underwent chemotherapy and developed NF at Bern University Hospital between January 2012 and December 2013. All included patients had urine cultures obtained during the diagnostic work-up. Data retrieved included demographic information, oncological diagnosis, microbiology, clinical outcome, and both empiric and definitive antibiotic therapy. We determined the frequency of bacteriuria and urinary symptoms, and whether antibiotics were changed based on these findings. The diagnosis urinary tract infection required both urinary tract symptoms and significant bacteriuria.

Results:
A total of 133 episodes of NF in patients with either acute myeloid leukemia (86.5%) or acute lymphoblastic leukemia (13.5%) were studied. Sixty-nine (51.9%) episodes occurred in male patients. Median age was 54 years (range 19–74). Mean temperature at start of NF was 38.6°C (range 38.0–40.1°C). Mean absolute leucocyte count was 0.12 G/l (range 0.0–0.4 G/l). The most common presentations were febrile diarrhea (n=61, 45.9%) and fever without concomitant symptoms (n=49, 36.8%). In 13 cases (9.8%) central venous catheter infection was clinically suspected. Bacteremia was documented in 75 (56.4%) NF episodes. Three patients presented with localizing signs of UTI (one with dysuria, two with flank pain); none of them had a suggestive urinalysis or significant bacteriuria. Urinalysis was positive in 18 (13.5%) and negative in 106 episodes (79.7%); in 9 episodes (6.8%) no urinalysis was obtained. Almost half of the urine cultures yielded bacterial growth (n=65, 48.9%) but only in 10 of these the bacteriuria was significant. None of the patients with significant bacteriuria had symptoms suggestive of UTI. In a single case antibiotic therapy was adjusted 12 days into the treatment course because ESBL-producing E.coli was detected. No other antibiotic change could be related to clinical or laboratory evidence of UTI. The overall mortality rate was 9.8% (n=13). The presence of significant bacteriuria was not associated with poor outcomes.
**P74**

**Staphylococcus aureus versus β-hemolytic streptococci in orthopaedic infections**

I Uçkay [1], D Lew [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland

**Aim:**
Clinical experience suggests that S. aureus tends to form abscesses (e.g., carbuncles, septic bursitis), whereas streptococci more often cause phlegmons and diffuse spreading infections (e.g., erysipelas, necrotizing fasciitis). We were interested in comparing the clinical presentation and measurable evidence of virulence of infections caused by S. aureus and β-hemolytic streptococci, especially S. pyogenes.

**Methods:**
We reviewed clinical information from databases of adult orthopaedic patients hospitalised at Geneva University Hospitals. We excluded patients with polymicrobial infections or who had received antibiotic therapy prior to admission. Group comparisons were made with Pearson-χ²-test.

**Results:**
Among 1229 different evaluable orthopaedic infections, 666 (54%) were caused by S. aureus, and 168 (14%) by various streptococci, with 39 (3%) caused by S. pyogenes. Of the 834 episodes caused staphylococcal or streptococcal, 122 (15%) were accompanied by bacteraemia. Comparing infections caused by S. aureus vs. all streptococci, there were no significant differences in sex, age, presence of diabetes mellitus or other immune suppression, serum CRP levels, percentage with infections of the foot, osteoarticular sites, or fracture-devices. In contrast, infections caused by S. aureus was significantly more often associated with bacteraemia (83/666 vs. 39/168; p<0.01), abscess formation (333/666 vs. 61/168; p<0.01), septic bursitis (219/666 vs. 28/168; p<0.01), and prosthetic joint infections (70/666 vs. 27/168; p=0.046), while necrotizing fasciitis was significantly more often caused by monomicrobial streptococcal infection (0/666 vs. 1/168; p=0.046). A comparison of infections caused by S. aureus vs. S. pyogenes alone yielded similar results, with the only significant difference being that S. pyogenes tended to be associated with a higher serum CRP level (median 95 mg/L vs. 76 mg/L; p=0.05).

**Conclusions:**
Our results confirm the clinical impression that infection with S. aureus is significantly associated with abscess formation, prosthetic joint infection and bacteraemia compared to β-hemolytic streptococci and that S. pyogenes tends to be associated with a high serum CRP level.
Successful interdisciplinary management of prosthetic hip and knee infections in an unselected patient population based on a comprehensive algorithm

J Amsler [1], H Eijer [2], G Waldegg [3], R Escher [3], M Egger [3]

[1] Spital Netz Bern, Medizinische Klinik, Bern, Switzerland
[2] Spital Emmental, Orthopädische Klinik, Burgdorf, Switzerland
[3] Spital Emmental, Medizinische Klinik, Burgdorf, Switzerland

Aims:
Management principles ensuring success in the treatment of prosthetic joint infections (PJI) have only become public around the millennium turn, summed up in a landmark article by Zimmerli in 2004 [1]. Much knowledge has been gained from studies in specialized centers, focusing on defined joints and selected patient groups, frequently preferring a single surgical treatment strategy. We therefore evaluated the treatment outcomes in unselected patients with PJI in our non-specialized secondary care hospital, where an interdisciplinary management of PJI according to a comprehensive algorithm was followed from 2004.

Methods:
All patients with PJI of the hip or knee between January 2004 and December 2011 were included in this retrospective cohort study. Data on comorbidities, type (early, delayed or late) and route of infection, recommended and chosen treatment strategy, and outcomes were gathered from patient charts. Follow-up was completed by phone calls to patients and, if necessary, treating physicians and relatives. Standard statistical tests were used for the analysis, including Kaplan-Meier survival function and Cox proportional hazards regression for treatment failures over time.

Results:
55 patients with PJI (39 hip and 8 knee arthroplasties, and 8 hip hemi-arthroplasties) with a median age of 69 years (IQR 62-83) were treated during the 8-year period; 23 (42%) were women. 22 patients suffered from early, 12 from delayed, and 21 from late infections. Retention with debridement was the most frequently applied strategy (n = 26, 47%), followed by two-stage exchange (n = 13, 24%). In a median follow-up time of 30 months (IQR 8-65) 12 treatment failures (22%) were observed (11 hips and 1 knee), leaving 43 patients (78%) without signs of persistent or recurrent infection during the observable follow-up. Multivariate Cox regression adjusting for age, sex and comorbidities yielded divergence from the treatment recommendation of the infectious diseases (ID) specialist as the only identifiable risk factor for treatment failure (HR = 5.4, 95%-CI 1.1 – 26, p = 0.035).

Conclusions:
Interdisciplinary treatment of unselected patients based on a comprehensive algorithm results in favorable treatment outcomes even in a non-specialized setting. Divergence from the algorithm-based treatment recommendation issued by the ID specialist is a risk factor for failure – be it driven by the patient or the surgeon.

References:
The Role of Proadrenomedullin as Prognostic Biomarker in Urinary Tract Infections: a Randomised Controlled Trial

D Drozdov [1], K Regez [1], M Guglielmetti [1], U Schild [1], S Schwenne [1], Z Caldara [1], A Conca [1], P Schuetz [1], A Huber [1], A Bock [1], C Fux [1], B Mueller [1], W Albrich [2]

[1] Kantonsspital, Aarau, Switzerland
[2] Kantonsspital, St. Gallen, Switzerland

Background:
Urinary tract infections (UTIs) are common drivers of hospitalisations. We developed an algorithm based on proadrenomedullin (ProADM), the post-acute care discharge score (PACD) and predefined clinical criteria with the aim to prevent unnecessary hospitalisations and, in case of admission, to minimise length of stay (LOS). The urinary tract is a frequent source of bacteraemia. ProADM was shown to be an excellent marker for prediction of bacteraemia and death in UTIs.

Methods:
We conducted a factorial design randomised controlled open-label trial. Immunocompetent adults with community-acquired UTI were consecutively screened and enrolled. Hospitalisation criteria with (ProADM group) and without (control group) ProADM were used for triage decision on admission; criteria for clinical stability with or without ProADM were used for risk assessment and hospital discharge during hospitalisation. Primary endpoint was overall LOS of hospitalisation within 90 days follow-up, secondary endpoints included the predictive value of ProADM for bacteraemia on admission and for death within 90 days follow-up. Mann-Whitney U test and linear regression analysis were performed to compare LOS. Areas under the curve (AUC) were calculated for ProADM for prediction of bacteraemia and death, and compared with procalcitonin, C-reactive protein and white blood cell count.

Results:
We screened 394 patients, 265 were excluded and 4 withdrew informed consent. We enrolled 125 patients (76% women); 90 (72%) were hospitalised, in 88 (70%) blood cultures were drawn on admission, 28 (22%) had bacteraemia, 5 (4%) died and 3 (2%) were lost to follow up. The overall LOS within 90 days follow-up was not different in the ProADM group compared to the control group (median 6.0 [IQR 3.0 to 12.0] vs. 5.0 [IQR 0.5 to 9.0] days, p = 0.31). The results of ProADM were available with a median time delay of 5 hours. For prediction of bacteraemia on admission ProADM showed an AUC of 0.73 (95% CI 0.62 to 0.84). For prediction of death within 90 days of follow-up the AUC of ProADM on admission was 0.80 (95% CI 0.67 to 0.93).

Conclusions:
ProADM was a good predictor of bacteraemia and death in patients with UTI. However, an algorithm based on ProADM, PACD and clinical criteria did not evidently reduce LOS in patients with UTI, likely due to the limited sample size of the study and the time delay of the ProADM results unsuitable for clinical routine. A point of care test for ProADM is warranted.
The effect of behavioural and treatment interventions to reduce Hepatitis C virus transmission among HIV-infected MSM: a cohort-based modelling study

L Salazar-Vizcaya [1], RD Kouyos [2], C Zahnd [1], G Wandeler [3], M Battegay [4], KAE Darling [5], E Bernasconi [6], A Calmy [7], P Vernazza [8], M Egger [1, 9], O Keiser [1], A Rauch [3]

[1] Institute of Social and Preventive Medicine (ISPM), Bern, Switzerland
[2] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, Zurich, Switzerland
[3] Department of Infectious Diseases, Bern University Hospital and University of Bern, Inselspital, Bern, Switzerland
[4] Division of Infectious Diseases and Hospital Epidemiology University Hospital Basel, Basel, Switzerland
[5] Infectious Diseases Service, Department of Medicine, University Hospital and University of Lausanne, Lausanne, Switzerland
[6] Division of Infectious Diseases, Lugano Regional Hospital, Lugano, Switzerland
[7] Division of Infectious Diseases, University Hospital Geneva, Geneva, Switzerland
[8] Division of Infectious Diseases, Cantonal Hospital St. Gallen, St. Gallen, Switzerland
[9] Centre for Infectious Disease Epidemiology & Research (CIDER), University of Cape Town, Cape Town, South Africa

Objectives:
To reproduce changes in the incidence of Hepatitis C virus (HCV) infections among HIV-infected men who have sex with men (MSM) using a mathematical model. To use this model to derive a basic reproduction number $R_0$ for this epidemic and to estimate the effect of behavioural and treatment as prevention interventions on future HCV incidence.

Methods:
Compartmental transmission model, calibrated with clinical, behavioural and epidemiological data from the Swiss HIV Cohort Study for the period 2000-2013. We modelled HIV-infected MSM living in Switzerland, who do not inject drugs. Model parameterisation included 5,052 participants of the Swiss HIV Cohort Study with available data on HCV status and sexual behaviour. We studied behavioural interventions or no intervention leading to: further increase, stabilisation or substantial reduction in high-risk sexual behaviour. Treatment interventions included: Increase in treatment uptake and use of second generation direct-acting antiviral agents (DAAs).

Results:
HCV transmission among HIV-infected MSM in Switzerland crossed the epidemic level ($R_0=1$) in 2010 and continued to increase afterwards ($R_0=1.7$ in 2013). The model suggests that this epidemic was mainly driven by high-risk sexual contacts within the HIV-infected MSM community. Future HCV incidence was predicted to increase if high-risk sexual behaviour increases further in all intervention scenarios, or to decrease immediately if high-risk sexual behaviour stabilises or diminishes and treatment uptake increases considerably. Regardless of treatment uptake or type of treatment, a substantial reduction of HCV is predicted from 2022 onwards, if high-risk sexual behaviour is substantially reduced (Figure).

Conclusion:
Treatment interventions to curb the HCV epidemic, such as increasing access to therapy and using treatments including second generation DAAs, are only effective if high-risk sexual behaviour levels off or decreases.
Projected HCV incidence in HIV-infected men who have sex with men (MSM) assuming no intervention to reduce high risk sexual behaviour (panel A), and health promotion leading to: i) stabilisation (panel B) and ii) substantial reduction (panel C) in high-risk sexual behaviour. Two scenarios of future treatment uptake were included: 1) treatment rate constant at the average between 2006 and 2013 (22% per year, continuous lines) or 2) increased treatment rate (100% per year, dashed lines). Two treatment alternatives are displayed: Second generation DAAs regimens (red) and the current standard of care (blue).

**Figure 1**

**Figure 2.** Projected HCV incidence in HIV-infected men who have sex with men (MSM) assuming no intervention to reduce high risk sexual behaviour (panel A), and health promotion leading to: i) stabilisation (panel B) and ii) substantial reduction (panel C) in high-risk sexual behaviour. Two scenarios of future treatment uptake were included: 1) treatment rate constant at the average between 2006 and 2013 (22% per year, continuous lines) or 2) increased treatment rate (100% per year, dashed lines). Two treatment alternatives are displayed: Second generation DAAs regimens (red) and the current standard of care (blue).
Treatment of Staphylococcus aureus persisting infections by lysosome alkalinization

N Leimer [1], C Rachmühl [1, 1], M Palheiros Marques [1, 1], AS Bahlmann [1], A Furrer [1], K Seidl [1], RA Schüpbach [2], AS Zinkernagel [1]

[1] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, University of Zurich, Zurich, Switzerland
[2] Division of Surgical Intensive Care Medicine, University Hospital Zurich, University of Zurich, Zurich, Switzerland

Aim:
The human pathogen Staphylococcus aureus (SA) causes invasive and chronic infections such as endocarditis and osteomyelitis. Recurrence rates are high despite in vitro effective antimicrobial therapy because SA can hide from extracellular active antibiotics and the host’s immune system in privileged locations such as abscesses and host cells. Relapsing SA infections have been associated with the small colony variant (SCV) phenotype and non-replicating persisters. Both subpopulations are characterized by either slow growth and reduced metabolism (SCVs) or dormancy (non-replicating persisters), resulting in antibiotic inefficiency and recurrence of infections. SCVs are often isolated from abscesses in which the pH is low. We hypothesized that SA adapt to the low pH, resulting in shut down of metabolism, stop of growth and thus persistence.

Methods:
We assessed the effect of pH on SA colony phenotype by growing SA in various pH media. Non-replicating persisters were assessed using fluorescence dilution of labeled bacterial cell wall. The localization of SA within host cells was investigated using a cell culture infection model, confocal- and electron microscopy. The same infection model was used to assess whether bacteria enter a persisting state while hiding within host cell lysosomes, where the pH is also low. The potential of alkalinizing agents (e.g. the anti-malaria drug chloroquine) on regrowth of persisting bacteria and enhanced antibiotic efficiency was investigated using in vitro and in vivo models.

Results:
We found that low pH induced SCVs and non-replicating persisters which were capable of regrowth. Within host cells, SA was localized within lysosomes, characterized by low pH. The percentage of SCVs increased over time in intracellular persisting bacteria. Treatment of infected host cells or mice with compounds that alkalize the pH of lysosomes led to growth resumption of intracellular persisting bacteria, resulting in a decrease of bacteria with the SCV phenotype.

Conclusion:
We showed that low pH, as found in abscesses and within lysosomes, induced the persisting subpopulations SCVs and non-replicating persisters. Raising the pH of culture medium or of lysosomes by adding alkalinizing agents resulted in regrowth of the persisting bacteria and reduced the number of SCVs. Lysosomal alkalinization thus may provide a novel additional therapeutic strategy for intracellular persisting staphylococcal reservoir eradication, thus preventing infection relapses.
P79
Variables associated with cure in surgical site infections of the spine

I Uçkay [1], J Billières [1], G. Racloz [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Concerning infections after orthopaedic and traumatologic spine surgery, little is known regarding therapeutic factors associated with cure. Likewise, we ignore the optimal duration and administration route of antibiotic therapy.

Methods:
Single-centre study 2008-2014 including adult orthopaedic patients. Statistical analyses included cluster-controlled (at patient level) Cox regression with emphasis on the number of debridements and the duration of antibiotic therapy.

Results:
Among 556 interventions in the study period, 25 (4%) became infected (median age 68 years, 9 immune-compromised). We detected 16 different pathogen constellations, among which Staphylococcus aureus predominated. Spondylodesis material was involved in 21 cases involving 21 episodes with screws, 3 cages and 20 tiges. The therapeutic approach consisted of surgical debridements (median number of 3 interventions (range, 1-12) and a targeted antibiotic therapy for a median duration of 6 weeks (range, 5-54 wks); of which a median of 2 weeks intravenously (range, 0-18 wks). For 14 episodes, rifampicin was used in combination therapy, while 18 episodes benefited of vacuum-assisted (VAC) devices. Eight cases also had local antibiotics such as bacitracin and vancomycin. Overall, 21 infections (21/25; 84%) were cured after a median follow-up of 3.6 years. In all 4 recurrences, wound cultures yielded the same organism than the index infection (methicillin-susceptible and methicillin-resistant S. aureus in two episodes each). In further univariate analyses, the number of surgical interventions, the duration of antibiotic therapy, sex, age, immune-suppression, serum CRP levels, leukocytosis, smoking status, or VAC use were statistically unrelated to cure. In multivariate analysis, the number of surgical interventions (hazard ratio [HR] 1.1, 95%CI 0.9-1.2) and antibiotic-related parameters did not influence cure. Specifically, antibiotic administration for <6 weeks revealed the same success as >6 weeks (HR 1.2; 0.4-3.3); and <2 weeks intravenously as much as >2 weeks (HR 0.6; 0.2-1.5).

Conclusion:
In our small retrospective cohort of orthopaedic material-related spine infections, all failures were due to S. aureus, while the number of debridements or the duration or the administration route of antibiotic agents did not influence cure.
Vitamin D and its interplay with infections and rejections in kidney and liver recipients

P Schreiber [1, 1, 2], H Bischoff-Ferrari [1, 3], K Boggian [1, 4], C van Delden [1, 5], N Enríquez [1, 5], T Fehr [1, 6], C Garzoni [1, 7], H Hirsch [1, 8], C Hirzel [1, 7], O Manuel [1, 9, 10], P Meylan [1, 10], L Saleh [1, 11], M Weisser [1, 8], N Müller [1, 1], Swiss Transplant Cohort Study [1]

[1] University Hospital Zurich, Division of Infectious Diseases and Hospital Epidemiology, Zurich, Switzerland
[2] University of Zurich, Institute of Medical Virology, Zurich, Switzerland
[3] University Hospital Zurich, Age and Mobility Center, Zurich, Switzerland
[4] Cantonal Hospital St. Gallen, Division of Infectious Diseases and Hospital Epidemiology, St. Gallen, Switzerland
[5] University Hospital Geneva, Division of Infectious Diseases and Hospital Epidemiology, Geneva, Switzerland
[6] Cantonal Hospital Graubünden, Internal Medicine, Chur, Switzerland
[7] University Hospital Bern, Division of Infectious Diseases and Hospital Epidemiology, Bern, Switzerland
[8] University Hospital Basel, Division of Infectious Diseases and Hospital Epidemiology, Basel, Switzerland
[9] Centre hospitalier universitaire vaudois, Infectious Diseases Service, Lausanne, Switzerland
[10] Centre hospitalier universitaire vaudois, Transplantation Center, Lausanne, Switzerland
[11] University Hospital Zurich, Institute of Clinical Biochemistry, Zurich, Switzerland

Background:
Inadequate vitamin D levels are highly prevalent in patients with end-stage organ failure. Beside its role for bone health an impact on additional outcome measures (e.g. infections, rejections) has been implicated.

Methods/Materials:
This study utilized prospectively collected samples and data derived from 70 kidney and 70 liver recipients within the STCS. Standardized, centralized measurement of 25-OH vitamin D (25OHD), 1,25-OH vitamin D (1,25OHD) and bone markers was performed. 25OHD levels were classified as severe deficiency (<30nmol/l), deficiency (>30&<50nmol/l), suboptimal (>50&<75nmol/l) and adequate (>75nmol/l).

Results:
Peri-transplant and at 6 months post-transplant the majority of kidney recipients had severely deficient 25OHD levels (45.7% resp. 31.4%). 27.1% resp. 34.3% had deficient levels, whereas a low proportion had suboptimal (15.7% resp. 30%) or adequate (11.4% resp. 2.9%) levels. 25OHD levels did not differ peri- and post-transplant, whereas 1,25OHD was significantly higher at 6 months post-transplant (p<0.001), resulting in an increased ratio of 1,25OHD/25OHD (p<0.001). Comparably, at time of transplantation as well as 6 months post-transplant the majority of liver transplant recipients showed severe deficiency (51.4% resp. 45.7%) or deficiency (24.3% resp. 25.7%), only 12.9% resp. 14.3% had suboptimal and 11.4% resp. 2.9% optimal 25OHD levels. No significant change was recorded in 25OHD and 1,25OHD over time. In kidney recipients no association between vitamin D and infections was detectable. In contrast, in liver graft recipients 25OHD values of less than 50nmol/l were independently associated with incidence of at least one infectious disease event (composite of bacterial, viral, fungal and parasitic infections) within the first 6 months post-transplant. In kidney recipients 25OHD levels < 50nmol/l were associated with a lower incidence of acute cellular rejections compared to kidney recipients with 25OHD levels > 50nmol/l. We were not able to identify an impact of vitamin D on rejections in liver recipients.

Conclusion:
Vitamin D deficiency is highly prevalent at time of transplantation and remains common at 6 months post-transplant in both kidney and liver recipients. The association with infections in liver recipients and with rejections in kidney recipients may suggest a role for vitamin D in the immune response.
P81
What proportion of clinical recurrences of diabetic foot infections (DFIs) are microbiologically due to new pathogens?

S Abrassart [1], I Uçkay [1], B Kressmann [1], D Lew [1], BA Lipsky [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
Clinical recurrences of DFIs are common and most often attributed to a failure of adequate surgical or antibiotic treatment of the initial infection. This study was designed to investigate how many recurrences at the same anatomical site are caused by new pathogens.

Methods:
We developed a single-centre database of patients hospitalized for treatment for DFIs, defined according the IDSA guidelines. We excluded patients with a foot wound without evidence of infection and those who had received recent antibiotic therapy. Pathogen identification and determination of antibiotic susceptibilities were performed routinely in the clinical microbiology laboratory.

Results:
Among 517 episodes of DFI, a recurrence occurred in 244 (47%) after a median of 2.4 years (range 60 days-5 years). The median duration of prior antibiotic therapy was 14 days (range, 0 to 315 days) with a median duration of intravenous therapy of 2 days (range, 0 to 90). Almost all patients had undergone at least 1 surgical intervention (range, 0 to 5, including 120 amputations). Among these 244 recurrences, 157 (64%) had isolates from their wounds that were not identified (among the three main pathogens) during the preceding episode.

Conclusion:
Our results suggest that up to two-thirds of recurrent DFIs at the same anatomical localisation may be due to new pathogens. This retrospective analysis needs further investigation by with sophisticated bacterial typing methods. This high rate of new pathogens in recurrent infections may be related to surgical site infections or selecting of pathogens by previous antibiotic use.
Which patients and orthopedic material do get infected with Gram-negative non-fermenting rods?

I Uçkay [1], C Landelle [1], D Lew [1], D Pittet [1]

[1] Geneva University Hospitals, Geneva, Switzerland

Aim:
The 1st and 2nd generation cephalosporins used for perioperative prophylaxis do not cover non-fermenting Gram-negative rods (NFR). We investigated patient populations and types of surgery at risk for Gram-negative infections overall, and NFR in particular.

Methods:
Retrospective cohort study of adult patients operated for orthopedic infections 2004 and 2014. Only the first episode of infection was considered for analysis and infection diagnosis was based on intraoperative samples.

Results:
The median age of all patients was 57 years; 871 were females, and 1021 were immune-suppressed. Overall, 665 episodes (24%) involved osteosynthesis material (321 arthroplasties, 150 plates, 54 nails, and other materials). A total of 319 patients (12%) developed bacteremia. The number of bone and joint infections was 1202, and there were 472 septic bursitis and 429 diabetic foot infections. The median duration of antibiotic prescription prior to intraoperative sampling was 4 days; it occurred in 42% of all cases. Of the total 2740 surgical procedures, 568 grew Gram-negative pathogens (21%) of which 258 (9%) were NFR (120 episodes as co-infection) and 178 (7%) Pseudomonas aeruginosa. Prior antibiotic use was significantly associated with NFR infections (159/947 vs. 99/1478; p<0.01). On the median, NFR patients yielded 7 days of prior antibiotic use compared to 3 days of patients with non-NFR infections (p<0.0001). Additional conditions associated with NFR infections were the presence of plates (25/144 vs. 233/2281; p<0.01) the presence of diabetic foot (57/385 vs. 201/2040; p<0.01). Besides plate infection, no other hardware or prosthesis was particularly involved in NFR infections. Risk was associated with an age older than 80 years. In this age category, NFR were responsible for 11% of all pathogens among orthopedic infections. In contrast, NFR were almost never documented in septic bursitis and less frequently associated with abscess formation in native bone or prosthetic joint infections. NFR infection was also less frequently identified in shoulder infections (3/80 vs. 255/2345; p=0.04).

Conclusion:
The most important finding associated with orthopedic infections due to NFR is prior antibiotic use in elderly patients with diabetic foot infections/problems. The usual osteosynthesis material (if present) in this region is the plate, which is also the only material significantly associated with NFR infection.
Who receives antibiotics before intra-operative microbiologic sampling for orthopaedic infections?

I Uçkay [1]

[1]Geneva University Hospitals, Geneva, Switzerland

Aim
Accurately determining the causative pathogens in orthopaedic infections is key for appropriately targeted antibiotic therapy. To ascertain the current practice on this matter in our hospital, we evaluated in which situations antibiotics were given preoperative antibiotics.

Methods
This was a retrospective study at Geneva University Hospitals, a tertiary care hospital, on adult patients hospitalized from 2004-2014. Group comparisons were conducted using the χ²-test.

Results
We reviewed 2632 episodes of community-acquired and nosocomial orthopaedic infections. The study population had a median age of 57 years, included 828 females (31%), 311 bacteraemic cases (12%), and 980 immune suppressed patients (37%). The types of infection included 312 prosthetic joint infections, 324 fracture-device infections, 522 osteoarticular infections, 458 cases of septic bursitis, 413 neuropathic foot infections, and various soft tissue infections, including 996 abscesses. In 1120 episodes (43%) patients received antibiotic therapy (parenteral in 61%) before they had specimens for culture obtained by intraoperative sampling or blood cultures.

Factors more frequently associated with preoperative antibiotic therapy were: female sex; advanced age; immune-suppression; and, prosthetic-related infections (all p≤0.01). In contrast, factors not associated with preoperative antibiotic therapy included apparent clinical severity (e.g., later diagnosed bacteraemic cases [p=0.42]) and soft tissue infections with abscess or purulent discharges (p = 0.30) other than neuropathic foot infections (p≤0.01) and septic bursitis cases (p≤0.01). The median preoperative serum CRP levels in those who did, and did not, receive antibiotics were 87 and 67 mg/L, respectively.

Conclusion
In our medical center over the past decade 43% patients hospitalized with orthopaedic infections were receiving antibiotic therapy before they had proper microbiologic sampling. Surprisingly, the clinical appearance of infection severity or the presence of pus was not associated with this preoperative antibiotic prescribing. Just on the contrary, many patients needing long-term targeted antibiotic therapy, e.g., because of the presence of osteosynthetic material or who appeared to be clinically fragile, received preoperative antibiotics without obtaining proper diagnostic specimens.
Longitudinal patterns of HIV-1 integration sites in CD4+ T cell subsets in vivo

Valentina Vongrad1,2, Yik Lim Kok1,2, Mohaned Shilaih1,2, Christine Leemann1,2, Nottania K. Campbell1,2, Herbert Kuster1,2, Rainer Weber1, Dominique Braun1,2, Roger Kouyos1,2, Huldrych F. Günthard1,2 and Karin J. Metzner1,2

1 Department of Medicine, Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, Switzerland
2 Institute of Medical Virology, University of Zurich, Switzerland

Aim:
HIV-1 can infect a variety of CD4+ T cell subsets, however, knowledge is limited on HIV-1 integration sites in different target cell subsets in longitudinal samples in vivo.

Methods:
Genomic features of HIV-1 integration sites in CD4+ T cell subsets were studied longitudinally in 10 HIV-1 infected patients, enrolled in the Zurich Primary HIV-1 Infection study: 5 patients started ART during primary HIV-1 infection and stopped treatment after at least one year of viral suppression and 5 patients started ART within 3 years after primary HIV-1 infection. Cryopreserved PBMC samples were sorted for resting and activated CD4+ T cells by FACS (4-6 time points per patient; 20 on and 37 off ART). Integration sites were amplified with non-restrictive linear amplification-mediated PCR and sequenced using Illumina MiSeq.

Results:
In total, 383 HIV-1 integration sites were identified: 271 in resting - 103 on and 168 off ART - and 112 HIV-1 integration sites in activated CD4+ T cells - 15 on and 97 off ART. Genomic features of the HIV-1 integration sites were indistinguishable in both resting and activated CD4+ T cells. None of those integration sites were observed twice at the exact same position. Gene hotspot analysis revealed that certain genes were favored for HIV-1 integration. 13 genes harbored HIV-1 proviral DNA in at least 2 patients. The genes BACH2 and MKL2 were preferred; BACH2 was detected 4 times (once in 2 patients, twice in one patient) exclusively in resting CD4+ T cells. MKL2 was identified once in two patients and at three time points in a third patient, in whom MKL2 was observed once in activated CD4+ T cells. Six of 8 HIV-1 integration sites in BACH2 and MLK2 in resting CD4+ T cells were detected during off ART periods.

Conclusion:
We observed gene hotspots but did not find evidence for massive clonal expansion of HIV-1 infected resting CD4+ T cells in HIV-1 infected individuals who started ART within 3 years after primary infection or during off ART periods, suggesting that early ART might prevent clonal expansion of latently HIV-1 infected cells.
Evaluation of the effectiveness of environmental disinfection by no-touch hydrogen peroxide technology against MDR bacteria contamination and comparison with active chlorine disinfectant.

M Ferrari [1], A Bocconi [2], A Anesi [3], C Garzoni [4, 5]

[1] Department of Hygiene, "Maggiore" Hospital A.O. Lodi, Lodi, Italy
[2] Management Department, "Maggiore" Hospital A.O. Lodi, Lodi, Italy
[3] Department of Microbiology, "Maggiore" Hospital A.O. Lodi, Lodi, Italy
[4] Department of Internal Medicine and Infectious Diseases - Clinica Lugenese, Lugano, Switzerland
[5] Clinic for Infectious Diseases - Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland

Introduction:
Multi-resistant organisms (MDRO) survive for long periods of time in a variety of surfaces in hospital environments with high risk of infection transmission.

Objectives:
The objective of this study was to evaluate effectiveness and non-inferiority of a disinfection system based on H2O2 and Ag+ micro-mist, vs. chlorine procedure, by monitoring the reduction of microbial contamination on room surfaces.

Methods:
Active chlorine (5.000 ppm), vs. decontamination system based on a solution of 5-8% H2O2 and 60 ppm active Ag+ (1mL/m3 intensity of treatment) were compared. 26 two-beds rooms located in different wards mainly within the Departments of Medicine and Rehabilitation were previously occupied by patients infected by MDRO. Environment and medical equipment disinfection procedures were performed prior to a new bed occupancy in addition to routine cleaning activities. 10 surfaces were sampled in the hospital room. Microbial colonization was assessed at Time 0 (T0) before cleaning, T1 immediately after cleaning and T2 after disinfection procedures, using swabs on a surface area of approximately 57 cm2. All swabs were inoculated with standard procedure and evaluated on CFU per cm2. Organisms were identified by standard microbiological methods.

Results:
780 surface samples were collected: 600 from rooms treated with H2O2, 180 with active chlorine. Before cleaning the surfaces, all samples collected in the rooms resulted colonized, with an average density of mesophile organisms up to 56 CFU/57 cm2 (range 0-400). MDROs were isolated from samples collected in 20/26 rooms respectively. After manual cleaning with detergent and active chlorine disinfection, an average density of organisms of 15 CFU/57 cm2 (range 0-270) was recorded. MDROs were found from samples collected in 2 rooms but only after an enrichment step. After H2O2 disinfection, a density of bacteria in the range of 0 and 3 CFU/57 cm2 was observed and no MDROs were found.

Conclusions:
Our data indicate that the hydrogen peroxide and active silver ions disinfection system is superior to manual cleaning procedures to eliminate MDRO from the environment. Hydrogen peroxide resulted more effective than active chlorine based procedure in minimizing the overall microbial load on the hospital room surfaces and in eradicating MDRO.
Incidence, temporal trends and mortality of methicillin-sensitive Staphylococcus aureus in 1’336 bloodstream infections: A single-center analysis over 20 years in Switzerland

B Wiggli [1], S Tschudin Sutter [1], B Lakatos [2], R Frei [1], M Battegay [1], A Widmer [1]


Objectives:
Staphylococcus aureus bloodstream infections (SAB) are attributed with substantial mortality and cost. In the last decades, SAB with methicillin-resistant isolates (MRSA) have drawn the attention due to its likely higher morbidity and mortality compared to methicillin-sensitive Staphylococcus aureus bloodstream infection (MSSA BSI). However, several studies are published on SAB, but very few countries and hospitals report exclusively data from MSSA-BSI. We investigated incidence, temporal trends and mortality and predictors of outcome in a single center cohort over 20 years at a tertiary center in Switzerland where the rate of MRSA BSI is below 4%.

Methods:
We conducted a retrospective analysis of the bloodstream infection cohort at the University Hospital of Basel. Data of all SAB episodes were collected between 1993 and 2013 by full-chart review, analysis of blood chemistry and hematology, underlying diseases, and antimicrobial treatment, bloodstream infections with MRSA were excluded. We analyzed incidence, temporal trends and mortality of MSSA BSI.

Results:
540,669 blood cultures were taken at the UHBS over 20 years during the study period until 2013. In this period the number of blood cultures/1000 patient-days increased from 97 to 147. We identified 1336 episodes of MSSA BSI with a yearly overall incidence per 1000 patient-discharges between 1.68 and 4.05 which remained stable with no significant variation. However we observe a significant increase in community-acquired cases, in parallel, nosocomial acquisition of MSSA BSI decreased significantly in the last decade (p<0.05). In-hospital-Mortality of MSSA-BSI at our institution is 19.3% with no significant trend over the last 20 years.

Conclusions:
To our knowledge, this cohort is the largest single-center longitudinal study on MSSA-BSI over time in Europe without the bias of MRSA-BSIs. Overall incidence of MSSA BSI remained stable over the last 20 years: However, community-acquired cases of MSSA-BSIs increased, while hospital acquired decreased. MSSA remains an important pathogen in BSIs.
<table>
<thead>
<tr>
<th>Variable</th>
<th>N / Mean</th>
<th>% / SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age at Onset</td>
<td>59</td>
<td>SD: +/-18</td>
</tr>
<tr>
<td>Number of males</td>
<td>875</td>
<td>65%</td>
</tr>
<tr>
<td>Duration of stay</td>
<td>24</td>
<td>IQR: 14-38</td>
</tr>
<tr>
<td>In-patient treatment</td>
<td>1291</td>
<td>97%</td>
</tr>
<tr>
<td>Nosocomial MSSA BSI</td>
<td>549</td>
<td>41%</td>
</tr>
<tr>
<td>Contaminated BSI</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>282</td>
<td>21%</td>
</tr>
<tr>
<td>IVDU</td>
<td>256</td>
<td>19%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>134</td>
<td>10%</td>
</tr>
<tr>
<td>Immunosuppression</td>
<td>272</td>
<td>20%</td>
</tr>
<tr>
<td>HIV</td>
<td>68</td>
<td>5%</td>
</tr>
<tr>
<td>Number of patients with:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZVC</td>
<td>642</td>
<td>48%</td>
</tr>
<tr>
<td>ICU-stay</td>
<td>397</td>
<td>30%</td>
</tr>
<tr>
<td>Duration of ICU</td>
<td>1</td>
<td>IQR: 0-4</td>
</tr>
<tr>
<td>Intubation</td>
<td>211</td>
<td>16%</td>
</tr>
<tr>
<td>Operation in past 30 days</td>
<td>334</td>
<td>25%</td>
</tr>
<tr>
<td>Duration of antibiotic therapy</td>
<td>19</td>
<td>IQR: 13-38</td>
</tr>
<tr>
<td>Number of pos. Bloodcultures</td>
<td>4</td>
<td>IQR: 2-4</td>
</tr>
<tr>
<td>Focus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>252</td>
<td>19%</td>
</tr>
<tr>
<td>Cath. or prosthetics</td>
<td>325</td>
<td>29%</td>
</tr>
<tr>
<td>Endocarditis</td>
<td>179</td>
<td>16%</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td>164</td>
<td>15%</td>
</tr>
<tr>
<td>Skin &amp; soft-tissue</td>
<td>131</td>
<td>12%</td>
</tr>
<tr>
<td>Respiratory</td>
<td>99</td>
<td>9%</td>
</tr>
<tr>
<td>Bones &amp; Joints</td>
<td>81</td>
<td>7%</td>
</tr>
<tr>
<td>Urogenital</td>
<td>29</td>
<td>3%</td>
</tr>
<tr>
<td>Unknown / Other</td>
<td>110</td>
<td>10%</td>
</tr>
<tr>
<td>Septic Shock</td>
<td>65</td>
<td>5%</td>
</tr>
<tr>
<td>Death</td>
<td>258</td>
<td>19%</td>
</tr>
</tbody>
</table>

IQR = Interquartile range  
ICU = Intensive care unit  
IVDU = Intravenous drug use  
HIV = Human immunodeficiency virus  
ZVC = Central venous catheter
Incidence of nosocomial (NO-MSSA) and community acquired (CA-MSSA) methicillin-sensitive Staphylococcus aureus bloodstream infection from 1993 to 2012, N=1234

Stable prevalence of transmitted INSTI resistance mutations despite increasing use of INSTIs
Ten years of MRSA surveillance in Switzerland: Similarities and differences with Europe

F Olearo [1], W Albrich [2], S Harbarth [1], A Kronenberg [3]

[1] University Hospital of Geneva, Geneva, Switzerland
[2] Cantonal Hospital of St. Gallen, St.Gallen, Switzerland
[3] University Hospital of Bern, Bern, Switzerland

Aim:
The global epidemiology of methicillin-resistant Staphylococcus aureus (MRSA) is heterogeneous. The objective of this study was to evaluate the epidemiology of MRSA in Switzerland over a 10-year period.

Methods:
We conducted a descriptive analysis of individual patient-level and aggregate MRSA data from the ANRESIS from 2004 to 2013. We also performed a time series analysis to characterize trends of MRSA and non-multidrug-resistant MRSA (Nm-MRSA), as a potential marker for community-associated MRSA, which was defined as being susceptible to at least three of the following agents: ciprofloxacin, clindamycin, tetracycline and trimethoprim-sulfamethoxazole (TMP/SMX) with stratification by Swiss regions, age-group and patient location.

Results:
Overall, 13,675 MRSA isolates were included. Although the proportion of MRSA among S. aureus (from 14% in 2004 to 10% in 2013 and the MRSA incidence decreased over time from 0.98 in 2004 to 0.58 per 1'000 discharged patients in 2013), an increasing trend of Nm-MRSA (+0.84% per quarter) was observed. Variation in the geographical distribution was noted with a decrease in the proportion of MRSA among S. aureus in the Western region and Ticino (from 25% in 2004 to 16% in 2013 and from 20% to 15%) and stable and low prevalences (3-5%) in the Eastern and Central regions. We observed an increase in MRSA among S. aureus in outpatients (+0.044% per quarter) and a decrease in inpatients (-0.13% per quarter). Further analysis showed an increase in MRSA rates among S. aureus in younger age groups (2-15y, +0.11% per quarter) compared to decreasing MRSA rates in S. aureus for older age (>65y, -0.29% per quarter). Resistance to ciprofloxacin, clindamycin, gentamicin and erythromycin in MRSA strains decreased. Conversely, resistance to tetracycline, TMP/SMX, fusidic acid and rifampicin remained almost stationary and low over the study period.

Conclusion:
The proportion of MRSA among S. aureus in Switzerland decreased overall. The Ticino and West regions have moved from having a hyper-endemic MRSA prevalence comparable with neighboring countries, to lower levels of prevalence. MRSA appears to be an increasing problem in the younger population and in outpatients. The increased susceptibility to several antibiotic classes other than β-lactams suggests dissemination of strains, which have classically been reported as community-associated.
Bloodstream infections and local access site infection surveillance program in hemodialysis, Vaud, Switzerland

A Deschamps [1], D Zbinden [1], M Attinger [1], C Petignat [1]

[1] Unité cantonale HPCI, Lausanne, Switzerland

Background:
Patients on chronic hemodialysis (HD) are at high risk of developing bloodstream infections (BSI) and local access site infection (LASI). These infections engender high morbidity and mortality. In 2007, a BSI and LASI infections surveillance program was created, following the implementation of recommendations for the prevention of healthcare-associated infections in HD centers of the canton of Vaud. Between 2007-2013, this surveillance program encountered organizational difficulties and failed to produce usable data representative of the situation.

Objectives:
The aim of the intervention was to improve the structure of the surveillance program in the different HD centers of the canton of Vaud to produce usable data representative of the situation.

Methods:
In order to improve infection data collection from the HD centers, a nurse was designated as Surveillance nurse in each center. The questionnaire and work instructions created in 2007 were adapted. A standardized methodological framework was established. Surveillance nurses in the participating centers were audited on work methodology. They were trained by the Senior Infection Control Nurse Specialist to better recognize and report infections in the questionnaire and they were offered regular contact to discuss problems encountered. The Senior Infection Control Nurse Specialist received the questionnaires and entered data to be analyzed on a database.

Results:
The number of reported infections is increasing in particular regarding LASI. 54 episodes of BSI and LASI were reported in 2014 compared to 16 reported episodes in 2013, for an equivalent number of HD sessions. In 2013, among the 16 episodes, 12 were BSI and 4 were LASI (3 catheter infections and 1 fistula infection). In 2014, 30 were BSI and 23 were LASI (21 catheter infections and 2 fistula infections).

Conclusion:
Auditing and training nurses in charge in HD centers helped us to increase the quality of BSI and LASI reporting. We observed an increased number of reported infections, especially LASI. The LASI could not be easily detected before the implementation of the methodological framework. This surveillance improvement ensures a more precise data collection enabli
Colonization with Resistant Microorganisms in Patients Transferred from Abroad: Who Needs to be Screened?

T Kaspar [1], A Schweiger [2], S Droz [3], J Marschall [1]

[1] Department of Infectious Diseases and Infection Prevention, Bern University Hospital, Bern, Switzerland
[3] Institute for Infectious Diseases, University of Bern, Bern, Switzerland

Background:
While multi-drug resistant organisms (MDRO) are a global phenomenon, there are significant regional differences in terms of prevalence. Traveling to countries with a high MDRO prevalence increases the risk of acquiring such an organism. In this study we determined risk factors for MDRO colonization among patients who returned from a healthcare system in a high-prevalence area (so-called transfer patients). Factors predicting colonization could serve as screening criteria to better target those at highest risk.

Methods:
This screening study included adult patients who had been exposed to a healthcare system abroad or in a high-prevalence region in Switzerland over the past six months and presented to our 950-bed tertiary care hospital between January 1, 2012 and December 31, 2013, a 24-month period. Laboratory screening tests focused on Gram-negative MDROs and methicillin-resistant Staphylococcus aureus (MRSA).

Results:
A total of 235 transfer patients were screened and analyzed, of which 43 (18%) were positive for an MDRO. Most of them yielded Gram-negative bacteria (42; 98%), with only one screening revealing MRSA (2%); three screenings showed a combination of Gram-negative bacteria and MRSA. For the risk factor analysis we focused on the 42 Gram-negative MDROs. Most of them were ESBL-producing E. coli and Klebsiella pneumoniae while only two were carbapenemase producers. In a univariate analysis, factors associated with screening positivity were hospitalization outside of Europe (p<0.001), surgical procedure in a hospital abroad (p=0.007), and on admission to our hospital - active infection (p=0.002), antibiotic treatment (p=0.014) and presence of skin lesions (p=0.001). Only hospitalization outside of Europe (Odds Ratio, OR 3.23 (95% CI 1.54-6.79)) and active infection on admission (OR 2.67 (95% CI 1.07-6.65)) remained as independent predictors of Gram-negative MDRO colonization.

Conclusion:
Our data suggest that a large proportion of patients (i.e., 82%) transferred to Switzerland from hospitals in high MDRO prevalence areas are unnecessarily screened for MDRO colonization. Basing our screening strategy on certain criteria (such as presence of skin lesions, active infection, antibiotic treatment, history of a surgical procedure abroad and hospitalization outside of Europe) promises to be a better targeted and more cost-effective strategy.
Point-of-use water filters: Do they provide sterile water over the entire time of the manufacturer’s warranty?

M Dangel [1], AF Widmer [1]

[1] University Hospital Basel, Basel, Switzerland

Introduction:
Hospital water supplies may contain waterborne pathogens: P. aeruginosa has been implicated in transmission of healthcare-associated infections (HAIs), in particular in ICUs. Point-of-use (POU) water filters deliver sterile water providing a service life between 7 and 62 days. Until recently, this time was limited to 30 days, and was extended during the last years. However, no independent investigation proved these filters to be able to provide sterile water for the entire lifetime claimed by the manufacturer.

Objectives:
First, validation of the manufacturer’s claimed standing time to provide sterile water, and secondly, to evaluate the filter’s performance after the expiration of its service life.

Methods:
Two POU water filters are installed in 2 rooms (R1, R2) on a ward to test the risk of contamination by tap water. Two types of filters were tested during a 7 months period: Pall Q-Point (service life by company: 62 days) and Anios 31DA+ (service life by company: 31 days). Samples were collected at the same date in two adjacent rooms on the same ward as control (C1, C2) that have the same main water supply. 36 samples (100ml each) were taken from faucets with filters and 23 from control without filters and analyzed for total viable count per millilitre, and number of bacteria and Pseudomonas aeruginosa (PSAE) per 100 millilitres.

Results:
Microbiologic examinations of tap water revealed a growth of PSAE in the first sample collected after 30 days in R1 (Filter nr. 1/10). In R2 the first filter was changed after 56 days (became clogged, delivered sterile water during 56 days). One PSAE colony appeared in R2 much later, after 203 days (Filter nr. 4/5). Total viable count per millilitre mean (SD) [R1+R2] 2,58 (17,1); [C1+C2] 122,5 (205,0); p < 0,001 number of bacteria per 100ml mean (SD) [R1+R2] 12,7 (32,1); [C1+C2] 104,17 (32,2); p < 0,001 Pseudomonas aeruginosa per 100ml mean (SD) [R1+R2] 6,29 (22,7); [C1+C2] 1,09 (5,4); p = 0,13 Molecular typing of the strains demonstrated high similarity suggesting that this PSAE strain is endemic to the water supply of our hospital.

Conclusion:
POU water filters significantly reduce the microbiological burden of tap water. This study confirms service lives of the filters: using filters beyond the manufacturer's recommendation may lead to high-level contamination with Pseudomonas aeruginosa.
Preliminary results of an admission-screening for multidrug-resistant Enterobacteriaceae in St.Gallen, Switzerland

E Lemmenmeier [1], D Flury [1], B Mani [2], M Schlegel [1]

[1] Kantonsspital St.Gallen, St.Gallen, Switzerland
[2] Zentrum für Labormedizin, St.Gallen, Switzerland

Aim:
The burden of multiresistant Enterobacteriaceae (MRE) is increasing and challenging public health. After a small outbreak with KPC-2-producing K.pneumoniae in our institution an admission-screening for Extended Spectrum Betalactamases (ESBL) and Carbapenemase-producing Enterobacteriaceae was implemented to conduct a risk-based screening strategy.

Methods:
All patients hospitalised abroad within the last 6 months are screened with rectal swabs at admission. Additional samples are obtained from urine, open wounds or tracheal secretions in case of urinary catheter, wounds or invasive ventilation. Samples are incubated in an enrichment broth, subsequently inoculated on screening plates for ESBL and Oxa-48. We use the BD PhoenixTM 100 system for susceptibility testing. In case of suspicion for ESBL or carbapenemase production colonies are investigated with phenotypic methods. Polymerase chain reaction applies if carbapenemase production is suggested. Since local guidelines do not ask for putting patients colonised with ESBL-E.coli under contact precautions, samples with suspected ESBL-E.coli are not further investigated.

Results:
From June 13 until July 14 107 patients were found eligible for screening. 8 patients were excluded (early discharge (4), neglect (4)), resulting in an analytic sample of 99. 12/99 patients were colonised with ESBL (K. pneumoniae (8), E. cloacae (2)) or New Delhi Metallobetalactamase (NDM) (K. pneumoniae (1), E.cloacae (1)). No patient with negative rectal screening showed a positive sample from any other anatomical localisation. Only few patients had positive samples from urine (3) or trachea (1) additionally to positive rectal swabs. Comparison of colonised and non-colonised patients showed differences in hospitalisation duration and ICU admission abroad, invasive ventilation, urinary and central venous catheter before screening. Colonisation with MRE strains resulted in longer hospitalisation stays in our institution (29 vs 14 days).

Conclusion:
A detection rate of 12% for colonisation with MRE in patients previously hospitalised abroad seems high enough to maintain the admission screening in our institution. Rectal screening might be sufficient to detect colonisation. Patients hospitalised in ICU before screening appear to have the highest risk for colonisation. Due to the small sample size detailed analysis for risk factors is not feasible. Therefore we didn’t implement a risk based screening strategy yet.
Prospective Surveillance of Surgical Site Infection after Cranial Neurosurgery: Infection Rate and Risk Factors

C Strahm [1], B Schoebi [1], W Albrich [1], G Hildebrandt [2], M Schlegel [1]

[1] Division of Infectious Diseases and Hospital Epidemiology, Cantonal Hospital St. Gallen, St. Gallen, Switzerland

[2] Department of Neurosurgery, Cantonal Hospital St. Gallen, St. Gallen, Switzerland

Objectives:
Data of Surgical Site Infections (SSI) in neurosurgery of the head are scarce. Incidences of 1–11% are reported. A prospective surveillance to determine SSI rate and risk factors at our hospital was conducted.

Methods:
The study was performed during one year (February 2013 to January 2014) at our tertiary care centre. Data from all patients undergoing neurosurgical procedures of the head (without endonasal access) were entered prospectively into a database. Infections were defined according the CDC/NHSN definitions, including a follow-up for 30 days without and 1 year with implantation of foreign material, respectively.

Results:
317 patients undergoing 333 procedures were included. Median age was 61 years. The SSI rate was 7.2% (24/333) overall. All infections but one were deep organ space infections (12/24 intracerebral infections and 11/24 meningitis/cerebritis, respectively). 21 of 24 infections were diagnosed either by positive cultures of sterile compartments or overt pus stated by the surgeon. Two infections were diagnosed on clinical grounds. Classical risk factors were not found to be significant predictors of SSI. Significant risk factor was external ventricular drain (EVD), especially if in place for >5 days. Foreign material and BMI >25 showed a trend towards an increased infection rate (IR). IR was influenced both by the index and by subsequent operations. In comparison with the previous surveillance period during 2009 the SSI rate was not different.

Conclusions:
SSI rate after cranial neurosurgery at our institution was stable comparing the two periods (2009 vs 2013) and comparable to published rates. Strongest risk factor for SSI was an EVD and the risk increased with duration of drainage. Since neurosurgical procedures especially craniotomies consist of heterogeneous interventions, care must be taken when comparing rates of different institutions.
Prospective validation of cessation of contact precautions for ESBL-producing E. coli

S Tschudin-Sutter [1], R Frei [1], F Schwahn [1], M Tomic [2], M Conzelmann [2], A Stranden [1], A Widmer [1]

[1] University Hospital Basel, Basel, Switzerland
[2] Felix Platter Hospital, Basel, Switzerland

Objectives:
We abandoned contact precautions for patients infected or colonized with ESBL-E. coli at our institution, as well as at an affiliated long-term-care centre. To validate this practice, all contact patients, hospitalized in the same room as a patient with ESBL-E. coli, were screened to determine rates of transmission in both institutions.

Methods:
This prospective observational cohort study was performed at two affiliated institutions in Switzerland: The University Hospital Basel, an academic tertiary care centre with 855 beds and the Felix Platter-Hospital - a 450-bed, university-affiliated geriatric and rehabilitation centre. Patients were included after routine contact precautions were abandoned for patients infected or colonized with ESBL-E. coli from June 2012 to December 2013 at the University Hospital Basel and from January 2012 to December 2013 at the Felix Platter-Hospital. All contact patients defined as patients hospitalized in the same room as a patient colonized or infected with an ESBL-E. coli for at least 24 hours were prospectively screened by performance of rectal swabs, swabs from any open wounds or drainages, as well as urine cultures given the presence of foley catheters. Transmission was regarded to have occurred when screening for ESBL-carriage of a contact patient was positive and the PCR subtype as well as molecular typing by pulsed-field gel electrophoresis (PFGE) revealed identity with the strain of the index patient.

Results:
During the study period, 231 contact patients (151 from the acute care hospital and 80 from the geriatric/rehabilitation hospital) were screened for carriage of ESBL-E. coli after a median contact time of 4 days at the acute care hospital and 15 days at the geriatric/rehabilitation hospital. ESBL-E. coli was recovered from a total of 24 contact patients, 12 from each institution. Identity of strains was confirmed in 11 cases, accounting for an overall transmission rate of 4.8%. Documented transmission rates were low with 2.6% at the acute-care hospital and 8.8% at the geriatric/rehabilitation hospital. Contact time was longer for patients in which transmission occurred (median 13 days, IQR 10-14 days versus 5 days, IQR 4-10 days, p=0.003).

Conclusion:
Discontinuing contact precautions for ESBL-E. coli in healthcare settings is associated with low transmission rates providing short exposure times and the-art infection control.
Simplifying hand hygiene technique: three steps are as efficient as six – results from a randomized cross-over trial

S Tschudin-Sutter [1], M Rotter [2], R Frei [1], D Nogarth [1], A Strandén [1], P Häusermann [1], A Widmer [1]

[1] University Hospital Basel, Basel, Switzerland
[2] Medical University Vienna, Vienna, Austria

Objectives:
The World Health Organization (WHO) provides guidance on the proper technique for the use of handrub consisting of six steps to ensure entire coverage of the hands. Several studies provide strong evidence for increased bacterial killing using this technique but compliance with all six steps is low. We therefore aimed to assess the efficacy of 3 steps outlining the technique for use of handrub as compared to the conventional six steps by comparing their respective degree of bacterial killing.

Methods:
We performed a randomized cross-over trial including 32 medical students at the University Hospital Basel, Switzerland in May 2014. Participants were randomly assigned to performance of hand hygiene following six steps for use of hand rub as outlined by the WHO (control group), or three steps (intervention group). The three steps consisted in first, covering all surfaces of the hands, second rotational rubbing of fingertips in the palm of the alternate hand, and third, rotational rubbing of both thumbs. Assignments were reversed after one day. Three ml of the reference disinfectant, 2-propanol (60%), were used for both techniques and the degree of bacterial killing was assessed as outlined by the European Norm (EN) 1500. In brief, hands were inoculated with broth cultures of E. coli and bacterial counts were assessed before and after use of handrub by immersing hands in nutrient broth. The mean logarithmic reduction in bacterial counts was compared between the two techniques by the Wilcoxon signed-rank test.

Results:
The bacterial load did not differ significantly before performance of hand hygiene between the control (median 6.37, interquartile range [IQR] 6.19-6.54) and the intervention (median 6.34, IQR 6.17-6.60) group, p=0.513. There was a trend towards lower bacterial counts after performance of hand hygiene in the intervention group (median 1.96, IQR 1.25-2.52) as compared to the control group (median 2.34, IQR 1.80-2.71), p=0.055. The logarithmic reduction factor was higher in the intervention group (median 4.45, IQR 4.04-5.15 versus median 3.91, IQR 3.69-4.62, p=0.022; Figure).

Conclusion:
The WHO recommended 6 step technique can be safely reduced to a 3 step procedure, based on the strict requirements of EN 1500. The simpler technique results in even higher antimicrobial killing, and focuses on finger tips and thumbs, areas that are commonly forgotten with the currently recommended 6 steps.
Transmissibility of C. difficile without contact isolation: results from a prospective observational study

A Widmer [1], R Frei [1], T Lawley [2], A Stranden [1], E Kuijper [3], C Knetsch [3], S Tschudin-Sutter [1]

[1] University Hospital Basel, Basel, Switzerland
[2] Wellcome Trust Sanger Institute, Hinxton, United Kingdom
[3] Leiden University Medical Center, Leiden, Netherlands

Objectives:
In contrast to current recommendations, contact precautions for patients with C. difficile infection (CDI) have not been implemented at our institution except for patients infected with hypervirulent strains such as ribotype 027 or 078. We aimed to estimate the transmissibility of C. difficile with standard precautions only.

Methods:
This prospective observational study was performed at the University Hospital Basel, Switzerland – a tertiary academic care centre with 855 beds from 01/2003 to 12/2013. For each index case with CDI, the contacts (i.e. patients sharing the same room during hospitalization) were screened for C. difficile by rectal swabs for detection of toxin producing C. difficile. C. difficile isolates from patients and contacts were characterised by PCR ribotyping. Transmission was defined as isolation of the same strain from index case and contact, confirmed by molecular typing. Next generation sequencing was performed to assess relatedness of strains if the index and contact patient revealed identical ribotypes. Differences in single nucleotide polymorphisms (SNPs) were interpreted as clonal between 0 and 2 and genetically related between 2 and 10.

Results:
We identified 1,032 cases with presence of toxigenic C. difficile in their stool. Among these, 845 fulfilled the definition of CDI as issued by ESCMID. 534 contacts were exposed to the 845 index cases during their hospital stay. Active screening for toxigenic C. difficile by rectal swabs was performed for 88.4% of all contact patients (472/534). 62 contact patients were discharged before a rectal swab could be performed. C. difficile was detected in 6.6% (31/472) of all contacts. Ribotyping to confirm transmission in these 31 contacts revealed identical strains in 6, accounting for transmission in 1.3% (6/472) of all contact patients. Next generation sequencing could be performed for 4 of the 6 pairs with identical strains, and revealed clonality in 2 pairs and genetical relatedness in the remaining two.

Conclusion:
We were able to identify a low rate of transmission of toxigenic C. difficile during a 10-year study period only implementing standard precautions without contact isolation for CDI, except for the PCR ribotype 027 or 078. Our findings challenge the current recommendations of contact precautions for patients with CDI in non-epidemic settings - potentially saving resources and improving patient care.
BACTERIAL CONTAMINATION IN DIALYSIS CENTER MASSIVELY REDUCED BY HYDROGEN-PEROXIDE-BASED HYPERDRYMIST® TECHNOLOGY

C. Ferrier-Guerra [1], C. Solcà [1], F. Villa [2], C. Garzoni [2, 3]

[1] Clinica Luganese, Nephrology Unit, Lugano, Switzerland
[2] Clinica Luganese, Department of Internal Medicine and Infectious Diseases, Lugano, Switzerland
[3] Clinic for Infectious Diseases - Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland

Introduction:
Environmental bacterial contamination is a major cause of nosocomial infections. Bacterial infections are the most frequent infectious complications in hemodialysis patients and a major cause of morbidity and mortality. Additionally, the increasing pressure of multidrug resistant bacteria (MRSA, VRE, ESBL, ...) constitutes a major threat in dialysis centers. We previously showed that the use of nebulized hydrogen peroxide (HP) through the HyperDRYMist® (HDM) technology massively reduces bacterial contamination detected after conventional cleaning procedures, both in vitro and in vivo studies. The aim of this study is to prove the efficacy of the HDM technology in reducing the bacterial environmental contamination in a dialysis center added to standard cleaning protocols.

Methods:
HDM® technology. The 99S disinfectant solution, based on HP and AG+ ions, is micro-nebulized into hyper-dry mist at rate of 1.3 ml/m3 at the end each working day. Process lasted about 6 minutes for 80m3 space. Bacterial contamination assessed by sampling 10 high-touch-surface points after standard cleaning procedures but before the treatment with the HDM technology, and 60 minutes after the end of the HDM® technology. Sampling was performed with surface-sampling slides (10 cm2) for biological bacterial contaminants. Tests repeated on 3 different days chosen randomly during 1-month period. Cleaning staff and physicians unaware of study to avoid biases. Statistical differences in CFU values stratified by treatment performed using non-parametric Kruskal-Wallis equality of populations rank test.

Results:
HDM® dramatically improved environmental contamination on inanimate surfaces of the dialysis center consistently on all measurements (see figure). Reduction in contamination higher than 99% and highly statistically significant (p <0.001). Additionally, well-known high degree of variability in efficacy of conventional cleaning abolished through the HDM. Bactericidal action of the nebulized formula reached consistently all surfaces throughout, even on high-touch spots representing elevated risk areas such as armrests and keyboards, and difficult-to-reach spaces (underneath the bed), where very high bacterial load detected despite extensive conventional cleaning.

Conclusions:
Despite regular and extensive execution, conventional cleaning procedures are well known and confirmed in this study to offer major margins of improvement. We demonstrated that the hydrogen-peroxide based.
Efficacy in ambulances of HYPERDRYMIST® micro-nebulized hydrogen peroxide solution in reducing bacterial contamination

C. Garzoni [1, 2], F. Villa [1], S. Regazzoni [3], A. Motti [3]

[1] Department of Internal Medicine and Infectious Diseases - Clinica Luganese, Lugano, Switzerland
[2] Clinic for Infectious Diseases - Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland
[3] Extra Hospital Emergency Service - Croce Verde, Lugano, Switzerland

Aim:
Surfaces contamination is a relevant source of nosocomial infections. Ambulances transport in difficult conditions colonized or infected patients. Presence of multidrug-resistant bacteria is unknown during transportation. Strict infection control protocols must be implemented to reduce potential bacterial transmission in ambulances. Objective was to demonstrate effectiveness of HyperDRYMist® (HDM) disinfection technology based on micro-nebulized hydrogen peroxide (HP) in reducing microbial contamination in ambulances after standard cleaning procedures.

Methods:
This was a 2-phase study. 1. Quantify the microbial load commonly present in ambulances. Ten internal sample points after standard cleaning in 12 randomly selected ambulances for 1 month. Routine cleaning performed after each patient. 2. Evaluate effectiveness of HDM for environmental decontamination. System activated in ambulances after standard cleaning/disinfection. Tests conducted using 4 ml/m3 of solution aerosolized for 2 min. After, ambulance’s doors opened to ventilate and residual HP concentrations measured. Bacterial contamination of 6 surfaces assessed after standard cleaning and disinfection, before HDM and after. Sampling through slides (10 cm2) for biological bacterial contaminants. Tests performed on 4 days, random selection in 2-month period. Paramedics not informed to avoid biases.

Results:
Microbial contamination in ambulances varies massively depending on reachability and tested vehicle (figure1). Hence 6 points with highest contamination selected to evaluate effectiveness of HDM (figure2). HDM dramatically reduces overall contamination on ambulances’ surfaces. Bactericidal action reached uniformly all surfaces, difficult-to-reach spots too. At nebulization’s end no HP presence in ambulances’ detected.

Conclusion:
Important bacterial contamination detected despite thorough/regular cleaning. Ambulances used in frantic situations and present many difficult-to-reach surfaces. HDM massively reduces bacterial contamination including difficult-to-reach areas. Easy procedure, rapid (2 minutes), cost effective, ambulance immediately operational. Procedure automated and operator independent, major advantage in emergency vehicles hectic operations. HDM easily implementable into standard protocols. Impressive decrease of contamination has potential to reduce pathogens’ transmission and increase safety for patients and rescuers.
Efficacy of HYPERDRYMIST® micro-nebulized hydrogen peroxide in reducing clostridium difficile generated hospital acquired infections.

M Ferrari [1], A Bocconi [2], A Anesi [3], C Garzoni [4, 5]

[1] Department of Hygiene, "Maggiore" Hospital A.O. Lodi, Lodi, Italy
[2] Management Department, "Maggiore" Hospital A.O. Lodi, Lodi, Italy
[3] Department of Microbiology, "Maggiore" Hospital A.O. Lodi, Lodi, Italy
[4] Department of Internal Medicine and Infectious Diseases - Clinica Luganese, Lugano, Switzerland
[5] Clinic for Infectious Diseases - Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland

Aim:
The majority of Hospital Acquired Infections (HAI) is linked to the presence of pathogens like C.diff, MRSA, VRE and Norovirus, which can persist for many months in the environment, despite routine cleaning and disinfecting procedures. Study objective was to intervene on the risk of infection by C.diff throughout our hospital ward. We evaluated the effectiveness of a new disinfection method HyperDryMist® (HDM) based on H2O2+Ag+, by monitoring infections’ reduction among patients as well as microbial room surfaces’ contamination.

Methods:
Controlled cross-over 6-month trial comparing two different disinfection procedures: (a) active chloride + dry vapor, vs (b)active chloride + HDM. Observation performed on 21 rooms (of 2 different hospital wards) occupied by patients infected by C.diff; interventions performed prior to new occupancy (already within 30’ after treatment), in addition to routine cleaning activities. Incidence of infections by C.diff monitored throughout the study. Microbial contamination on specific high-touch surfaces assessed with portable ATP bioluminescence (RLU) at T0 before cleaning, T1 immediately after cleaning, and T2 after HDM. Statistical tests included Chen-Shapiro test for normality and non-parametric tests non-normal data; comparisons made using Mann-Whitney test.

Results:
Treatment with HDM drastically reduced environmental contamination by 92.11% (iqr 9.56) as compared to standard procedure: 61.93% (iqr 30.99-variability reflecting different degrees of contamination among events) vs 97.04% (iqr 9.56) p<0.001. Reduction of contamination on surfaces was uniform across the room, best result for the aluminum head-boards (p<0.001). On 105 post cleaning measurements, 58 above the 100 RLU threshold, i.e. 55.23%. After HDM down to 1, at 0.09%. More importantly, during study period, patient C.diff infection rates drastically fell by 97.03% p<0.001 after treatment with HDM and returned to initial values (approx. 4.69%) when treatment suspended, results collected via 1-month follow up.

Conclusion:
Disinfection with HDM drastically reduced presence of organic contaminants right from first application. Reduced C.diff rates among patients suggest treatment’s efficacy against spores. Because contact with contaminated surfaces in rooms previously occupied by infected patients increases the likelihood for acquiring new infections, effective preventive intervention is paramount in contrasting spread of HAI while cutting their costs.
Figure 1: Lodi Chart

Figure. RLU values at T0 before cleaning, T1 immediately after cleaning, and T2 after infection control with HyperDryMist H2O2. Low variability (reflecting difference in bacterial contamination among events) confirms the efficacy of HyperDryMist in reducing peak events.
P100

Efficacy of HYPERDRYMIST® technology in reducing residual environmental MDR bacterial contamination in tertiary hospital

M. Ferrari [1], A. Bocconi [2], A. Anesi [3], S. Asticcioli [3], D. Baroni [3], C. Garzoni [4, 5]

[1] Department of Hygiene, AO Lodi, “Maggiore” Hospital of Lodi, Lodi, Italy
[2] Hospital Management AO Lodi, “Maggiore” Hospital of Lodi, Lodi, Italy
[3] Department of Microbiology. AO Lodi, “Maggiore” Hospital of Lodi, Lodi, Italy
[4] Department of Internal Medicine and Infectious Diseases, Clinica Luganese, Lugano, Switzerland
[5] Department of Infectious Diseases, Inselspital, Bern University Hospital and University of Bern, Bern, Switzerland

Introduction

Environmental persistence of multidrug-resistant (MDR) organisms in hospital environment is arduous to reduce or eliminate. Efficacy’s inconsistency characterizing manual disinfection that generates high levels of residual surface contamination compounds adversities in achieving reduction.

Objectives:
The study evaluated a novel no-touch disinfection technology named HyperDRYMist®, which decontaminates hard surfaces by delivering an aerosolized enhanced solution of Hydrogen Peroxide, as an addition to manual disinfection (terminal cleaning).

Methods:

Hard surfaces of 20 hospital rooms occupied by patients affected by classic MDR bacteria were prospectively sampled for contamination in 10 standardized high-touch points following patient’s discharge. Measurements were taken after manual disinfection with active chlorine (2000 ppm), before micro-nebulization via HDM® and after it. Eventual residual bacterial contamination excluded by enriched broth culture.

Results:
For 8 months, 20 cases of “classic” MDR patients were prospectively identified and included in the study (see list below). After terminal cleaning, mean residual bacterial contamination was 59.27±78.89 (mean± SD) cfu/ml, with values reaching up to 400 cfu/ml, then reduced to 2,48±12,07 (p<0.0001) after HDM®. The environmental presence of MDR after conventional cleaning was specifically investigated. In 14/20 rooms MDRs bacteria still detected, in particular found MRSA in 4 of 4 rooms, Acinetobacter baumanii in 2/2, MDR Pseudomonas in 2/2, KPC in 2/4, VRE in 0/2, E.coli ESBL 2/2, K. pneumonia ESBL 0/2, Stenotrophomonas maltophilia 2/2. After HDM® in none of the rooms MDR bacteria were detected.

Conclusion:
The study evinces how significant levels of environmental contamination persist when manual disinfection is the sole method adopted to eradicate MDR bacteria from surfaces. In spite of quality control and certified protocols, overall inconsistency of results manual disinfection was observed. Varying degrees of efficacy were very clearly operator’s dependent. HDM® brought consistency of results in drastically reducing pathogens’ presence. Although eliminated with HDM® in the rooms sampled, persistence of MDRs suggests surfaces may play pivotal role for pathogens’ transmission. Hence the need for disinfection technologies like HDM® to be embedded in terminal cleaning procedures to prevent the environmental permanence of pathogens on surfaces.
136

P101 Routine testing and isolation: the 2014/15 influenza epidemic in a tertiary care hospital

N Bartlomé [1], C.A Fux [1], C Ottiger [2], E Bucheli Laffer [1]

[1] Clinic for Infectious Diseases and Hospital Hygiene, Kantonsspital Aarau, 5001 Aarau, Switzerland
[2] Departement of laboratory medicine, Kantonsspital Aarau, 5001 Aarau, Switzerland

Aim: Influenza epidemics occur seasonally and result in substantial morbidity and mortality. Preventing hospital transmission of influenza is of special concern. We describe the course of the 2014/2015 influenza epidemic in a 600-bed tertiary care hospital from November 2014 to March 2015 after implementation of a new test and isolation strategy.

Methods: During the epidemic, influenza was suspected in patients with a temperature >38°C plus two or more of the following symptoms: rhinitis, pharyngitis, cough, dyspnea, head- or body aches and diarrhoea. RT-PCR for influenza A and B from nasopharyngeal swabs and droplet isolation were proposed for all suspected cases on hospital admission or during hospital stay. Cases were defined as nosocomial, if symptoms occurred >72h following hospital admission.

Results: 281/844 (33%) swabs of suspected cases (in- and outpatients) were positive for influenza A or B. 226 (80%) were positive for influenza A and 55 (20%) for Influenza B, reflecting the ongoing epidemic. The median age of confirmed cases was 60.5 years (range 0-97 years). 140 (50%) were male and 48 (17%) were children. Of the 204 (73%) patients hospitalized, 41 (20%) required intensive care and one patient died. 77/281 (27%) patients with a positive swab were treated as outpatients. 182/281 (65%) positive samples were drawn in the emergency department, 6 on the ICU, 68 (24%) on the ward, the remainder in outpatient clinics or the dialysis unit. The considerable number of positive swabs on the ward suggests, that influenza was expressed suspected only after transfer from emergency department. 190/204 (93%) inpatients were isolated at the time influenza was suspected and the swab was drawn. 8 (3%) influenza cases were classified nosocomial, of which only 3 were true nosocomial after chart review. 134 isolation days in 123 patients with suspected influenza but subsequently negative swabs were unnecessary. Remarkably, 96 (78%) of these patients were children, in whom the applied influenza definition appeared to be less accurate.

Conclusions: Routine testing and isolation based on a clinical case definition seems reasonable to prevent nosocomial influenza transmission, but requires a high acceptance of the strategy in all healthcare workers. Laboratory-confirmed influenza cases improve influenza awareness among healthcare workers. Short PCR turnaround times reduce excess isolation days and further improve the implementation of the strategy.
The 2015 Influenza Epidemic at a Swiss Private Clinic

C Rohrer [1], J Stekelenburg [2], D Jegher [1], I Amrein [3], S Pranghofer [3], C Orasch [1]

[1] Department of Infectious Diseases and Hospital Epidemiology, Hirslanden Klinik St. Anna, Lucerne, Switzerland
[2] Emergency department, Hirslanden Klinik St. Anna, Lucerne, Switzerland
[3] Bioanalytica Microbiology Laboratory, Lucerne, Switzerland

Aim:
The 2015 Swiss influenza epidemic was more intense than in the preceding years. Little is known about influenza epidemics in the setting of private clinics. The goal of our study was to compare the 2015 influenza epidemic in a private clinic with the preceding years and to analyse the 2015 epidemic in terms of patient characteristics, outcome and the performance of medical staff in diagnosing influenza. In a 200-bed private clinic in Lucerne, data of patients in whom an influenza was suspected were prospectively collected from 01.01. until 31.03.2015.

Methods:
Clinical characteristics, outcome, swab positivity and adherence to the local algorithm were analysed. For influenza-PCR, the FilmArray® Respiratory Panel was used. Influenza screening was performed in 4/768 (0.5%), 13/753 (1.6%), and 5/820 (0.6%) inpatients evaluated at the emergency department in 2012, 2013 and 2014 respectively.

Results:
Of these, 1 (25%), 4 (30.8%) and 3 (60%) were positive in 2012, 2013 and 2014 respectively. In 2015, nasopharyngeal swabs for suspected influenza were performed in 70/923 (7.6%) inpatients. 32 (45.7%) had a positive influenza-PCR: 21 (65.5 %) influenza A and 11 (34.4%) influenza B. Median age of patients with suspected influenza was 73 (19-91) years, median duration of hospitalisation was 8 (1-36) and droplet isolation 2 (0-8) days. Nine (12.9%) patients were treated with empirical oseltamivir because of immunosuppression. Four (5.7%) patients died: one of them had an influenza A but died from cardiac insufficiency due to a HOCM. Fifty-nine (84.3%) of patients with suspected influenza and 30/32 (93.8%) PCR-positive patients were correctly isolated. Local algorithm was completely followed in 23/70 (32.9%) patients. Non-adhesion to the algorithm occurred in 47 (67.1%) patients: 22 patients were afebrile, 24 did not fulfill 2 clinical criteria and 1 patient was not isolated. No nosocomial influenza transmission was noted. The proportion of positive swabs as well as adherence to our local algorithm increased in the second half of the influenza season: Swabs were positive and the algorithm followed in 40.9% and 18.2% in weeks 4-9 compared to 47.9% and 39.6% in weeks 10-14 respectively.

Conclusion:
This years’ heavy Swiss influenza epidemics also touched private clinics. The local influenza algorithm was only followed in a third of all patients, but increasing adherence to the algorithm and an increasing positivity rate of nasopharyngeal swabs was observed in the course of the epidemics.
Analyse inkorrekt angeordneter Isolationsmassnahmen in einer Spitalregion

A Riedel [2], M Schlegel [1], M von Kietzell [1]

[1] Kantonsspital St. Gallen Departement Innere Medizin Klinik für Infektiologie und Spitalhygiene, St. Gallen, Switzerland
[2] Spitalregion Rheintal Werdenberg Sarganserland, Switzerland

Einführung:

Ziel:
Mit Überprüfen der korrekten Indikation zur Isolation bei Notfalleintritten soll sichergestellt werden, dass keine unnötigen Isolationen bei Eintritt erfolgen.

Methode:
Sämtliche bei Eintritt verordneten Isolationen werden in der Spitalregion (drei Standorte mit je rund, 80, 110 und 130 Betten; gesamt 330) über ein elektronisches Meldeportal (Art und Beginn der Isolation) der Spitalhygiene gemeldet. Die angeordneten Isolationen wurden retrospektiv basierend auf den bei Eintritten vorliegenden klinischen Daten und allenfalls durchgeführter Norovirus-Antigen-Schnellteste gemeinsam von einem Infektiologen und einer Fachperson Spitalhygiene nach Indikation für die Isolationsmassnahme überprüft. Die Richtlinien für die Indikationen von Isolationen liegen dem betreuenden Personal in elektronischer Form vor und können via PC oder Handhelds beigezogen werden.

Resultate:
Insgesamt wurden für den Zeitraum vom 1.1.2014-31.12.2014 74 Isolationen mit gesamt 282 Isolationstagen analysiert. Davon wurden 26 Isolationen (35%) als nicht korrekt indiziert bewertet mit entsprechend 74 (26%) ungerechtfertigten Isolationstagen. 19 dieser 26 unbegründet angeordneten Isolationen (73%) wurden bei Diarrhoe oder vermutetem Norovirus-Infekt begonnen, wobei sich 18 dieser Isolationen (95%) in einem Spital der Spitalregion konzentrierten.

Diskussion:
Einsatz von Sicherheitsprodukten in Schweizer Spitälern - Evaluation der aktuellen Situation in Spitälern der Romandie und des Tessins

C Colombo [1], H Sax [1], E Käslin [2], B Merz [2]

[1] Universitätsspital Zürich (USZ), Zürich, Switzerland
[2] Schweizerische Unfallversicherungsanstalt (Suva), Luzern, Switzerland

Hintergrund:
Nadelstich- und Schnittverletzungen gelten als einer der häufigsten auftretenden Arbeitsunfälle im Gesundheitswesen. Dabei stellen die blutübertragbaren Infektionserreger weiterhin ein substantielles Risiko dar. Es existiert gute Evidenz dafür, dass der Einsatz von Sicherheitsinstrumenten (SD) zu einer Reduktion solcher Verletzungen führt.

Methoden:
Diese Studie untersuchte 2014 das Ausmass der Anwendung von SD in Akutspitälen der Romandie und des Tessin. Ein 13 Item Fragebogen ging an Spitäler der Zentrumsversorgung. Erfragt wurden die Art der SD, deren Einsatzort, die Motive für die Umstellung sowie die Verantwortlichkeiten dieser Prozesse.

Ergebnisse:
62 kontaktierte Spitäler haben die Fragebogen retourniert, 12 Spitalverbunde und fünf Einzelspitäler. 15 Spitäler/Spitalverbunde (88%) hatten mindestens ein SD flächendeckend im ganzen Spital im Einsatz, drei Spitalverbunde mindestens ein SD in einzelnen Bereichen (Notfall, IPS). Die am häufigsten eingesetzten Sicherheitsinstrumente waren Verweilkanülen (82%), Lanzetten zur kapillaren Blutentnahme (76%), Flügelkanülen (71%), venöse Blutentnahmenadern/-systeme (71%) und Port-a-Cath Systeme mit 65%. Nur ein Spitalverbund hatte Sicherheits-Skalpelle im Einsatz und kein Spital atraumatische chirurgische Nähnadeln. Eine SD-Version von allen drei Nadel-Typen mit grossen Lumen (d.h. Verweil-, Flügelkanülen und Blutentnahmenadern) kamen in 8 (47%) Spitälen/Spitalverbunden gleichzeitig in den Einsatz. Die am häufigsten genannten Initianten eines Wechsels von konventionellen Instrumenten auf SD waren mit 59% Medizinpersonalen und die Umstellungen wurden in 53% durch die Empfehlung der SUVA und in 41% durch Firmenvertretung angestossen. Eine Mehrheit der Spitäler/Spitalverbunde (88%) besitzt ein Konzept zur Einführung von neuen Devices, mittels Ankündigung via Intranet oder der Verteilung von Informationsflyer.

Schlussfolgerungen:
Inzidenz nosokomialer Influenza und Influenza-Durchimpfung am Kantonsspital St.Gallen (Grippeprävention am KSSG (GRIP))

D Flury [1], D Nicca [2], B Schöbi [1], R Kuhn [1], G Rettenmund [1], B Rusch [1], A Steffen [1], G Dollenmeier [3], P Vernazza [1], M Schlegel [1]

[1] Kantonsspital St.Gallen, St.Gallen, Switzerland
[2] Pflegewissenschaften Universität Basel, Basel, Switzerland
[3] Zentrum für Labormedizin, St.Gallen, Switzerland

Ausgangslage:

Methoden:

Resultate:

Konklusion:
Punktprävalenzstudie zum Einsatz von Urin-Dauerkathetern und Indikationen Antibiotikatherapie bei möglichen katheterassozierten Harnwegsinfektionen

M von Kietzell [1], J Kengelbacher [2], M Schlegel [1]

[1] Klinik für Infektiologie und Spitalhygiene, Kantonsspital St. Gallen, St. Gallen, Switzerland
[2] Kompetenzzentrum Gesundheit und Alter, St. Gallen, Switzerland

Einführung:
Das Vorhandensein eines transurethralen Dauerkatheters (DK) ist als Hauptrisikofaktor für nosokomiale Harnwegsinfekte anerkannt. Gleichzeitig ist die asymptomatische Bakteriurie ein häufiger Grund für unnötige antibiotische Therapie.

Ziel:
Das Ziel dieser Untersuchung war, die Indikationen der Einlage eines Dauer-Urinkatheters zu überprüfen und die Qualität der Antibiotikaverschreibung bei katheterassozierten Harnwegsinfekte in einer geriatrischen Klinik zu erfassen. Die Ergebnisse sollen als Ausgangspunkt für qualitätsverbessernde Massnahmen verwendet werden.

Methoden:
Mit einer Punktprevalenzstudie wurden alle hospitalisierten Patienten erfasst. Bei den Patienten, die während ihrer Hospitalisation gemäss Pflegedokumentation eine Harnableitung mittels Dauerkatheter hatten, wurde die Indikation für diese Massnahme und allfällige antibiotische Therapien überprüft und deren Indikation anhand eines infektiologischen Aktenkonsiliums bewertet.

Resultate
Die Anzahl hospitalisierter Patienten an der geriatrischen Klinik mit rund 90 Betten und einer durchschnittlichen Hospitalisationszeit von 18 Tagen am Erfassungstag im November 2014 betrug 84, alle konnten in die Analyse eingeschlossen werden. Bei 11 (13.1%) war eine Harnableitung mittels DK dokumentiert. Die Indikation für die Harnableitung mittels Dauerkatheter war bei 6 der 11 Patienten (55%) klar nachvollziehbar (Harnverhalt, nachgewiesene Harnabflusstörung). Bei 5 Patienten (45%) war keine klare Indikation aus der Pflegedokumentation ersichtlich. Eine antibiotische Behandlung für einen möglichen katheterassozierten Harnwegsinfekt wurde bei 4 Patienten dokumentiert. Von diesen war die Indikation zur antibiotischen Therapie nur in einem Fall (25%) gemäss infektiologischer Beurteilung klar gegeben.

Diskussion:
Burden of invasive pneumococcal disease (IPD) and serotype epidemiology in Switzerland 2005-2014

C Hauser [1, 2], M Küffer [1], M Hilty [1, 2]

[1] Institute for Infectious diseases, University of Bern, Bern, Switzerland
[2] Department for Infectious Diseases, University Hospital, Bern, Switzerland

Aim
To describe the incidence and serotype epidemiology of invasive pneumococcal disease (IPD) according to distinct age groups before, during and after the uptake (i.e. recommendation and reimbursement) of 7- (since 2007) and 13-valent (since 2011) pneumococcal conjugate vaccines (PCV) for children up to 5 years old in Switzerland.

Methods
The Federal Office of Public Health (FOPH) receives standardized mandatory IPD reporting forms from treating physicians while the National Reference Centre for Pneumococci (NZPn) serotypes the pneumococcal isolates from IPD cases in Switzerland. For this study, incidence data is derived from the FOPH homepage and therefore is based on the reporting forms. Serotype distribution includes all invasive isolates sent to the NZPn. For trend analysis p-values were calculated by χ²-test and values ≤.05 were deemed significant.

Results
From 2005 to 2014, the overall IPD incidence decreased in Switzerland (12.8-9.7/100’000: p<0.0001). As for distinct age groups, rates fell significantly by 61% in vaccine-age children (age 0-4: 18.8/7.3) and by 22% in adults (13.7/10.7). Children 5-14 years did not show a significant IPD reduction for 2005-2014. The proportion of IPD by PCV13 serotypes (STs) decreased significantly by around 40% in all age groups combined (77.6%-43.4%; p<0.0001) with the exception of the children aged 5-14 years (78.6%-77.8; p=0.7). Analyzing the individual PCV7 serotypes (STs), ST 14 was significantly reduced to 4.3% while all other STs decreased below 3%. As for the PCV13 but non-PCV7 serotypes, they also show decreasing trends in the very recent years (2013 and 2014) with the exception of ST 3 which remained high (15.6%). In addition, among the significantly emerging non-vaccine types are serogroup 15 (0.4-3.0%; p<0.0001), 22F (0.2-10.8%; p<0.0001) and 24 (0.2-3.3%; p<0.0001). Serogroup 23 remained at about 6% with 23A/B (5.4%) largely replacing 23F.

Conclusions
The recommendation and reimbursement of PCV vaccines in Swiss children was followed by a reduction of IPD incidence by about two thirds in young children and by about one quarter in adults. In older children not yet routinely vaccinated with PCV13 there was no significant reduction of PCV13-IPD. The reductions in IPD are largely mirrored by PCV13-serotype reduction. However, some non-vaccine Serotypes/groups (15, 22F, 24, 23A/B) seem to be emerging and warrant close surveillance.
**Objective:**
The aim of our study was to summarize the effect of nasal (± whole body wash) MRSA decolonization in hemodialysis patients by means of a systematic review and meta-analysis.

**Methods:**
We identified eligible studies using MEDLINE, EMBASE, the Cochrane database, clinicaltrials.org and conference abstracts. We considered studies of any design that investigated success of MRSA decolonization in hemodialysis patients. For the statistical analysis, we used STATA 13 to express study-specific proportions with 95% confidence intervals. A likelihood ratio test was used to test for inter-study heterogeneity.

**Results:**
Six published prospective cohort studies and one study described in a conference abstract met our inclusion criteria. From 1,150 hemodialysis patients enrolled in these studies, MRSA was isolated from nasal swabs of 147 (12.8%) patients. Six of the trials used mupirocin nasal ointment and combined it with chlorhexidine body washes for decolonization. The most commonly used protocol was a 5-day course of mupirocin nasal ointment application T.I.D. and chlorhexidine body wash Q.D. The pooled success rate of decolonization was 0.88 (95% CI 0.75-0.95). A likelihood ratio test of the fixed versus the random effect model showed significant inter-study heterogeneity (p=0.047). Four out of the 7 studies determined the rate of MRSA infection in 94 carriers, two (2%) of which experienced infection.

**Conclusions:**
The use of mupirocin together with whole body decolonization is highly effective in eradicating MRSA carriage in hemodialysis patients. The current literature, however, is characterized by a lack of comparative effectiveness studies for this intervention.
Handrub use is correlated with hand hygiene compliance over time

S Haubitz [1], T Kaspar [1], D Nydegger [1], A Eichenberger [2], R Sommerstein [1], J Marschall [1]

[1] Department of Infectious Diseases and Hospital Epidemiology, Bern University Hospital, Bern, Switzerland
[2] Department of Hospital Pharmacy, Bern University Hospital, Bern, Switzerland

Background:
Direct observation of hand hygiene compliance is the gold standard for assessing and the basis for promoting hand hygiene. However, it is resource-consuming and provides but a momentary snapshot of performance. We sought to determine the role of hand disinfectant consumption as a surrogate marker for hand hygiene compliance.

Methods:
Starting in 2007, we observed hand hygiene compliance in select departments of a tertiary care hospital in Switzerland once each year. Indications for hand disinfection followed national recommendations which are in accordance with the „five moments for hand hygiene“ propagated by WHO in 2009. We calculated hand hygiene compliance as the rate of performed disinfections per observed indications. Information on hand disinfectant consumption was drawn from departmental orders with our hospital pharmacy.

Results:
We collected hand hygiene compliance data from 2007 to 2014, with an average of 2'064 observed indications per year (95% confidence interval 1'785 – 2'341). The mean observed compliance rate was 0.71 (0.64 – 0.78) and increased over time from 0.62 (2007) to 0.77 (2014), \( p=0.002 \) (regression analysis). On average, 13'679 liters per year (11'009 – 16'349L) of hand disinfectant were used in the observed departments. There was a significant correlation between volume of disinfectant used for hand rubs and hand hygiene compliance, both in regression analysis \( (p=0.045) \) and by Spearman rank test \( (p=0.007) \) (cf. figure). Patient-days were not adjusted for as their number did not change substantially over the observation period.

Conclusion:
Hand disinfectant consumption was correlated with the directly observed hand hygiene compliance over a span of eight years. Fluctuations of disinfectant ordering may provide additional information on trends in hand hygiene compliance aside from direct observations.
Development of cleaners for biofilm removal

P Stiefel [1], S Mauerhofer [2], S Altenried [1], Q Ren [1], U Rosenberg [2], M.A. Biernat [2]

[1] Laboratory for Biomaterials, Swiss Federal Laboratories for Materials Science and Technology (Empa), St. Gallen, Switzerland
[2] Borer Chemie AG, Zuchwil, Switzerland

In different places within the health care system biofilms pose a risk for patient’s health. Especially flexible endoscopes, often used on immunocompromised patients, are in the spotlight for hygiene professionals and reprocessing specialists. The need for a cleaning agent that will combat the biofilm and ensure biofilm-free surfaces of medical devices as well as flexible endoscopes is therefore great. Hence, in our study, we systematically assessed, compared and used several reported methods for the biofilms quantification. That has led to development of the cleaning agent that demonstrates biofilm removal and cleaning capabilities superior to existing products. The appropriate biofilm quantification methods have been chosen, among others including detection of viable cells, total cells, total biomass or specific compounds of the extracellular polymeric substances (EPS) (BacTiter-Glo assay, crystal violet (CV) staining, microplate turbidity threshold assay (MTTA)). P. aeruginosa and S. aureus biofilms were used as cleaning targets. Biofilm removal was further characterized by cleaning endoscope channels with grown biofilm as described in CEN ISO/TS 15883-5, determining cell, polysaccharide, and protein reduction. S. aureus biofilm was significantly less resistant to cleaning than P. aeruginosa biofilm. CV staining as well as TOSI cleaning indicators showed a low cleaning performance of enzymatic disinfectant-cleaners. BacTiter-Glo assay showed good performance of disinfectant-cleaners but as well some of cleaners. Our best near-pH-neutral cleaner formulas containing a special mixture of enzymes, reduced the CV-stainable biomass by 80-90% and viable, culturable P. aeruginosa by a factor (RF) of 1.5-1.8 log10 (MTTA) relative to NaCl. Cleaning experiments with such a formula on P. aeruginosa biofilm in endoscope channels showed a reduction of cells close to a RF of around 2 log10, as well as ca. 90 % reduction of sugars and protein (EPS). The study has shown that disinfectant-cleaners are neither good disinfectants nor good cleaners. A well formulated, near-pH-neutral enzymatic cleaner reduces biofilm total biomass as good as a very strong alkaline solution containing surfactant, complexing agent and active chlorine. We have demonstrated that only excellent cleaning guarantees the success of the following disinfection stage. The best formula among tested products in both biofilm removal and cleaning performance was developed and selected for commercialization.
Hintergrund:
Die ventilatorassozierte Pneumonie (VAP) ist die häufigste nosokomiale Infektion auf Intensivstationen. Für die Prävention sind verschiedene Massnahmen notwendig, die in der Literatur gut beschrieben wurden. 2011 wurde im UniversitätsSpital Zürich ein VAP-Präventions-Bundle mit neun Elementen von einer interdisziplinären Arbeitsgruppe ausgearbeitet und auf Ebene der Intensivpflege implementiert.

Ziel:
Ziel dieser Studie war, die Adhärenz bezüglich vier ausgewählten Elementen des VAP-Bundles zu überprüfen: kontinuierliche subglottische Absaugung, 30°-Oberkörperhochlagerung, Mundpflege mit Chlorhexidin 0.2% und täglicher Sedationsstopp.

Methode:

Resultate:
 Legionella in Hospitals: Duties, responsible and integrated Risk Management.
A study on the role of Facility Management (FM) in cooperation with other people in charge

TW Leiblein [1], S Hofer [1]

[1] ZHAW - Zurich University of Applied Sciences, Waedenswil, Switzerland

Purpose:
This research addresses facility managers and other duty holders in hospitals with portfolios of services on built environments regarding water systems and Legionella. The purpose of the work will be to identify the duty holders, key people and relevant activities in healthcare facilities concerning risk management on Legionella in waterlines/water systems of hospitals.

Theory:
Healthcare facilities (hospitals) can be part of a facility manager’s activities portfolio. Hospitals represent one out of the most complex organisational structures. The complexity is made up of the organisation as well as of the technical and highly competitive service demands. Thus duty holders find a highly interdisciplinary field, which is also faced with existing regulations and organisational barriers. Activities regarding risk management of Legionella in water systems include hazard analysis, systematic prevention activities, interdisciplinary work or points of intersection to third parties.

Design/methodology/approach:
Drawing on the stakeholder theory approach, facility managers as primary stakeholders at the forefront of organisational behaviour change are in a position to influence individuals working in business, government departments and public services. The term “primary stakeholders” implies that there are at least secondary stakeholders, too. The stakeholder theory provides a suitable theoretical framework to analyse the relation between the policy issues and responsibilities. The theory explains how to identify and engage with stakeholders for group effort, mutual dependence and legitimacy. The research focuses on activities from the perspective of different stakeholders of FM and FM support processes. During service delivery FM has to fulfil certain duties in an organisation that is subjected to certain social, cultural, legal and political dominators. The research will be limited to organisations in the healthcare sector (hospitals). It will be a multi-method design, carried out in two related phases. The first phase starts with a rather open and inductive interview study (expert interviews). Based on these first insights a questionnaire study follows up. According to the objectives set, different types of data analysis and data collecting will be included. We call for public and private hospitals to voluntarily participate in the national study. Interested organisations are invited to contact the author: thomas.leiblein@zhaw.ch

Findings:
The research is in its initial stage. Thus the research design is elaborated as yet. This research shall provide a significant contribution to knowledge in the field of Legionella in water systems and Legionella prevention as part of FM and FM services activities in healthcare facilities. This national research project contributes to an international research project.

Originality/value:
The novelty of this research is considering FM relevant organisational theory aspects and legal aspects in the wider picture of FM theory, including principles of management activities such as risk management, quality management, process management and hygiene management.
Umsetzung eines Schulungskonzeptes im Umgang mit der Ebola-Schutzausrüstung am UniversitätsSpital Zürich

P. Martic [1], M. Dunic [1], C. Colombo [1], H. Giger [1], M. Meier [1], L. Clack [1], D. Bircher [1], N. Eberhard [1], R. Sommerstein [1], S. Kuster [1], H. Sax [1]

[1] UniversitätsSpital Zürich, Zürich, Switzerland

Hintergrund:

Ziel:

Ergebnisse:

Schlussfolgerung:
P115
„CleanHands“ - Elektronisches Hilfsmittel für die Erfassung und Auswertung der Händehygiene im klinischen Alltag auch auf der Notfallstation

S. Simonet [1], C. Kahlert [1], J. Marschall [2], M. Schlegel [1]

[1] Kantonsspital, Infektiologie und Spitalhygiene, St. Gallen, Schweiz
[2] Inselspital, Infektiologie und Spitalhygiene, Bern, Schweiz

Hintergrund:

Methoden:

Schlussfolgerung:
Preclinical public medical preparedness - Evaluation of 1,533 patients treated at the largest sporting event in Switzerland

S Hostettler-Blunier [1], L Martinolli [1], H Bähler [2], F Neff [2], B Schnüriger [1, 1, 3]

[1] Emergency Department University Hospital Inselspital, Bern, Switzerland
[2] Sanitätspolizei, Bern, Switzerland
[3] Department of Visceral & Transplant Surgery University Hospital Inselspital, Bern, Switzerland

Aims:
The "Eidgenössische Schwing- und Älplerfest" (ESAF) is the largest 3-day sports event in Switzerland, carried out every three years. During the entire 3-days approximately 300,000 spectators visit the traditional wrestling contests. Public medical aid and support of such a mass gathering is a great challenge and little data is available. The aim of this study was to review the preclinical medical structure as well as the frequency of injury and disease patterns during the three event days.

Methods:
Retrospective study of prospectively collected data. The injury and illness patterns were classified as minor injuries (NACA Classification 0-1) or as major injuries (NACA Classification >1). In addition, 17 sub-categories were created to group injuries and illnesses. Moreover, operational strategy of the onsite medical aid including the number of medical personnel was related to the number of treated patients. A total of three Medical Assistance Points (MAPs) were set up, each of which responsible for a predefined sector within the festival ground. In addition, mobile first responder teams provided on the spot medical aid or transportation to one of the MAPs. A front line operational management coordinated patient flow. All three MAPs were differently sized, equipped and staffed. The personnel planning was carried out with the "Maurer-Formel".

Results:
Overall, 1,533 patients were treated during the entire three festival days; 242 patients (15.0%) on day 1, 863 (56.3%) on day 2 and 428 (27.9%) on day 3. Mean age was 37.3±16.7 years. 63 patients were younger than 16 years. At all three festival days, the frequency of the treatments peaked between 12am and 4pm. Mean time spent within the MAPs was 12.5±26.6 minutes per patient. In total, 30 physicians and 438 paramedics including members of the Swiss Armed Forces provided a total of 5,399 hours of medical support. Overall, 52.9% of patients (n=811) were treated at the second largest MAP. In 1,063 of 1,533 cases (69.3%) an accurate diagnosis was documented. Of those, 503 patients (47.3%) suffered bee/wasp stings, of which 71 (14.1%) were potentially life-threatening requiring hospitalization in 9 patients (1.8%). In 18.8% (n=200) of patients, minor wounds and in 9.2% (n=98) musculoskeletal injuries were the reason for admission to one of the three MAPs. The two most common non-trauma-related reasons for MAP admission were alcohol and drug abuse (4.1%) and gastrointestinal diseases (4.0%). A total of 58 pat
P117
SOS MAM, an experimental telemedicine call center in process; analyzed of four case reports

H Nespoulet [1], E Cauchy [1], P Zellner [1], M-A Magnan [1], F Coppex [2], M De Riedmatten [2], J Richon [2]

[1] IFREMMONT - Institut de Formation et de Recherche en Medecine de Montagne - Chamonix Hospital
France, Chamonix, France
[2] GRIMM - Groupement d’Intervention Medicale en Montagne - Switzerland, Sion, Switzerland

Aim:
The increase of technical communication devices and the ease of data transfer by anyone from any remote area has enhanced management abilities in mountain medicine care by telemedicine. As part of a European program on the franco-swiss border (Interreg IV), two mountain medicine centers collaborated to develop a call center managed by physician experts in order to give practical advice to mountain guides in case of illness or accidental impairment during any expedition (SOS-MAM Project).

Methods:
Since 2012, IFREMMONT (France) and GRIMM (Suisse) have collaborated to implement a specific call center supervised by ten mountain medicine experienced physicians (6 French, 4 Swiss). Thirty mountain guides were trained for three days in advanced rescue courses then equipped with a satellite phone, and some with ambulatory transmittable ECG devices. An Internet platform adapted to ensure highest standards for privacy and medical responsibility was created and tested. For this report, four different cases of emergency calls are detailed and analyzed to demonstrate the interest and utility of such a service.

Results:
The first case was a French Himalayist affected by a severe high altitude pulmonary edema at 4800 meters during the ascent of Ratnachuli (Nepal). The guide already trained for the program successfully treated with an addition of three sessions of portable hyperbaric chamber, nifedipine and sildenafil protocol helping by the SOS MAM expert. The second case was a Swiss himalayist presenting with signs of high altitude retinal hemorrhage at 7000 meter while he was attempting ascent of Cho Oyu (Nepal). Diagnosed by an ophthalmologist experimented in mountain illnesses he was advised to get down and finally saved his eye. The third was a case of chest pain at base camp of Mustagh Ata (China), ECG was performed in the field and transmitted to the expert by the SOS MAM platform attesting cardiac infarction. The fourth concerned a severe frostbite case in North Pole evaluated by satellite phone.

Conclusion:
The authors demonstrates the platform and the successful functioning of the call center SOS-MAM.
P118
Chloroquine increases the intracellular concentration and activity of isoniazid and pyrazinamide by reversing inflammation-induced macrophage efflux

U Matt [1], P Selchow [2], S Strommer [3], O Sharif [4], K Schilcher [1], F Andreoni [1], A Stenzinger [5], A Zinkernagel [1], M Zeitlinger [3], P Sander [2], J Nemeth [1]

[1] Division of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, Zurich, Switzerland
[2] Institute of Medical Microbiology, University of Zurich, Zurich, Switzerland
[3] Department of Clinical Pharmacology, Medical University of Vienna, Vienna, Austria
[4] Laboratory of Infection Biology, Department of Medicine I, Medical University Vienna, Ce-M-M-, Center for Molecular Medicine of the Austrian Academy of Science, Vienna, Austria
[5] Institute of Pathology, University Hospital Heidelberg, Heidelberg, Germany

Rationale:
Mycobacterium tuberculosis (MTB) is notorious for persisting within the host’s macrophages. Efflux pumps decrease intracellular drug levels within macrophages, fostering persistence of MTB during therapy. Recently, we have shown that isoniazid (INH) and pyrazinamide (PZA) are substrates of the efflux pump Breast Cancer Resistance Protein-1 (BCRP-1), which is inhibited by chloroquine.

Objectives:
To assess the influence of efflux pumps on the intracellular pharmacokinetics, and - dynamics of INH and PZA in macrophages and the impact of adjuvant chloroquine.

Methods, Measurements and Main Results:
BCRP-1 was expressed in macrophages and foamy giant cells at the site of MTB infection. Interferon (IFN)-γ increased the expression of BCRP-1 in macrophages. Using a BCRP-1 specific, fluorescent dye and radioactively-labeled INH, we demonstrate that, upon activation with IFN-γ, efflux from macrophages increased. As predicted, chloroquine was able to inhibit active efflux and augmented the intracellular concentrations of both INH and the dye. In line, chloroquine and specific inhibition of BCRP-1 increased the antimycobacterial activity of INH against intracellular MTB. Chloroquine had comparable advantageous effects on the intracellular pharmacokinetics and activity of pyrazinamide (PZA). The adjunctive effects of chloroquine on intracellular killing were measurable at concentrations easily achievable in humans.

Conclusions:
Chloroquine, a widely used and worldwide available drug may potentiate the efficacy of standard MTB therapy against the intracellular compartment.
Marzel A
Matt U
Meier M.T.
Meyer B
Meyer D
Moser A
Müller A
Myburgh R
Naggio S
Nespoulet H
Oberle CS
Olearo F
Ory S
Osthoff M
Pessoa C
Piquilloud L
Piso RJ
Pluess-Suard C
Qalla-Widmer L
Radovanovic D
Rohrer C
Rohrer O
Riedel A
Rütsche J
Salazar-Vizcaya L
Schauenburg P
Scherrer AU
Schilcher K
Schreiber P
Schwab E
Sekaggya C
Shilaih M
Simon R
Simonet S
Steinrücken J
Stiefel P
Strahm C
Tschanz C
Tschudin-Sutter S
Uçkay I
Von Braun A
Von Dach E
Vongrad V
Von Kietzell M
Vu-Cantero DL
Weber I
Weber K
Weidner E
Widmer A
Wiggli B
Willner H
Zahnd C
Zante B

FM06
P118
P112
P88
P24; P26
P30
FM03
P61
P59
P117
P67
P87
P14
FM04; P29
P16
P19
P53
P68
SGSH Session I: 5
FM01
P102
P01
P103
P07
P77
P20
P51; P69
P54
P39; P80
Diplomarbeit NDS Intensivpflege 3
P36; P63
P40
P11
P115
P73
P110
P93
P09
P94; P95
P32; P37; P38; P44; P47; P49; P56; P57; P58; P65; P71; P74; P79; P82; P83
P55
P41
P84
P106
P46
FM14
Diplomarbeit NDS Intensivpflege 2
P04
P96
P86
Diplomarbeit NDS Intensivpflege 1
FM07
P22; P23