

Environmental Mycology Ecology and Epidemiology

P5-001. Epidemiological survey of tinea capitis and introduction of molecular techniques in a primary school in the outskirts of Lisbon during 1987/1988 and 1998/99

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An epidemiological survey of tinea capitis was performed in a primary school in the outskirts of Lisbon during the years of 1987/88 and then repeated in 1998/99.

In the first study 173 children were examined by a medical team and was found 25% of positive cases with a prevalence of *Microsporum audouinii* (60%) and *Trichophyton megninii* (15%); in the latest study 86 children were examined after a treatment of Ketoconazol and was found 28% of positive cases with a prevalence of *Microsporum audouinii* (41,6%) followed by *Trichophyton soudanense* (29,1%), that did not appear in 1987/88.

In both studies we found that the predominancy of children infected had African origin, lowever in the last one, we was found a child of European origin infected with *Microsporum audouinii*.

These data emphasize the risk of school contamination for this dermatophyte.

In these studies we considered positive cases the detection of dermatophytes and *Chrysosporium sp.*, however other fungi like *Candida albicans* were identified. In 98/99 we found 8 children with *Candida albicans* in the hair; we performed a PFGE (pulsed field gel electrophoresis). The karyotypes were the same in all the strains tested.

These epidemiological results demonstrate the importance of systemic treatment and profilatic measures to ensure that there is no recontamination.

P5-002. Infections caused by *Trichophyton tonsurans* Malmsten

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We have been detecting infections caused by *Trichophyton tonsurans* on wrestlers and their family members in Hungary since 1998.

The infection was localized on the scalp, arms and trunk of the body of the nine patients observed. Since then, we have cultivated the pathogen from the nail of three onychomycotic patients. In the microculture of the isolated fungus we have only occasionally found deformed, 4-6 cell macroconidium. We have performed screening tests on the sportsmen and their relatives. This has shed light on five more cases. One patient got infected in Greece, while the source of two other cases was unknown.

Terbinafine (Lamisil) tablets were given to patients with infection on the scalp and nails. The tinea capitis improved after a therapy of six weeks, in one case relapse was reported. We have treated the patients diagnosed with tinea corporis with 1% terbinafine crème, and in 2-3 weeks they recovered. In the onychomycotic cases we had given the terbinafine tablet for a period of 12 weeks. One patient became symptomless on a six-week fluconazol (Diflucan) therapy. Due to the increase of tourism in Hungary, we can expect further infected cases.

P5-003. Incidence of fungal infections in HIV infected patients

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Background: Higly active antiretroviral therapy (HAART) has show to be effective to get undetectable viral loads, increase of CD4-cell count and to diminish mortality and admissions in HIV infected patients. Also, it has been associated with a lower incidence of opportunistic infections and has allowed to stop profilaxis when CD4 cell count is over 200 cell/mL.

Objective: to assess the incidence of opportunistic fungal infections in HIV infected patients in our hospital before and after the introduction of HAART.

Method: A retrospective incidence study was carried out in a 450-bed university hospital in Barcelona (Spain). In this center, HAART started to be used at the end of 1996. Patient included were all HIV infected patients that were admitted in our hospital between 1993 and 1999. Demographic data, parenteral drug use (PDU) and fungal infections produced by *Candida sp.*, *Cryptococcus sp* and *Pneumocystis carinii* were recorded.

Results: During the study period, 1198 episodis of fungal infections were recorded. Men: 78.8%, PDU: 60.3%, mean age: 34.5 years. The number of admissions of HIV infected patients was:

Year	1993	1994	1995	1996	1997	1998	1999
Admissions	489	634	679	647	487	504	617

The incidence of fungal infections was the following:

	<i>Candida sp</i> (oral)		<i>Candida sp</i>		<i>Cryptococcus sp</i> (esofagici)		<i>P. carinii</i>		TOTAL infections	
	n*	I**	n*	I**	n*	**	n*	I**	n*	I**
1993	108	22%	1	0.2%	4	0.8%	33	6.7%	146	29.9%
1994	121	19%	1	0.2%	16	2.5%	47	7.4%	178	28.1%
1995	165	24%	7	1.0%	14	2.1%	43	6.3%	220	32.4%
1996	174	27%	31	4.8%	12	1.8%	55	8.5%	266	41.1%
1997	119	24%	22	4.5%	4	0.8%	31	6.4%	173	35.5%
1998	93	18%	14	2.8%	4	0.8%	26	5.2%	136	27.0%
1999	43	7%	11	1.8%	0	0.0%	25	4.1%	79	12.8%

*number of episodes of fungal infections. **I=incidence

Frequently, opportunistic fungal infections have been observed in non-controlled or bad adherent patients.

Conclusions: The incidence of fungal infections in HIV infected patients admitted in our hospital increased from 1993 until 1996. From 1997 until 1999, when HAART was introduced in our center, this incidence decreased. HAART could have an important influence in the reduction of the incidence of fungal infections.

P5-004. Comparative performance of Impactor air samplers for quantification of fungal contamination

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Introduction. Invasive aspergillosis is a major opportunistic fungal infection in severely immunocompromised patients. The nosocomial origin of aspergillosis has been demonstrated in epidemic situations, and monitoring of environmental fungal contamination is now strongly recommended. The aim of this study was to assess the performance of different impactor air samples for fungal spore collection in the hospital environment.

Methods. Four recent impactor air samplers were selected: Samplair (AES, Combours, France), Air Test Omega (LCB, France), Air Samplair Mas-100 (Merck, France), and BioImpactor 100-08 (AES). They were compared with one another at three different hospital sites with various levels of aerobiocontamination using sampling volumes of 100 and 200 liters. In each site, samplers were successively permuted and measures were made in triplicate.

Results and Discussion. No significant difference in spore recovery efficiency was found between Air Test Omega, Mas-100 and BioImpactor, whereas Samplair was significantly less efficient. BioImpactor was then selected to represent the three efficient impactors and was compared with the Andersen disposable sampler considered as a "reference impactor", the new generation SAS impactor (SAS 100, Bioblock), the Collectron MDS air sampler (Sartorius, France) based on filtration method, and the High Flow Air Sample (Bio Test, France), based on centrifugation method. No significant difference was observed in terms of spore recovery.

Conclusion. On the basis of their performance, unit sampling cost, autonomy and simplicity of use, we conclude that recent impactors Air Test Omega, Air Samplair Mas-100, BioImpactor 100-08 and SAS are suitable for routine indoor evaluation of fungal contamination of hospital air.

P5-005. Characterization of some morphological and biological features of strains of cryptococci, isolated from patients in Russia

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Features of 5 strains of cryptococci, isolated during 1998-1999 from patients in Russia were studied. Four strains (no. 87, 88, 89, 1171-Abd) were identified as *Cryptococcus neoformans* var. *neoformans* (canavanine-glycin-bromthymol blue agar test). Strainno. 90 isolated from blood of a patient with cryptococcal vertebral osteomyelitis was identified as *Cryptococcus albidus* var. *albidus*. *C. neoformans* no. 88 was isolated post mortem from an HIV-infected patient, who died of disseminated cryptococcosis. Strains no. 87, 89, 1171-Abd were isolated from HIV-negative patients with cryptococcoma of brain (no. 87) or meningitis (no. 89, 1171-Abd). On Sabouraud agar cultures of *C. neoformans* no. 87, 89, 1171-Abd were pasty and tan, no. 88 was pasty and yellow-reddish. After 3 days of growing at 28°C yeast cells of all *C. neoformans* strains measured 4.5-6.75µm, capsules were 1.2-2.5 µm in width. Unlike in other strains, capsules with visible under the light microscope surround-

ded only 10% of cells of *C. neoformans* no. 88. During storage strains no. 87, 89 (isolated in 1998) increased capsular polysaccharide production and became more mucous, meanwhile strains no. 88 (isolated in 1998) and 1171-Abd (isolated in 1999) did not alter the production of polysaccharide. *C. albicans* cultured on Sabouraud agar at 28°C was greyish-tan and mucous. Cells were 4-7 µm in diameter and encapsulated by narrow, about 1 µm, polysaccharide capsules. Some cells had capsules of 5 µm in width. The strain grew well at 35°C, at 37°C the growth was poor. Activity of several enzymes was studied: 1) urease; 2) phenoloxidase; 3) phospholipase; 4) protease. All strains except no. 89, were urease positive. Urease activity of the strain no. 89 was very weak and could be detected on Christensen's urea only after 5 days of incubation. All strains of *C. neoformans* demonstrated high phenoloxidase activity on agar media with L-dopa or aqueous plant extracts (ex. from *Helichrisum arenarium*, fam. Compositae). Maximal melanin production was noted in the strain no. 88 (isolated from HIV-positive patient). *C. albicans* produced a zone of dark coloration around the streak of culture on agar media with plant extracts. On egg-yolk agar weak secretion of phospholipase by strains no. 87, 89, 90 was revealed. On agar with bovine albumin at pH=7.5 no proteolytic activity could be detected in the strains of cryptococci. *C. neoformans* no. 88, isolated from HIV-infected patient differed from other strains studied in the production of polysaccharide and melanin - the propertie that contribute to virulence of this fungus.

P5-006. Study of candidemias in a cancer hospital

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Background: Recently, a major and interesting modification in the etiology and epidemiology of candidemia in cancer patients has occurred. We analyzed all cases of candidemias during the last decade in our centre.

Method: The charts for each patient for whom blood culture(s) were positive for yeast at our institution between 1 January 1991 and 31 December 1999 were retrospectively reviewed. Yeast isolates were identified by API-ID32C and Chromagartechnique.

Results: Between 1991 and 1999, 96 episodes of candidemia (96 patients) occurred and 94 were analyzed: 70% of patients (pts) and 33% hematologic malignancy (HM) including 10 LAM pts. Three patients were ST and HM. Median age was 57 years (23-86) and sex ratio was 45/50 (M/F). Distribution of variables known, in the literature, as risk factors for candidemia development were: transplant 13% (8 alloBMT, 5 auto BMT), surgery one month before the episode 36%, ICU 29%, TPN 23%, neutropenia (smaller than 500 neutro/ul) 45%, corticosteroid therapy 37%. All pts were previously treated with antibiotics. Antifungal prophylaxis was administered in 34%. *C. albicans* was isolated in 415 of episodes and *Candida non-albicans* in 59%, with predominance of *C. glabrata* 23% and *C. krusei* 13%. In univariate analysis *C. albicans* was significantly associated with ST (p smaller than 0.01), TPN (p smaller than 0.01), and *Candida non-albicans* with transplant (p smaller than 0.05), antifungal prophylaxis (p smaller than 0.01) and neutropenia (p < 0.01). Previous colonisation with the same species was shown in 23/34 pts with *C. albicans* and 23/45 of *Candida non-albicans*. In a multivariate logistic regression model, ST (p=0.003) and ICU (p=0.02) were found as independent factors for candidemia with *C. albicans*, respective odd ratios of 7.92 (CI 95% 1.97-31.87) and 4.81 (CI 95% 1.34-17.18). Mortality was 2% at 10 days and 12% at 30 days after candidemia.

Conclusions: *C. albicans* was associated to ST and ICU. An important increase of *C. glabrata* and *C. krusei* and a larger diversity of *Candida* isolates were demonstrated.

P5-007. Fungal risk in the hospital environment: A 8 years long monitoring

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Objective: Preventive actions must be instated in high infectious risk units of hospital in order to prevent nosocomial infections. The aim of this study was to analyse the results of a 8 years long monitoring and to define an optimal strategy for aspergillosis prevention within our hospital.

Methods: The environmental fungal detections were carried out in the operating rooms (17) and haematological protected units (2). Samplings were performed twice a year in each room using contact plates for plane surfaces (3 sites), sterile swabs for grids and air sampler (RCS biotest®).

Results: Since 1992 to 1999, 4083 samples were taken in 1094 rooms of 19 units. The number of rooms without any fungus increased regularly between 1992 and 1999 (41.1% and 74.6% respectively). The rooms with mold contamination were classified according to the number of fungal colony forming units, and the presence or not of *Aspergillus fumigatus*. The operating rooms which require highest protection (cardiac,

thoracic, urologic surgeries, neurosurgery and haematological unit) evidenced a lower mold contamination (71.8% of rooms were negative) than the others (gynecology, stomatology, digestive surgery) (54.7% were negative). The most frequent species isolated were *Penicillium* sp (26.7%), *Cladosporium* sp (15.9%) and *Aspergillus* sp (8.0%). Fortunately, *Aspergillus fumigatus* was rarely isolated (2.7%).

Conclusion: This study demonstrates that environmental control measures were effective in reducing exposures of hospitalized patients to airborne spores. The results contribute to validate our environmental sampling protocol and may be useful in establishing exposure guidelines.

P5-008. Less common sources of phaeohyphomycosis

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Phaeohyphomycosis includes all skin subcutis and systemic infections of men and animals, evoked by Dematiaceae fungi. These fungi can be found on plants, fruits, in the soil, on textiles not only in tropical countries, but also in temperate zones.

Many cases of phaeohyphomycosis occur now also as nosocomial diseases, especially in immunocompromised patients. The sources of infection for hospitalised patients are not quite clear. For this reason we paid special attention to some food distributed to patients or brought them by visitors.

We determined a high percentage of Dematiaceae fungi on the fruits (66% - *Cladosporium herbarum*, *Alternaria alternata*, *Aureobasidium pullulans*, *Helminthosporium* sp. and *Phoma* sp.) The highest percentage of *Aureobasidium* was found on bilberries and black currants, the highest percentage of *Cladosporium herbarum* on white and black currants. In comparison, these fungi were found on cheese only in 8 percentage and on the other sorts of food no black fungi could be determined.

P5-009. Aspergillosis in Iceland: A 15-year retrospective study

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Objective: The aim of the study was to examine the incidence of different clinical forms of *Aspergillus* infections, underlying risk factors, treatment and outcome. This is the first report on aspergillosis in Iceland.

Methods: Cases were identified by a retrospective review of microbiological and pathology records at the National University Hospital in Iceland, where almost all immunocompromised patients in the country are treated. The study period was from 1984 to 1999. Patients whose samples (nail and ear samples excluded) grew *Aspergillus* or demonstrated fungal hyphae were included in the study. Patient charts were reviewed and each case was evaluated as infection (confirmed, probable or possible), colonization or contamination.

Results: The study group included 114 cases, whereof 107 were evaluable. *Aspergillus* was isolated from 93 patients (172 samples) and pathological examination identified fungal hyphae in 19 cases (34 samples). *A. fumigatus* was identified in 74% of positive cultures. Confirmed or probable infection, possible infection, colonization and contamination were identified in 27 (25.2%), 4 (3.7%), 3 (2.8%) and 73 (68.2%) patients respectively. Fourteen patients with cancer or chronic pulmonary diseases had confirmed or probable invasive infection. Twelve of these patients died; only 6 had received antifungal treatment. Other clinical forms of infection were aspergilloma or lung abscess in 5 patients, skin infection in one and sinusitis in 7. The incidence of invasive aspergillosis in the Icelandic population was 0.65/105 per year; the rate of infection in patients with malignant hematological disorders was 0.7%. Necropsies were performed on 7018 individuals during the study period; invasive aspergillosis was diagnosed in 6 cases (0.085%).

Conclusion: The major clinical forms of *Aspergillus* infection occur in Iceland. The incidence of invasive infection appears low compared to other countries. A prospective study of the incidence might reveal whether this is due to insufficient diagnosis and reporting.

P5-010. Simultaneous infection by two distinct strains of *Cryptococcus neoformans* var. *neoformans* in a patient. Usefulness of the RAPD technique

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The aim of this study was to differentiate *Cryptococcus neoformans* isolates obtained from different samples from the same patient, using the RAPD technique. Seven isolates of 3 patients with cryptococcosis, were obtained from the blood cultures and CSF, simultaneously. All of the isolates were serotype A except for one patient, for whom *C. neoformans* serotype D was isolated from the LCR, while simultaneously *C. neoformans* serotype A was isolated from the blood cultures. DNA was extracted using the Lehman method. The primers CN1 (5' TACCCCGCCCA-

TATTCCAT3), 5- SOR (5 ATGGGAATACGACGGCTGTAG3) and MYCI (5 GAGGAAGGTGGGGATGACGT3) were used for the amplification. Electrophoresis was performed in a 2% agarose gel with ethidium bromide. The reproducibility of the method was checked by amplifying the DNA on 3 different occasions. Two reference strains of *C. neoformans* (RVA (56164) serotype A and RVD (68038) serotype D) were added to the controls. The results indicate that the 2 patients in whom only *C. neoformans* serotype A was isolated had the same electrophoretic profile (profile Y). However, the profile of the serotype D in the LCR of the patient in which the 2 serotypes coincided was different (profile II). Using this technique, it has been possible to detect the simultaneous infection by 2 distinct strains in the same patient and demonstrate that the electrophoretic pattern was similar in the other 2 patients.

P5-011. Multicentre study of the prevalence of *Aspergillus fumigatus* in haematology units using the honey jar technique

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Aims: To assess the prevalence of airborne *Aspergillus fumigatus* in the hospital environment and to evaluate potential links with the incidence of invasive aspergillosis.

Methods: The prevalence of *Aspergillus* was monitored at different locations within each hospital (Bristol, Dublin, Edinburgh, Glasgow and London) for up to 38 weeks by a sedimentation technique. The environment was sampled using the Honey Jar technique (Milne 2000); Jars were left open in one of a number of hospital locations and replaced at weekly intervals. Peaks in colony forming units were correlated with specific events and outbreaks of aspergillosis.

Results: Background levels of *A. fumigatus* and peaks varied between hospitals. One to four peaks were recorded in each hospital. In two instances peaks corresponded to specific events: an opened window in the drug room at Dublin (week 4) and renovation work in London (week 3). Two probable cases of aspergillosis occurred following renovation work in London (week 4), and one possible case was recorded (week 8/9) in Bristol following a peak of unknown cause in week 7.

Conclusion: This simple technique provides a low cost method of continually monitoring the levels of *A. fumigatus* in the clinical environment. These preliminary results suggest that there may be a correlation between above normal levels of *A. fumigatus* in the atmosphere and the subsequent development of infection.

*Milne, LJR. 6th Congress of the European Confederation of Medical Mycology. Barcelona, 9-11 November 2000; abstract/poster.

P5-012. The honey jar technique for the continuous monitoring of *Aspergillus fumigatus* in air

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Aim: To determine the comparative efficiency of the honey jar for the collection of *Aspergillus fumigatus* from the environment.

Methods: The honey jar consists of a high-sided, screw-capped, 200ml disposable plastic container (aperture diameter 5.5cm). After exposure, particles collected in the jar were suspended in sterile Tween 80 (0.01%), serially diluted and cultured on agar. This new technique was compared after 6 hours exposure with settle plates and surface swabbing. Conventional air samples were collected using a Sieve Impact Air Sampler (MAS 100) at the beginning and end of the 6 hour period in order to provide a background reference of the amount of *A. fumigatus* in the air. Further comparisons were made between the Honey Jar technique and surface swabbing over 24, 72 (weekend) and 168 hours (1 week). The study was conducted over four weeks at three locations - an office, a laboratory side room and a hot room. All samples were incubated at 45°C for two days and the number of colony forming units (cfu) recorded.

Results: The sieve air sampler showed that the level of contamination differed markedly between sites and this was confirmed by all three sedimentation techniques at 6 hours.

Site	Air Sampler cfu/m ³ (n=80)	Settle Plate	Surface	Honey Jar
		(n=40)	Swab (n=40)	(n=40)
cfu/100cm ² after 6h				
Office	28	7	2	13
Laboratory	262	90	28	958
Hot Room	2405	220	258	6324

At 6, 24, 72 and 168 hours, the Honey Jar method yielded consistently higher counts than the surface swab. The method was also found to be superior to settle plates. There was large variation in the counts obtained by all techniques at all locations, indicative of daily variations in environmental levels of *Aspergillus* spores.

Conclusion: The honey jar method provides an efficient, low cost, quantitative means of continuously sampling for *Aspergillus fumigatus* in the environment. It offers considerable potential for adaptation to other areas of aerobiology.

P5-013. Dermatophytes isolated at H. G. Santo António

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Objective: To evaluate the incidence of dermatophytes isolated at our hospital from March 1997 to April 2000 and correlate them with anatomic localization, age and sex distribution.

Material and Methods: A total of 955 cutaneous samples were submitted to the usual microscopic and cultural laboratory procedures. We isolated 220 dermatophytes from 150 female and 70 male patients with ages between one month and eighty years old. We observed 13 different species in glabrous skin (36,8%), nails (23,2%), scalp (18,6%), feet (12,3%), groin (4,5%), hand (3,2%) and beard (1,4%) samples.

Results: *T. rubrum* was the predominant specie (51,4%) in all anatomic sites, excluding scalp, followed by *M. canis* (22,7%) the leading agent of tinea capitis. *T. schoenleinii* (3,6%) was the second agent isolated from the scalp samples, all members of the same family, but one. The percentage of the other species was: *T. megninii* (6,8%), *T. mentagrophytes var. interdigitale* (5%), *T. mentagrophytes var. granular* (3,3%), *E. floccosum* (1,8%), *T. violaceum* (1,8%), *M. persicolor* (0,9%), *M. gypseum* (0,9%), *T. soudanense* (0,9%), *T. verrucosum* (0,5%), *T. tonsurans* (0,5%). All dermatophytosis, except tinea capitis by *M. canis* and *T. schoenleinii*, appeared mainly in adult patients. The female sex was more affected with skin lesions by *M. canis* (70%) and in nail and foot infection by *T. rubrum* (60% and 64%, respectively). In scalp *M. canis* was more common in male (64%) than in female (36%).

Conclusions: Our results revealed no substantial differences to other portuguese studies regarding the major agents of dermatophytosis. The relatively high incidence of *T. schoenleinii* was justified by household contact and low socioeconomic conditions.

P5-014. Comparative performance of IMPACTOR air samplers for quantification of fungal contamination

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Introduction. Invasive aspergillosis is a major opportunistic fungal infection in severely immunocompromised patients. The nosocomial origin of aspergillosis has been demonstrated in epidemic situations, and monitoring of environmental fungal contamination is now strongly recommended. The aim of this study was to assess the performance of different impactor air samplers for fungal spore collection in the hospital environment.

Methods. Four recent impactor air samplers were selected: Samplair (AES, Combours, France), Air Test Omega (LBC, France), Air Samplair Mas-100 (Merck, France), and BioImpactor 100-08 (AES). They were compared with one another at three different hospital sites with various levels of aerobiocontamination using sampling volumes of 100 and 200 litres. In each site, samplers were successively permuted and measures were made in triplicate.

Results and Discussion. No significant difference in spore recovery efficiency was found between Air Test Omega, Mas-100 and BioImpactor, whereas Samplair was significantly less efficient. BioImpactor was then selected to represent the three efficient impactors and was compared with the Andersen disposable sampler considered as a "reference impactor", the new generation SAS impactor (SAS 100, Bioblock), the Collectron MDS air sampler (Sartorius, France), based on filtration method, and the High Flow Air Sample (BioTest, France), based on centrifugation method. No significant difference was observed in terms of spore recovery.

Conclusion. On the basis of their performance, unit sampling cost, autonomy and simplicity of use, we conclude that recent impactors Air Test Omega, Air Samplair Mas-100, BioImpactor 100-08 and SAS 100 are suitable for routine indoor evaluation of fungal contamination of hospital air.

P5-015. Monitoring of fungi flora on beaches sand along the Estoril coast, Portugal

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Ecological and hygienic interests led us to analyse the mycoflora of sand from 9 beaches along the Estoril coast. During the summer period 108 sand samples were collected from two different areas: non-flooded area high tidal conditions and flooded area inter tidal conditions. This study was performed to monitor the weakly iodine treatment applied to the sand. Filtration method and conventional media was used for the analytical determinations. The genera of the filamentous fungi with highest incidence were representative: *Aspergillus*, *Penicillium*, *Cladosporium*, *Alternaria*, *Acremonium*, *Fusarium*, *Trichophyton*, *Scopulariopsis*. Non-sporulating fungi were also detected mainly in flooded area. Several other genera were detected at quite low occurrences. During this process variations of the mycoflora occurred probably related with environmental pressure. The isolation of recognise pathogenic fungi, such as *Trichophyton* and *Scopulariopsis*, may be considered an infectious hazard factor for the population bathing at this beaches.

P5-016. Distribution of yeast isolates in patients treated in the General University Hospital of the NW Greece

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Aim: The aim of the study was to determine the etiologic agents of yeast infections in internal medicine, oncology, surgical and cardiothoracic, intensive care pediatric units and neonatal intensive care units.

Methods: Yeast species were isolated from clinical samples including blood, BAL and peritoneal fluid. Primary isolates were obtained onto CANDIDA ID (BioM rieux) and identified by the API system ID 32C (BioM rieux) and by additional physiological and biochemical tests, as certain *C. tropicalis* strains presented as pinkish-white colonies on CANDIDA ID medium and a doubtful API profile. DNA form type, reference and clinical isolates from patients with yeast infections were typed by PCR-RFLP analysis.

Results: The most frequent etiologic agent of yeast infections in all clinics was *Candida albicans* followed by *C. glabrata*, *C. guilliermondii*, *Cparapsilosis*, *C. tropicalis*, *C. kefyr*, *Clavispora lusitaniae* and *Lodderomyces elongisporus*. Identification by PCR was accurate where doubtful profiles were obtained with the API system.

Conclusions: Accurate identification of the nosocomial yeast pathogens is greatly assisted by PCR and molecular typing of the isolates is a useful and rapid epidemiological tool in identifying epidemics in the hospital.

*We acknowledge the help of A. Velegraki.

P5-017. Incidence of mixed fungal colonization - A prospective 18 months study

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Fungal colonization is an independent risk factor for developing invasive candidosis including candidemia. Patients (P) colonized with more than one species (sp) have an additional risk for selection strains less susceptible to flucanazole or other antimycosis. The aim of this prospective study was to determine the incidence of mixed colonisation with fungi detected in patients of a non-surgical, non-haematological intensive care unit.

Patients: During a 18 months period 244 patients were examined within the first days after admission: 92 women, 152 men, mean age 63 years (range 17.8-90.2), APACHE-II-Score 20.8. Samples from nostril, throat, trachea, faeces and urine were cultured on CHROM-or CandID-agar at 36°C. The were qualitatively and quantitatively analysed after 48 h and after 7 days.

Results: Fungi were found in 76.6% of all patients (187/244). More than one species was detected in 39% (73/187) of these patients (2 sp in 52 P, 3 sp in 20 P, 4 sp in 1 P). 80.7% of the patients (151/187) were colonized by *Candida* (*C. albicans* (87 P with *C. albicans* alone, 64 P with *C. albicans* and one or more *C. species*). The flucanazole resistant and less susceptible species *C. krusei* and *C. glabrata* were detected in 41.7% of these patients (78/187). Most of them were mixed colonized (*C. krusei* alone in 2 P, *C. krusei* and other species in 6 P, *C. glabrata* alone in 17 P, *C. glabrata* and other species in 54 P, one patient had both *C. krusei* and *C. glabrata*). Number of patients with *Candida* colonization and mixed colonization increased with rising age.

Patients younger than 50 years (50/244) were colonized in 62% (31/50), patients older (193/244) in 80% (155/193). In the group of the patients under 50 years 9.7% (3/31) showed mixed colonization, in the older group 44.5% (69/155) showed mixed colonization. A long hospital stay and previous hospitalizations resulted in a higher frequency of mixed colonization. When the hospital stay was shorter than 7d and when there was no previous stay in the last year only 31.8% of the patients (28/88) had mixed colonization. If the patients stayed in the hospital longer than 7d or had previous hospitalisation in the passed year the number of mixed colonization increased up to 55.1% (54/98).

Conclusions: The frequency of mixed fungal colonization in patients colonized with *Candida* is high and increases with the age and the time of stay in hospital.

P5-018. Epidemiology of tinea capitis (Sao Paulo, Brazil)

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Tinea capitis is the most common pediatric fungal infection affecting usually school-age children. Notwithstanding this fact, its diagnostic is not always considered when symptoms are vague or when clinical findings are nonspecific. It is considered a Public Health Problem. From February 1996 to June 2000, 132 children from 1 to 14 years old clinically suspected to have *tinea capitis* were examined. Scrapings and/or hair samples were taken off for direct microscopic examination and attempts of culture were made on Sabouraud dextrose agar and Sabouraud dextrose agar with chloramphenicol and cycloheximide. *Tinea capitis* was confirmed in 112 occasions. *Kerion* was diagnosed in 9 occasions and *tinea capitis* with tonsures was verified in 103 children. *Tinea capitis* like *kerion* caused by *M. canis* (44.4%), *T. tonsurans* (44.4%) and *M. gypseum* (11.2%) was diagnosed.

Microsporium canis was the causative agent in 70.5% followed by *Trichophyton tonsurans* (23.2%), *T. mentagrophytes* (3.6%), *M. gypseum* (1.8%) and *T. rubrum* (0.9%). Males (61%) were more affected than females (39%). Familiar epidemics was registered in 10 occasions (two brothers in each). An epidemic caused by *M. canis* that infected 8 out 54 children from an orphanage was also diagnosed. It is important we have to take into consideration that: 1) *M. canis* was the major agent of *tinea capitis*; 2) *T. rubrum* was isolated in one episode; 3) the predominant *tinea capitis* was alopecia followed by *kerion*.

*This work was partly supported by CNPq

P5-019. Epidemiology of tinea cruris (Sao Paulo, Brazil)

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Tinea cruris is a dermatophytic infection of the groin, perineum and perianal region. It occurs worldwide and is more prevalent in tropical countries. From April 1995 to March 1997, 105 clinically suspected cases of *tinea cruris* were investigated in Sao Paulo, Brazil. The infection was confirmed in 66 (62.8%) cases by positive direct microscopy and/or culture. The male to female patient ratio was 4:1. The main causative agent was *Trichophyton rubrum* (45/50) followed by *T. tonsurans* (3/50) and *T. mentagrophytes* (2/50). Surprisingly, *Epidermophyton floccosum* was not found at any time during this investigation. Besides the predominant clinical types -- erythematous scaly plaques (45) and erythematous liquenificated plaques (12) -- the classic eczema marginatum, erythematous plaques, erythematous pigmented plaques, pigmented scaly lesions and erythema and maceration were also observed. In fourteen cases (21%) other body areas were also involved, chiefly the feet and toenails. *T. rubrum* was the agent isolated from *tinea cruris* and other infected sites. It is worth noting that during our investigation:

1. *T. rubrum* was the predominant dermatophyte species; *E. floccosum* was not isolated at any occasion;
2. The main clinic types were erythematous scaly plaques and erythematous liquenificated plaques; the classic *eczema marginatum* of Hebra was not an important clinic form of *tinea cruris* infection.

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P5-020. Nosocomial yeast infections in neonatal intensive care unitMM Lopes¹, R Barros², M Serelha², Y Peres², MT Neto², G Freitas¹.¹Microbiologia, Faculdade Farmacia, Univ. Lisboa;²Lab. Patologia Clínica, Hospital D. Estefânia, Lisboa, Portugal

Objectives: *Candida* species are increasingly important nosocomial pathogens in critically ill children. The aim of this study was to characterize nosocomial yeast infections to access the relative importance of different risk factors.

Materials and Methods: From October 1998 to December 1999, all the patients hospitalised at NICU were surveyed in order to detect nosocomial infections. The isolation and identification of yeasts were made according to the routine methods. From each patient, it was obtained information about different risk factors (prematurity, intravascular catheters, total parental nutrition and antimicrobial agents).

Results: It was detected yeast nosocomial infection in 10 hospitalised children, 1 female and 9 male, age ranging from 1 day to 3 months (mean = 1 month). *Candida albicans* was the most frequently isolated fungal pathogen (54.5%), followed by *Candida parapsilosis* (36.4%), and in one case was isolated *Sacharomyces cerevisiae* (9.1%). Common risk procedures included cirurgy (81.8%), parenteral nutrition (72.7%), intravascular catheters (54.5%) and ventilation (54.5%). Near 90% of the patients had previously received antibiotics.

Conclusions: With the trend of increasing nosocomial fungal infections, we should be more alert to the possibility of such infections. We conclude yet that measures must be taken to reduce these risk factors whenever possible.

P5-021. Genetic relatedness of *Candida* strains from recurrent vulvovaginal candidosisAcácio Gonçalves Rodrigues^{1,3}, Cidália Pina Vaz^{1,3}, Paula Sampaio⁴, Célia Pais⁴, Sofia Costa-de-Oliveira¹, J Martinez-de-Oliveira², A Freitas da Fonseca¹. ¹Dept. Microbiology; ²Dept. Obstetrics/Gynaecology, Porto School of Medicine; ³IPATIMUP - Institute of Pathology and Molecular Immunology or Porto University; ⁴Dept. Biology, Minho University, Braga, Portugal

A cohort of women with diagnosed recurrent vulvovaginal candidosis (RVVC) was followed along a period of 10 months. At each clinical episode mycological cultures were taken from the vagina. The rectum was also cultured at the first episode. The collected strains were frozen at -80°C and later typed by a PCR based method, using a non-specific primer (T3B) designed from intergenic spacer regions of tRNA. Recurrent episodes were detected in 11 women. The number of recurrences per number of women (R/W) was respectively 2/6, 3/3, 4/1 and 5/1. The strains isolated were *Candida albicans* in 9 women, *C. glabrata* and *C. parapsilosis* in 1 woman each. In each of 7 women no genetic variation was found between the different isolates; in each of 5 women, 1 single strain from the same species but showing genetic differences was found along the observation period. However, the original strain persisted and was isolated in all 5 cases along and/or at the end of the follow up. The strains isolated from the rectum corresponded the species isolated from the vagina in all cases and were genetically related in 66.7% of cases. Our results support the assumption that RVVC is mainly due to recurrence of the same endogenous *Candida* strain rather than re-infection by exogenous strains and that the intestine represents an important reservoir for the persistence of *Candida* organisms

P5-022. Microbiological analysis of phytotherapies commercialized at Sao Paulo (Sao Paulo, Brazil)

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In a period of 13 months, a total of 40 and 50 phytotherapeutic samples used respectively in capsules teas were studied according to Pharmacepia USP XXIII in order to verify their microbiological contamination. Our results revealed that out of 40 capsule samples 32 (80%) and 10 (25%) showed respectively more than 1000 CFU/g for bacteria and 100 CFU/g for filamentous fungi and yeasts. *E. coli* 6 (15%), *S. aureus* 1 (2.5%), *P. aeruginosa* 1 (2.5%), *Salmonella* and *Shigella* spp 11 (27.5%) environmental Gram- positive bacilli 35 (87.5%), *Aspergillus* spp 2 (9.61%), *Penicillium* spp 2 (5%), *Candida* sp 1 (2.5%), *Acremonium* 1 (2.5%), *Fusarium* sp 1 (2.5%), *Rhizomucor* sp 1 (2.5%) and *Rhizopus* 1 (2.5%) were identified. With the tea out of 52 samples, 22 (44.23%) and 6 (11.53%) showed respectively more than 1000 CFU/g for bacteria and 100 CFU for fungi. *E. coli* 8 (15.4%), *S. aureus* 8 (15.4%), *P. aeruginosa* 4 (7.7%), *Salmonella* and *Shigella* spp 15 (28.8%), environmental Gram- positive bacilli 19 (36.5%), *Aspergillus* spp 5 (9.61%), *Penicillium* spp 4 (7.69%) and *Phizopus* sp 1 (1.92%) were isolated. We have to take into consideration that: 1) phytotherapies may be used as alternative medicine; 2) a great number of samples show a very high percentage of potentially pathogenic organisms; 3) these

organisms may produce deleterious effects specially for little children and immunocompromised patients; 4) worldwide very little information is available on the microbiological contamination and associated quality problems. It should be necessary to establish an effective and permanent control of Sanitary Surveillance in order to avoid health hazards to the million of people that use phytotherapies.

*Grants from CNPq

P5-023. Intensive rebuilding of a BMT ward and the risk of migration of fungal spores to patients with compromised host defence

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During intensive building activities high numbers of fungal spores may be released in the air. To document such release during intensive reconstruction of our hematology-BMT ward, Sabouraud settlement plates were placed at 40 sites, where dust was expected to fall down. The sites were located in the rebuilding area, the part the ward still in use and the patient rooms consisting of an anteroom entry, accessible without protective clothing and an ultra-clean bed site part, only accessible with protective clothing and provided with HEPA filter air conditioning. In the nursing office and the corridor minor construction work had to be done, including local removal of the ceiling to get access to the network of pipes. The Sabouraud plates were exposed to the air during 20 hours, incubated at 37° C during 2 days followed by 18° C for 3 days. Then the numbers of colony forming units (CFU's) were counted.

During four months of rebuilding activities the rooms of the patients remained almost free of spores. In the ultra clean part of the room 96% of the cultures were free of fungal CFU's. The 4% positive plates only yielded one CFU per plate except a few with 2-5 CFU's. Similar results were obtained in the anteroom with 95% negative plates. These figures did not differ from the results obtained prior to the rebuilding operation. Explosive release of spores occurred in the building area, i.e. 100% positive cultures yielding filamentous fungi ranging from 10 to more than 100 (median 30) CFU's per plate.

Although the measures to prevent migration of spores from the building area to the ward was considerably effective, still the explosive release of spores was reflected by a slight and transient increase of CFU of settlement plates exposed to the air in the corridor and nursing office. The present study reveals that rebuilding within the hospital may be accompanied by release of filamentous fungal spores but that it is possible to prevent migration to the patient rooms with relatively simple measures

P5-024. First import case of paracoccidioidomycosis in The Netherlands

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Aim: To describe the first case of an imported infection with *Paracoccidioides brasiliensis* in the Netherlands.

Case report: In Nov 1998 a 60-year-old male was referred by his dentist to the oral surgeon for evaluation of a gradually increasing painful oral ulcer not reacting to local therapy. Because of the suspicion of oral cancer a biopsy was performed. Several days later the pathologist noted a granulomatous inflammation with several yeasts. Upon consultation with the clinical mycologist he suggested the yeasts to resemble *Paracoccidioides*, however there was no travel history available. The next day a new biopsy was performed and direct examination revealed yeasts cells typical of *Paracoccidioides*. History taking revealed that he lived in Peru and Equador for 26 years until 1991. A medical examination in Dec 1997 revealed the presence of shortness of breath, a high ESR, night sweats and weightloss. The pulmonologist concluded that there was a restrictive pulmonary disease and concluded on basis of the HR-CT scan that the patient probably suffered from sarcoidosis. He started treatment with prednisone (40 mg daily) and used INH prophylaxis for TBC. In the course of six months there was deterioration and his mouth became painful. In addition he developed a microscopic hematuria which prompted an urological evaluation. After the diagnosis was made microscopically the prednisone and INH were stopped and treatment was started with itraconazole suspension 200mg daily. Within 4 weeks the oral ulcers disappeared and after three months his shortness of breath had disappeared. Nine weeks after the start of itraconazole a urine culture became positive with *Paracoccidioides brasiliensis*. Serology revealed a high titer of complement fixing antibodies (>256) against *P. brasiliensis*. The patient was treated for 15 months with itraconazole with excellent results. Until now there is no sign of relapsed disease which was mistaken for sarcoidosis. The Latin-American travel history was known by the pulmonologist but this triggered him only to start tuberculosis prophylaxis.

P5-025. Investigation of genetic polymorphism of *Aspergillus fumigatus* in patients with IA: Interest of combining several typing methods
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Genotypes of 52 strains of *A. fumigatus* isolated from 12 patients with invasive aspergillosis (IA) were investigated by four different typing methods (Random Amplified Polymorphic DNA, Sequence Specific DNA Polymorphism, Microsatellites polymorphism and Multilocus Enzyme Electrophoresis). Patients were hospitalized in 3 different geographic areas (Lyon, Grenoble, Milan). In each case, genetic polymorphism of several colonies within the first specimen was studied. We identified 3 patients (out of the 12 studied) who carried out a single genotype, 6 were infected by 2 genotypes and 2 patients exhibited 4 and 5 different genotypes respectively. Combination of typing methods provided a better discriminatory power than the use of a single method. Indeed, typing methods used alone were not able to discriminate strains from different geographic areas whereas combination of the four methods exhibited a geographical structure of strains studied. This work demonstrated the usefulness of combining several typing methods for better understanding the epidemiology of *A. fumigatus* and clarify whether it is sufficient to type one isolate from each specimen for determining the strain involved in IA.

* European concerted action n° BMH4-CT-97-2481, leader: R. Grillo⁹

P5-026. Demonstration of dermatophyte in voluntary persons from the soles using the foot-press method. Preliminary study
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The purpose of the present study is to investigate the presence of dermatophytes in the soles, of 144 voluntary persons (not previously diagnosed of *tinea pedis*). They were examined using the foot-press method (modified from Marayuma *et al.* 1998 *Mycoses* 1998; 41: 145-151). The group was composed of 54 medical students, 40 patients attending a dermatologic clinic and 50 inpatients from internal medicine unit. The culture medium used was Sabouraud glucose agar with chloramphenicol and cycloheximide. The culture dishes were incubated at 30°C for 4 weeks. Isolated dermatophytes were confirmed by their gross and microscopic appearance.

Dermatophytes were isolated in 5 persons/patients (2 *Trychophyton rubrum* and 3 *T. mentagrophytes* var. *interdigitale*). Two cases in which *T. mentagrophytes* var. *interdigitale* group was isolated presented *tinea pedis*. Nevertheless, those patients with *T. rubrum* and one with *T. mentagrophytes* var. *interdigitale* were asymptomatic.

In summary, the prevalence of *tinea pedis* in our sample, using the foot-press method was 3.5%. This technique seems to be a useful and easy way to diagnose *tinea pedis* and probably also to detect carriers.

P5-027. Prevalence of *Candida dubliniensis* in the oral cavity of HIV-positive patients and of healthy people

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The purpose of the present study is to prospectively test the presence of *Candida dubliniensis* in all (92) the HIV-infected patients of Huesca (city with 200.000 inhabitants), from October 1999 to June 2000.

Oral samples were obtained from the middorsum of the tongue with a sterile swab from 92 HIV-positive patients with and without muguet and 42 medical students were taken as a control group. Cultures were performed in CHROMagar. The identification was made by germ tube formation, differential growth at 37 and 45°C, API 20C and indirect immunofluorescence (Bikandi *et al.* J Clin Microbiol 1998; 36: 2428-2433) **Results:** Of the HIV-infected patients, 68 (73.9%) were males and 24 (26.1%) were females. The mean CD4+ count was 373; mean viral load was 59,078 copies/ml. Mean age for *C. dubliniensis*-positive patients was 33, and 39.2 for *C. dubliniensis*-negative patients (p = 0.03). *C. dubliniensis* was isolated in 14 (15.2%) of the patients and none of the control group. Previous (last month) or actual muguet was found in 3/14 (21.4%) patients with *C. dubliniensis* and in 38/78 (48.7%) without *C. dubliniensis* (p= NS). One of the 14 (7.1%) patients with *C. dubliniensis* and twelve of the 78 (15.4%) without *C. dubliniensis* (p=NS) received antifungal therapy one month before specimen collection (p= NS).

Conclusions: *C. dubliniensis* was recovered from the oral cavities of 15.2% of the HIV-infected patients and 0% of the control group.

P5-028. Dermatophyte infections in Zaragoza (Spain): trends from 1987 to 2000

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The prevalence of dermatophytoses in a Teaching Hospital in Zaragoza from January 1987 to May 2000 was investigated. Cultures were performed on Sabouraud glucose agar containing chloramphenicol (SGDC), SGDC with cycloheximide and Dermatophyte Test Medium. One hundred and sixty-eight patients with dermatophytoses were diagnosed during this period and one thousand and seventy-one dermatophyte strains were isolated.

The commonest dermatophyte recovered was *Microsporium canis* (377, 35.2%), followed by *T. mentagrophytes* (332, 31%), *T. rubrum* (210, 19.6%), *E. floccosum* (97, 9%), *T. verrucosum* (32, 3%), *M. gypseum* (11, 1%), *T. tonsurans* (9, 0.8%), *M. persicolor* 1 and *M. audouinii* 1.

The most frequent clinical entity was *tinea corporis* followed by *tinea unguium*, *tinea capitis*, *tinea faciei*, *tinea cruris*, *tinea pedis*, *tinea barbae*, *tinea manuum*

Conclusions: *M. canis* was the most common pathogen isolated. *Tinea corporis* was the most frequent form of dermatophytosis.

P5-029. Phenotypic characteristics of *Paracoccidioides brasiliensis* strains

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The dimorphic fungus *Paracoccidioides brasiliensis* (*Pb*) is one of the most prevalent invasive fungal pathogens in Latin America. In this study, we investigate the following proofs for phenotypic characteristics of *Pb* isolates: urease production, behavior in canavanine-glycine-bromothymol blue (CGB) and tetrazolium chloride (TTC) media and in the Odds & Abbott system. Twenty different isolates of *Pb* were grown in Bacto-Peptone, Dextrose-Agar, pH 5,5 at 27 °C, and one loopful of each of these cultures were transferred onto Petri dishes of basal media. All isolates were plated in duplicates at 27 °C and were examined daily for 30 days in order to observe the colony growth and proteinase production for Odds & Abbott system, growth with pigment red to TTC, growth color change from yellow to blue to CGB and yellow to red to urease. All isolates of *Pb* were positive in all proofs and their Odds & Abbott biotype was found to be 777. They all showed the same profile when cultured on urease, CGB and TTC media.

*Supported by FAPESP

P5-030. Isolation of *Cryptococcus neoformans* var. *gattii* from a new source in India

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The aim of the present study was to search for the present of *C. neoformans* in the environment of frequented areas of Betul city. A total of 131 soil samples were collected from around the hospitals, nursing homes, theatres, hotels, schools and houses situated in different localities. All the samples collected were from near the human urine.

Isolation of *C. neoformans* was done on Guizotia-abyssinica-creatinine agar medium and the yeasts were identified on the basis of melanin-production and morphological characteristics. The variety identification was made by the canavanine-glycine-bromothymol-blue agar method. Out of 131 samples investigated 23 were found to be positive for the growth of *C. neoformans*. Of all *C. neoformans* isolated, 11 isolates were that of *C. neoformans* var. *gattii*.

In the present study, a new ecological niche for *C. neoformans* var. *gattii* has been reported.

P5-031. Statistical analysis of MLEE results prove the clonal reproduction on the yeast *Candida dubliniensis*

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Multilocus Enzyme Electrophoresis was performed on 70 European strains of *Candida dubliniensis* and two reference strains of the Central Bureau voor Schimmelcultuur. We tested 20 enzymes systems.

Results showed poor intraspecies polymorphism: only 10 isoenzymes were polymorphic and the 70 strains were regrouped within 10 Electrophoretic Types (ET). A Factorial Correspondence Analysis clustered these 10 ET in 3 groups. Then, the population genetics of the 36 strains from HIV-infected patients in London was investigated. The exist-

tence of strong heterozygote deficits and of one excess associated with significant linkage disequilibrium between pairs of loci, together with the predominance of multilocus genotypes strongly suggest that *C. dubliniensis* is mainly (if not totally) clonal. More researches are needed, with a larger number of strains, to determine the clonal reproduction of the whole species which would be important for epidemiological studies.

P5-032. Blood stream infections due to *Candida* species in England and Wales: Data from the ECMM epidemiological survey of candidaemia in Europe

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Seven large hospitals (4 London, 2 North England and 1 Wales) were selected for this 28 months sentinel study. The participants were required to complete case report forms for each episode of candidaemia and return each report with the yeast isolate to the co-ordinating centre (Royal Free Hospital). At the end of the survey each institutions laboratory database was searched to ensure all cases of fungaemia were identified. An interim analysis of 163 cases of fungaemia is presented. The incidence of candidaemia was 11.3/1000 beds/year of 3.1/100,000 bed days. The main patient groups affected were general surgery (40.6%), ITU (45%), haematology (15%), solid tumour (10.6%) and foetal immaturity (6.3%). *C. albicans* was isolated in 64.4% of cases. Other cases were due to *Candida glabrata* (15%), *C. parapsilosis* (10%), *Candida species* (4.4%), *C. krusei* (2.5%), *C. tropicalis* (2.5%) and *C. lusitanae*, *C. lipolytica* and *C. famata* (<1%). Within the different patient groups the percentage of fungaemia with *C. albicans* varied from 80.6% in ITU patients to 40% in haematology patients. A total of 47.5% of patients were treated with fluconazole. Others received amphotericin B (22.8%), combination (7.6%), Ambisome (1.3%), itraconazole (1.3%) and 19.6% received no treatment. Overall mortality at 30 days was 27%. In those with a central venous catheter (CVC), removal was associated with a mortality of 16.7% vs 51.2% in those in whom the CVC remained *in situ*.

P5-033. Epidemiological survey of candidemia in Spain

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Objective: to analyze and compare the epidemiology of candidemias in our country.

Methods: Data were collected in 19 Spanish hospitals with a questionnaire prepared by ECMM, from September 1997 to September 1999.

Results: A total of 290 patients (age range: 3 days - 88 years old) were divided in two according to age: children (<15 years) and adults (>15 years). Candidemia was more frequent in males. Previous treatment with antibiotics was a predisposing factor (87%) in children and 73.8% in adults. There was a much higher frequency of candidemia among children admitted to ICU or suffering from haematological diseases (60% and 81.2%, respectively) than among adults (41% and 12.4%). The frequency of candidemia in patients with general surgery, organ transplantation, HIV or burns was low in both groups. Candidemia was diagnosed as 1st episode in 95% of children and 99.5% of adults. Blood cultures obtained from vein were positive in 82.4% of adults and in 55% of children. The frequency of IV line *in situ* at time of the first positive blood culture was 96.3% of children and 78.1% of adults. The IV line was removed after diagnosis in 73.8% of children and 44.3% of adults. *C. parapsilosis* was the species isolated more frequently in children (50%), followed by *C. albicans* (36.3%). In adults the most common was *C. albicans* (45.7%) followed by *C. parapsilosis* (22.4%). Outcome was favorable in 66.2% of children and in 57.3% of adults.

Conclusions: Children and adults have different predisposing factors for Candidemia. Rate of candidemia for different species of *Candida* is also different in the two age groups.

P5-034. ECMM Survey of histoplasmosis in Europe.

Report from Italy

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Histoplasmosis is a rare disease in Italy. From 1955 to 1994, 28 cases have been reported, seven associated with AIDS [1-17]. Most of the patients had a history of visiting or living in the American regions of high endemicity but eight of them have never been out of the country, which supports an apparently autochthonous origin of the infection. This hypothesis was also supported by the isolation of the fungus from soil, peribronchial lymph nodes of two dogs and two feral mammals [1]. Further evidence was provided by the results of an histoplasmin skin test survey [18].

The aim of the ECMM project was to increase the knowledge of the incidence and epidemiology of this mycosis in Europe by starting reporting procedures and by collecting data of the cases diagnosed over a five year period (January 1995-December 1999). Over this study period, data from 25 cases were collected in Italy. History of travel or residence in the known endemic areas was recorded for 20/25 patients, and this was the only risk for nine visitors of caves in South and Central America and for a well-driller worker in Asia. As reported in the past, some patients (five) acquired histoplasmosis despite never having left the country. Among 12 patients with underlying disease, 11 were affected with AIDS and one was given chronic corticosteroid therapy because of rheumatoid arthritis and presented extended lesions confined to the skin. All patients with no underlying disease developed pulmonary histoplasmosis except one who presented bilateral adrenal incidentalomas. Histology was diagnostic in 12 cases and was the only proof of the disease in seven. Antibody response was detected in 11 and was the sole laboratory evidence of infection in the nine symptomatic visitors of caves. The fungus was isolated in culture from samples (mostly blood and skin) of nine patients (eight with AIDS and one treated with corticosteroids).

This survey has highlighted the difficulties to diagnose histoplasmosis. As shown by two cases incidentally diagnosed at surgery the disease may remain undiagnosed, particularly in non-compromised individuals. Surveillance is still ongoing, in order to draw attention to this fungal disease, improve its diagnosis and knowledge of its epidemiology.

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P5-035. ECMM survey of candidemia in Europe. Report from Italy

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Candidemia survey was carried out in one region of Italy (Lombardia: 8,924,870 population) for a 28-month period (September 1, 1997 to December 31, 1999) through regular contact with 35 participating hospital laboratories. Laboratory audit was done every 4 months to ensure all cases of candidemia were reported. A total of 645 episodes were notified to the coordinator and 634 strains (the first isolate for each episode) were collected. The ECMM form was completely filled for 569 episodes.

The overall rate of candidemia, evaluated for the 32 hospitals for which reports could be ensured exhaustive, was 0.38/1,000 admissions for >1 day, 0.44/10,000 patient-days. A number of candidemia superior to the expected one was reported in both the summer periods included in the survey, probably related to the reduced levels of assistance during these periods. Candidemia occurred more frequently in males (60%) and in the age 70-79 years (25%); 6.5% of patients were <12 month old.

The blood culture system most frequently used was Bactec, Becton Dickinson (40%), Bactalert, Organon Teknika (26%) and Isolator, Oxoid (23%), this last often employed together with another system. Misidentification rate (submitting laboratory identification vs coordinator identification) was 9%. *C. albicans* was identified in 58% of the episodes, followed by *C. parapsilosis* (15%), *C. glabrata* (13%) and *C. tropicalis* (6%). Two different *Candida* species were isolated from nine episodes. The frequency of candidemia due to *C. glabrata* increased throughout the study from 10% in the 1st year (Sept 97 – Aug 98) to 15% in the following 16 month period (Sept 98 – Dec 99).

The major underlying medical conditions included antibiotic treatment identified in 88% of the episodes, surgery (56%) - mainly abdominal (61%) and cardiovascular (20%) - intensive care (45%), solid tumor (28%), steroid use (15%). Haematological malignancy, HIV infection, foetal immaturity accounted for 7, 6 and 4%, respectively. A vascular catheter was present in 89% of patients, and colonization by the same *Candida* species preceded candidemia in 83% of patients submitted to mycological investigation. Unfortunately, colonization was investigated only in 40% of the cases.

Antifungal therapy was given to 448 out of 505 (89%) patients in whom candidemia was diagnosed before death. Fluconazole was used in 62.5% of the cases, amphotericin B (conventional or lipid-based) in 29.7%. Vascular catheter was removed in 339 out of 452 patients (75%). Thirty-five per cent of patients (187/541) died within 30 days after diagnosis; 28 patients were lost at follow up after 30 days. Mortality rate calculated for ten hospitals reporting ≥ 20 cases ranged from 9.5 to 53%. The highest mortality rate was reported in *C. tropicalis* (44%), *C. albicans* (38%) and *C. glabrata* (35%) infection. Septic shock was reported in 95 patients, and early (<30 days) candidemia related complications in 39.

The results of this survey emphasize the importance to i) speciate isolates from blood cultures and note changes in aetiology, ii) keep on monitoring specific groups of high risk patients, such as those submitted to gastrointestinal and cardiovascular surgery and prematurely born neonates, iii) inform clinicians of the need to treat, iv) be alert to detect outbreaks.

P5-036. Working group: ECMM candidemia. ECMM prospective epidemiological survey of candidemia in Europe: Report from France (682 cases)

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Objective. Special effort must be made in Europe to investigate the present epidemiology of bloodstream infections (BSIs) due to *Candida* species. Indeed the frequency of candidemia has risen dramatically over the last decade and the cost of health care of these nosocomial infections seems to grow in hospitals. In this aim, 25 French centres (23 teaching hospitals, 2 general hospitals) participated prospectively at a national survey from September 1997 to December 1999 (12 to 28 months according to the hospital).

Method. All cases of candidemia were recorded on the ECMM form 682/713 episodes were evaluable (716 strains). The incidence rate of candidemia was 0,39/1,000 admissions > 1 day. The first yeast isolate of each episode was collected by the coordinating centre (Grenoble).

Clinical information, mycology results and outcome. Both groups of adults (93%) and children ≤ 15 years, (7%) were analysed separately.

- Among adults (males 63%, females 37%, mean 59 years), the main underlying diseases associated to candidemia were solid tumour (30%), major surgery (27%), hematological malignancies (21%), other (27%). 35% of patients with yeast BSI were hospitalized in ICU, 75% received antibiotics, 22% steroids, 25% cytotoxic therapy. Candidemia were less frequently observed in solid organ transplantation (3%), severe burns and analysis (2,5%), AIDS (2,2%), drug addiction non-HIV (1%). Intravascular devices were associated with yeast BSIs in 88% (central 60%, peripheral alone 28%). Overall, the six most commonly yeasts isolated were: *C. albicans* 54%, *C. glabrata* 19%, *C. tropicalis* 10%, *C. parapsilosis* 8,5%, *C. krusei* 3,5%, *C. kefyr* 2%, other emerging *Candida* 3%. Polymicrobial candidemia (2 or 3 *Candida* species in the same blood culture vial) was detected in 25 patients (54 strains). Overall mortality rate at 30 days was 45%. A highest mortality rate was observed in infections due to *C. krusei*, *C. tropicalis*, *C. glabrata* (>56%) than in those due to *C. Albicans* and others (<42%).

- In children (n=47, males 53%, females 47%), 38% of candidemia episodes were diagnosed in neonates (n=18, mean birth weight 1,300 g). 62% of the Y-BSIs occurred in infants < 12 months (n=15) and children ≤ 15 years (n=14) with various forms of cancer, burns, surgery for mal-

formations, organ transplantation, severe infectious syndrom. Comparatively to adults, two main differences were observed. i) *C. parapsilosis* (20%) was the second etiologic agent after *C. albicans* (49%) while *C. glabrata* was less frequent (8,4%). ii) The survival rate was higher than in adults (79% v 55%) particularly in neonates (17 survivals/18).

Diagnosis and medical procedures. At the present time, the majority of the French hospital laboratories (22/24) used automatic blood culture systems (Bactec®, Vital®, Bioargos®, Organon®) for fungal detection, sometimes in association with lysis-centrifugation. Regarding medical practices, overall 84% of the patients received systemic antifungals: fluconazole alone 51%, IV amphotericin B alone 21%, various antifungal associations 10%. Specific treatment was not recorded in 12% of the patients. Generally, this reflects situation where patients did not survived long enough to receive adequate therapy. Treatment ND: 4%. Considering the management of indwelling intravenous catheter in candidemic patients, those were withdrawn in half of the cases. Among catheters cultured (72%), 68% showed a yeast colonization: exceptionally, the species was different of that isolated from the blood culture.

Conclusion. In comparison with a previous multicentric French study carried out in the 1995 (Richet H. *et al*, 37th ICAAC 1997), our national survey confirms the growing incidence of candidemia in hospitals, and the continuous shift to non-*albicans* species which now represent about 46% of the isolates. The increasing importance of yeasts as agents of sepsis has certainly resulted in the use of new microbiologic systems for BSI detection and effort to diagnose fungal infections accurately. Remarkably, as observed in USA (M. Pfaller *et al*, JCM 1998, 36:1886), *C. glabrata* (19%) has become the second pathogen after *C. albicans*. Factors which influence this evolution are not well understood yet. Finally for the future, this study addresses new issues in epidemiology of these nosocomial infections. It could be also the basis of next collaborative investigations such as antifungal susceptibilities of the strains.

P5-037. Survey of cryptococcosis in Europe. The ECMM working group report

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The ECMM prospective survey of cryptococcosis in Europe started on July 1997 with the participation of 17 Countries. As of December 1999, 655 cases were notified using the ECMM survey form and 565 strains sent to the National Coordinator Centers. The analysis of the cases reported during this 30 month period was performed by the Convenor using the epidemiology programme Epi-Info version 6.0. In the analysis only 565 cases were included whose forms were received from the Coordinators of France (158 forms), Italy (156), Austria, Germany and Switzerland (60), Spain (43), Belgium (29), United Kingdom (29), Greece (24), Portugal (20) and from other seven Countries (less than seven forms each). *Cryptococcus neoformans* var. *neoformans* was the etiologic agent of all the cases except four caused by var. *gattii* serotype B (in Austria, Germany, and Greece) and three caused by other *Cryptococcus* species, namely *C. albidus* (in Russia), *C. laurentii* and *C. luteolus* (in Bulgaria). Cryptococcosis was associated with HIV infection in 77% of cases, with the highest frequency in Italy (94%) and Portugal (90%), and was indicative of AIDS in 57.5% of patients. The median CD4+ lymphocyte count was 33/mm³ (range, 0-480/mm³). Approximately 85% of the patients had <100 CD4+ lymphocytes/mm³. In 99 cases, cryptococcosis occurred in HIV negative patients, mainly associated with cancer (42), organ transplantation (20), autoimmune disease (8), sarcoidosis and trauma (5 each). Corticosteroid therapy was reported in 25 patients, and contact with birds in 21, in seven of whom as unique risk for infection. Risk factors were unknown in 27 cases and not reported in six. Cryptococcosis was more frequently observed in males (80%) and in the age of 31-40 years (45%). Symptoms at diagnosis were specified in 82% of cases, with meningismus as the most frequent (65%) and the sole manifestation in half of them. Other clinical manifestations were fever (42%), mental alteration (11%), respiratory symptoms (10%). Skin lesions occurred in 10% of patients, complicated by cellulitis in 2 cases. Diagnosis was made only by serum antigen detection in 6 patients. The fungus was cultured in 542 (96%) cases, mostly from CSF (76%) and blood (34.5%). The extension of the infection was not systematically investigated. In 12 cases diagnosis was made post-mortem as unexpected event. As initial treatment, conventional amphotericin B was the most prescribed drug, given alone (24%) or associated with flucytosine (26%) or as lipid formulation (4.5%). Fluconazole comes second, given as monotherapy (22%) or combined with flucytosine (2.7%). A variety of combined schedules was used in the remaining patients. Treatment was not specified in seven cases.

To fulfill the main objective of the study, strains from 299 patients from 12 Countries were sent to the Convenor for typing. Germany and UK decided to perform locally the determination, whereas France did not join the typing protocol. Strains were serotyped by latex agglutination (Crypto Check Iatron Labs, Tokyo, Japan) and genotyped by PCR fingerprinting using (GACA)₄ oligonucleotide as single primer (Viviani et al 1997). At present, all typing data are available except those of UK (typing is ongoing). The genotype VN6/serotype A appears to be prevalent (44.3%) in Europe, followed by the intermediate genotypes (33.3%, namely 21.6% VN4 and 11.7% VN3) and by the VN1/serotype D (22.3%). The last sero/genotype was found in seven Countries, with the highest prevalence in northern Italy (44%). The intermediate genotypes (VN3 and VN4) were detected in eight Countries with the highest prevalence in Spain.

This is the first prospective survey carried out on European basis. The results obtained so far are encouraging for keeping the surveillance ongoing in order to better define the geographical occurrence of cryptococcosis and outline a map of distribution of var. *neoformans* pheno/genotypes in Europe.

P5-038. ECMM epidemiological survey of cryptococcosis: Report from Spain

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This study constitutes an approach to the knowledge of cryptococcosis in Spain as a part of a wider epidemiological survey of the disease involving Europe. For the data request the ECMM form was used. It registries demographic data, risk factors, diagnostic methods and initial treatment. All cases reported were accompanied by the correspondent isolate of *Cryptococcus neoformans*.

Results obtained from September 1, 1997 to December 31, 1999 are analysed and presented. Twenty Spanish hospitals reported 44 cases and strains within that period of time. 89% (39) of patients were males and 11% (5) were females; 52% (23) of them were between 20 and 40 years old. 84% (37) corresponded to new cases and 14% (6) to relapses of the disease. The HIV infection was the most frequent risk factor reported (86%) and, for 24% of them (9), cryptococcosis was the AIDS defining disease. Most frequently registered symptoms were cephalaea, fever, vomiting and central nervous system disorders. For the diagnosis, CSF analysis showed positive India ink for 64% (28) cases, and positive specific antigen detection for 97% of the studied fluids. *Cryptococcus neoformans* was isolated from CSF in 77% (34) of cases; 27% (12) it was obtained from blood cultures, and from other sources in 16% (7). Concerning to the antifungal therapy, Amphotericin B monotherapy was prescribed for 20 patients; Fluconazole for 5 patients and Itraconazole for one of them. For 7 patients combined therapy with Amphotericin B and Fluconazole was the initial treatment, and Amphotericin B + Flucytosine for 3 cases.

All strains collected (100%) corresponded to *C. neoformans* var. *neoformans*. Serotypes distribution was 46% (20) for serotype A; 23% (10) for serotype D, 23% (10) for serotype AD. 7% (3) isolates remains not serotyped, and 1 of them was serotyped as AB (MA. Viviani results). MICs were determined for all strains using the microdilution method. The antifungal drugs tested were Amphotericin B, Itraconazole, Voriconazole, Fluconazole and Flucytosine. Genotyping with PCR amplification of the DNA repetitive sequence [GACA]₄ was also performed. In that sense, 10 DNA patterns were found. Some relationship between genotype and serotypes could be established. For serotype D, two different patterns were found; serotype AD strains could also be grouped into two DNA patterns. For serotype A, the strains showed five different band patterns and, one special pattern was obtained with the strain serotyped as AB.

P5-039. ECMM epidemiological survey on cryptococcosis in Europe: Report from Belgium

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An epidemiological survey on cryptococcosis has been performed in Belgium since 1990 on request of the Scientific Institute of Public Health and a first report was presented during the ECMM Congress organized in Brussels in 1995. Between 1990 and 1994 (no survey in 1991), 65 cases always due to the variety *neoformans*, exception made for one case, were reported in 48 months (1.3 case / m.). 80% were observed in males and AIDS was already the major predisposing factor (in 50 out of 63 documented cases). Other underlying factors were detected in 10 patients but could not be found in 3 patients including a case of lungcryptococcoma resulting from exposure to a very high inoculum. Two thirds of the patients either originated from Africa or had been living there. Cryptococcosis revealed the AIDS condition in 11 out of the 50 cases. Between January 1995 and June, 30 1997 (30 months) which is the starting date of the present ECMM survey, 52 additional cases were observed in Belgium (1.7 case / m.). Less information is available for this second series but nevertheless we are able to say that almost all the cases were due to the variety *neoformans*, serotype D being frequently associated with primary cutaneous cryptococcosis. As for the epidemiological factors, a close contact with birds and more especially with pigeons seems to be in a good many cases at the origin of cryptococcosis. The sexe ratio kept unchanged (80% in males). As for the origin of the patients - information was available for 50 cases- two thirds (34) were from Europe with 32 Belgians and one third (16) were from Africa. AIDS remained the most important favourable factor as it was involved in 38 out of 49 well documented cases.

The third survey includes the cases observed from July, 1997 until December 1999 (30 months). Twenty nine cases were observed in Belgium that means only one per month. The sexe ratio was 21 males for 8 females and one third of the patients were in the thirties. One third of the patients came from Africa (10 cases). The AIDS condition of the patients was proved in two third of the patients.

The isolates could only be obtained in 22 cases. The serotyping first performed at the Institute of Tropical Medicine (Antwerp) was controlled in the M. Viviani's laboratory, the European Coordinator who also genotyped them with the GACA 4 primer. Serotype A is predominant (13), followed by AD (5) and D (4). The different profiles (12 X VN6, 6 X VN4, 4 X VN1) will be discussed in the light of the results obtained in Italy by Cogliati et al. (Medical Mycology 2000, 38, 97-103).

P5-040. Epidemiological survey of cryptococcosis in Europe: Report from Poland

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Program of ECMM research on cryptococcosis epidemiology in Poland was published in Medical Mycology and data were collected by personal contact with mycological laboratories, centers of transplantology, haematology and infection's diseases. During 3 years study from 1.07 1997 to 30.06. 2000 cryptococcosis were found in 9 patients, 3 women and 6 men in age 28-65. Risks factors were as follows: reduced immunity by HIV/ AIDS in 4 cases, kidney transplantation in 3 persons and in one case the professional exposure, pigeon breeder in another case in result of liver's cirrhosis symptoms. In all of the persons cryptococcosis were diagnosed in period of spring time and autumn season. In 6 patients symptoms of meningitis and encephalitis with presence *Cryptococcus neoformans* in cerebro-spinal fluid by direct methods and in cultures. In 2 cases cryptococcus was detected in tissues cultures and in histopathological investigations. In one person, brown coal miner liver and spleen enlargement with thrombosis of portae et spleen venes as well as leukopenia et thrombocytopenia were found. Blood cultures for fungi in the patient were negative but in bone marrow higher percent of promyelocytes and spawnes of fungi resembling *Nocardia asteroides* were detected. Cultures from bone marrow blood showed grow of *Nocardia asteroides*. He was treated with imipenem, trimethoprim and fluconazol and because thrombosis of portae et spleen venes with heparin. After therapy he shortly improved but afterwards he bled from digestive system and in lungs appeared nodules what with positive scening test in serum, urine and abdominal fluid for cryptococcosis antigen, despite negative blood cultures suggested cryptococcosis. Again improvement after fluconazol treatment was significant. Cryptococcosis in Poland with population 38.7 mln is rarely diagnosed. We propose that in case of symptoms suggesting of meninges involvement by fungi to study of cerebrospinal fluid with indian ink and culture it on Sabouraud medium. The diagnosis of cryptococcal infection should be obligatory performed in such cases which are complicated with thrombosis.

P5-041. ECMM cryptococcosis survey in Germany, Austria and Switzerland

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This paper includes the results of the ECMM study conducted in Germany, Austria and Switzerland between July 1997 to December 1999 and compares these results with the older PEG cryptococcosis survey performed in Germany during 1992-1994. Interesting epidemiological changes can be observed between the two studies. In the ECMM study overall 60 cases have been reported (43 in G, 13 in Ch, 4 in A). The incidence of new cases is clearly decreasing: 30 cases have been reported from Germany (in 2 years ECMM) versus 47 cases in the PEG survey. The same phenomenon was observed in other countries. AIDS is still the most important risk factor (60%), however, in comparison to the older PEG-study a significant shift can be observed with other risk factors increasing (40% vs 15%). With the change of the spectrum of underlying diseases, the proportion of patients older than 60 years is also increased 24% vs 8.5%. The number of males decreased from 85% to 65.5% depending on the proportion of male AIDS patient. Beside the typical cryptococcal meningitis, which is diagnosed by CNS symptoms, CT screening or antigen in the CSF, other localisations of the disease - like lung and skin - have been observed. *Cryptococcus neoformans* has been isolated in 52 patients, three isolates belong to the variety *gattii*; these three strains have been isolated from patients which got infected outside of Germany. The serotype A is dominant in the variety *neoformans*. Regarding the therapy following observation can be drawn: AIDS patients with cryptococcosis are treated in Germany mostly with the triple combination 5FC+AmphB+Flu. The same patients are treated in Switzerland either by a combination of 5FC+Amph B or Amph B+Flu, often they receive only a monotherapy with Amph B or Flu. Non-HIV-patients with skin or lung locations respond well to Flu monotherapy. Finally we thank all participants who have sent their strains and questionnaires to the convenors.

P5-042. ECMM study of histoplasmosis in Europe: Data from Germany, Switzerland and Austria

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In this part of the ECMM survey data on the incidence and epidemiology of histoplasmosis in Germany, Switzerland and Austria were collected retrospective from January 1995 - December 1997 and prospective from January 1998 until December 1999. Over this period, 54 cases of histoplasmosis were reported: 48 in Germany, 4 in Switzerland and 2 in Austria. All patients, who had been asked for travel history (50/54), have been in an area known to be endemic for *Histoplasma capsulatum*. The infection was probably acquired in Central America (20), Africa (14), South America (11), less often in North America (4) and South East Asia (3). This travel history was the only risk factor in 30/54 cases. In 16/18 patients with proven disseminated histoplasmosis AIDS was the main underlying disease. Other risk factors included Non Hodgkin lymphoma (1), common variable immunodeficiency (1) or the use of corticosteroid therapy due to a chronic pulmonary disease (1). All but one of the 30 persons without an underlying disease developed a pulmonary histoplasmosis and one a skin disease through *H. capsulatum*. Diagnosis was done in 28 cases by histology, in 17 cases *H. capsulatum* was detected by culture, in 29 persons antibodies against *H. capsulatum* were detectable.

The number of diagnosed histoplasmosis is only the "top of an iceberg" because of the high percentage of self limiting infections in non-immunocompromised persons.

P5-043. Epidemiological survey on candidemia in Europe: Results of Germany and Austria

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These results of our part of the Epidemiological Survey on Candidemia (1998-99) come from 10 university hospitals and two ambulatory laboratories of Germany. Two university hospitals and one non-teaching hospital from Austria participate in this study. Not all questionnaires were filled out completely because it is a lot of work for the mycologist working in a microbiological institute to collect the clinical data. That is the reason for differences in the underlying data.

Mycological data: A total number of 238 isolates was collected from 230 patients. In 222 cases (96.5 %) only one species was isolated. Eight patients (3.5 %) had a mixed infection with two species. *Candida (C.) albicans* was the most isolated species (66 %, 157 / 238; 6 times mixed with other species), followed by *C. glabrata* (15.1 %, 36 / 238; 7 times mixed), *C. tropicalis* (7.6 %, 18 / 238; 3 mixed), *C. parapsilosis* (5.9 %, 14 / 238) and *C. lusitanae* (1.3 %, 3 / 238). Seven other species (*C. famata*, *C. guilliermondii*, *C. humicola*, *C. intermedia*, *C. norvegensis*, *C. pelliculosa*, *C. sake*) were only isolated one time, in three cases *C. spec.* were indicated.

Patients: Data of 230 patients were analysed. 16 patients were infants younger than one year (seven days to eight months, 10 male, 5 female, 1 sex not indicated), 8 were children up to 15 years (4 male, 4 female), 206 adults from 17 to 89 years (109 male, 83 female, 14 sex not indicated). More than 65 % of the adults (139 / 206) were older than 50 years. It was the first episode of candidemia for the most patients (96.6 %, 199

/ 206), seven patients (3.4 %) had a relapse. Blood cultures were collected utilising followed systems: 51.1 % (117 / 229) BACTEC (Becton Dickinson), 30.6 % (70 / 229) VITAL (bioMérieux), 13.5 % (31 / 229) BacT / Alert (Organon), 3.1 % (7 / 229) BBL-Septi-Check (Becton Dickinson), 1.7 % (4 / 229) Thioglycolate medium. Sites for collecting blood samples were vein (52.3 %, 102 / 195), catheter (44.1 %, 86 / 195) and port systems (3.6 %, 7 / 195).

A lot of underlying diseases and other risk factors was shown. The most frequently named risk factor was the use of antibiotics (97.6 %, 166 / 170 patients, total 397 antibiotics) especially against anaerobes or aerobic/anaerobe mixed infections (34 %, 135 antibiotics). Fetal immaturity was the main risk factor in infants (75 %, 12/16). General surgery (50 %, 112/224), intensive care unit (ICU, 50 %, 112 / 224), solid tumors (20.1%, 45 / 224) or use of corticosteroids (17 %, 38 / 224) followed. Other factors were seldom investigated because of missing samples: chemotherapy (7.1 %, 16/224), hematological diseases (5.4 %, 12/224), organ transplantation (4.9 %, 11 / 224), other diseases like pancreatitis or diabetes (3.6 %, 8 / 224). HIV (1.3 %, 3 / 224) or burning (0 %) did not play a role. However, in the most cases not only one risk factor was found. 61.2 % of the patients (137/224) had three or more risk factors. Colonization was investigated in 123 patients. The same *Candida*-species was found on one or more sites in 98.4 % (121). In 188 patients an in situ line was present (157 times central venous catheter, 11 peripheral and 20 port system). The same yeast species was found in 68 % (83) of the cultured lines (122). Prior candidemia antimycotics were given in 47 of 116 cases (40.5 %), mostly fluconazole (57.4 %, 27/47). Fluconazole was also the preferred antimycotic for treatment (70.9 %, 129/182), alone (124) or in combination with amphotericin B (4) or 5-fluorocytosine (1), followed by amphotericin B (18.7 %, 34 / 182) alone, amphotericin B with 5-fluorocytosine (4.4 %, 8/182) and nystatin (3.3 %, 6/182). The outcome was described for 161 patients: 60.3 % (97 / 161) survived and 39.7 % (64 / 161) died within 30 days. But we have not any data how often candidemia was the true reason for death. Conclusion: Within two years 230 cases of candidemia were reported from selected hospitals of Germany and Austria. Immature infants and older patients were concerned frequently. A lot of risk factors was found, underlying diseases as well as iatrogenous factors. Often the patients had more than three risk factors. Colonization was a important risk factor, too. But only in the half of the patients colonization was investigated. A result of this study may be the urgent recommendation for mycological monitoring of patients endangered to develop an invasive mycosis.

P5-044. ECMM's survey of candidemia in Europe: Report from Sweden

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Aim: To obtain information of bloodstream infections due to *Candida* and *Torulopsis* species in hospitalised patients from different countries in Europe, during the period, 010198 to 311299.

Method: All hospitalised patients with candidemia could be included in the study. Cases of documented candidemia have been recorded on a questionnaire. The forms and the corresponding isolates have been sent to the national co-ordinators. Six hospitals (4 University and 2 general hospitals), from the middle part of Sweden have participated.

Results : Mycology data; 191 patients had 196 infectious episodes of candidemia. The total number of positive blood cultures were 347, (range: 1-10 positive blood cultures/ patient) and the total number of *Candida* isolates were 200 (3 patients had doubleinfections with *C. albicans* and *C. glabrata*, 1 patient with *C. albicans* and *C. lusitaniae*). The spectrum of *Candida* species (n=200) were: *C. albicans* 67.5%, *C. glabrata* 16.5%, *C. parapsilosis* 8%, miscellaneous 8%. In 84 general surgery and ICU patients, with 86 isolates, *C. albicans* (70%) dominated followed by *C. glabrata* in 16% and *C. parapsilosis* 5% and other 9%. In general medicine (n=23), *C. albicans* was isolated in 65%, *C. glabrata* in 26% and miscellaneous 9%. In fetal immaturity (n=31), *C. albicans* was isolated in 68%, *C. parapsilosis* 19.6%, other 12.6%, and in children (n=13), *C. albicans* in 54%, *C. parapsilosis* in 23%, *C. glabrata* in 16% and other in 7%. In hematology / solid tumor patients (n=19) *C. glabrata* 42%, and other non-*albicans* spp. 16%, dominated over *C. albicans* 42%. The blood culture system most often used was: Bactec, Bact alert and Vital. The overall incidence rate was 3.2/10.000 hospitalised patients >1 day (range of 1-4/10.000 in 6 hospitals)

Clinical characteristics: Age: median 59 years (range 0-94 years) Sex: 43% females and 57% males. 49.5% of patients >59 years, fetal immaturity: patients aged 0-2 month 15.5%. Underlying disease (n=191): General surgery + ICU n=84, fetal immaturity n=30, children=13, general medicine=23, hematological disease=15, solid tumors=4, organ transplant=5, miscellaneous n=9, unknown 8.

Mortality: Preliminary data; up to 55% of patient died within 30 days after candidemia was detected, 71.5% with *C. albicans* and 28.5% with *C. glabrata*.

Conclusion: The patients with candidemia (n=191) was mostly older patients >59 years (49.5%), most often undergoing (abdominal) surgery or treated at intensive care units (44%), followed by premature neonates in 15.5%. *C. albicans* was the most common sp. followed by *C. glabrata* among surgery/ICU and general medicine patients, while *C. albicans* and *C. parapsilosis* was the most common spp. in neonates and children. In patients with hematological disease/solid tumors, *C. glabrata* and other non-*albicans* spp. dominated over *C. albicans*. This study, initiated by ECMM is the first candidemia survey performed in Sweden. Although the study is of great importance, there have been difficulties to receive forms from the clinicians so for the future, if a study like this will be repeated, the questionnaires have to be simplified.