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Nosokomiale invasive Aspergillosen (IA)

6. Kölner Hygienetag
28.10.2015
Prof. Dr. Frauke Mattner

Abgabe von infektiösen Partikeln direkt in die Luft
Schimmelpilzsporen (hier Aspergillus fumigatus)

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Wachstum von Aspergillen: Vorkommen in der Umwelt

Hyphen (1) enden in Vesikeln (2) mit Phialiden (3), die dann Konidien (= Sporen, 4) ausbilden, die sich schließlich ablösen

1 2 3 4

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Übertragung von Aspergillen: aerogene Transmission

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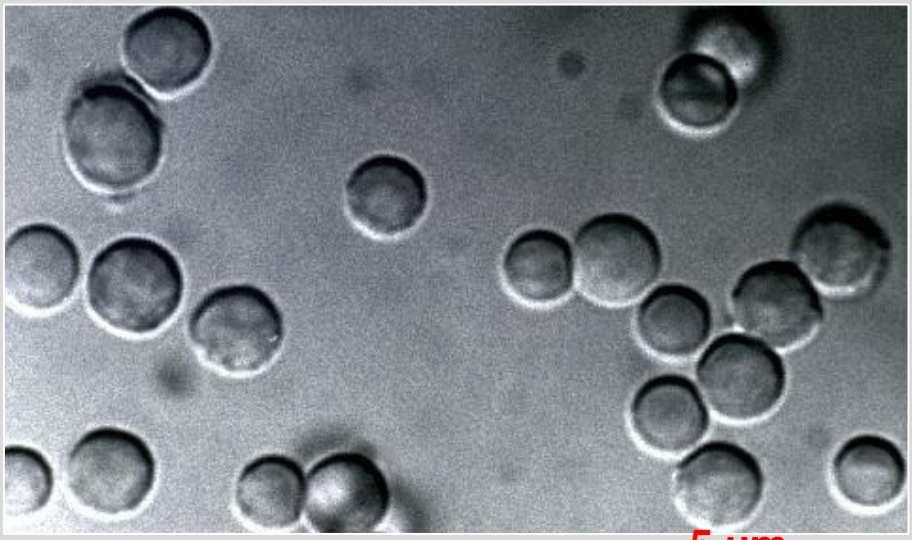
Sporengröße:

2 bis 4 µm



- **Sporen können bis in die Alveolen inhaliert werden (7 pro Tag!!)**
- **Elimination des Erregers bei immunkompetenten Menschen in der Regel problemlos**
- **andere: Risiko einer invasiven Aspergillose (IA)**

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Wann sind Schimmelpilzsporen „unterwegs“?
Im Sommer und Herbst!!

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CAVE Fensterlüftung

Sommer und Herbstzeit

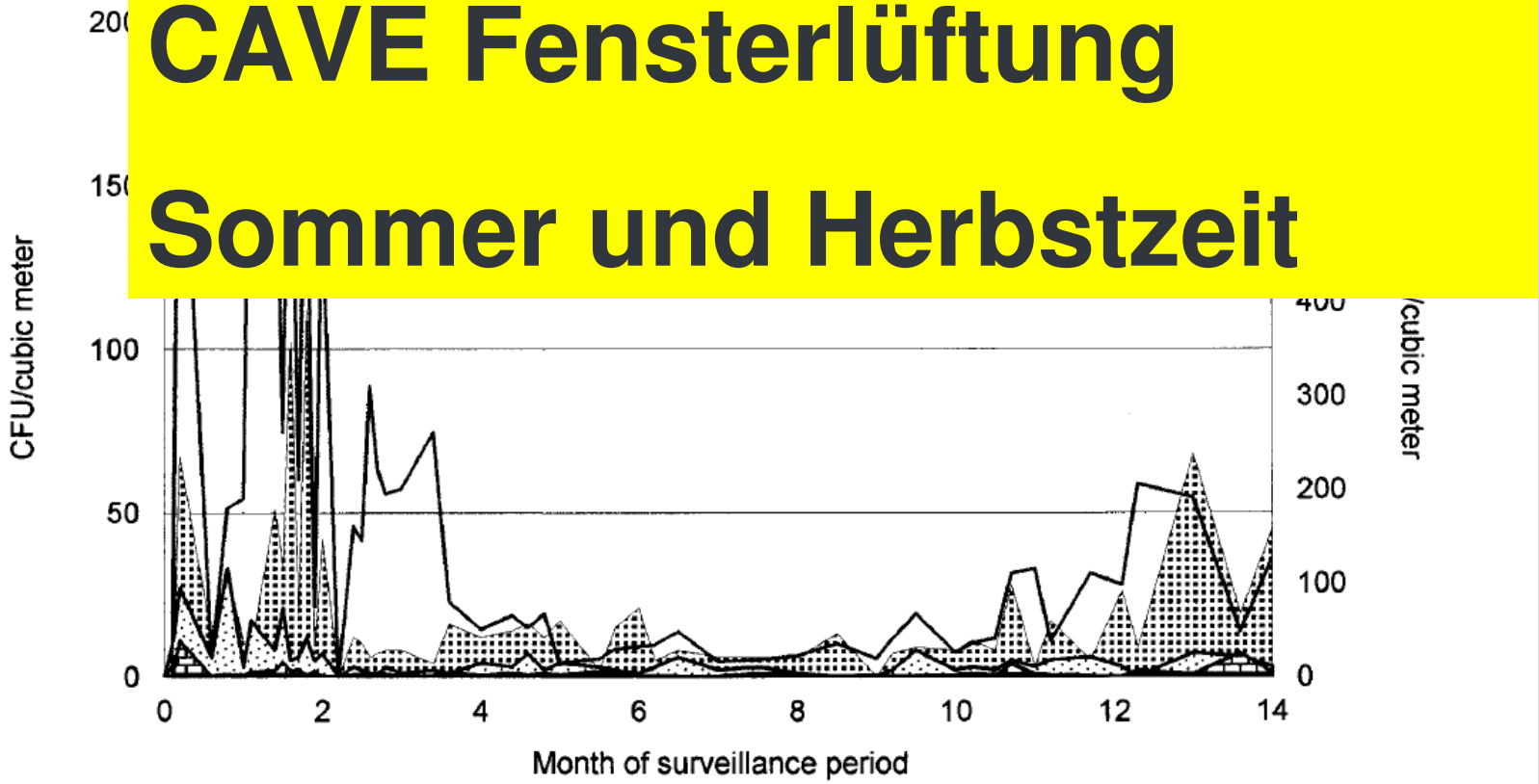

FIG. 1. Results of a 14-month surveillance period of the conidia of nonpathogenic fungi present in air samples from within the hospital outside the department of hematology, air samples within the hematology ward, and air samples in HEPA-filtered rooms. The numbers of conidia outside are depicted in the line (enumeration on the y_2 axis). The surveillance began in July 1994 (0 on the x axis) and ended in September 1995 (14 on the x axis).

JOURNAL OF CLINICAL MICROBIOLOGY, June 1999, p. 1752–1757

Surveillancedaten über IA (1)

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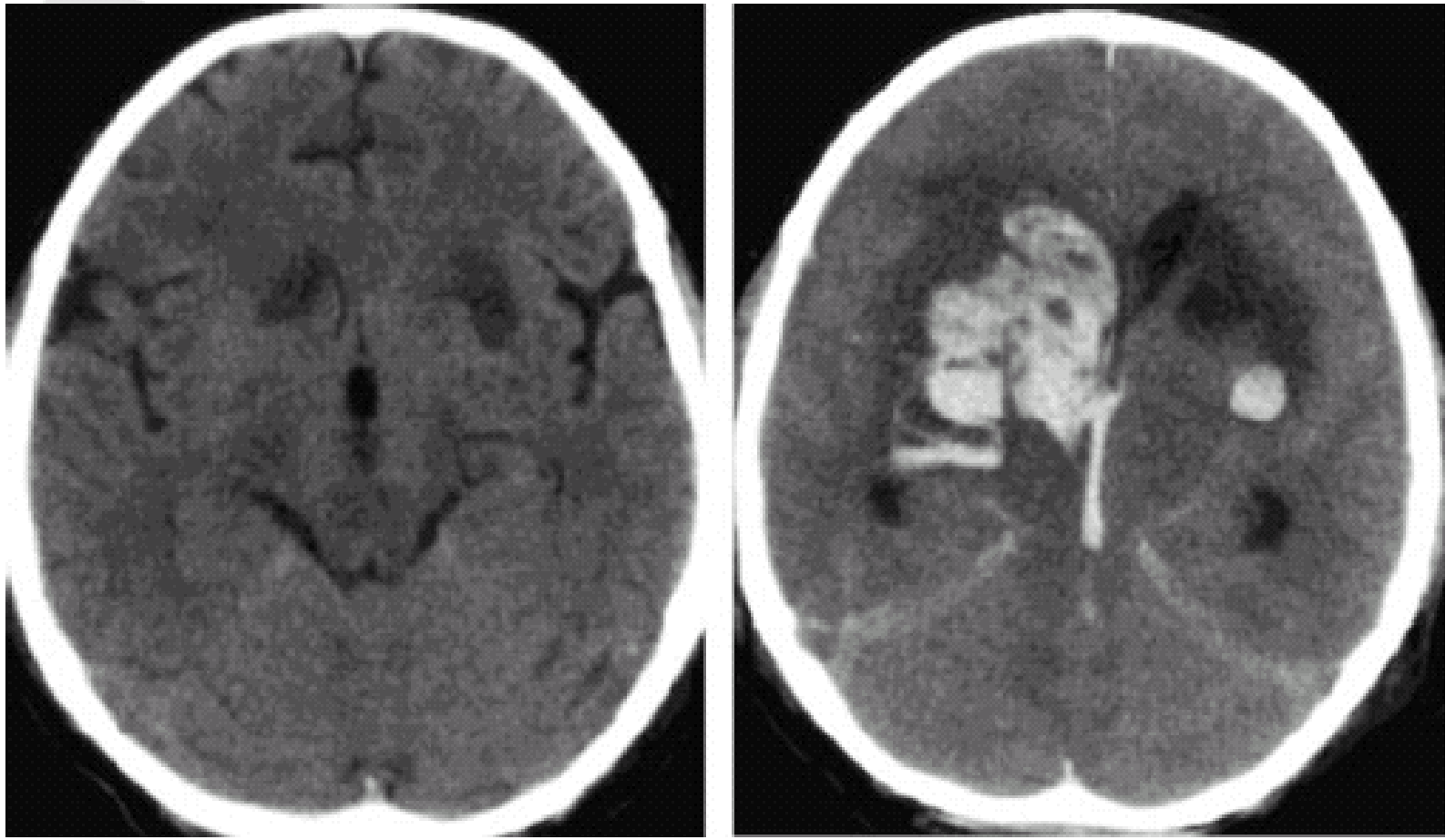
- **Prospektive 1-Jahres Studie auf einer hämatologischen Station in Straßburg**
- **21 Umgebungsisolate und 26 klinische Isolate typisiert.**
- **34 unterschiedliche Genotypen festgestellt**
- **2 Patienten hatten mindestens zwei verschiedene Stämme**
- **2 Patienten hatte identische Stämme mit denen, die bei Umgebungsuntersuchungen nachgewiesen wurden**

J Hosp Infect 2005: 60(1):61-8 Menotti J



Vaskulitisch mediierte Infarzierungen im Basalganglienbereich, im Verlauf intrazerebrale Massenblutung, Einklemmung und Hirntod

Mattner F, nosokomiale invasive Aspergillose

Mattner F,Haubitz B, Strueber M, Neuroradiologie, MHH: Mycoses 2004

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Mortalität und Patientenrisikogruppen

REVIEW

Nosocomial aspergillosis in outbreak settings

R-P. Vonberg*, P. Gastmeier

53 Ausbrüche zwischen 1970 und 2004 publiziert
insgesamt 458 Patienten analysiert

Journal of Hospital Infection (2006) 63, 246–254

Mortalität

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Hämatologie, Onkologie und KMTX	57,6 %	n = 299
Patienten nach Organtransplantationen	55,9 %	n = 44
sonstige Immunsuppression	52,3 %	n = 77
ohne bekannte Immunsuppression	39,4 %	n = 38
gesamt	55,0 %	n = 458

- Mattner F, nosokomiale invasive Aspergillose

Journal of Hospital Infection (2006) 63, 246–254

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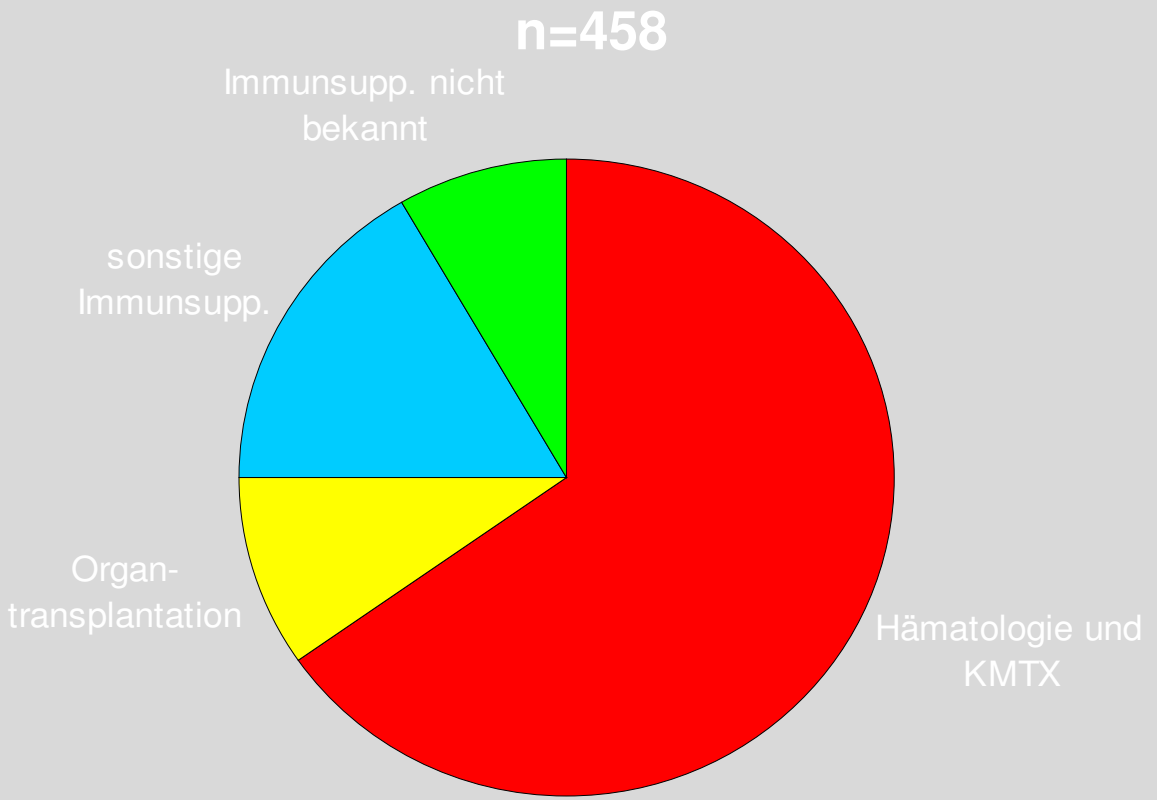
nosokomiale Aspergillose: Risikogruppen

- Hämatologie
- KMTx
- SOT
- Intensivpatienten



Mattner F, nosokomiale invasive Aspergillose

Journal of Hospital Infection (2006) 63, 246–254

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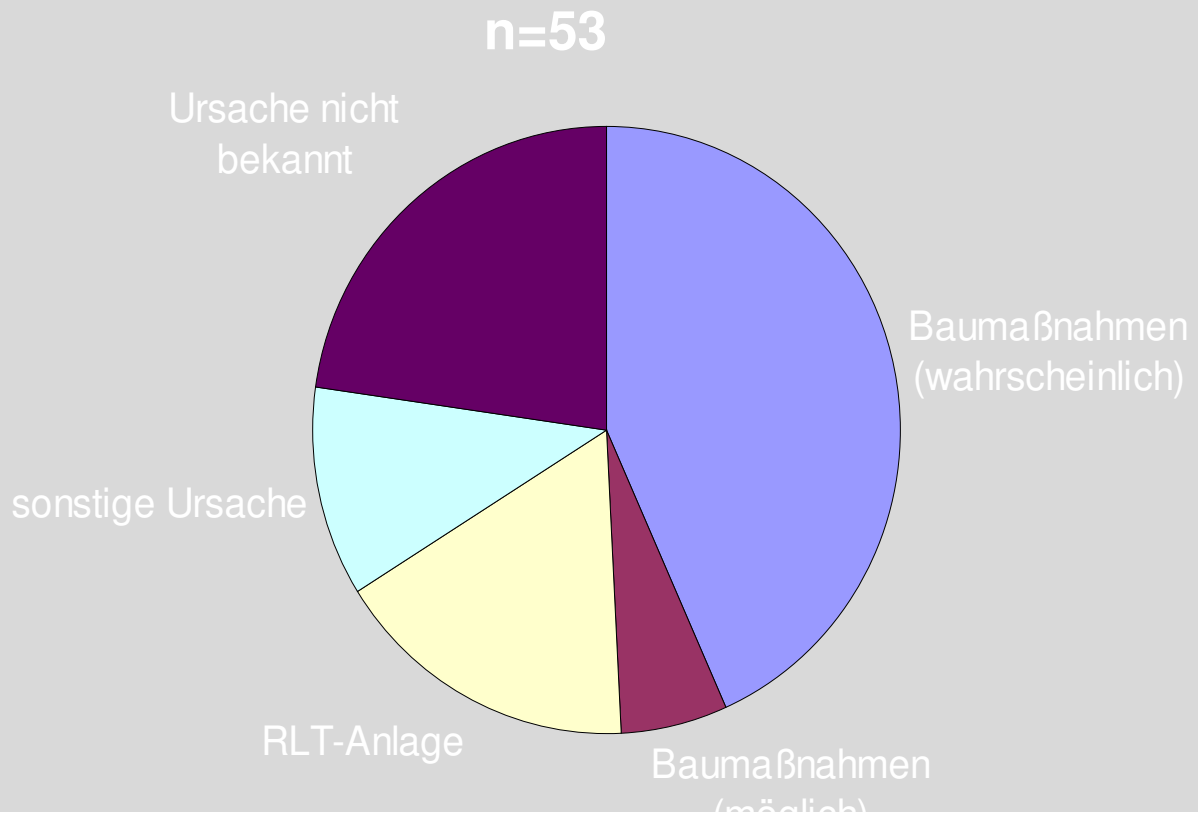
Aspergillose: nosokomiale Ausbrüche „Ursachen“

Baumaßnahmen
RLT-Anlagen
„Sonstige“
unbekannt



Mattner F, nosokomiale invasive Aspergillose

Journal of Hospital Infection (2006) 63, 246–254

Beispiel INTERVENTION:
Successful control of an outbreak of invasive aspergillosis
in a regional haematology unit during hospital construction works

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CAVE Bautätigkeit

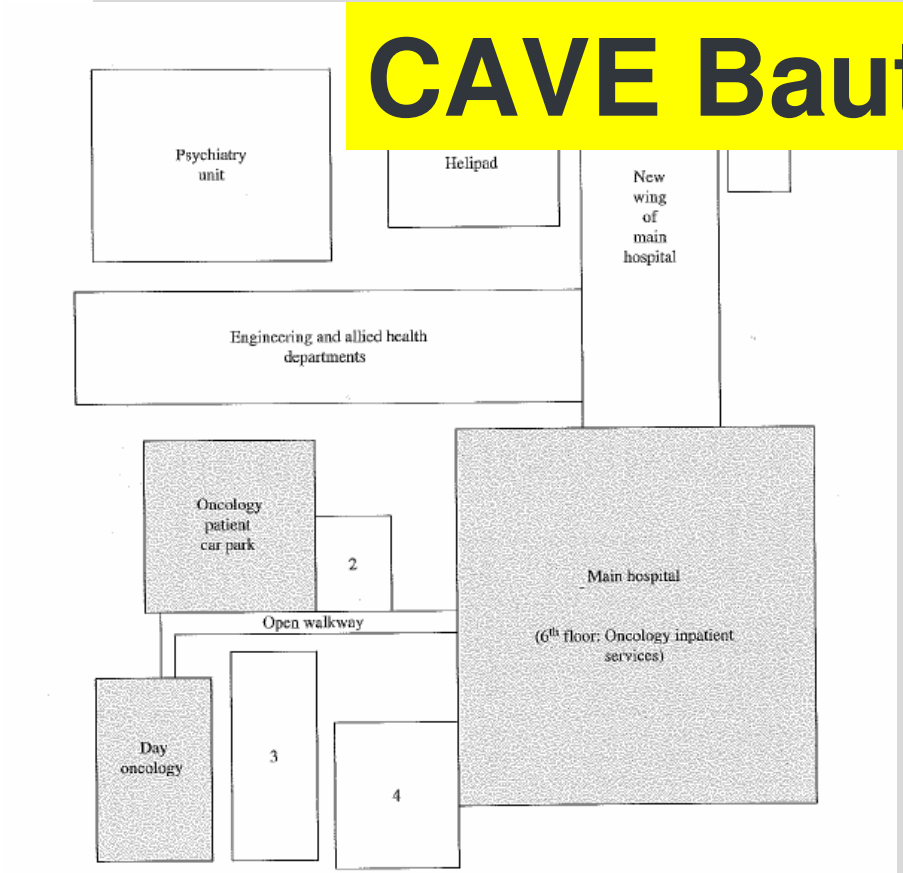

Figure 1 Schematic outline of hospital layout. (1) Endoscopy suite; (2) finance department; (3) library; (4) staff lounge.

-Klinik mit 40 Leukämie-

- **Bautätigkeiten um die onkologische Tagesklinik herum bevor die Tagesklinik ins Haupthaus umziehen konnte**
- **Nach Auftreten von 5 Fällen Umzug ins Haupthaus und „Abschottung“**
- **Vorikonazol-Prophylaxe**
- **Ein autopsiebestätigter Todesfall**

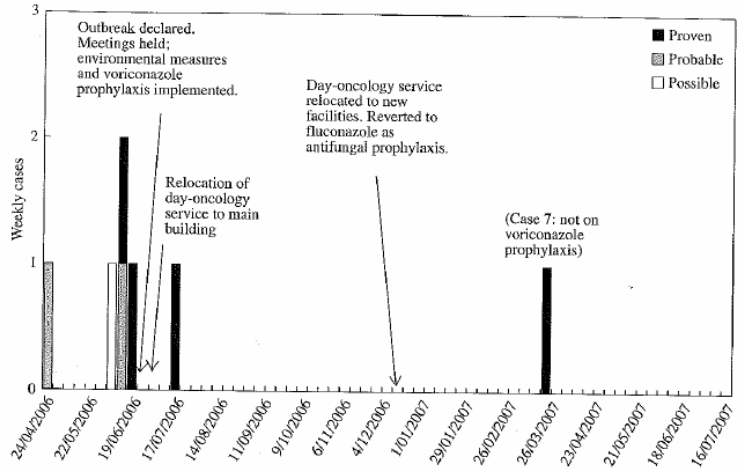

Figure 2 Timeline of invasive aspergillosis outbreak.

Mattner F, nosokomiale invasive Aspergillose
J Hosp Infect 2008, 69, 33-38

Ausbruch auf einer Frühchenstation

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- Zwis… cutanen Aspe… rd, UK;
- ein F… unter Posa…
- Nach… Wass… (Mikr… typische Ident…
- Transmissionsweg: Töpfchen? Kontakt?
- Aufbereitung von Inkubatoren!!!

CAVE Trocknung der Wasserreservoire von Inkubatoren

J Hosp Infect 2011:79(4):344-8 Etienne KA et al.

Ausbruch von invaisver Aspergillose (IA) (A. fumigatus) auf einer Intensivstation (Madrid, Spanien)

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- Herzchirurgische Intensivstation 2006-2008
- Monatliche kulturelle Luftkeimmessungen mit Differenzierung und Quantifizierung von Schimmelpilzen, Isolate wurden aserviert.
- Auftreten von 7 proven und probable IA Fällen

- 5 lung infection, 1 medaistinitis, 1 lung infection plus mediastinitis), Motalität 85%
- 3 Pat. Herz-Transplantation, 2 Pat. Kortikosteroid-Therapie, 2 Pat. Diab. Mellitus
  - Während Ausbruchsphase 175, 50,25,20,160, 400 KBE/m³ Luft, davor und danach A. fumigatus nur vereinzelt (Median 0 KBE/m³); in 3 Patienten Isolate mit Patientenisolaten identisch
  - Keine neuen Fälle nach adäquater Filtrierung (HEPA) der Luft der RLT Anlage der Intensivstation
  - Conclusion: Überprüfung der Luftqualitäten auf Intensivstationen

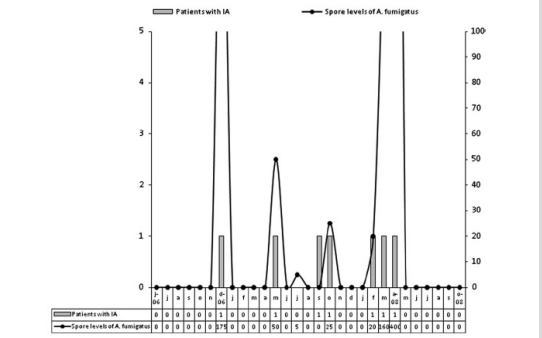

Figure 1. Spore levels of *Aspergillus fumigatus* in the major heart surgery intensive care unit and their relationship with the occurrence of invasive aspergillosis (IA).

TABLE 3. Diagnoses of the 10 patients, clinical samples with isolation of *Aspergillus fumigatus*, and number of different genotypes found[a]

Patient	Diagnosis	No. of days of admission to unit	Clinical samples			
			Source	No.	No. of different genotypes	Genotype matching environmental genotype
1	Proven surgical wound IA[b]	31	Surgical wound (n = 8), bone biopsy specimen	9	2	Yes
2	Probable pulmonary IA	33	Bronchial aspirate (n = 4), protected brush catheter	5	1	No
3	Pulmonary colonization	10	Bronchial aspirate	3	4	No
4	Pulmonary colonization	18	Bronchial aspirate	1	2	No
5	Probable pulmonary IA	12	Bronchial aspirate	4	3	Yes
6	Pulmonary colonization	34	Bronchial aspirate	1	1	No
7	Probable pulmonary IA	79	Bronchial aspirate	3	2	Yes
8	Probable pulmonary IA	5	Sputum (n = 3), bronchial aspirate, protected brush catheter	5	3	No
9	Proven surgical wound IA	83	Surgical wound	3	3	No
10	Surgical wound colonization	50	Surgical wound	1	1	No

[a] The presence of matches between environmental and clinical genotypes is also shown. Patients with proven/probable invasive aspergillosis are highlighted with shading.
[b] IA, invasive aspergillosis.

Clin Infect Dis 2012:54(3):e24-31: Palaez T et al., JCM 2011:49(10) 3498-503: Guinea J et al.

Ausbruch von invaisver Aspergillose (IA) (A. fumigatus) auf einer Intensivstation (Madrid, Spanien)

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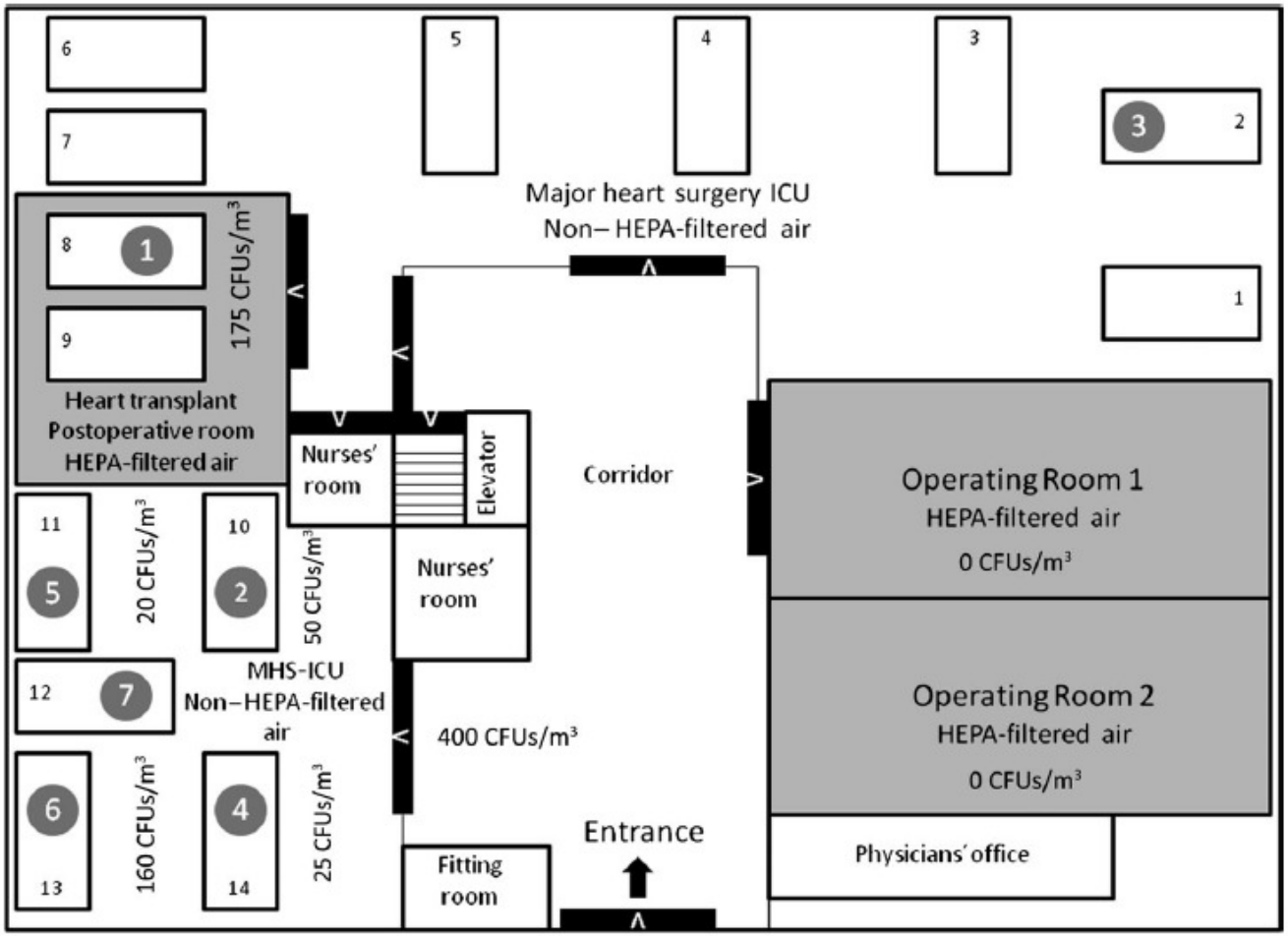

Figure 2. Map of the major heart surgery intensive care unit (MHS-ICU) showing the bed of the seven patients with invasive aspergillosis (*circles*) and *Aspergillus* conidia load. CFU, colony-forming unit; HEPA, high-efficiency particulate air.

Diagnose invasive Aspergillose

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- **Schwierig!!dran denken!!**
- **Aspergillom: durch Immunreaktion abgekapselter Prozess, der KEINE invasive Aspergillose darstellt (z.B. Nasennebenhöhlenaspergillom, Aspergillom der Lunge, cerebrales Aspergillom????)**

- **Pulmonal: antibiotikaresistente Pneumonie**
- **Aspergillussepsis (im Blut kaum nachweisbar)**
- **ungehindertes Wachstum durch Gewebestrukturen**
- **mikrobiolgisiche Kultur in der BAL/Bronchialsekret (Wiederholermaßen oder auch einmalig bei immunsupprimiertem Patienten)**
- **ß-D-Glucan oder Gallaktomanan aus dem Blut oder Bronchialsekret/BAL**
- **Radiologische Befunde (Herde mit Halo, interstitielle Bilder)**
- **Biopsie/OP Materialien (Histologie in Pathologie)**

Mattner F, nosokomiale invasive Aspergillose

Purpose der Definitionen
EORTC-Definitionen

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During the past several decades, there has been a steady increase in the frequency of opportunistic invasive fungal infections (IFIs) in immunocompromised patients. However, there is substantial controversy concerning optimal diagnostic criteria for these IFIs. Therefore, members of the European Organization for Research and Treatment of Cancer/Invasive Fungal Infections Cooperative Group and the National Institute of Allergy and Infectious Diseases Mycoses Study Group formed a consensus committee to develop standard definitions for IFIs for clinical research. On the basis of a review of literature and an international consensus, a set of research-oriented definitions for the IFIs most often seen and studied in immunocompromised patients with cancer is proposed. Three levels of probability are proposed: "proven," "probable," and "possible." The definitions are intended for use in the context of clinical and/or epidemiological research, not for clinical decision making.

Definitions of Invasive Fungal Infections • CID 2002:34 (1 January)

Conclusions. These revised definitions of invasive fungal disease are intended to advance clinical and epidemiological research and may serve as a useful model for defining other infections in high-risk patients.

Definitions of Invasive Fungal Disease • CID 2008:46 (15 June)

Table 2. Criteria for probable invasive fungal disease except for endemic mycoses.

- Host factors[a]
  - Recent history of neutropenia (<0.5 × 10^9 neutrophils/L [<500 neutrophils/mm^3] for >10 days) temporally related to the onset of fungal disease
  - Receipt of an allogeneic stem cell transplant
  - Prolonged use of corticosteroids (excluding among patients with allergic bronchopulmonary aspergillosis) at a mean minimum dose of 0.3 mg/kg/day of prednisone equivalent for >3 weeks
  - Treatment with other recognized T cell immunosuppressants, such as cyclosporine, TNF-α blockers, specific monoclonal antibodies (such as alemtuzumab), or nucleoside analogues during the past 90 days
  - Inherited severe immunodeficiency (such as chronic granulomatous disease or severe combined immunodeficiency)
- Clinical criteria[b]
  - Lower respiratory tract fungal disease[c]
    - The presence of 1 of the following 3 signs on CT:
      - Dense, well-circumscribed lesions(s) with or without a halo sign
      - Air-crescent sign
      - Cavity
  - Tracheobronchitis
    - Tracheobronchial ulceration, nodule, pseudomembrane, plaque, or eschar seen on bronchoscopic analysis
  - Sinonasal infection
    - Imaging showing sinusitis plus at least 1 of the following 3 signs:
      - Acute localized pain (including pain radiating to the eye)
      - Nasal ulcer with black eschar
      - Extension from the paranasal sinus across bony barriers, including into the orbit
  - CNS infection
    - 1 of the following 2 signs:
      - Focal lesions on imaging
      - Meningeal enhancement on MRI or CT
  - Disseminated candidiasis[d]
    - At least 1 of the following 2 entities after an episode of candidemia within the previous 2 weeks:
      - Small, target-like abscesses (bull's-eye lesions) in liver or spleen
      - Progressive retinal exudates on ophthalmologic examination

antibodies (such as alemtuzumab), or nucleoside analogues during the past 90 days
- Inherited severe immunodeficiency (such as chronic granulomatous disease or severe combined immunodeficiency)

Clinical criteria[b]
- Lower respiratory tract fungal disease[c]
  - The presence of 1 of the following 3 signs on CT:
    - Dense, well-circumscribed lesions(s) with or without a halo sign
    - Air-crescent sign
    - Cavity
- Tracheobronchitis
  - Tracheobronchial ulceration, nodule, pseudomembrane, plaque, or eschar seen on bronchoscopic analysis
- Sinonasal infection
  - Imaging showing sinusitis plus at least 1 of the following 3 signs:
    - Acute
    - Nasal
    - Exter
- CNS infec
  - 1 of the
    - Focal
    - Meni
- Disseminated candidiasis
  - At least 1 of the following 2 entities after an episode of candidemia within the previous 2 weeks:
    - Small, target-like abscesses (bull's-eye lesions) in liver or spleen
    - Progressive retinal exudates on ophthalmologic examination

Mycological criteria
- Direct test (cytology, direct microscopy, or culture)
  - Mold in sputum, bronchoalveolar lavage fluid, bronchial brush, or sinus aspirate samples, indicated by 1 of the following:
    - Presence of fungal elements indicating a mold
    - Recovery by culture of a mold (e.g., *Aspergillus, Fusarium,* Zygomycetes, or *Scedosporium* species)
- Indirect tests (detection of antigen or cell-wall constituents)[e]
  - Aspergillosis
    - Galactomannan antigen detected in plasma, serum, bronchoalveolar lavage fluid, or CSF
  - Invasive fungal disease other than cryptococcosis and zygomycoses
    - β-D-glucan detected in serum

EORTC Definitionen werden Nicht-hämatologischen Patienten nicht gerecht

Erarbeitung von Definitionen für z.B. Lungentransplantierte

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ISHLT CONSENSUS STATEMENTS

A 2010 working formulation for the standardization of definitions of infections in cardiothoracic transplant recipients

Shahid Husain, MD, MS,[a] Martha L. Mooney, MD, MS, FACP,[b] Lara Danziger-Isakov, MD, MPH,[c] Frauke Mattner, MD, PhD,[d] Nina Singh, MD,[e] Robin Avery, MD, FIDSA,[c] Michael Ison, MD, MS,[f] Atul Humar, MD, MSc,[g] Robert F. Padera, MD, PhD,[h] Leo P. Lawler, MD, FRCR,[i] Andy Fisher, PhD, FRCP,[j] Richard J. Drew, MD,[i] Kate F. Gould, MBBS, MRCP, FRCP,[k] Amparo Sole, MD, PhD,[l] Sean Studer, MD, MSc,[m] Patricia Munoz, MD,[n] Lianne G. Singer, MD, FRCPC,[a] and Margaret Hannan, MD, FRCP, FRCPath,[i] for the ISHLT Infectious Diseases Council Working Group on Definitions

The Journal of Heart and Lung Transplantation, Vol 30, No 4, April 2011

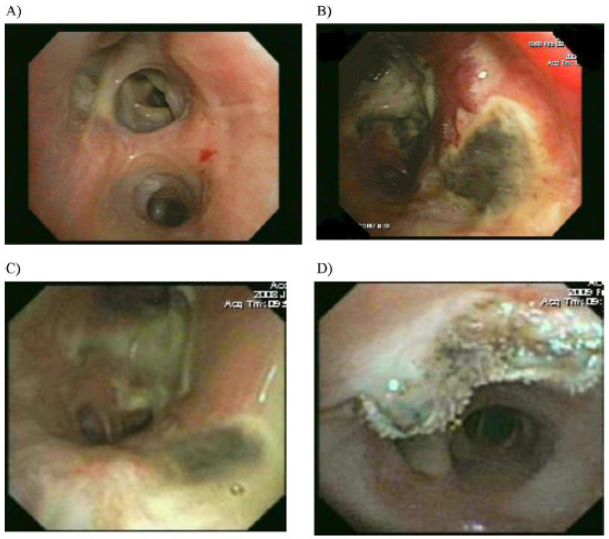

Figure 1 Presentations of tracheobronchitis (TrB) and bronchial anastomatic infection (BAI) in lung transplant recipients. (A) Normal bronchoscopy. (B) Bacterial tracheobronchitis. (C) Fungal tracheobronchitis. (D) Bronchial anastomotic infection.

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Table 4c Fungal Bronchial Anastomotic Infection in Lung Transplant Recipients

Syndrome[a]	Signs/symptoms	Radiology	Laboratory
Bronchial anastomotic infection **Proven:** Histology (biopsy showing histologic evidence of invasion by fungal hyphae or pseudohyphae) or positive culture from the sterile tissue *ALONE; OR* with sign/symptoms + radiology + laboratory **Probable:** Sign/symptoms + radiology + laboratory + negative histology	At least one of the following: • New onset of purulent sputum *OR* change In character *OR* quantity of sputum *OR* respiratory secretions suctioned • New-onset or worsening cough, dyspnea, tachypnea, or bronchial breath sounds *AND* endobronchial lesions restricted to the site of anastomosis without clinical or histologic involvement of other parts of bronchial tree or lung parenchyma (Figure 1b)	Chest radiograph without: • New or progressive and persistent infiltrate • Consolidation • Cavitation • Nodules *OR* CT scan without: • New or progressive and persistent infiltrate • Consolidation • Cavitation • Nodules	Single positive culture for mold in BAL *OR* single positive PCR for mold in BAL *OR* positive galactomannan in the BAL *OR* at least TWO positive sputum cultures/PCRs of fungal organisms (excluding *Candida* species)

[a]In the absence of biopsy categorize as probable: In the presence of histologic findings of both acute rejection and fungal invasion it should be classified as acute rejection with proven fungal infection.

The Journal of Heart and Lung Transplantation, Vol 30, No 4, April 2011

Fast alle IA Fälle immunsupprimiert!!!

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Seven-year surveillance of nosocomial invasive aspergillosis in a French University Hospital

Cécile Garnaud [a,*], Marie-Pierre Brenier-Pinchart [a,b], Anne Thiebaut-Bertrand [c], Rebecca Hamidfar [d], Jean-Louis Quesada [e], Annick Bosseray [f], Bernadette Lebeau [a], Marie-Reine Mallaret [g,b], Danièle Maubon [a,b], Christel Saint-Raymond [h], Claudine Pinel [a,b], Virginie Hincky [i], Dominique Plantaz [b,j], Muriel Cornet [a,b], Hervé Pelloux [a,b]

Table 1 Characteristics of the 70 patients with a proven or a probable invasive aspergillosis.

	Total	IA type		Age	Gender	Origin			First-line treatment			Mortality	
Host factors[a,b]	(*n*)	Proven (*n*)	Probable (*n*)	Median [IQR]	Men/ women (*n*/*n*)	Nosocomial *n* (%)	Community-acquired *n* (%)	Undetermined *n* (%)	Monotherapy *n* (%)	Bitherapy *n* (%)	No treatment *n* (%)	3-month *n*/*n*	1-year *n*/*n*
Neutropenia	40	2	38	55 [46.5–62.2]	28/12	14 (35.0)	11 (27.5)	15 (37.5)	23 (57.5)	11 (27.5)	1 (2.5)	18/37	25/34
Allogeneic HSCT	11	1	10	55 [30–58]	7/4	3 (27.3)	5 (45.4)	3 (27.3)	5 (45.4)	5 (45.4)	0 (0)	7/10	9/10
Use of corticosteroids	32	3	29	59 [54.2–62.2]	25/7	9 (28.1)	15 (46.9)	8 (25)	16 (50)	11 (34.4)	2 (6.2)	17/31	22/29
Immunosuppressants	20	1	19	58 [41.8–61]	13/7	7 (35)	7 (35)	6 (30)	11 (55)	8 (40)	0 (0)	9/19	11/19
Inherited immune disorder	2	1	1	36 [32–40]	1/1	0 (0)	2 (100)	0 (0)	0 (0)	1 (50)	1 (50)	1/2	2/2
All patients	**70**	**5**	**65**	**58 [47.5–63]**	**50/20**	**21 (30)**	**27 (38.6)**	**22 (31.4)**	**39 (55.7)**	**21 (30)**	**4 (5.7)**	**34/66**	**45/62**

IA: Invasive Aspergillosis, HSCT: Haematopoietic Stem Cell Transplant, IQR: interquartile range.
[a] According to Ref.[27]
[b] Patients may have more than one host factors.

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Warum traten keine IA in anderen Klinikumsbereichen auf???

Graf *et al. BMC Infectious Diseases* 2011, **11**:163
http://www.biomedcentral.com/1471-2334/11/163

BMC Infectious Diseases

RESEARCH ARTICLE Open Access

Five-years surveillance of invasive aspergillosis in a university hospital

Karolin Graf[1*], Somayeh Mohammad Khani[1†], Ella Ott[1†], Frauke Mattner[1,2†], Petra Gastmeier[1,3†], Dorith Sohr[3†], Stefan Ziesing[1†] and Iris F Chaberny[1†]

Table 1 Cases found through indicators and IA cases resulting (with each method)

	all cases	cases with one indicator		cases with two indicators			cases with three indicators
		M*	PA*	M, PH*	M, PA*	PH, PA*	M, PH, PA*
no IA	490	231	6	253	-	-	-
proven IA	56	3	6	17	13	2	15
probable IA	25	6	-	17	-	1	1
possible IA	133	45	-	88	-	-	-

* M = Microbiological indicator, PA = Pathological indicator, PH = Pharmacological indicator

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Table 2 Incidence densities of IA

Year	# of cases (proven and probable)	# of patient days	incidence density (per 100,000 patient days)	95% CI	p-value (vs. 2003)
2003	32	391.445	24	5.59; 11.54	-
2004	16	407.007	15	2.25; 6.38	0.008
2005	15	407.644	6	2.06; 6.07	0.427
2006	7	415.980	5	0.68; 3.47	0.044
2007	11	431.954	4	1.27; 4.56	0.804

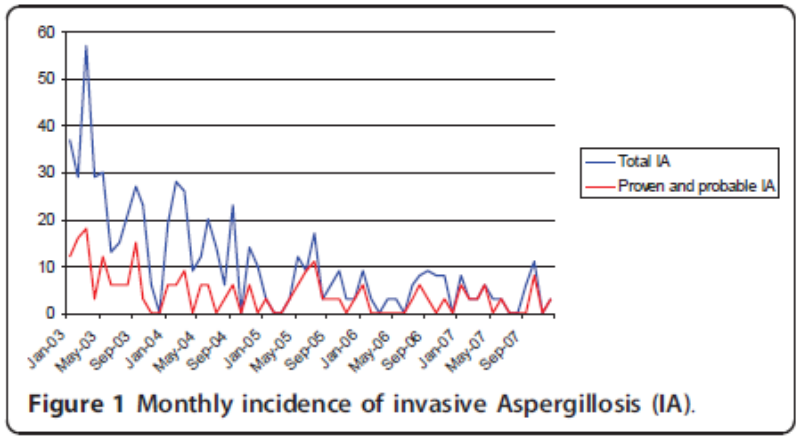

Figure 1 Monthly incidence of invasive Aspergillosis (IA).

Mattner F, nosokomiale invasive Aspergillose

Graf *et al. BMC Infectious Diseases* 2011, **11**:163
http://www.biomedcentral.com/1471-2334/11/163

36 von 81 Patienten (=44%) waren nicht transplantiert und hatten keine immunsuppressive Therapie!!

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Table 3 Underlying diseases for all confirmed cases of invasive aspergillosis

underlying diseases	proven + probable n = 81	possible n = 133	total (%) n = 214
hematological diseases	17 (38%)	55 (41%)	72 (34%)
organ transplantation	39 (49%)	55 (41%)	94 (44%)
single lung transplantation	1	2	3
double lung transplantation	13	23	36
liver transplantation	9	12	21
heart transplantation	4	2	6
heart-lung transplantation	3	3	6
renal transplantation	4	0	4
stem cell transplantation	4	13	17
pancreas transplantation	1	0	1
liver diseases	12	14	26
lung diseases	15	31	4
kidney diseases	4	4	8
heart diseases	4	1	5
heart and lung diseases	3	5	10
pancreas diseases	1	0	1
malignancy (solid tumor)	10 (22%)	6 (5%)	15 (7%)
human immunodeficiency virus	0	0	0
immunosuppressive treatment	73 (85%)	117 (88%)	190 (89%)

Graf *et al. BMC Infectious Diseases* 2011, **11**:163
http://www.biomedcentral.com/1471-2334/11/163

Table 4 Underlying diseases for proven and probable cases of invasive aspergillosis (IA) without transplantation or primary immunosuppression

underlying diseases/therapy	proven + probable IA n = 81	total (all proven and probable cases) (%)
tumor diseases	10	12.3%
colorectal cancer (colectomy, rectal resection)	4	4.9%
gastric cancer (gastrectomy)	2	2.5%
cholangiocarcinoma (tumor resection)	1	1.2%
hepatocellular carcinoma	2	2.5%
renal carcinoma (nephrectomy)	1	1.2%
other diseases	26	32.5%
gastroenterologic diseases	10	12.3%
necrotizing enterocolitis	1	1.2%
necrotizing pancreatitis	2	2.5%
chronical hepatitis B infection	3	3.7%
liver cirrhosis	3	3.7%
citrullinaemia	1	1.2%
prematurity	1	1.2%
heart diseases	4	4.9%
congenital heart disease	1	1.2%
dilatative cardiomyopathy	2	2.5%
endocarditis	1	1.2%
vascular diseases	1	1.2%
type B dissection (stent implantation)	1	1.2%
renal diseases	4	6.2%
renal insufficiency	4	4.9%
other diseases	5	6.2%
multiple trauma	3	3.7%
sinusitis maxillaris	2	2.5%

- Mattner F, nosokomiale invasive Aspergillose

Wer sucht, der findet…

Kliniken Köln
Beste Medizin für alle.

13% aller IA sind lediglich in der Autopsie nachgewiesen worden

- Mattner F, nosokomiale invasive Aspergillose

Präventionsmaßnahmen IA

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- Geschlossene Räume (Fenster, Türen)
- Erhöhte Luftwechselzahl (> 15 pro h)
- Dreistufig gefilterte Luft (0,3 µm)
- Positiver Druck (10 % mehr Zuluft als Abluft)
- Gerichteter Luftstrom

Präventionsmaßnahmen IA

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- Personaltraining
- Surveillance der Fälle

- Zimmer mit Luftfiltration und gerichtetem Luftstrom
- Vermeidung von stauberzeugenden Tätigkeiten
- Besonderer Schutz bei Betreten von Bereichen ohne Luftfiltration (FFP2 Maske bei starker Immunssuppression)

Präventionsmaßnahmen IA

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- **Protective environment**
  - Zimmer mit Unterdruck
  - Versiegelte desinfizierbare Flächen
  - Staubfreiheit (Reinigung/Desinfektion feucht durchzuführen)
  - Keine Pflanzen, keine Blumen
  - Keine Kartonagen, keine Papiertücher
  - Keine rohen Lebensmittel, keine Gewürze
  - Keine unabgeschotteten Baustellen
  - Tragen einer FFP 2 Maske bei Transporten durch das Haus
  - Mitarbeiter tragen Kleidung ohne Schimmelpilzsporen (CAVE Raucher im Sommer-Herbst)
  - Fenster geschlossen! Keine Fenster-Türen in den benachbarten Räumen nach außen öffnen

CDC Guideline isolation precautions, 2007

ZUSAMMENFASSUNG

Kliniken Köln
Beste Medizin für alle.

- Nosokomiale IA kommen recht häufig vor und nur zu ca. 55% bei Immunsupprimierten/Transplantierten
- Bei Immunsupprimierten kommt die IA sehr häufig vor
- Nosokomiale Ausbrüche können auf Fensterlüftungen, unabgeschottete Baustellen, unzureichende RLT-Anlagen oder auch kontaminierte Wasserreservoire zurückführbar sein.
- Spezifische Präventionsmaßnahmen: PROTECTIVE ENVIRONMENT

- „WEIT VORHER“ DARAN DENKEN…..NICHT ERST BEI DER DIAGNOSEFINDUNG EINES PATIENTEN

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Surveillance nosokomialer IA an einem Universitätskrankenhaus in Frankreich

Kliniken Köln
Beste Medizin für alle.

- Prospektive Surveillance von 2003 bis 2009 durchgeführt
- Verwendung von EORTC/MSG Kriterien
- 5 proven und 65 probalbe IA festegestellt
- 74% der Patienten hatten maligne Erkrankungen
- 49 Fälle waren bestanden bereits bei Aufnahme, 21 waren nosokomiale Fälle
- Alle 21 nosokomialen Fälle traten auch in Räumen ohne RLT-Anlage oder ohne Luftdekontamination bzw. in der Nähe von Bauarbeiten.
- Die 3-Monats Überlebensrate war in beiden Gruppen 50%.

J Infect 2012;65(6):559-87 Garnaud C et al.