



Medidas de precaução em imunossuprimidos: o que realmente é necessário?



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Epidemiologia

- ↑ população de imunocomprometidos:
 - ▣ Avanços no tratamento do câncer
 - ▣ Progressos em Tx de órgãos
 - ▣ ↑ sobrevida de pacientes com doenças crônicas
 - ▣ ↑ Envelhecimento populacional

Doenças infecciosas :

- Principal causa de morbidade e mortalidade
- Difícil diagnóstico e tratamento
- Desafios na prevenção



Imunossuprimidos - População heterogênea

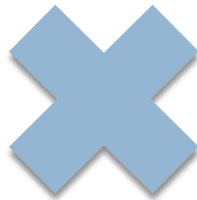
- Disfunções imunes hereditárias:
 - Imunodeficiências primárias
- Imunossupressão fisiológica:
 - Neonatos, gestantes, idosos
- Disfunções induzidas por agressões externas:
 - Pós-operatório, politrauma, queimado
 - Esplenectomia
 - **Drogas imunossupressoras**
 - **Quimioterapia Tu sólidos**
 - **TCTH, Tx órgãos sólidos**
- **Dç linfoproliferativas**
 - **Aplasia, leucemias , linfomas**
- SIDA

Infecção & Imunossuprimidos

□ Dificuldades de Classificação

IRAS

(Inf Relac Assist Saúde)



Doença Oportunista?

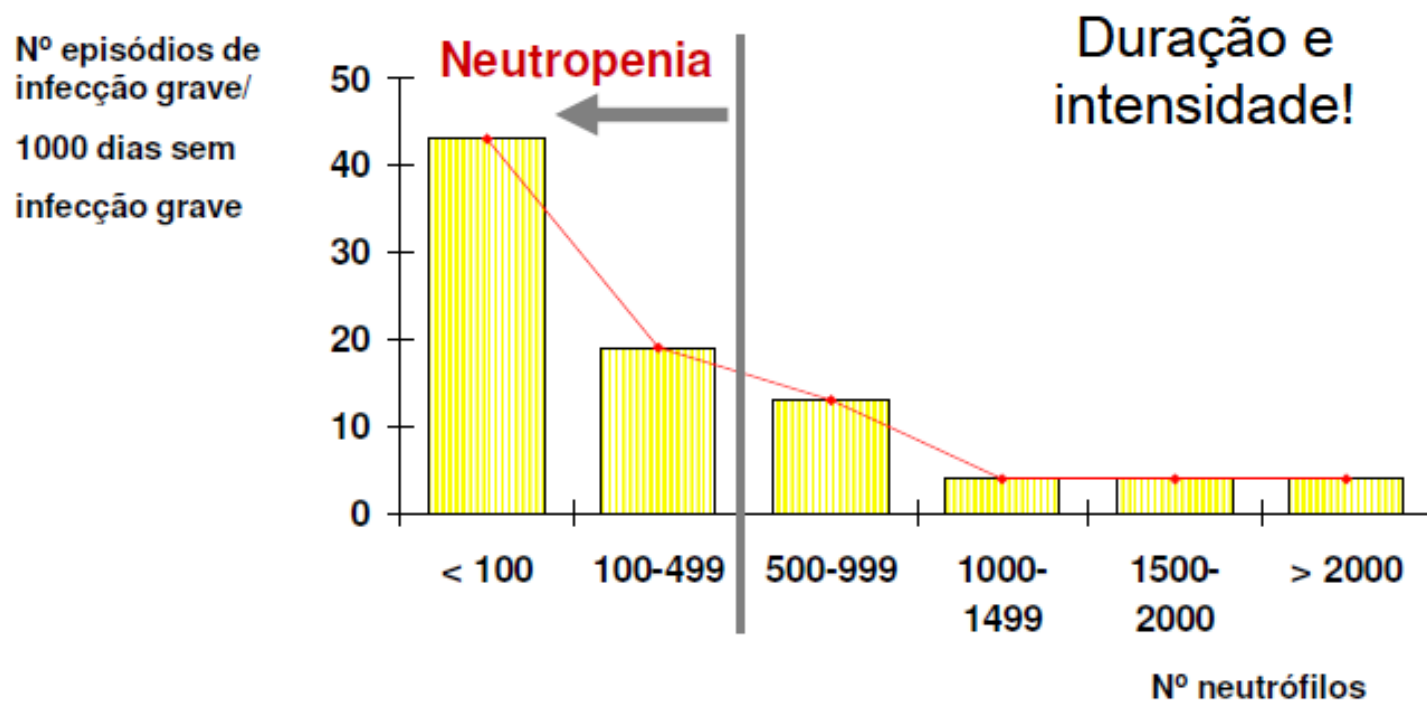
Reativação de Infecção latente?

Translocação bacteriana e fúngica

(Microbiota endógena)

Infecção fonte ambiental

Neutropenia & risco de infecção



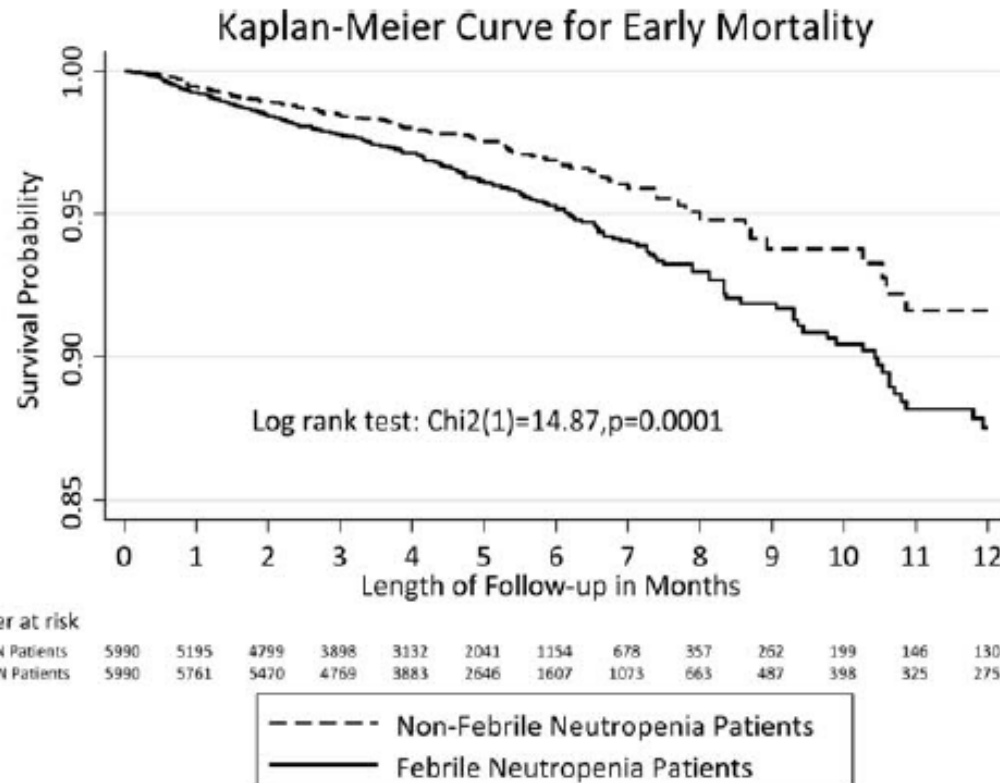
Neutropenia: Principal fator de risco p/Infecção:

- Neutropenia < 100 cels/mm³
- Duração > 7 dias

Bodey et al. Ann Intern Med 1966;64:328-40

Risk of Mortality in Patients With Cancer Who Experience Febrile Neutropenia

Gary H. Lyman, MD,



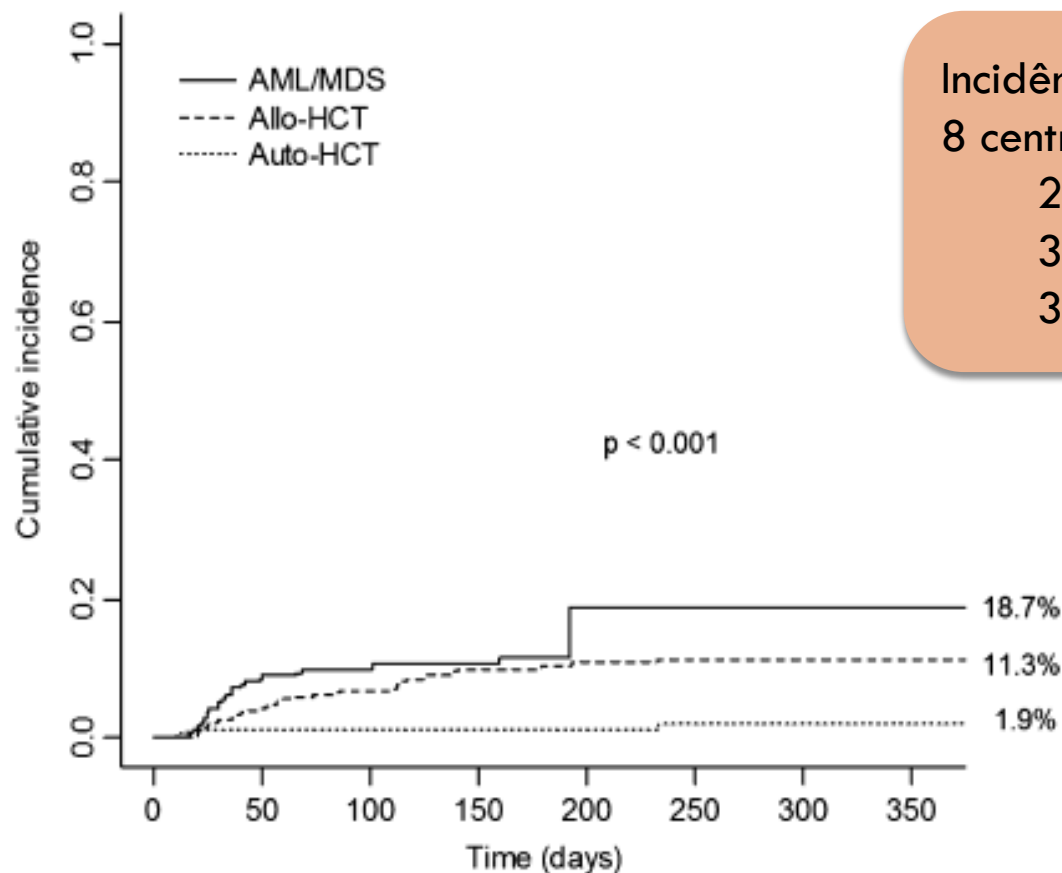
- 5.990 pac cada grupo
- Risco de morte:
15% maior nos paciente com neutropenia febril
- Mortalidade global:
5% Tu sólidos
11% Dç hematológicos

Invasive fungal diseases in haematopoietic cell transplant recipients and in patients with acute myeloid leukaemia or myelodysplasia in Brazil

M. Nucci¹, M. Garnica¹, A. B. Gloria², D. S. Lehueur³, V. C. H. Dias⁴, L. C. Palma⁵, P. Cappellano⁶, K. Y. Fertrin⁷, F. Carlesse⁸, B. Simões⁵, M. D. Bergamasco⁶, C. A. Cunha⁴, A. Seber⁸, M. P. D. Ribeiro¹, F. Queiroz-Telles⁴, M. L. M. Lee⁸, M. L. Chauffaille⁶, L. Silla³, C. A. de Souza⁷ and A. L. Colombo⁶

Clin Microbiol Infect 2013; **19**: 745–751

Incidência de Inf Fúngica Invasiva



Incidência cumulativa de IFI
8 centros Brasil- 2007-2009
237 pac LMA/Mielodisplasia
378 pac TMO alogênico
322 pac TMO autólogo

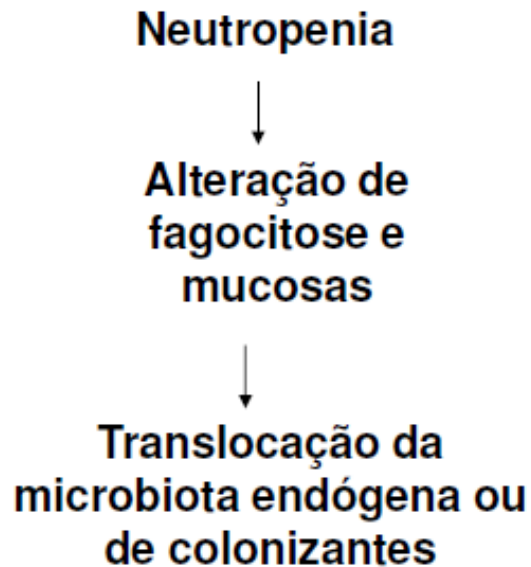
LMA / Mielodisplasia

TMO alogênico

TMO- autólogo

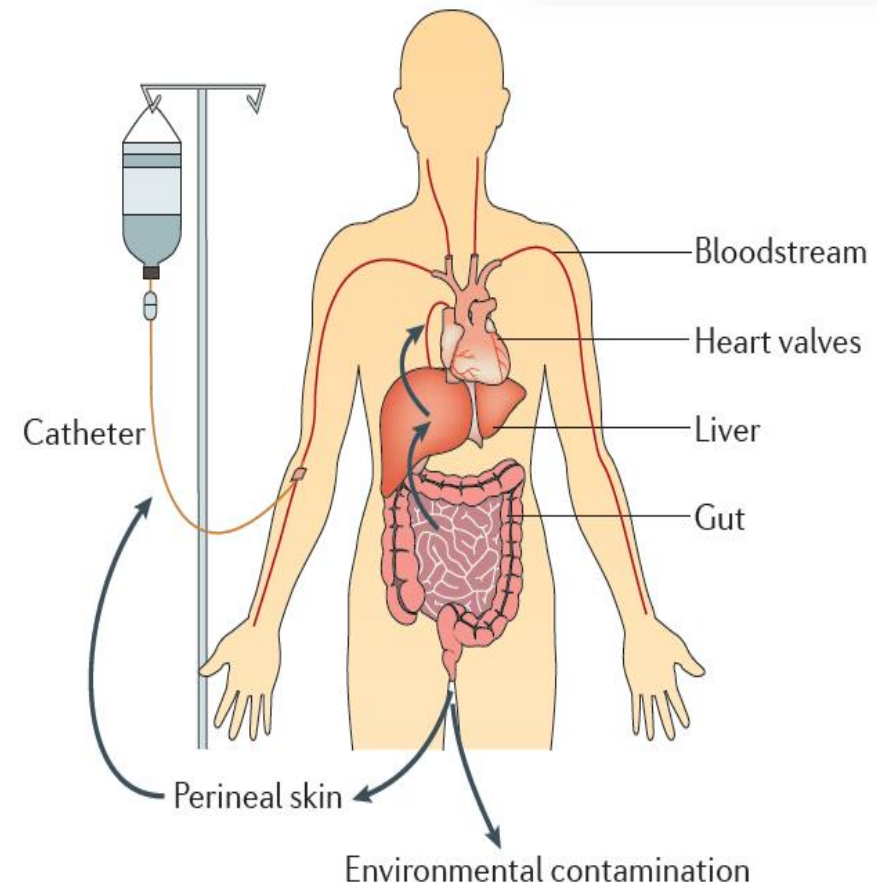
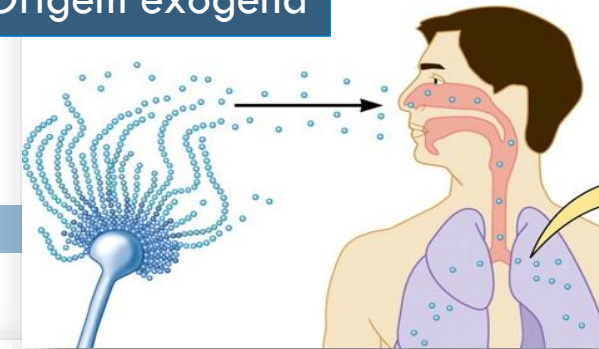
Patogenia das Infecções

**>80% das infecções:
Origem flora endógena**



Origem endógena

Origem exógena



Prevenção Infecção em Imunossuprimidos

- Medidas ambientais
- Correção da neutropenia
- Uso de ATB profilático/pre-emptivo
 - Supressão da flora endógena
- Precauções e Uso EPIs:
 - Higiene das Mãos
 - Precauções isolamento
- Dietas ↓ carga microbiana

Nesher et al. Infection 2014;42:5-13

Tomblyn M et al. Biol Blood Marrow Transplant.. 2009;15:1143-1238

Freifeld AG et al. Clin Inf Dis 2010;52(4): 56-93

Ambiente- Qual a importância ?

Do Ar

Fonte mais conhecida
Uso de Filtros HEPA
Fluxo laminar
Pressão positiva

Da Água

Estudos com relação genotípica:
Isolados *Aspergillus* e *Fusarium* em
pacientes e sistema água
Uso de filtros (?)

Dos Alimentos

↓ concentração bacteriana
Dados controversos
Meta-análise inconclusiva
Sem benefício em ↓ Infecção

Medidas de Intervenção- Ambiente

□ Filtro HEPA:

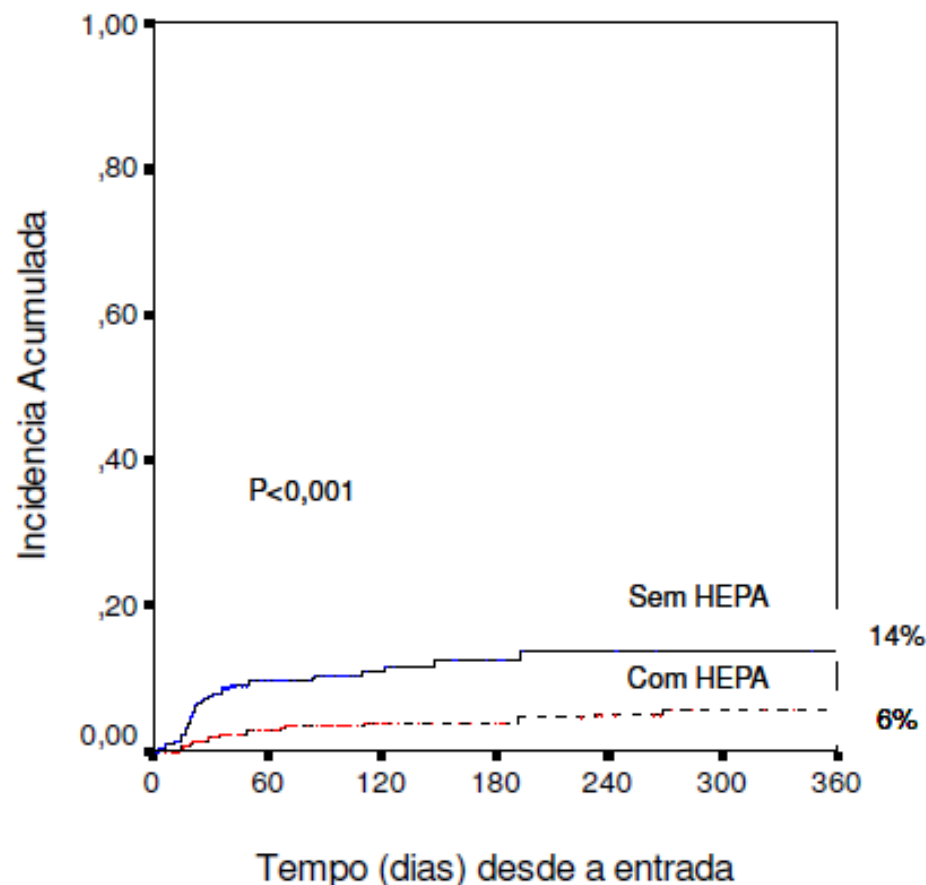
- Remove 99,9% partículas suspensas $\geq 0,3\mu\text{m}$
- Prevenção de fungos filamentosos
 - Fundamentais : próximos a construções
- Custo e necessidade de manutenção e troca

□ Pressão positiva

- Fluxo laminar, portas com fechamento automático
- Selagem de portas, janelas, ductos de ventilação
- Coleta de amostras de ar
- Coleta amostras de água



Incidência acumulada de aspergilose aguda em centros com e sem filtro HEPA



Ambiente Protetor- Isolamento Reverso

- Primeiros estudos- 1970-80

Pacientes alto- risco (indução LMA e TCTH):

- Quarto privativo, Filtro HEPA
- Uso de Avental, luvas, máscara
- Uso de ATB oral não-absorvível
- Difícil interpretação dos resultados
 - Estudos com combinações diversas de medidas
 - N pequeno
 - Populações heterogêneas
 - Esquemas diferentes de QT

7. Nauseef WM, Maki DG. A study of the value of simple protective isolation in patients with granulocytopenia. N Engl J Med 1981;304:448-453.

13. Passweg JR, Rowlings PA, Atkinson KA, et al. Influence of protective isolation on outcome of allogeneic bone marrow transplantation for leukemia. Bone Marrow Transplant 1998;21:1231-1238.

3. Schimpff SC, Greene WH, Young VM, et al. Infection prevention in acute nonlymphocytic leukemia: laminar air flow room reverse isolation with oral, nonabsorbable antibiotic prophylaxis. Ann Intern Med 1975;82:351-358.

2. Yates JW, Holland JF. A controlled study of isolation and endogenous microbial suppression in acute myelocytic leukemia patients. Cancer 1973;32:1490-1498.

Ambiente Protetor- Isolamento Reverso

- Primeiros estudos- 1970-80

Pacientes alto- risco (indução LMA e TCTH):

- Maioria dos pacientes com isolamento reverso + Uso de ATB
- Difícil avaliar impacto da medida isolada
- Maioria estudos:
 - ↓ TAXA DE INFECÇÃO, sem ↓ mortalidade

7. Nauseef WM, Maki DG. A study of the value of simple protective isolation in patients with granulocytopenia. N Engl J Med 1981;304:448-453.

13. Passweg JR, Rowlings PA, Atkinson KA, et al. Influence of protective isolation on outcome of allogeneic bone marrow transplantation for leukemia. Bone Marrow Transplant 1998;21:1231-1238.

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2. Yates JW, Holland JF. A controlled study of isolation and endogenous microbial suppression in acute myelocytic leukemia patients. Cancer 1973;32:1490-1498.

The Boy in the Bubble

David Phillip Vetter

- ❑ EUA- Texas (Set 1971-Fev 1984)
- ❑ Sd Imunodeficiência grave combinada
 - ❑ Ambiente estéril
 - ❑ Dist psiquiátricos graves
- ❑ Morreu aos 12 anos:
 - ❑ Linfoma não-Hodgkin (EBV)
 - ❑ Após TCTH alogênico (doadora: irmã)



BAYLOR COLLEGE OF MEDICINE ARCHIVES



Quartos privados, selados, ambiente “estéril”



Horizontal laminar airflow



Vertical laminar airflow

Ambiente Protetor- Isolamento Reverso

Pacientes baixo- risco (Linfoma, Tu sólidos):

Poucos estudos, n pequeno

- Grupo isolamento reverso + uso de ATB & precaução padrão
- Alguns trabalhos:
 - ↓ TAXA DE INFECÇÃO, sem ↓ mortalidade
- Maioria trabalhos:
 - Sem ↓ TAXA DE INFECÇÃO
- Difícil avaliar impacto medidas de isolamento
 - Maioria com uso de ATB combinado

15. Bodey GP, Rodriguez V, Murphy WK, Burgess A, Benjamin RS. Protected environment—prophylactic antibiotic program for malignant sarcomas: randomized trial during remission induction chemotherapy. *Cancer* 1981;47:2422–2429.

14. Bodey GP, Rodriguez V, Cabanillas F, Freireich EJ. Protected environment-prophylactic antibiotic program for malignant lymphoma: randomized trial during chemotherapy to induce remission. *Am J Med* 1979;66:74–81.

16. Hortobagyi GN, Buzdar AU, Bodey GP, et al. High-dose induction chemotherapy of metastatic breast cancer in protected environment: a prospective randomized study. *J Clin Oncol* 1987;5:178–184.

Reverse isolation for neutropenic patients

Srividyalakshmi Seshadri, MD,¹

Summary of evidence for benefit of reverse isolation

Patient group	HEPA filtration or laminar air flow		Reverse isolation in a standard room	
	Reduced infections	Improved survival	Reduced infections	Improved survival
Allogeneic marrow or stem cell graft	Yes	Yes	No	No
Standard treatment of acute leukemia or aplastic anemia	Yes	No	No	No
Chemotherapy of solid tumors or lymphoma	No*	No	No	No

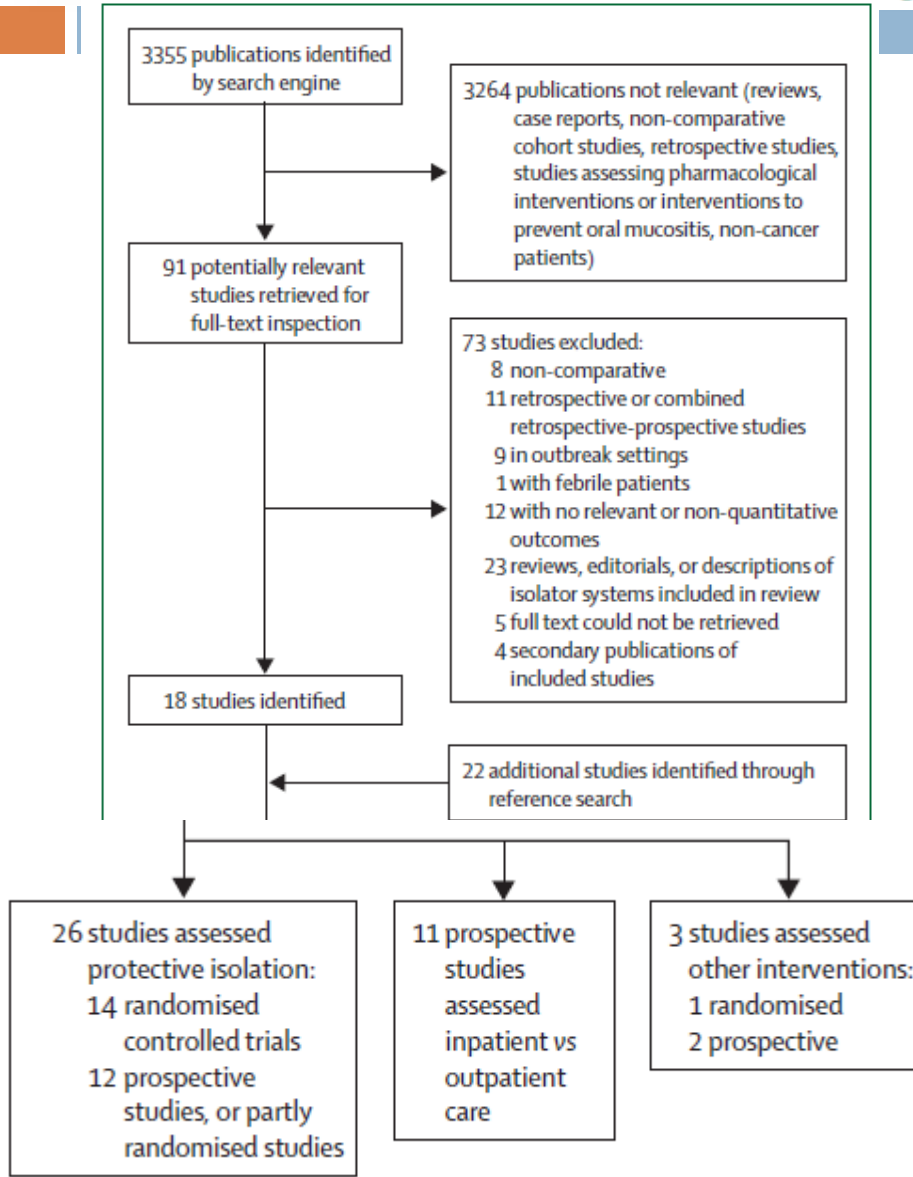
*Unless kept hospitalized for an entire 3 cycles of treatment

HEPA = high-efficiency particulate air

Infection-control interventions for cancer patients after chemotherapy: a systematic review and meta-analysis

Lancet Infect Dis 2009;
9: 97-107

Aqata Schlesinger, Mical Paul, Anat Gafer-Gvili, Bina Rubinovitch, Leonard Leibovici



Revisão sistemática e meta- análise
40 estudos (1971 - 2008)

Todos pac. alto risco

Nenhum com Tu sólidos

Isolamento protetor:

- **Controle ar +**
- **Precauções barreira +**
- **Supressão de flora endógena (ATB)**

Estudos mais antigos

- Isolamento e Descontaminação c/ ATB
- Tenda plástica com filtração ar

6 estudos : precauções barreira isoladas

Redução mortalidade geral

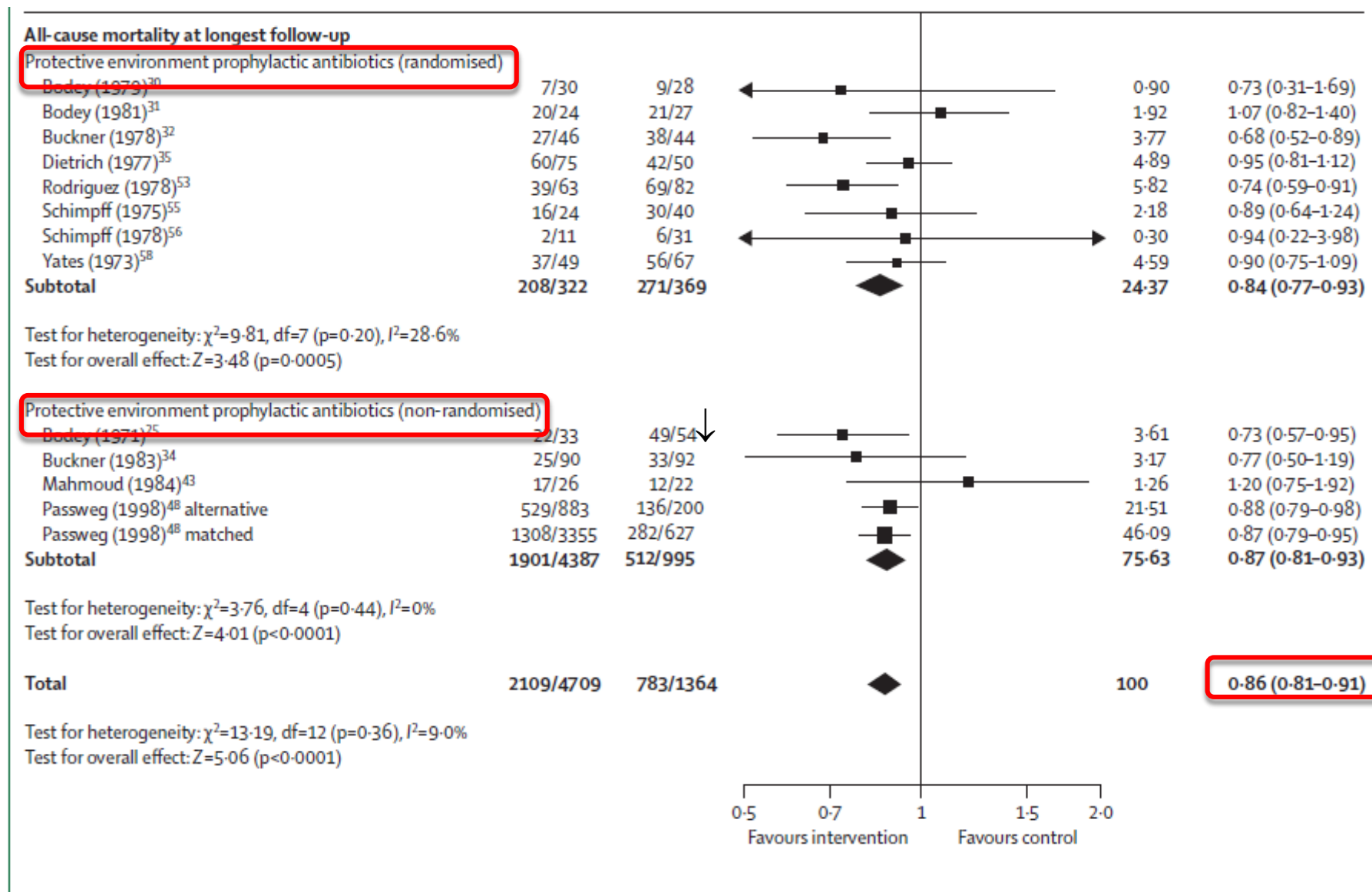
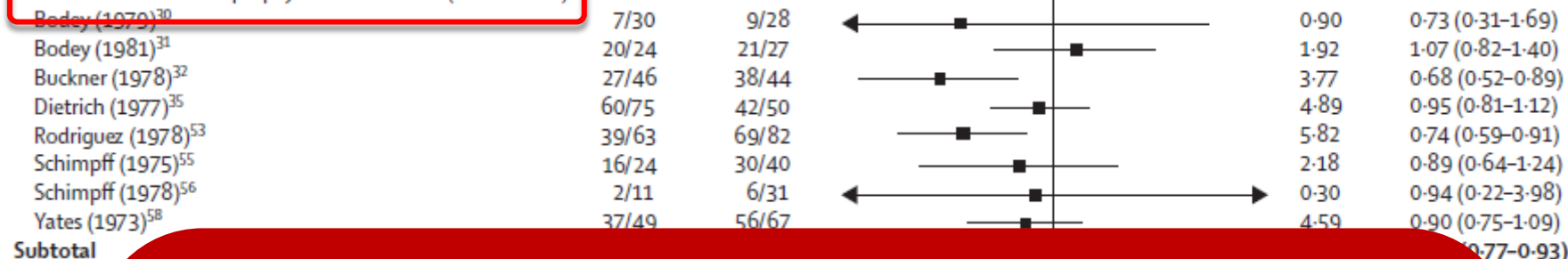


Figure 2: All-cause mortality at 30 days and at longest follow-up in studies assessing protective isolation

All-cause mortality at longest follow-up

Protective environment prophylactic antibiotics (randomised)



↓ Mortalidade (follow-up: 30 dias e 100 d- 3 anos)

Controle do ar (HEPA) e Precauções barreira isolados:

- Não ↓ taxa infecção
- Não ↓ mortalidade

Inclusão dos ATB e antifúngicos profiláticos :

Necessários p/ ↓ mortalidade

Medida mais impactante !!!

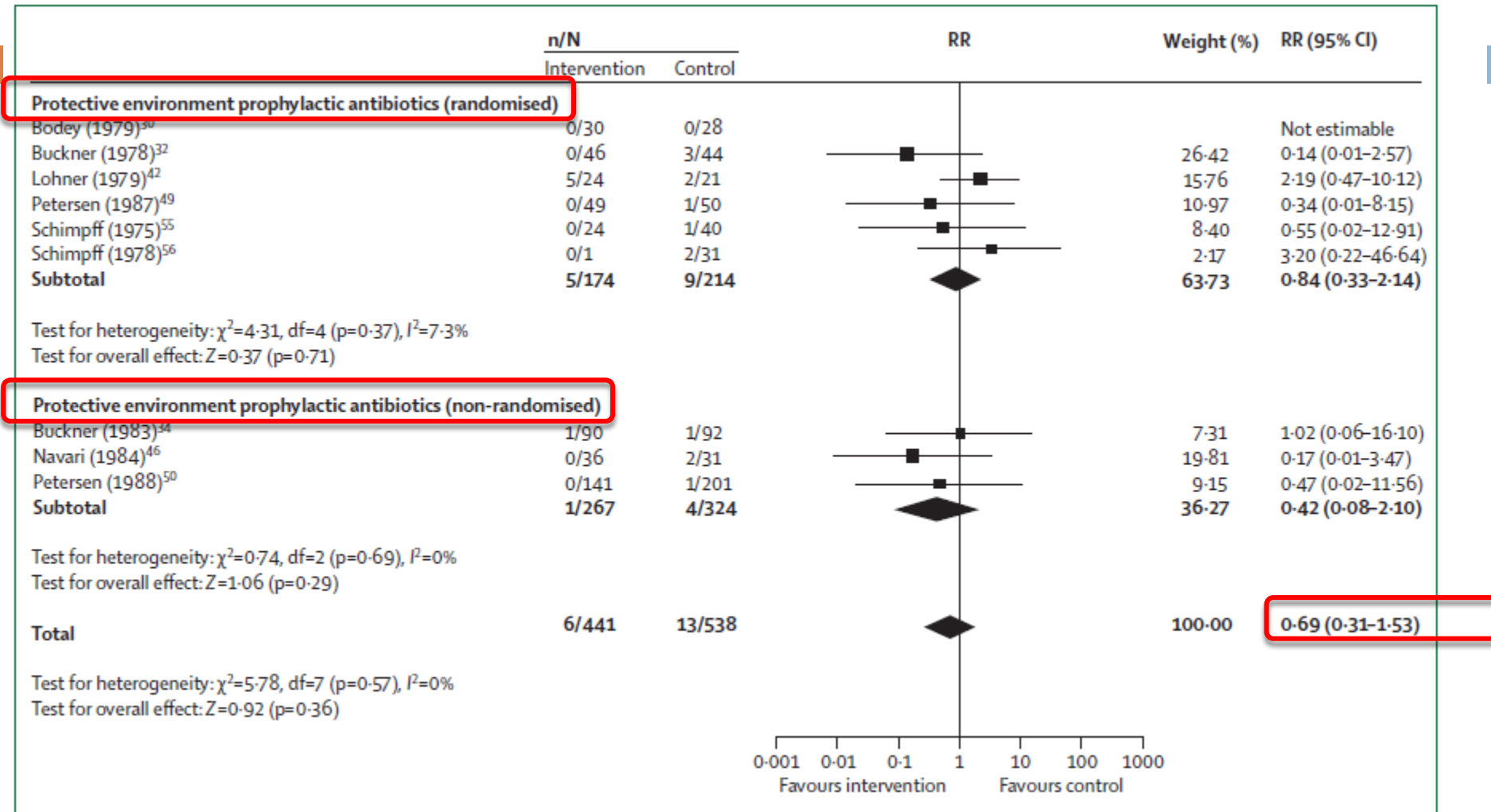
Favours intervention

Favours control

Figure 2: All-cause mortality at 30 days and at longest follow-up in studies assessing protective isolation

Incidência inf. fungos filamentosos

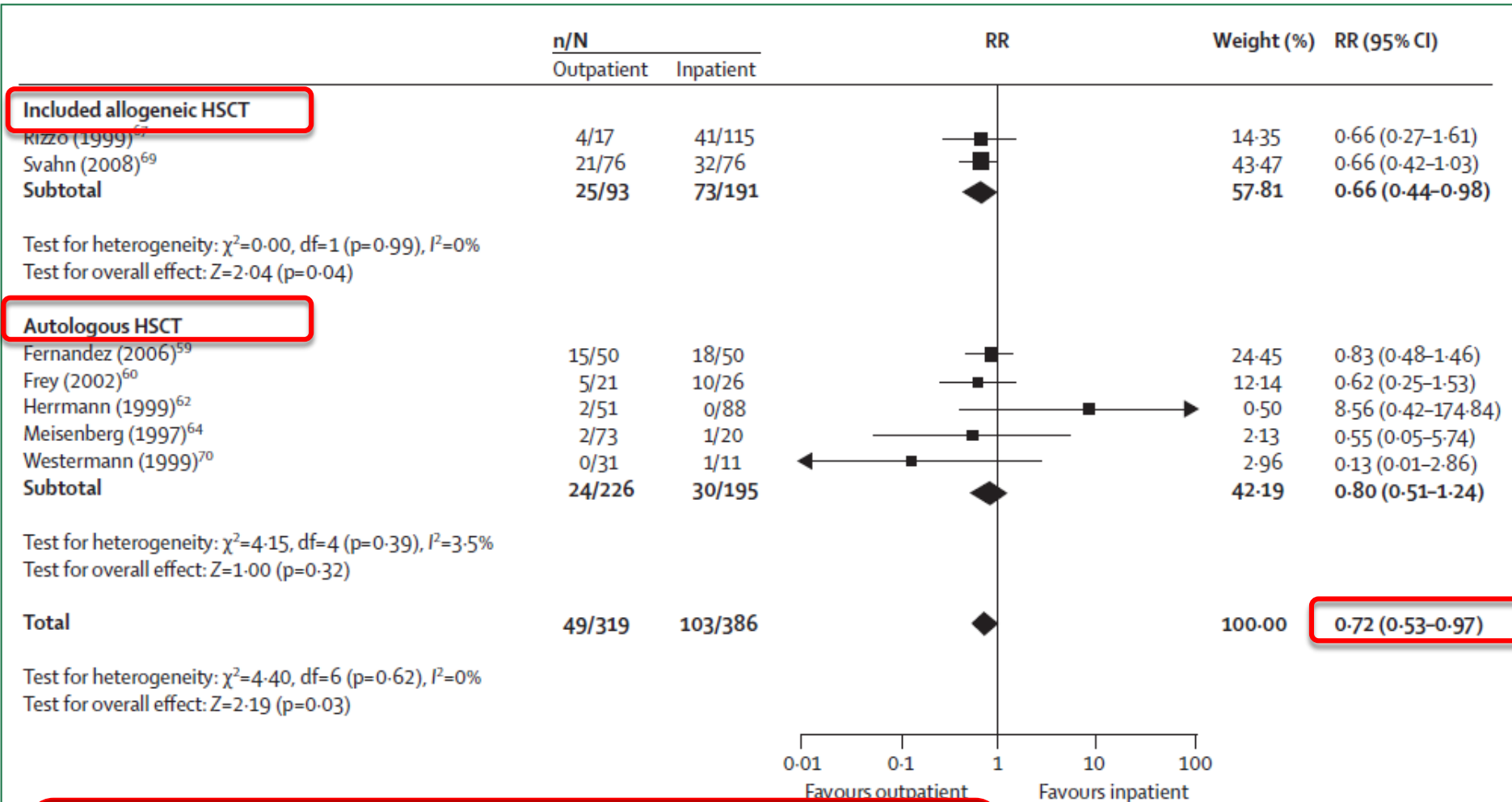
Figure 3: Infections caused by moulds in studies assessing protective isolation, all with air quality control (including air filtration)



Não houve ↓ infecções por fungos filamentosos

Mortalidade tto ambulatorial & internado

Figure 4: Outpatient versus inpatient management after haematopoietic stem-cell transplantation (HSCT) in non-randomised studies: all-cause mortality at longest follow-up



↓ Mortalidade geral pac tto ambulatorial
 Maioria dos estudos : TCTH autólogo baixo risco
 Uso ATB profilaxia ambulatorial

Guidelines for Preventing Opportunistic Infections Among Hematopoietic Stem Cell Transplant Recipients

October 20, 2000 / Vol. 49 / No. RR-10



HOSPITAL INFECTION CONTROL

- Ventilação Quarto
 - ▣ Filtro HEPA, > 12 trocas ar/hora
 - **TCTH alogênico (All)**
 - **TCTH autólogo: Avaliar se neutropenia prolongada (CIII)**
 - ▣ Fluxo laminar: opcional (CII)
 - Benefício em ↑ sobrevida: não comprovado
 - ▣ Pressão positiva (BIII)
 - ▣ Selagem quartos, janelas, ductos de ventilação (BIII)
- Reformas e construções
 - ▣ Evitar (AIII)
 - ▣ Medidas de controle de fungos filamentosos (AIII)
 - ▣ Uso de N95 pelos paciente durante transporte (CIII)


Guidelines for Preventing Opportunistic Infections Among Hematopoietic Stem Cell Transplant Recipients



HOSPITAL INFECTION CONTROL

- Limpeza do ambiente, equipamentos, brinquedos (BIII)
- **Higiene das mãos (AI)**
- Evitar plantas e flores secas ou frescas (BIII)

Isolation and Barrier Precautions

- Quarto individual (BIII)
- **Precauções padrão (AIII)** 
- Profissionais de saúde
 - Afastamento trabalho se inf. Transmissíveis (AI)
 - Vacinação (BIII)

2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Jane D. Siegel, MD; Emily Rhinehart, RN MPH CIC; Marguerite Jackson, PhD;
Linda Chiarello, RN MS; the Healthcare Infection Control Practices Advisory
Committee

I.E.1. Immunocompromised patients

- Internamento no mesmo ambiente com outros pacientes
 - ▣ Evitar exposição dçs infecciosas (influenza, inf. Respiratórias)
 - ▣ Cuidados individuais pacientes alto risco (neutropenia prolongada)

- TCTH alogênicos: Ambiente Protegido
 - ▣ Prevenção de inf. fúngica invasiva

Protective Environment

Protective Environment

I. Patients: allogeneic hematopoietic stem cell transplant (HSCT) only

- Maintain in PE room except for required diagnostic or therapeutic procedures that cannot be performed in the room, e.g. radiology, operating room
- Respiratory protection e.g., N95 respirator, for the patient when leaving PE during periods of construction

II. Standard and Expanded Precautions

- Hand hygiene observed before and after patient contact
- Gown, gloves, mask NOT required for HCWs or visitors for the room
- Use of gown, gloves, mask by HCWs and visitors according to Standard Precautions and as indicated for suspected or proven infection. Transmission-Based Precautions are recommended

IV. Surfaces

- Daily wet-dusting of horizontal surfaces with EPA-registered hospital disinfectant
- Avoid dusting methods that create aerosols
- No carpeting in patient rooms
- No upholstered furniture and furnishings

V. Other

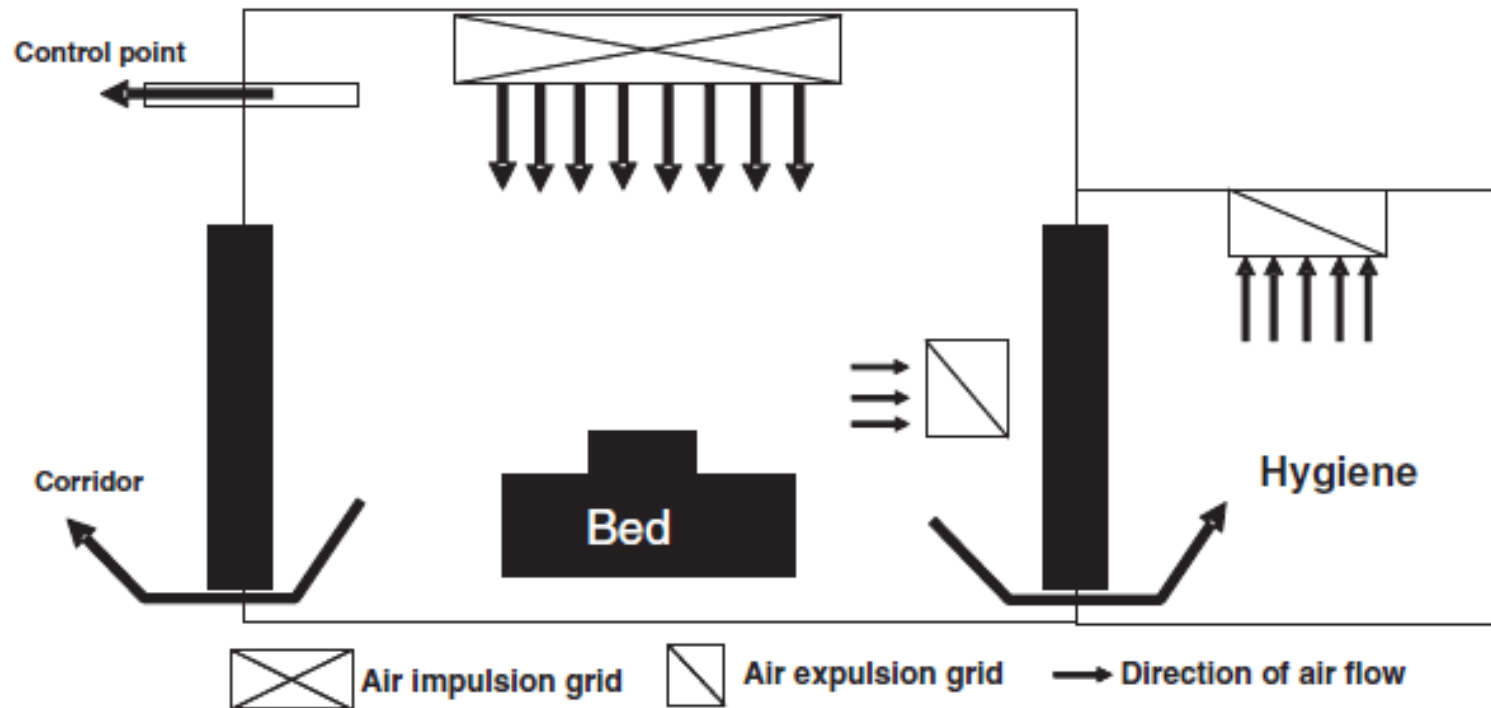
- No flowers (fresh or dried) or potted plants in PE rooms or areas
- Use vacuum cleaner equipped with HEPA filters when vacuum cleaning is necessary

III. Engineering

- Central or point-of-use HEPA (99.97% efficiency) filters capable of removing particles 0.3 μm in diameter for supply (incoming) air
- Well-sealed rooms
 - Proper construction of windows, doors, and intake and exhaust ports
 - Ceilings: smooth, finished, no gaps, joints, crevices
 - Walls: smooth, finished, no gaps, joints, crevices
 - Floors: smooth, finished, no gaps, joints, crevices
- Air flow patterns: supply and exhaust grills located so that clean, filtered air flows from one side of the room, flows across the patient's bed, exits on opposite side of the room
- Positive room air pressure in relation to the corridor
 - Pressure differential of >2.5 Pa [0.01" water gauge]
- Monitor and document results of air flow patterns daily using visual methods (e.g., flutter strips, smoke tubes) or a hand held pressure gauge
- Self-closing door on all room exits
- Maintain back-up ventilation equipment (e.g., portable units for fans or filters) for emergency provision of ventilation requirements for PE areas and take immediate steps to restore the fixed ventilation system
- For patients who require both a PE and Airborne Infection Isolation, use an anteroom to ensure proper air balance relationships and provide independent exhaust of contaminated air to the outside or place a HEPA filter in the exhaust duct. If an anteroom is not available, place patient in an AIIR and use portable ventilation units, industrial-grade HEPA filters to enhance filtration of spores.

Fluxo laminar : Não recomendado

Protective Environment



Guidelines for Preventing Infectious Complications among Hematopoietic Cell Transplantation Recipients: A Global Perspective

*Marcie Tomblyn, Tom Chiller, Hermann Einsele, Ronald Gress, Kent Sepkowitz, Jan Storek,
John R. Wingard, Jo-Anne H. Young, Michael A. Boeckh*

Biol Blood Marrow Transplant 15: 1143-1238 (2009) © 2009 American Society for Blood and Marrow Transplantation

Biol Blood Marrow Transplant 15: 1143-1238, 2009

Hand Hygiene

"Hand hygiene is the mainstay of infection prevention in the hospital, and is an essential element of Standard Precautions for all patients (AII)"

...

Room Ventilation

"Central or point-of-use HEPA filters with 99.97% efficiency for removing particles ≥ 0.3 μ m in diameter (AIII)".

"Directed airflow so that air intake occurs at 1 side of the room and air exhaust occurs at the opposite side (BIII)".

"Self-closing doors to maintain constant pressure differentials (BIII)"

Isolation and Barrier precautions

"HCT recipients should be placed in single-patient rooms (BIII), if possible".

"The efficacy of protective isolation measures for autologous HCT recipients is not well established (BIII)".

"HCT recipients may benefit from wearing masks or N95 respirators ...outside...rooms, especially during periods of hospital construction and renovation (CIII)"

...

Plants and flowers

"Most experts recommend that plants ... should not be allowed in hospital rooms ... because *Aspergillus* species ... have been isolated from the soil (CIII)"

Ambiente protetor: TCTH alogênico (BIII)

Ante-sala : Opcional

Se não for possível:

Priorizar pac alto risco (neutropenia prolongada, tto GVHD)

Uso de filtro HEPA portátil- ambiente não protetor (BIII)

Hand Hygiene

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...

Plants and flowers

"Most experts recommend that plants ... should not be allowed in hospital rooms ... because *Aspergillus* species ... have been isolated from the soil ... (DIII)"

Monitorização casos aspergilose e outras IFI (BIII)

Coleta amostra de ar para esporos de fungos:

Não recomendado de rotina (DIII)

Se surtos (CIII)

Hand Hygiene

"Hand hygiene is the mainstay of infection prevention in the hospital, and is an essential element of Standard Precautions for all patients (AII)"

...

Room Ventilation

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...

Plants and flowers

"Most experts recommend that plants ... should not be allowed in hospital rooms ... because *Aspergillus* species ..."

Usar água estéril :

Reservatórios de nebulizadores, enxague equipamentos (BIII)

Evitar umidificadores de ar geram aerossóis (DI)

Cultura para *Legionella* spp de amostra de água potável de rotina (CIII)

Metodologia ideal: não definida

Custo-benefício : Não comprovado!

XII. What Environmental Precautions Should be Taken When Managing Febrile Neutropenic Patients?

Recommendations

48. Hand hygiene is the most effective means of preventing transmission of infection in the hospital (A-II).

49. Standard barrier precautions should be followed for all patients, and infection-specific isolation should be used for patients with certain signs or symptoms (A-III).

50. HSCT recipients should be placed in private (ie, single-patient) rooms (B-III). Allogeneic HSCT recipients should be placed in rooms with >12 air exchanges/h and high-efficiency particulate air (HEPA) filtration (A-III).

51. Plants and dried or fresh flowers should not be allowed in the rooms of hospitalized neutropenic patients (B-III).

52. Hospital work exclusion policies should be designed to encourage health care workers (HCWs) to report their illnesses or exposures (A-II).

Guidelines for the prevention of invasive mould diseases caused by filamentous fungi by the Spanish Society of Infectious Diseases and Clinical Microbiology (SEIMC)

I. Ruiz-Camps¹, J. M. Aguado², B. Almirante¹, E. Bouza³, C. F. Ferrer-Barbera¹, O. Len¹, L. Lopez-Cerero⁴, J. L. Rodríguez-Tudela⁵, M. Ruiz⁶, A. Solé⁷, C. Vallejo⁸, L. Vazquez⁹, R. Zaragoza¹⁰ and M. Cuenca-Estrella⁵ GEMICOMED
(Medical Mycology Study Group of SEIMC)

- **Quartos individuais, com filtro HEPA, pressão positiva**
 - **Imunossupressão grave, alto risco (TCTH alogênico) (IA)**
- **Culturas de vigilância de rotina ar e água**
 - ▣ Não recomendado (IB)
- **Uso de Precauções padrão**
- **Higiene dos pacientes (fase aplasia)**
 - ▣ Uso de esponjas uso único para higiene leito
 - ▣ Não usar chuveiro ou banheira (IB)
 - ▣ Sem recomendação para uso de filtros torneiras, chuveiros

Effectiveness of a Protective Environment implementation for cancer patients with chemotherapy-induced neutropenia on fever and mortality incidence

Paula Stoll Pharm, MSc

Estudo intervenção : 2007-2008

Hosp Clinicas Porto Alegre

Intervenção:

- Ambiente Protetor:

Quarto individual – TCTH alogênico

Filtro HEPA

Pressão positiva, selagem

Rotinas CCIH

Controle :

Neutropênicos internados em 2006

American Journal of Infection Control 41 (2013) 357-9

Table 1

Characteristics of studied groups

Characteristics	Protective environment (PE) (n = 190)	Control (n = 181)	P value
Male, n (%)	90 (47.4)	85 (47.0)	.94*
Age (yr), mean (SD)	46.3 (15.1)	46.3 (15.0)	.97 [†]
Underlying disease, n (%)			.001 [‡]
Acute myeloid leukemia	69 (36.3)	54 (29.8)	
Chronic myeloid leukemia	9 (4.7)	6 (3.3)	
Acute lymphoid leukemia [§]	14 (7.4)	26 (14.4)	
Chronic lymphoid leukemia	6 (3.2)	4 (2.2)	
Multiple myeloma [§]	49 (25.8)	20 (11.0)	
Hodgkin disease	5 (2.6)	10 (5.5)	
Non-Hodgkin's lymphoma [§]	21 (11.1)	33 (18.2)	
Myelodysplastic syndrome	6 (3.2)	5 (2.8)	
Other hematological malignancies	2 (1.1)	3 (1.7)	
Aplastic anemia	6 (3.2)	6 (3.3)	
Solid tumors [§]	2 (1.1)	11 (6.1)	
Others	1 (0.5)	3 (1.7)	
Risk categories, n (%)			.19*
Autologous HSCT	50 (26.3)	37 (20.4)	
Allogeneic HSCT	19 (10.0)	18 (9.9)	
Acute myeloid leukemia	63 (33.2)	52 (28.7)	
Other diseases	58 (30.5)	74 (40.9)	
Neutropenia causes, n (%)			.14*
Chemotherapy	179 (94.2)	163 (90.1)	
Others [¶]	11 (5.8)	18 (9.9)	
Length of neutropenia (days), median (P ₂₅ -P ₇₅)	12 (8-17)	12 (8-18)	.85 [#]
Severe neutropenia (ANC ≤ 100/mm ³), n (%)	170 (89.5)	168 (92.8)	.26*
Central venous catheter use, n (%)	171 (90.0)	154 (85.1)	.15*
Prophylaxis use, n (%)			
Antibacterial	127 (66.8)	137 (75.7)	.06*
Antiviral	160 (84.2)	136 (75.1)	.03*
Antifungal	93 (48.9)	72 (39.8)	.08*
Corticosteroid use, n (%)	42 (22.1)	49 (27.1)	.27*

Table 1
Characteristics of studied groups

Characteristics	Protective environment (PE) (n = 190)	Control (n = 181)	P value
Male, n (%)	90 (47.4)	85 (47.0)	.94*
Age (yr), mean (SD)	46.3 (15.1)	46.3 (15.0)	.97 [†]
Underlying disease, n (%)			.001 [‡]
Acute myeloid leukemia	69 (36.3)	54 (29.8)	
Chronic myeloid leukemia	9 (4.7)	6 (3.3)	
Acute lymphoid leukemia [§]	14 (7.4)	26 (14.4)	
Chronic lymphoid leukemia	6 (3.2)	4 (2.2)	
Multiple myeloma [§]	49 (25.8)	20 (11.0)	
Hodgkin disease	5 (2.6)	10 (5.5)	
Non-Hodgkin's lymphoma [§]	21 (11.1)	33 (18.2)	
Myelodysplastic syndrome	6 (3.2)	5 (2.8)	
Other hematological malignancies	2 (1.1)	3 (1.7)	
Aplastic anemia	6 (3.2)	6 (3.3)	
Solid tumors [§]	2 (1.1)	11 (6.1)	
Others [¶]	1 (0.5)	2 (1.1)	
Risk categories, n (%)			.19*
Autologous HSCT	50 (26.3)	37 (20.4)	
Allogeneic HSCT	19 (10.0)	18 (9.9)	
Acute myeloid leukemia	63 (33.2)	52 (28.7)	
Other diseases	58 (30.5)	74 (40.9)	
Chemotherapy	179 (94.2)	163 (90.1)	
Others [¶]	11 (5.8)	18 (9.9)	
Length of neutropenia (days), median (P ₂₅ -P ₇₅)	12 (8-17)	12 (8-18)	.85 [#]
Severe neutropenia	170 (89.5)	168 (92.8)	.26*
Prophylaxis use, n (%)			
Antibacterial	127 (66.8)	137 (75.7)	.06*
Antiviral	160 (84.2)	136 (75.1)	.03*
Antifungal	93 (48.9)	72 (39.8)	.08*
Antidysrhythmic	55 (28.9)	72 (39.8)	.06*

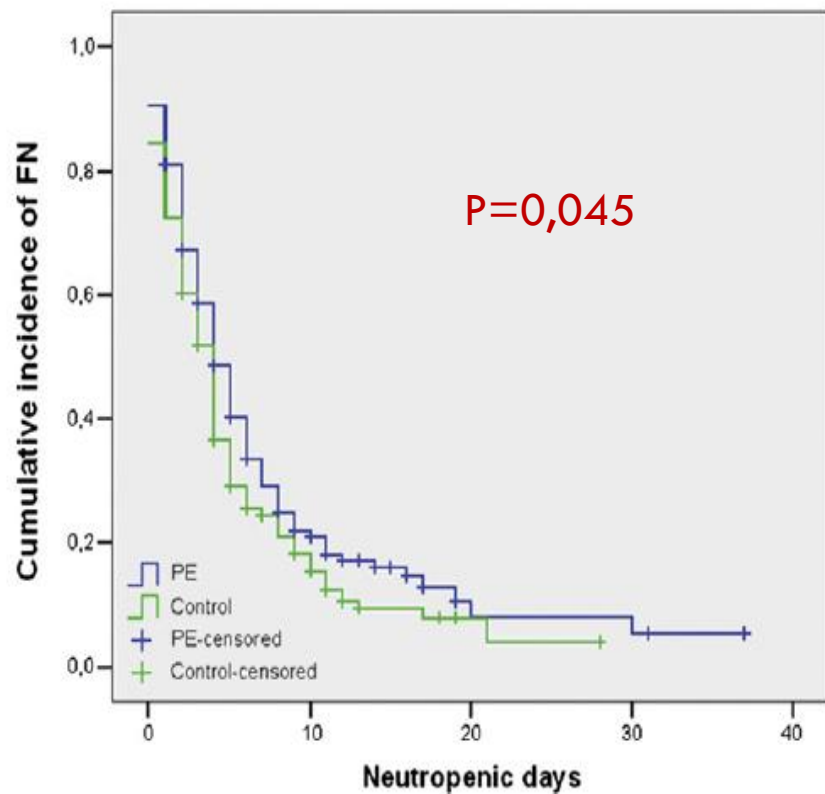


Fig 1. Kaplan-Meier curves for febrile neutropenia (FN) incidence in protective environment (PE) and control groups (log-rank test, $P = .045$).

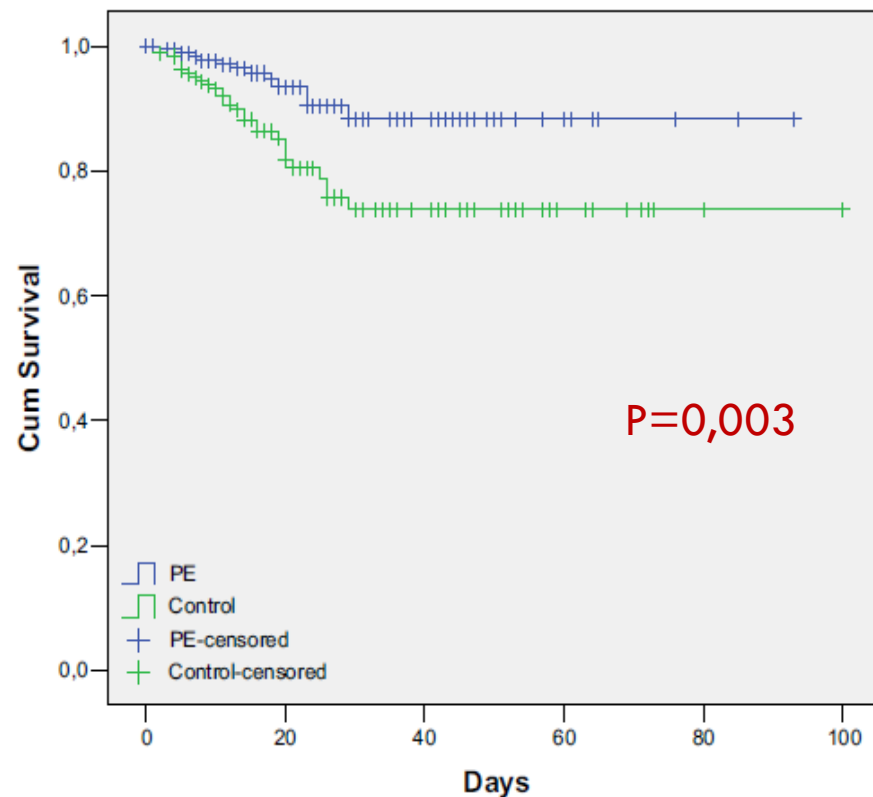


Fig 2. Kaplan-Meier curves for 30-day mortality in protective environment (PE) and control groups (log-rank test, $P = .003$).

Grupo ambiente protetor:

- ↓ Neutropenia febril, ↓ mortalidade 30 dias,
- ↓ infecções fúngicas

Benefício do isolamento protetor – TODOS (independente risco)

Ambiente Protetor- Consequências

Custos Financeiros

- Diretos:
 - EPI, reformas, manutenção, filtros, sist ventilação
- Indiretos: ↑ necessidade de quartos, pessoal

Impacto emocional

- Isolamento social
- 40% distúrbios psiquiátricos (pós TCTH)
- Privação convívio família e amigos

Impact of contact isolation for multidrug-resistant organisms on the occurrence of medical errors and adverse events

J. R. Zahar

Intensive Care Med (2013) 39:2153–2160

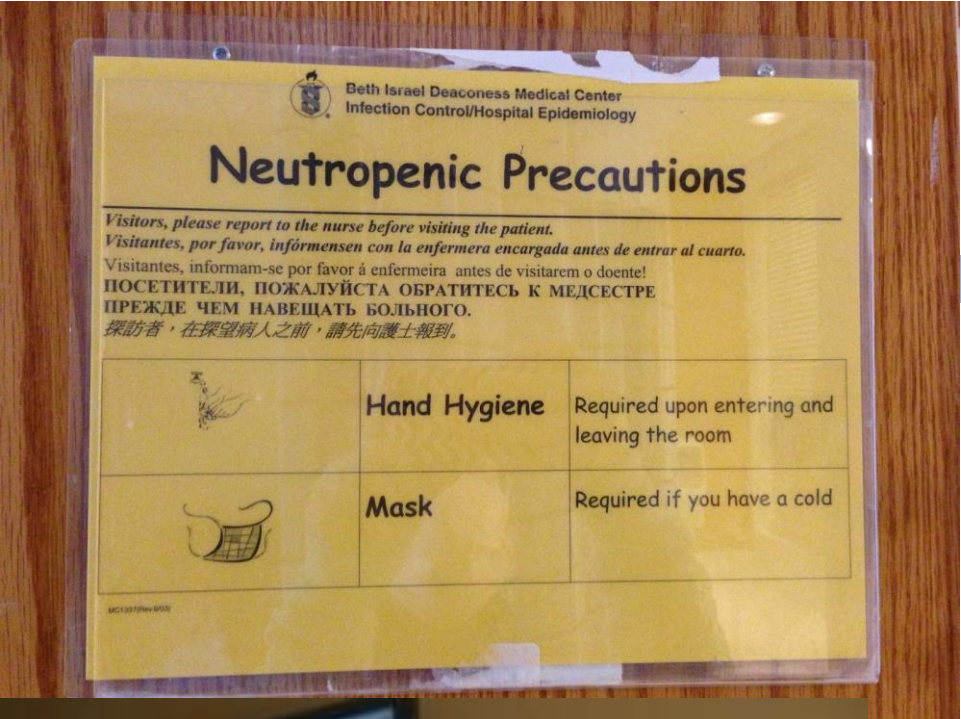
Estudo caso controle- 2 UTIs França- 1.221 pac não-neutropênicos ou Tx
170 isolados Multi R & 980 não isolados

Maior risco de eventos adversos pacientes em isolamento

Table 4 Risk of adverse events and medical errors according to isolation status

	Non-isolated patients 980 (100)	Isolated patients 170 (100)	Unadjusted sHR (95 % CI)	<i>p</i>	Adjusted sHR [95 % CI]	<i>p</i> ^a
Adverse events						
Accidental removal of endotracheal tube or catheter	41/784 (6.5)	14/148 (9.5)	1.2 (0.6–2.5)	0.6	1.3 (0.6–2.8)	0.5
Phlebitis/pulmonary embolism	26/980 (2.7)	15/170 (8.8)	2.8 (1.4–5.8)	0.004	1.8 (0.8–3.9)	0.15
Haemorrhage	24/980 (2.5)	15/170 (8.8)	2.4 (1.1–5.2)	0.03	1.5 (0.7–3.5)	0.3
Packed red blood cells administration (number of packs)	195/980 (19.9)	76/170 (44.7)	1.9 (1.4–2.7)	0.0001	1.3 (0.9–1.8)	0.2
Hypoglycaemia	168/980 (17.1)	74/170 (43.5)	1.9 (1.4–2.7)	0.0001	1.5 (1.0–2.1)	0.03
Hyperglycaemia	535/980 (54.6)	135/170 (79.4)	1.6 (1.2–2.0)	0.0004	1.5 (1.2–2.0)	0.002
Hypematremia	23/980 (2.4)	11/170 (6.5)	1.3 (0.5–3.3)	0.6	0.7 (0.2–1.8)	0.4
VAP	64/497 (12.9)	50/125 (40)	1.2 (0.7–2.0)	0.5	1.1 (0.7–1.8)	0.7
VAP (sensitive isolates)	56/497 (11.3)	32/125 (25.6)	1.1 (0.6–1.9)	0.8	1.0 (0.6–1.8)	0.9
VAP (resistant isolates)	16/497 (3.2)	29/125 (23.2)	2.2 (1.4–3.4)	0.0005	2.1 (1.3–3.3)	0.002
Medical errors						
Anticoagulant prescription error	66/980 (6.7)	23/170 (13.5)	2.1 (1.2–3.5)	0.007	1.9 [1.1–3.3]	0.02
Anticoagulant administration error	31/705 (4.4)	12/148 (8.1)	1.3 (0.6–2.9)	0.5	1.0 [0.4–2.2]	0.9
Anticoagulant administration or prescription error	88/705 (12.5)	32/148 (21.6)	1.8 (1.1–2.8)	0.01	1.5 [0.9–2.5]	0.09
Insulin administration error administering insulin	41/771 (5.8)	118/158 (74.7)	1.2 (0.9–1.6)	0.2	1.0 [0.8–1.4]	0.8

Apesar de tudo isso...



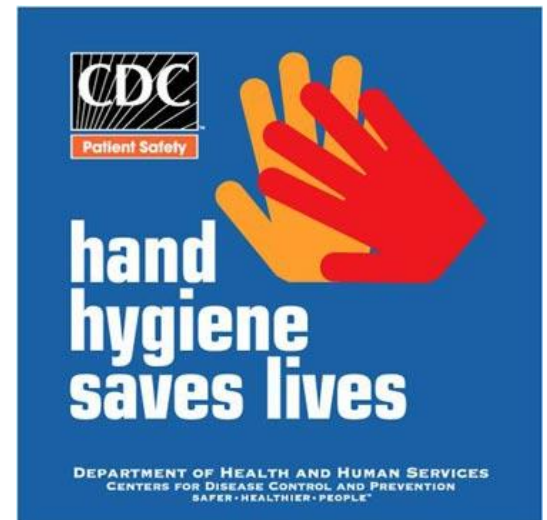
Why The Mask?

- Iconic symbol of medicine
- Strong symbol of caring
- Recognition of physician as “powerful”, “competent”, “good looking” (according to recent study)



Conclusões

- Reconhecer e individualizar o risco infeccioso de cada imunossuprimido, em cada fase do tratamento
- Maioria das infecções:
 - ▣ Flora endógena
- Medidas gerais de prevenção de IRAS
 - ▣ **Higiene das mãos- mais importante!**
 - ▣ Precauções padrão
 - ▣ **Sem benefício medidas de isolamento!!**
- Ambiente protetor:
 - ▣ TCTH alogênicos e pac alto risco





V Congresso Norte-Nordeste de Infectologia



Seara Praia
Hotel Fortaleza



de 4 a 6 de dezembro de 2014

Obrigado!

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