Biossegurança em Unidades Primárias de Saúde

IV Encontro Nacional de Tuberculose

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Biossegurança em Tuberculose
Breve histórico

OSHA– 1997
(Occupational Safety and Health Administration)

- Publica regulamentações em relação a Tuberculose ocupacional

OMS – 2000

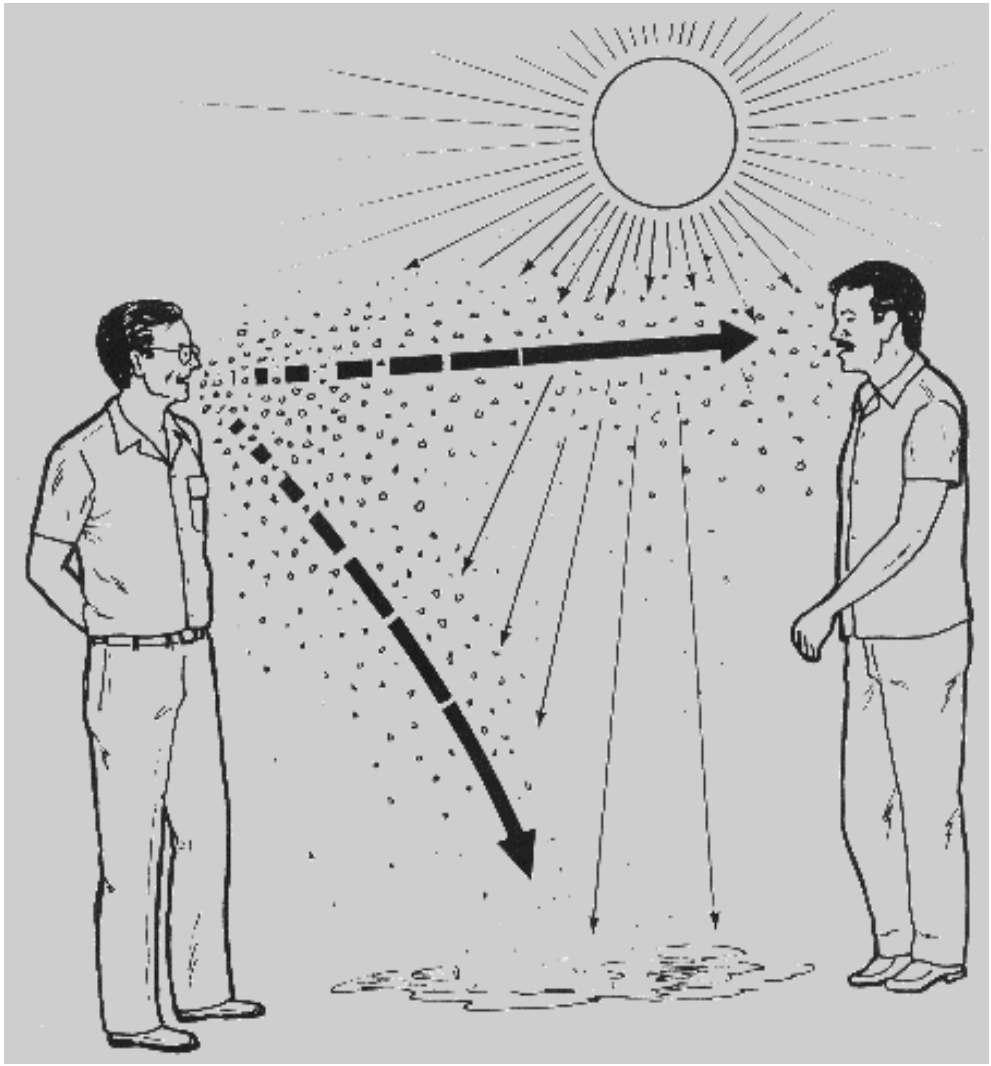
- Prioriza a elaboração de Normas de Biossegurança para países em desenvolvimento

MS – Brasil – 2000

- Estabelece Normas de Biossegurança de acordo com o grau de complexidade da Unidade de Saúde (US)
- Propõe a criação de Comissão de Controle da Infecção Tuberculosa em nível Estadual e Municipal (coordenará a implantação das medidas de biossegurança nas US)

Transmissão

- Foco bacilífero
- Número de partículas
- Ventilação / radiação
- Duração da exposição



Aerossol

Medidas de Controle de Infecção

- Medidas Gerenciais

Criar, apoiar e operacionalizar, avaliar e manter as medidas de controle de infecção

- Medidas Administrativas

Reduzir a exposição dos trabalhadores de saúde e dos usuários

- Controle Ambiental

Reduzir a concentração de gotículas infectantes

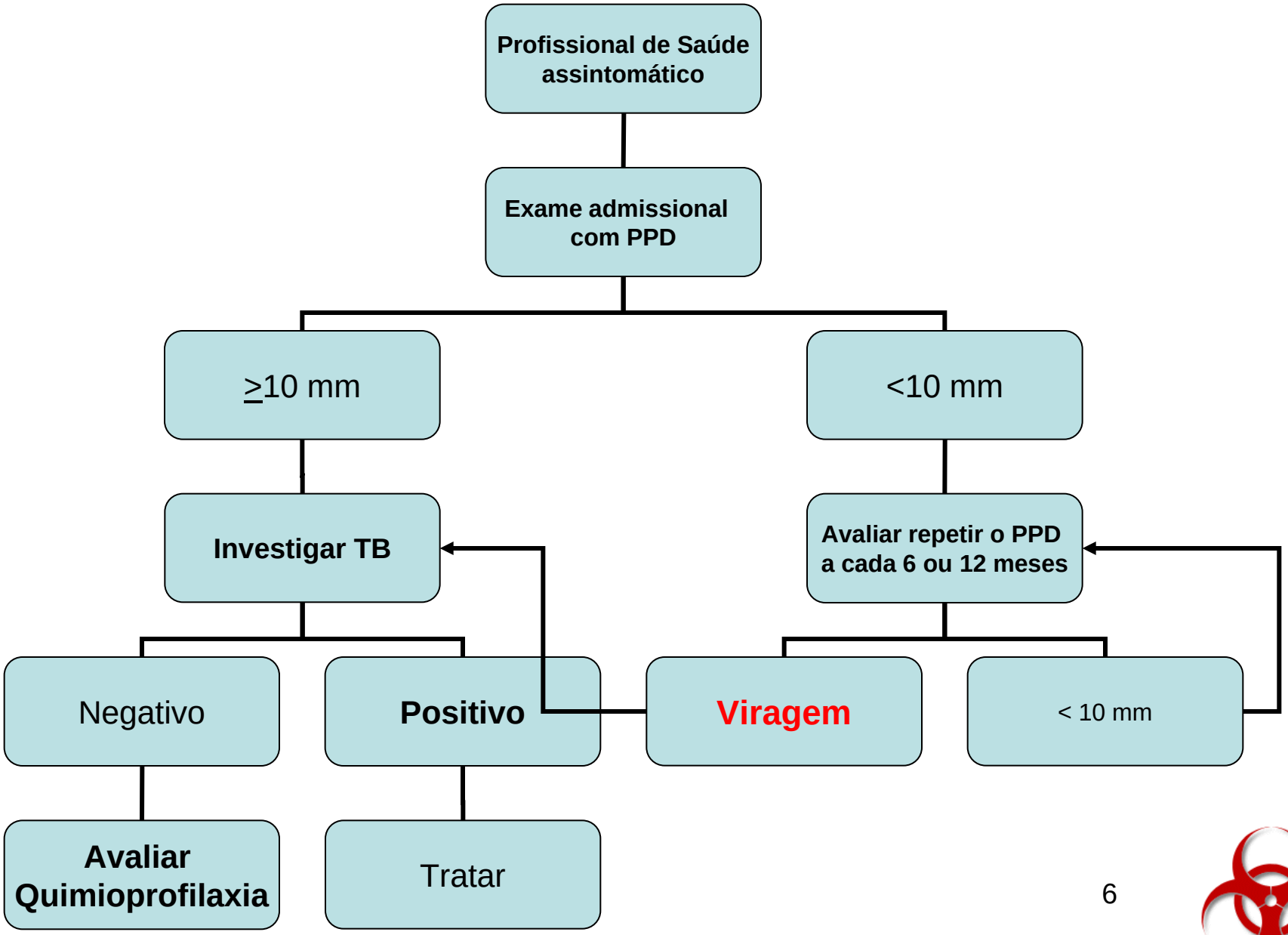
- Proteção Respiratória Individual

Proteger o profissional individualmente da inalação de partículas infectantes

Medidas Gerenciais

- Instituir um grupo de controle da infecção
  - Quem:
    - Médico do PCT ou infectologista, um enfermeiro, um profissional do laboratório e um representante da direção da unidade
  - O que é básico:
    1. Avaliar o risco da unidade
       - Prevalência de TB na região
       - Nº de notificações da unidade
       - Nº de pacientes HIV + na unidade
       - Nº de profissionais da unidade doentes e infectados

Teste Tuberculínico



Taxa de Conversão

$$\frac{\text{N total de profissionais (exceto os novos) com TT positivo recente no ano}}{\text{N total de profissionais (exceto os novos) que tiveram TT aplicado e lido no ano}} \times 100 = \text{Taxa de conversão}$$

$$\frac{\text{Total number of staff (except new hires) with newly positive TST or IGRA results/year}}{\text{Total number of staff (except new hires) who had TSTs applied and read/year or IGRAs completed/year}} \times 100 = \textbf{Conversion Rate}$$

Medidas Gerenciais

2. Capacitar todos os profissionais em Tb
3. Avaliar a necessidade de outras medidas e implantar as necessárias
   - Perfil da unidade : que serviços oferece?
   - Fluxo de pacientes: onde os pacientes SR circulam?
   - Planta baixa da unidade: qual a estrutura física da us?
4. Avaliar e monitorar periodicamente as medidas implantadas

Medidas Administrativas

- Criar um fluxo para SR e BAAR + dentro da US;
- Divulgar protocolo de abordagem de SR para todos os profissionais inclusive porteiros, guardas etc;
- Priorizar o atendimento dos SR e agilizar a coleta de BAAR e outros exames visando redução do tempo de permanência na US;
- Agendar pacientes de 3 a 4 / hora visando reduzir a aglomeração nos ambientes de espera;
- Orientar pacientes com tosse a utilizar lenços por meio de sinalização e fornecer lenços descartáveis.

Suspeita Clínica → Diagnóstico Rápido
Tratamento Imediato

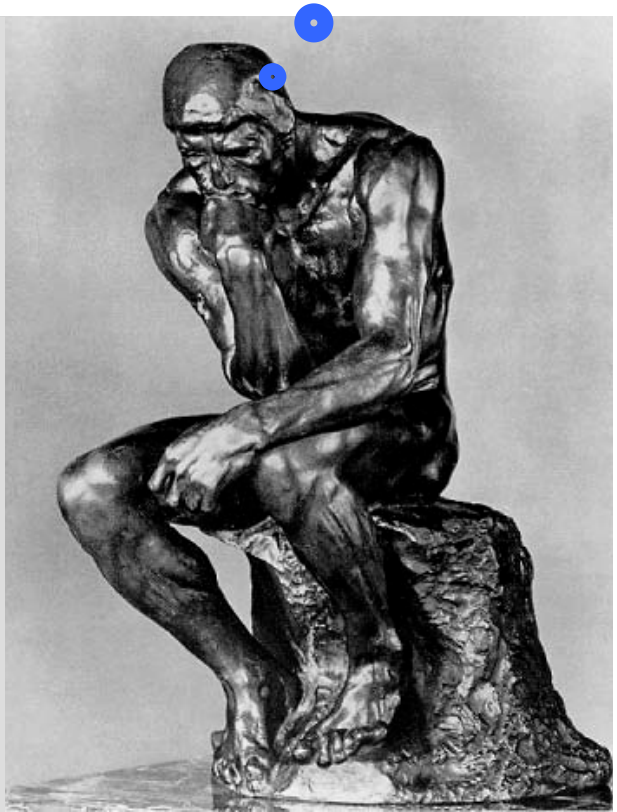
Será
Tuberculose ?

Devemos pensar em TB!

- **Tosse**
- **Febre**
- **Sinais radiológicos**
- **História epidemiológica**

Agilizar o diagnóstico

Iniciar o tratamento



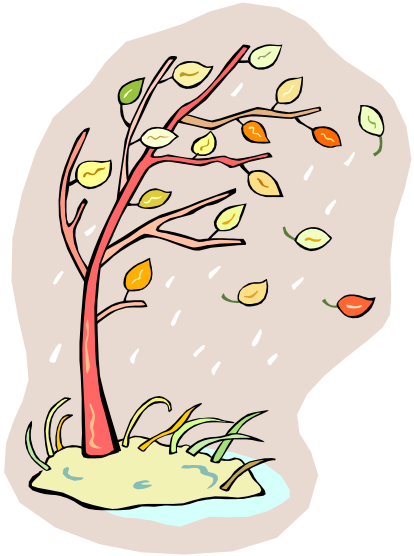
Medidas Administrativas

Proteja sua tosse, use um lenço

A Guideline for Establishing Effective Practices: Identifying Persons with Infectious TB in the Emergency Department
Institutional Consultation Services ▪ Francis J. Curry National Tuberculosis Center

Medidas de Controle Ambiental

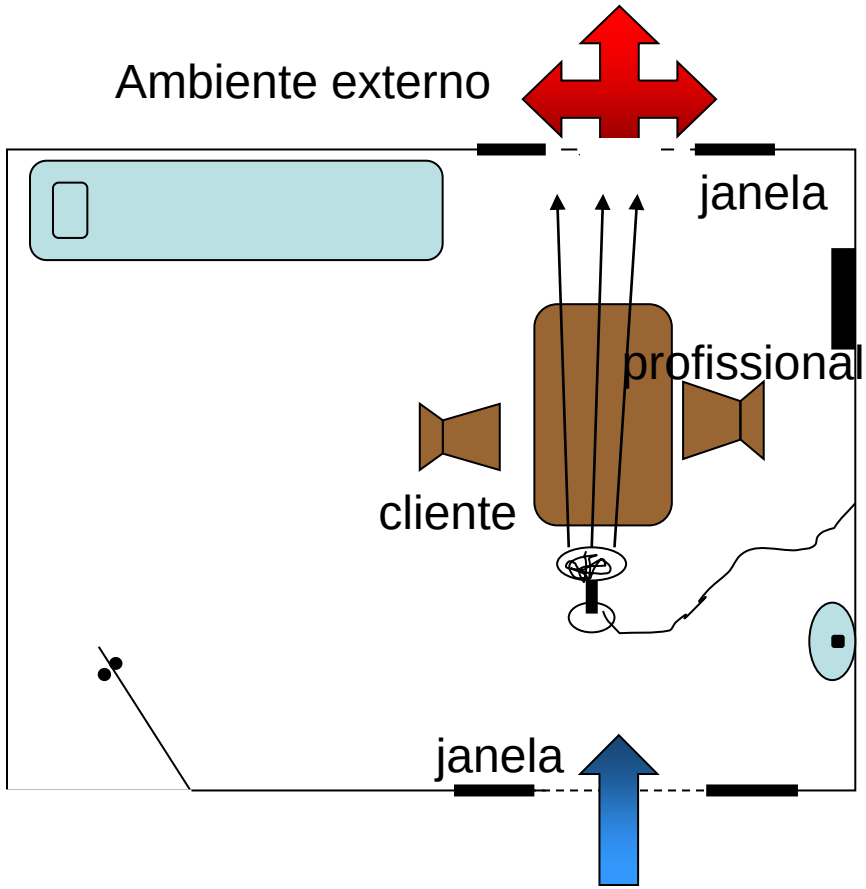
- Ventilação - Recomenda-se o mínimo de12 trocas de ar por hora!
  - Mecânica
  - Mista
  - Natural



- Filtração – Manutenção cara
- Radiação UV- Manutenção sofisticada e não funciona bem em alta umidade

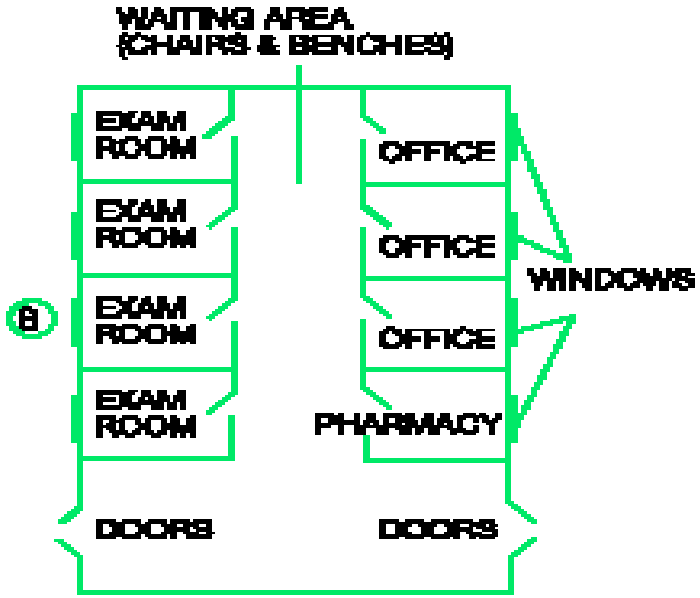
Medidas de Controle Ambiental

- Escolher as salas mais ventiladas para atendimento e sala de espera
- Manter janelas abertas
- Avaliar a possibilidade de aumentar ou criar janelas
- Dispor os móveis de modo a facilitar a dispersão do ar para fora
- Evitar a recirculação de ar
- Instalar ventiladores de forma a direcionar o fluxo de ar para o exterior
- Avaliação da necessidade de uso de exaustores e filtros de alta eficiência

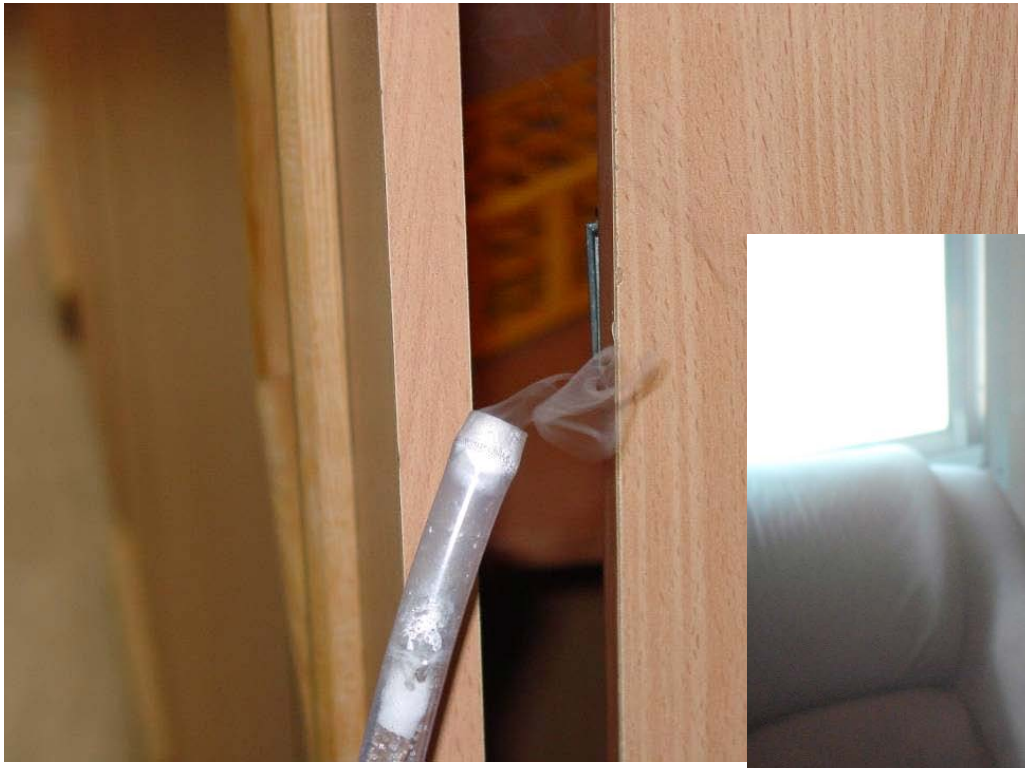


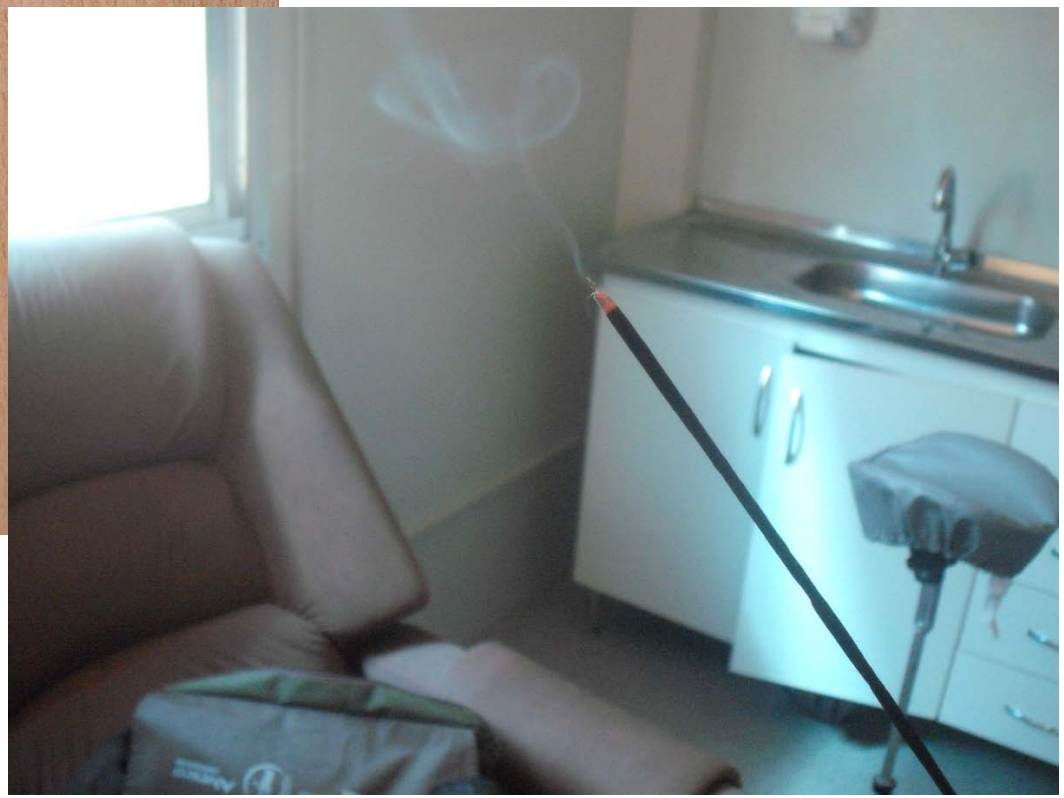
SIDE A

SIDE B



PLANE VIEW

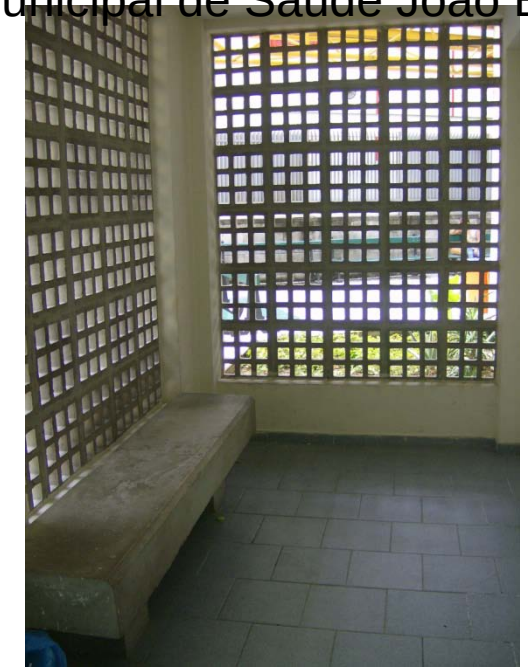




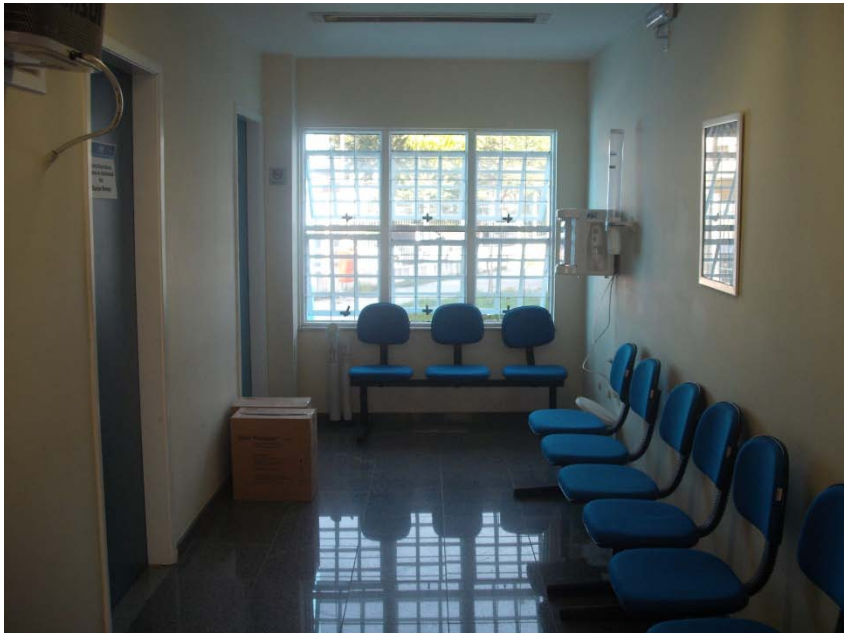
Verificar se fluxo de ar está na direção desejada?

15

Centro Municipal de Saúde João Barros Barreto



Clinica da Família Olímpia Esteves

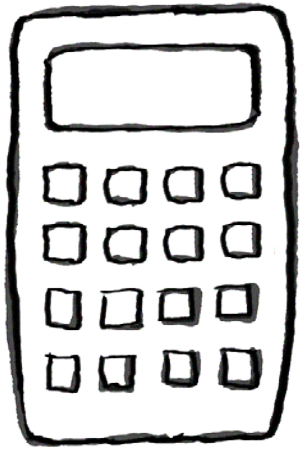


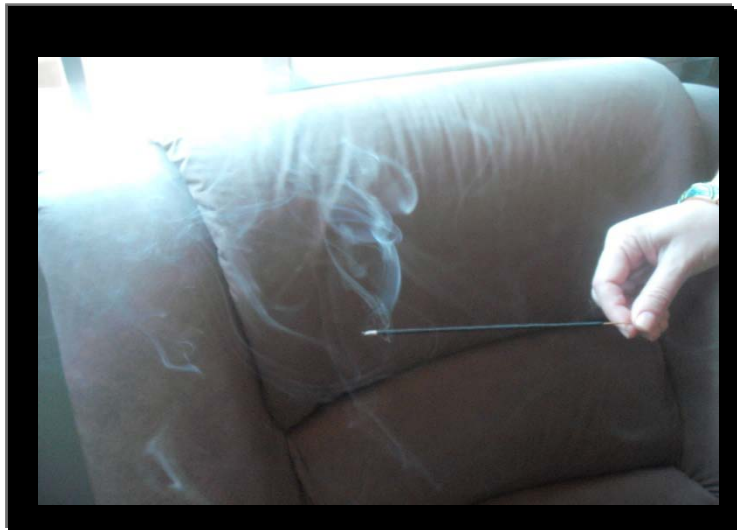

SEJAM BEM-VINDOS


GOVERNO DO
Rio de
Janeiro
SOMANDO FORÇAS
SECRETARIA
DE SAÚDE
E DEFESA CIVIL

O ideal é medir as trocas de ar

1. Trena
2. Anemometro
3. Incenso
4. Calculadora
5. Bloco de notas





Calcule o volume da sala

Volume = Largura x Profundidade x altura

Exemplo :

3 m largura x 5 m profundidade x 3 m altura = 45 m^3

Meça a dimensão da área de abertura para calcular as trocas

Área da janela e/ou porta aberta =
Largura x altura
Exemplo 1: Área = 0.5 m x 0.5 m = 0.25 m^2

20

Cálculo do N de trocas de ar por hora

- Volume da sala
  = largura x profundidade x altura = 45 m^3

- Área da janela = largura x altura = 0.25 m^2

- Velocidade do ar através da janela= 1 m/s
- Fluxo do ar
  = Área da janela x velocidade do ar = 900 m^3/h
- TAH
  = Fluxo de ar dividido pelo volume da sala
  = $\frac{900\ m^3/hora}{45\ m^3}$ = **20 trocas por hora**

Promover a renovação do ar de forma natural é eficaz ?

ABSTRACT

Background

Institutional transmission of airborne infections such as tuberculosis (TB) is an public health problem, especially in resource-limited settings where protective mea as negative-pressure isolation rooms are difficult to implement. Natural ventilation low-cost alternative. Our objective was to investigate the rates, determinants, and natural ventilation in health care settings.

Methods and Findings

The study was carried out in eight hospitals in Lima, Peru; five were hospitals of "old-fashioned" design built pre-1950, and three of "modern" design, built 1970–1990. In these hospitals 70 naturally ventilated clinical rooms where infectious patients are likely to be encountered were studied. These included respiratory isolation rooms, TB wards, respiratory wards, general medical wards, outpatient consulting rooms, waiting rooms, and emergency departments. These rooms were compared with 12 mechanically ventilated negative-pressure respiratory isolation rooms built post-2000. Ventilation was measured using a carbon dioxide tracer gas technique in 368 experiments. Architectural and environmental variables were measured. For each experiment, infection risk was estimated for TB exposure using the Wells-Riley model of airborne infection. We found that opening windows and doors provided median ventilation of 28 air changes/hour (ACH), more than double that of mechanically ventilated negative-pressure rooms ventilated at the 12 ACH recommended for high-risk areas, and 18 times that with windows and doors closed ($p < 0.001$). Facilities built more than 50 years ago, characterised by large windows and high ceilings, had greater ventilation than modern naturally ventilated rooms (40 versus 17 ACH; $p < 0.001$). Even within the lowest quartile of wind speeds, natural ventilation exceeded mechanical ($p < 0.001$). The Wells-Riley airborne infection model predicted that in mechanically ventilated rooms 39% of susceptible individuals would become infected following 24 h of exposure to untreated TB patients of infectiousness characterised in a well-documented outbreak. This infection rate compared with 33% in modern and 11% in pre-1950 naturally ventilated facilities with windows and doors open.

Conclusions

Opening windows and doors maximises natural ventilation so that the risk of airborne contagion is much lower than with costly, maintenance-requiring mechanical ventilation systems. Old-fashioned clinical areas with high ceilings and large windows provide greatest protection. Natural ventilation costs little and is maintenance free, and is particularly suited to limited-resource settings and tropical climates, where the burden of TB and institutional TB transmission is highest. In settings where respiratory isolation is difficult and climate permits, windows and doors should be opened to reduce the risk of airborne contagion.

OPEN ACCESS Freely available online

PLOS MEDICINE

Natural Ventilation for the Prevention of Airborne Contagion

A. Roderick Escombe[1,2,3*], Clarissa C. Oeser[3], Robert H. Gilman[3,4], Marcos Navincopa[5], Eduardo Ticona[5], William Pan[4], Carlos Martínez[5], Jesus Chacaltana[6], Richard Rodríguez[7], David A. J. Moore[1,2,3], Jon S. Friedland[1,2], Carlton A. Evans[1,2,3,4]

1 Department of Infectious Diseases & Immunity, Imperial College London, London, United Kingdom, 2 Wellcome Trust Centre for Clinical Tropical Medicine, Imperial College London, London, United Kingdom, 3 Asociación Benéfica PRISMA, Lima, Perú, 4 Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States of America, 5 Hospital Nacional Dos de Mayo, Lima, Perú, 6 Hospital Nacional Daniel Carrión, Lima, Perú, 7 Hospital de Apoyo María Auxiliadora, Lima, Perú

Proteção Respiratória

- Em serviços ambulatoriais é recomendado o uso de respiradores pelos funcionários quando da realização de procedimentos geradores de tosse com suspeita de TB em fase contagiante
- Quando do atendimento de MDR também indica-se uso de respiradores
- Em serviços com grande número de pacientes novos bacilíferos em um mesmo local discute-se o uso do respirador dado que os pacientes de maior risco são aqueles sem tratamento ou seja antes da suspeita diagnóstica

Qual respirador usar e como usar? N95 & PFF2

CA :certificado de acreditação do MTE gravado e solicitar registro na ANVISA

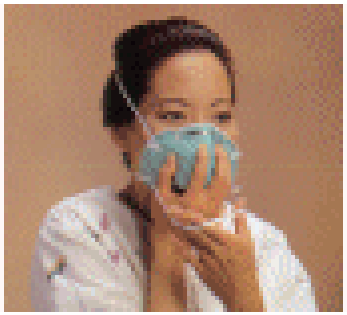
Proteção Respiratória

Uso correto do E.P.I

I

II

III



IV

V

Teste de vedação

JAMA®

Online article and related content current as of November 13, 2009.

Respirator Tolerance in Health Care Workers

Lewis J. Radonovich, Jr; Jing Cheng; Brian V. Shenal; et al.

JAMA. 2009;301(1):36-38 (doi:10.1001/jama.2008.894)

http://jama.ama-assn.org/cgi/content/full/301/1/36

Table 1. Characteristics and Tolerability of Respiratory Protective Ensembles[a]

Ensemble	Manufacturer (Model)[b]	Included Equipment	Cost, $[c]	Reusability[d]	Median Tolerance Time (Q75, Q25), h[e]	Probability of Tolerance at 8 h (95% CI)[f]	HR (95% CI)[g]	*P* Value[h]
Powered air-purifying respirator	3M (BE-12)	Gown, gloves, hood, air hose, filter cartridge, battery pack, and charger	768.20	Yes	7.6 (1.8,8.0)	0.56 (0.35-0.72)		
Cup N95 + exhalation valve	3M (8511)	Gown, gloves, goggles	2.11	No	7.7 (4.1,8.0)	0.55 (0.35-0.72)		
Medical mask (no respirator)	Precept (15320)	Gown, gloves, goggles	1.40	No	7.7 (4.9,8.0)	0.52 (0.32-0.69)		
Duckbill N95	Kimberly-Clark (PFR95170)	Gown, gloves, goggles	1.43	No	6.6 (2.9,8.0)	0.48 (0.29-0.65)		
Half-face elastomeric respirator	North (5500 series)	Gown, gloves, goggles, 2 filter cartridges	20.80	Yes	6.8 (2.1,8.0)	0.41 (0.23-0.58)		
Cup N95 + exhalation valve + medical mask	3M (8511) or Precept (15320)	Gown, gloves, goggles	3.51	No	4.3 (1.9,8.0)	0.41 (0.23-0.58)	1.70 (1.04-2.78)[i]	.03
Cup N95	3M (1860)	Gown, gloves, goggles	1.75	No	5.8 (4.1,8.0)	0.33 (0.17-0.51)	1.79 (1.15-2.79)[i] 1.61 (0.97-2.71)[j]	.03 .07
Cup N95 + medical mask	3M (1860) or Precept (15320)	Gown, gloves, goggles	3.15	No	4.1 (1.7,7.2)	0.30 (0.14-0.47)	1.14 (0.72-1.80)[k]	.57

Abbreviations: CI, confidence interval; HR, hazard ratio; N95, filters ≥95% of particles approximately 0.3 μm in size; Q75, tolerance time reached by 75% of participants; Q25, tolerance time reached by 25% of participants.

[a] All respirators were commonly used by the local and national Veterans Health Administration hospitals and were certified by the National Institute for Occupational Safety and Health. Equipment changes between patients were in accordance with airborne transmission–based infection control precautions from the Centers for Disease Control and Prevention[3] unless the clinical setting required otherwise.

[b] 3M is located in St Paul, Minnesota; Precept Medical Products, Arden, North Carolina; Kimberly-Clark, Neenah, Wisconsin; and North Safety Products, Cranston, Rhode Island.

[c] Data from Safety Company (http://www.safetycompany.com) and Laboratory Safety supply (http://www.labsafety.com) accessed March 24-25, 2008.

[d] Designed to be used for more than 1 patient encounter,[1] as specified by the manufacturer.

[e] Kaplan-Meier estimates without considering correlation.

[f] Based on extended Cox model to account for within-participant correlation.

[g] Risk of intolerance (doffing) before 8 h, comparing 2 ensembles.

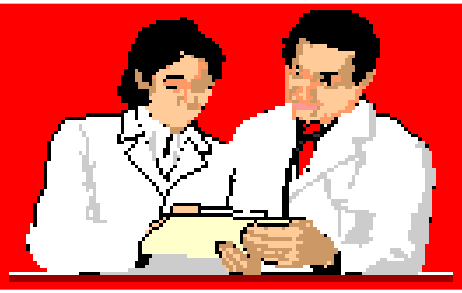
[h] Bonferroni step-down method.

[i] Compared with cup N95 + exhalation valve.

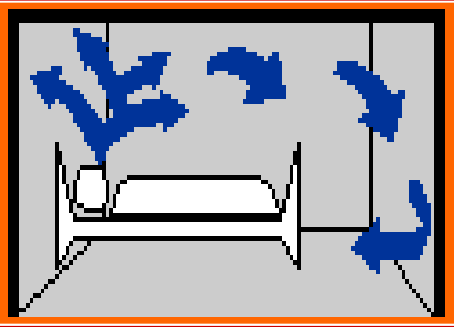
[j] Compared with medical mask.

[k] Compared with cup N95.

Hierarquia das Medidas de Controle de Infecção



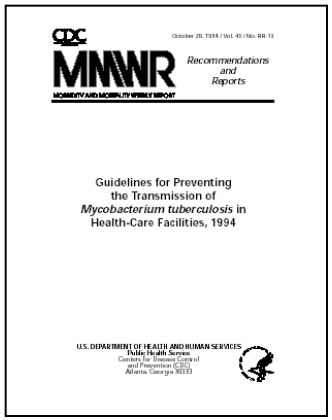
Medidas Administrativas

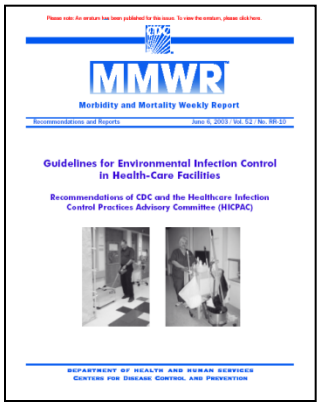


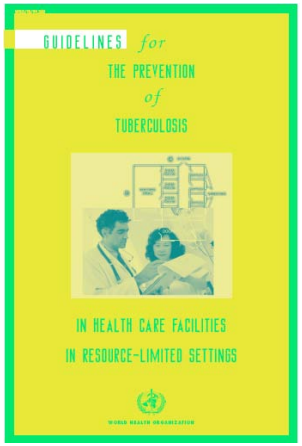
Controle Ambiental

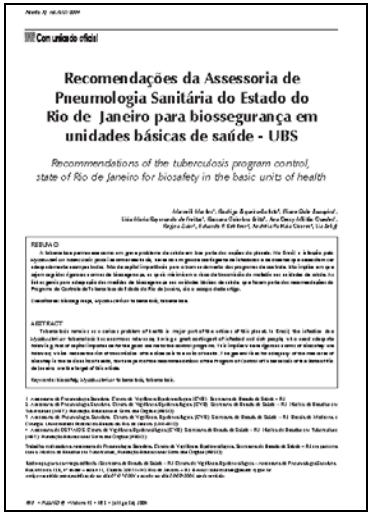
Proteção Respiratória

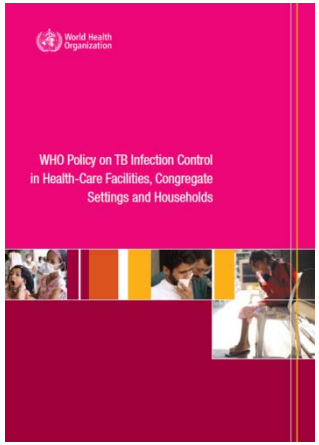

Agora estou
seguro !











http://www.stoptb.org/wg/tb_hiv/icshome.asp

http://www.who.int/tb/health_systems/infection_control/en/

http://www.nationaltbcenter.edu/TB_IC/

http://www.sopterj.com.br/revista/2004_13_3/default.asp

RIO 2014

ESPERAMOS VOCÊ!

SBPT

Congresso Brasileiro
de Pneumologia e Tisiologia