# INCIDENCE OF TUBERCULOSIS IN IPANEMA COUNTY, MINAS GERAIS STATE - 2009 TO 2014

MIRIAN CRISTINA DE **OLIVEIRA**[1], ARILTON JANUÁRIO BACELAR **JÚNIOR**[2*], ARINIZA ANIELLE FÉLIX **OLIVEIRA**[3], KLEBER CORCETTI DUTRA RITA DE CÁSSIA **GOMES**[3], VALÉRIA GOMES SCHERRE **CORCETTI**[3]

**1.** Professor, Master in Microbiology; **2.** Pharmacist-Biochemist and Bachelor of Laws. Specialist in Clinical Analysis, Infectious Parasitic Diseases, Waste Management in Health Care, Education Law and Public Law. Doctoral Student in Law and Social Sciences. MBA in Educational Management. Coordinator of Pharmacy Course of the Faculty President Antonio Carlos Ipatinga-UNIPAC. Member of the CRF-MG Education Commission; **3.** Ungraduated Student of Biomedicine, Faculty Única - Ipatinga.

* Faculty Presidente Antônio Carlos, Ipatinga - Marquês de Caravelas Street, 148, Cidade Nobre, Ipatinga, Minas Gerais, Brazil. CEP 35162-148 dr.arilton@gmail.com

**Received:** 06/01/2015. **Accepted:** 06/11/2015

## ABSTRACT

The objective of this study was to analyze the frequency and clinical features of tuberculosis (TB) in the municipality of Ipanema / Minas Gerais State, Brazil. The research has descriptive and documentary via quantitative analysis of data in the compulsory notification forms of TB patients in the period between 2009 and 2014. Throughout the period studied was observed the occurrence of 42 cases, with a mean incidence of 37.65 /100.000 inhabitants. Most cases occurred in males and aged between 21-40 years. Among the comorbidities associated with TB in the municipality are alcoholism, HIV / AIDS and diabetes. The monitoring through the Directly Observed Treatment (DOT) was performed in 19 cases, but in six of these, there was abandonment. Despite efforts in fighting TB, there is a high rate of incidence of the disease. The city has not yet reached the goal set by the World Health Organization (WHO) for number of cases of the disease, but has already achieved positive results on the target set for the number of deaths.

**KEYWORDS:** Tuberculosis, epidemiology, incidence, comorbidities.

## 1. INTRODCTION

TB is an infectious disease caused by *Mycobacterium tuberculosis*. It presents airborne with chronic evolution and primarily affects the lungs, where it finds favorable environment for its proliferation. A patient with TB can expel about 3.5 million bacilli by droplets during talking, coughing or sneezing. These droplets can remain suspended in the air in areas of poor ventilation and be inhaled by others, forming a network of transmission of the disease[1,2,3,4].

The slow multiplication of the bacillus (every 12-20 hours) causes symptoms evolve slowly, which slows down the search for medical care. Often when the diagnosis is made, the sputum smear is positive, the epidemiological cycle is completed, infecting the communicating[5,6].

According to WHO, one third of the world population is infected by *Mycobacterium tuberculosis*. The annual number of new cases is about 8.8 million and most are concentrated in 22 countries, including Brazil occupies the 18th place, with about 85,000 cases/ year and approximately 5000 deaths associated[7,8,9,10,11.]

Some associated factors help to explain the gravity of the situation; among them is cited vulnerability of living conditions, low education, illicit drug use, alcohol use, social inequality, limitations in health services, immunosuppressive diseases, antibiotic resistance, abandonment of treatment, overcrowding, an aging population, lack of medical advice on the consequences resulting from the interruption of treatment and lack of drug use supervision[3,12,13,14,15,16].

The behavior and commitment of patients regarding treatment are directly linked to therapeutic success. Alcoholics and drug addicts do not usually make the correct treatment which leads to bacterial resistance to multiple drugs. Social exclusion of patients is also a serious problem, which happens even within families, increasing the chances of death with disease progression[12,17,18,19,20].

The aim of this research was to analyze the frequency and clinical features of TB in individuals from Ipanema community/ MG, and evaluate variables related to noncompliance with treatment, given that knowledge of this information can guide the planning of future action in that municipality in with regard to the control of the disease.

## 2. MATERIAL AND METHODS

The current study is descriptive and documentary, carried out through quantitative analysis of data in the records of compulsory notification of TB patients in the municipality of Ipanema, Minas Gerais, Brazil, in the period between 2009 and 2014.

The research data were collected through a questionnaire developed exclusively for it. They were then used to fill database (Microsoft Excel platform) for further analysis. Later, comparative testing was performed using $\chi 2$ test (or Fisher's exact test, in indicated cases) for categorical variables using the SPSS 16.0 as editor.

## 3. RESULTS

Over the period studied there was the occurrence of 42 cases in the city, and calculated a mean incidence of 37.65 per 100,000 inhabitants. Of these, 38 (90.48%) were new cases, 3 (7.14%) were identified as return after default of it ment and only one patient (2.38%) did not have its source identified. The city's population was estimated at 19,318 inhabitants in 2014 (Table 1).

Most patients were male (64.29%) and were aged between 21 and 40 years (57.14%) followed by patients between the ages of 41 and 60 years (28.57%). Table 1 shows the demographic and clinical characteristics of patients with tuberculosis in Ipanema municipality.

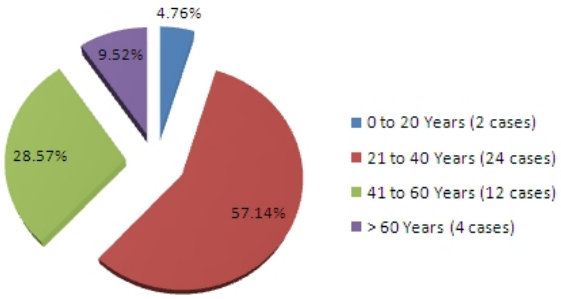


**Figure 1.** Tuberculosis by age group in the city of Ipanema / MG. **Source:** OLIVEIRA MC, BACELAR JR AJ, OLIVEIRA AAF, Dutra KC, RC GOMES, CORCETTI VGS.

The smear microscopy was performed in all cases; of which 37 (88.10%) positive and 5 (11.9%) negative. Chest radiography was performed in 40 patients, 39 (92.86%) were diagnosed as suspected, 1 (2.38%) were diagnosed normal and radiography was not performed in 2 patients (Table 1).

Various comorbidities are present, the most common: alcohol consumption (23.81%), HIV / AIDS (9.52%) and diabetes (4.76%; Figure 2). Alcohol drinking was the only variable associated with the abandonment of treatment (p = 0.05). The TB deaths accounted for 2.38% (1 case) of deaths and there were 3 deaths (7.14%) from other causes. With respect to clinical outcome, there were 28 (66.67%) cases of healing, followed by 8 (19.05%) cases of noncompliance; 3 (7.14%) cases of deaths from other causes; 1 case (2.38%) of death from tuberculosis 1 (2.38%) case of transference. A case has not been evaluated due to failures in reporting forms (Table 1).

**Table 1.** Tuberculosis incidence - Ipanema / MG.

| TUBERCULOSIS INCIDENCE IPANEMA 2009 TO 2014 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **T0TAL** | **%** |
| **CASES** | 8 | 9 | 5 | 4 | 9 | 7 | 42 | 100 |
| **MENS** | 3 | 7 | 1 | 4 | 6 | 6 | 27 | 64.29 |
| **WOMANS** | 5 | 2 | 4 | 0 | 3 | 1 | 15 | 35.71 |
| **NEW CASES** | 8 | 9 | 4 | 3 | 8 | 6 | 38 | 90.48 |
| **READMISSION** | 0 | 0 | 1 | 0 | 1 | 1 | 3 | 7.14 |
| **NO RECORD ENTRY** [1] | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2.38 |
| **SUSPECT RX** | 7 | 9 | 4 | 4 | 8 | 7 | 39 | 92.86 |
| **NORMAL RX** | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2.38 |
| **RX NOT DONE** [2] | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 4.76 |
| **BAAR +** | 7 | 9 | 4 | 3 | 7 | 7 | 37 | 88.10 |
| **BAAR -** | 1 | 0 | 1 | 1 | 2 | 0 | 5 | 11.90 |
| **DOT**[3] | 2 | 1 | 0 | 0 | 9 | 7 | 19 | 45.24 |
| **TB DEATH**[4] | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2.38 |
| **OTHER CAUSES DEATH** [5] | 1 | 1 | 1 | 0 | 0 | 0 | 3 | 7.14 |
| **ABANDONO** | 1 | 1 | 1 | 1 | 3 | 1 | 8 | 19.05 |
| **TRANSFERENCE** | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2.38 |
| **CURES** | 6 | 7 | 3 | 2 | 5 | 5 | 28 | 66.67 |
| **INHABITANT** | 17883 | 18170 | 18457 | 18744 | 19031 | 19318 | | |
| **INC/100.000**[6] | 44.7 | 49.5 | 27 | 21.3 | 47.2 | 36.2 | | |
| **INC/MAN/100.000**[7] | 37.65 | | | | | | | |

(1) no check in; (2) RX unrealized; (3) directly observed treatment; (4) death tuberculosis; (5) other causes death; (6) incidence / 100,000 inhabitants; (7) Average incidence/ 100,000 inhabitants. **Source:** OLIVEIRA MC, BACELAR JÚNIOR AJ, OLIVEIRA AAF, DUTRA KC, GOMES RC, CORCETTI VGS.

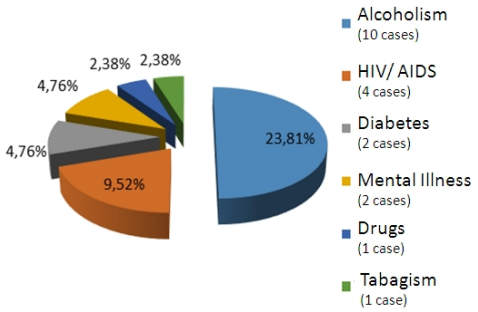


**Figure 2.** Comorbidities associated with TB in the municipality of Ipanema/ MG. **Source:** OLIVEIRA MC, BACELAR JR AJ, OLIVEIRA AAF, Dutra KC, RC GOMES, CORCETTI VGS.

.

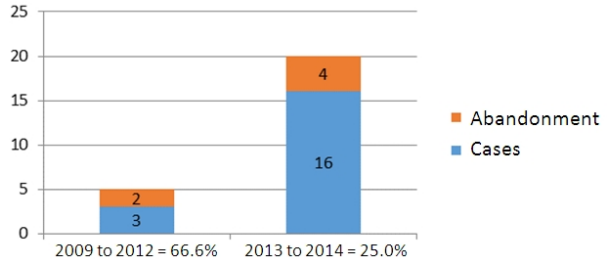


**Figure 3.** Cases of abandonment of treatment after DOT**. Source:** OLIVEIRA MC, BACELAR JR AJ, OLIVEIRA AAF, Dutra KC, RC GOMES, CORCETTI VGS.

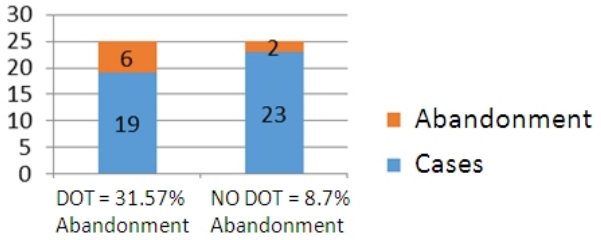


**Figure 4.** Comparison of treatment dropout after DOT and abandonment of treatment without application of TDO. **Source:** OLIVEIRA MC, BACELAR JR AJ, OLIVEIRA AAF, Dutra KC, RC GOMES, CORCETTI VGS.

## 4. DISCUSSION

The incidence of tuberculosis in the period studied in the municipality of Ipanema/ MG (37.65/ 100,000) is significantly greater than that observed in the state of Minas Gerais, which was 22.3/ 100,000 population between the years 2002 and 2009[8] and 17.9/ 100,000 in 2013[21]. This is comparable to the incidence observed in the Santa Catarina State (37/ 100,000)[22] and is higher than the national mean of 35.4/ 100,000 inhabitants in 2013. However, can seem low when faced with the high rate of the municipality of Abre Campo/ MG (131.4/ 100,000)[21]. This rate observed in the municipality of Ipanema/ MG, is higher than recommended by the NTCP (National Tuberculosis Control Program) goal millennium development (25.6/ 100,000), to be achieved by the year 2015 (results already achieved by the MG state)[8].

The difference between the high rates of incidence in the municipality regarding the state probably should be the prioritization in health services, concentrated in metropolitan areas that are signaled by the disease 8 control program demonstrating that this prioritization should be reviewed. Worth remembering that in 2003 the Ministry of Health has increased the budget for the NTCP in 14 times, but in 2011 still watched approximately 70,000 new cases and 4,500 deaths/ year 23,24,25. As noted earlier, tuberculosis in the municipality is predominant in males and in the economically active age group.

Among comorbidities present, alcohol consumption is the most frequent, being present in 23.8% of the total, followed by HIV / AIDS and diabetes, getting in line to that found in Minas Gerais. The co-infection rate of HIV/ AIDS (9.52%) in Ipanema/ MG, compared with the results obtained in the state of Santa Catarina in 2009 (26.33%) 26, is relatively low. It notes that alcohol consumption is associated with the abandonment of treatment ($p = 0.05$). Indicating a need for monitoring of patients by multidisciplinary teams to minimize the aggravation of the disease and guide patients, thus preventing abandonments[8].

The situation of foreclosure cases in Ipanema/ MG, records the tuberculosis deaths (2.38%) within the target set by WHO (less than 5%) by 2015. This goal was achieved by the municipality, as demonstrated in the study, where the rate was only one recorded case, being also below the MG mortality rate, according to the SINAM (National System for Medical care). The cure rate was 66.67% and the percentage of abandonment, 19.05%. Both fell short of targets set by the NTCP in line with the WHO recommends 85% cure and up to 5% of abandonment[8,25,27,28,29,30].

The implementation of DOT is stimulated when cure and dropout rates recommended by WHO are not be reached[31]. The abandonment rates after DOT in Ipanema/ MG municipality remain high, even when we applied the DOT in all registered cases, as in the period 2013/2014, which was 25% of abandonment. This result demonstrates the need not only the implementation but also to improve the application of the method, since most cases of abandonment are patients with greater social vulnerability (low education, HIV, without family ties) 8. In the case of the municipality observed there was a higher withdrawal in patients enrolled in the program compared to those who did not have the monitored treatment.

## 5. CONCLUSION

Despite efforts to combat tuberculosis, there is a high number of incidence of the disease. It is found through study that certain regions are to some indexes within the established or expected goals, but analyzing broadly still fall short of the MS (Ministry of Health) that is 25.6 cases per 100,000 population 2015. the city of Ipanema/ MG has not yet reached the recommended target for number of cases, but has already achieved positive results on the WHO target set for the number of deaths.

The frequency of abandoned and the number of comorbidities are still very high in this population, especially those related to alcoholism, HIV and diabetes. Actions should be implemented to decrease these numbers and consequently the deaths and the incidence.

Projects like the DOT should be reviewed, seeking improvements and verifying that your steps are being executed with correction because it was observed that it is not effective in the city studied, since the group accompanied by the program had a higher dropout rate when compared to unaccompanied group.

## REFERENCES


[1] Ferreira Júnior S. Conhecimento, atitudes e práticas sobre tuberculose e HIV/AIDS em prisões e no serviço público de saúde [Dissertação - Mestrado] [Internet]. Campinas: UNICAMP; 2011. [acesso em 14 out 2014]; Disponível em: http://www.bibliotecadigital.unicamp.br/document/?view=000788757

[2] Medeiros CJ, Pretti CBO, Nicole AG. Caracteristicas demográficas e clinicas dos casos de tuberculose notificados pelo Núcleo de Epidemiologia Hospitalar no Município de Vitória, Estado do Espírito Santo, Brasil, 2009-2010. Epidemiol. Serv. Saúde [periódicos na Internet]. 2012; 21: 159-66 [acesso em 15 abr 2015]. Disponível em: http://scielo.iec.pa.gov.br/scielo.php?pid=S1679-49742012000100016&script=sci_arttext&tlng=en

[3] Silva ESF, Barbosa LD. O perfil epidemiológico da tuberculose em Unaí- MG. Rev. FACTU ciência [periódicos na Internet]. 2012; 22:104-24. [acesso em 16 abr 2015]; Disponível em: http://www.clickunai.com.br/clientes/cms/documentos/factu_-_revista_factu_ciencia_22_-_2012_-_setembro_2012.pdf#page=105

[4] Couto DS, Carvalho RN, Azevedo EB, Moraes MN, Pinheiro PGOD, Faustino EB. Fatores determinantes para o abandono do tratamento da tuberculose: representações dos usuários de um hospital público. Saúde em debate [periódicos na Internet]. 2014; 38:572-81 [acesso em 10 abr 2015]; Disponível em: http://www.scielo.br/scielo.php?pid=S0103-11042014000300572&script=sci_arttext

[5] Siqueira HR. Enfoque clínico da tuberculose pulmonar. Pulmão [periódicos na Internet]. 2012; 21:15-18 [acesso em 14 set 2014]; Disponível em: http://sopterj.com.br/profissionais/_revista/2012/n_01/04.pdf

[6] Alcântara CCS, Kritski AL, Ferreira VG, Façanha MC, Pontes RS, Mota RS, et al. Fatores associados à tuberculose pulmonar em pacientes que procuraram serviços de saúde de referência para tuberculose. J. Bras. Pneumologia [periódicos na Internet]. 2012; 38:622-29 [acesso em 21 set 2014]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-37132012000500012

[7] Oliveira MG, Delogo KN, Oliveira HMMG, Netto AR, Kritski MMO. Anemia em pacientes internados com tuberculose pulmonar. J. Bras. Pneumologia [periódicos na Internet]. 2014; 40:403-10 [acesso em 20 set 2014]; Disponível em: http://jornaldepneumologia.com.br/detalhe_artigo.asp?id=2310

[8] Augusto CJ, Carvalho WS, Gonçalves AD, Ceccato MGB, Miranda SE. Características da tuberculose no estado de Minas Gerais entre 2002 e 2009. J. Bras. Pneumologia [periódicos na Internet]. 2013; 39: 357-364 [acesso em 14 out 2014]; Disponível em: http://www.jornaldepneumologia.com.br/detalhe_artigo.asp?id=2028

[9] Coêlho DMM, Viana RL, Madeira CA, Ferreira LO, Campelo V. Perfil epidemiológico da tuberculose no município de Teresina-PI, no período de 1999 a 2005. Epidemiol. Serv. Saúde [periódicos na Internet]. 2010; 19: 33-42 [acesso em 2015 abr 10]; Disponível em: http://scielo.iec.pa.gov.br/scielo.php?pid=S1679-49742010000100005&script=sci_arttext

[10] Campos WR, Campos GS, Miranda SS. Tuberculose intraocular. Rev. Bras. Oftalmologia [periódicos na Internet]. 2011; 70:437-51 [acesso em 16 abr 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-72802011000600021

[11] Portela MC, Lima SML, Brito C, Ferreira VMB, Escosteguy C, Vasconcellos MTL. Programa de controle da tuberculose e satisfação dos usuários, Rio de Janeiro. Rev. Saúde Pública [periódicos na Internet]. 2014; 48:497-507 [acesso em 18 abr 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-89102014000300497&lng=pt&nrm=iso

[12] Brás OCR. Vulnerabilidade e tuberculose no Rio de Janeiro. Saúde e Sociedade [periódicos na Internet]. 2014; 23:190-99 [acesso em 23 mar 2015]; Disponível em: http://dx.doi.org/10.1590/S0104-12902014000100005

[13] Piva SGN, Costa MCN, Barreto FR, Pereira SM. Prevalência de deficiência nutricional em pacientes com tuberculose pulmonar. J. Bras. Pneumologia [periódicos na Internet]. 2013; [acesso em 23 set 2014]; 39:476-483. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-37132013000400476&lng=pt&nrm=iso&tlng=pt

[14] Furini AAC, Pedro HSP, Rodrigues JF, Montenegro LML, Machado RLD, Schindler CFHC, et al. Detecção do complexo Mycobacterium tuberculosis por nested polymerase chain reaction em espécimes pulmonares e extrapulmonares. J. Bras. Pneumologia [periódicos na Internet]. 2013; 39:711-18. [acesso em 01 out 2014]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-37132013000600711&lng=pt&nrm=iso&tlng=pt

[15] Loureiro RB, Villa TCS, Netto AR, Peres RL, Braga JU, Zandonade E, et al. Acesso ao diagnóstico da tuberculose em serviços de saúde do município de Vitória, ES, Brasil. Ciência & Saúde Coletiva [periódicos na Internet]. 2013; 19:1233-244 [acesso em 21 set 2014]; Disponível em: http://www.scielo.br/scielo.php?pid=S1413-81232014000401233&script=sci_arttext

[16] Chirinos NEC, Meirelles BHS. Fatores associados ao abandono do tratamento da tuberculose: uma revisão integrativa. Texto & Contexto - Enfermagem [periódicos na Internet]. 2011; 20:599-606 [acesso em 18 abr 2015]; Disponível em:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072011000300023&lng=pt&nrm=iso

[17] Macedo LR, Macedo CR, Maciel ELN. Vigilância epidemiológica da tuberculose em presídios do Espírito Santo. Rev. Bras. Promoção da Saúde [periódicos na Internet]. 2013; 216-22 [acesso em 04 dez 2014]; Disponível em: http://www.redalyc.org/pdf/408/40828920009.pdf

[18] Souza SS, Silva DMGV. Passando pela experiência do tratamento para tuberculose. Texto & Contexto - Enfermagem [periódicos na Internet]. 2010; 19:636-43 [acesso em 14 abr 2015]; v. 19: p. 636-643. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072010000400005

[19] Silva CB, Lafaiete RS, Donato MO. O consumo de álcool durante o tratamento da tuberculose: percepção dos pacientes. Rev. Eletrônica saúde mental álcool e drogas [periódicos na Internet]. 2011; 7: 10-17 [acesso em 18 abr 2015]; Disponível em: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1806-69762011000100003&lng=pt&nrm=iso

[20] Campani STA, Moreira JS, Tietbohel CN. Fatores preditores para o abandono do tratamento da tuberculose pulmonar preconizado pelo Ministério da Saúde do Brasil na cidade de Porto Alegre (RS). J. Bras. Pneumologia [periódicos na Internet]. 2011; 37-776-782 [acesso em 11 abr 2015]; Disponível em: http://www.scielo.br/pdf/jbpneu/v37n6/v37n6a11.pdf

[21] SES-MG. Coordenação Estadual de Pneumologia Sanitária. Panorama epidemiológico da tuberculose em Minas Gerais. 2014 [acesso em 18 abr 2015]. Disponível em: http://funed.mg.gov.br/wp-content/uploads/2014/06/Apresenta%C3%A7%C3%A3o1_FUNED_EPIDEMIO-TB_2014_Dr-Pedro.pdf

[22] Traebert J, Ferrer GCN, Nazário NO, Schneider IJC, Silva RM. Tendência temporal da mortalidade por tuberculose no estado de Santa Catarina, Brasil, no período entre 2002 e 2009. J. Bras. Pneumologia [periódicos na Internet]. 2012 [acesso em 10 mar 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_abstract&pid=S1806-71320130003003357&lng=pt&nrm=iso&tlng=pt

[23] Ministério da Saúde. Tratamento Diretamente Observado (TDO) da Tuberculose na Atenção Básica. Brasília: Ministério da Saúde; 2011 [acesso em 11 mai 2015]. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/tratamento_diretamente_observado_tuberculose.pdf

[24] Marquieviz J, Alves IS, Neves EB, Ulbricht L. Estratégia de Saúde da Família no controle da tuberculose em Curitiba (PR). Ciências saúde coletiva [periódicos na Internet]. 2013; 18: 265-71 [acesso em 21 mai 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232013000100027&lng=en&nrm=iso

[25] Silva EA, Anjos UU, Nogueira JA. Modelo preditivo ao abandono do tratamento da tuberculose. Saúde debate [periódicos na Internet]. 2014; 38:200-09 [acesso em 22 mai 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-11042014000200200&lng=pt&nrm=iso

[26] Ferrer GCN, Silva RM, Ferrer KT, Traebert J. A carga de doença por tuberculose no estado de Santa Catarina. J. Bras. Pneumologia [periódicos na Internet]. 2013; 39-61-68 [acesso em 05 mai 2015]; Disponível em: http://www.scielo.br/scielo.php?pid=S1806-37132014000100061&script=sci_arttext&tlng=pt

[27] Cecilio HPM, Fernandes CAM, Mathias TAF, Marcon SS. Perfil das internações e óbitos hospitalares por tuberculose. Acta Paul. Enfermagem [periódicos na Internet]. 2013; 26:250-55 [acesso em 21 mai 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-21002013000300008

[28] Furlan MCR, Oliveira SP, Marcon SS. Fatores associados ao abandono do tratamento de tuberculose no estado do Paraná. Acta Paul. Enfermagem [periódicos na Internet]. 2012; 25:108-114.[acesso em 20 mai 2015]; Disponível em: http://www.scielo.br/scielo.php?pid=S0103-21002012000800017&script=sci_arttext&tlng=pt

[29] Wendling APB, Modena CM, Schall VT. O abandono do tratamento da tuberculose sob a perspectiva dos gerentes de diferentes Centros de Saúde de Belo Horizonte - MG, Brasil. Texto Contexto Enfermagem [periódicos na Internet]. 2012; 21:77-85 [acesso em 21 mai 2015]; Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072012000100009

[30] Micheletti VCD. Resistência aos fármacos e os resultados evolutivos clínicos - laboratoriais observados em pacientes com tuberculose participantes do inquérito nacional de resistência em porto alegre no período de 2006 – 2007 [Tese - doutorado] [Internet]. Porto Alegre: Universidade Federal do Rio Grande do Sul. Faculdade de Medicina; 2012 [acesso em 22 mai 2015]. Disponível em: http://www.lume.ufrgs.br/bitstream/handle/10183/89989/000863155.pdf?sequence=1

[31] Ministério da Saúde. Manual de Recomendações para o Controle da Tuberculose no Brasil. Brasília: Ministério da Saúde; 2010 [acesso em 02 mai 2015]. Disponível em: http://www.cve.saude.sp.gov.br/htm/TB/mat_tec/manuais/MS11_Manual_Recom.