Childhood TB in Myanmar: trends in notification, profile and treatment outcomes in the private sector

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Setting: Myanmar National Tuberculosis (TB) programme (NTP).

Objective: To describe 1) the trends in childhood TB (aged ≤ 14 years) notification from 2014 to 2017 and quantify the private sector contribution to this notification; and 2) the profile and treatment outcomes of childhood TB managed in the private sector in 2016.

Study design: This was an observational study involving the review of routine records and reports of the NTP public-private mix (PPM) projects managed by the Myanmar Medical Association and Population Service International.

Results: The total number of childhood TB notified has declined from 36 314 in 2014 to 28 723 in 2017 (average annual decline = 2607 cases per year). The private sector contribution to the notification remained between 17% and 19%. Of the 5616 childhood TB cases diagnosed and treated under the two PPM projects in 2016, 99% were clinically diagnosed and 5459 (97.7%) had successful treatment outcomes. Children aged ≥ 10 years, males, those with bacteriologically confirmed TB, those treated in the regions or states of Mandalay, Chin and Shan had a higher risk of an unfavourable outcome (lost to follow-up, death, move to second-line treatment and not evaluated).

Conclusion: Childhood TB notification is showing a declining trend. One of five notified childhood TB cases was diagnosed and treated in the private sector, where the successful treatment rate was high.

According to the World Health Organization (WHO) estimates in 2017 one million children (aged ≤ 14 years) worldwide became ill with tuberculosis (TB).¹ Approximately 36% of these children with TB live in South-East Asia.¹ However, the actual burden is likely to be higher given the challenge in diagnosing TB in children.² The WHO, along with various partners, have developed a roadmap for reaching the goal of zero TB deaths among children worldwide by 2030.³ Achieving this goal requires greater advocacy, commitment, financial resources and joint effort from all stakeholders involved in providing health care for children and from those involved in TB control. In South-East Asia, where the TB burden is largest, more than one half of the TB patients (including children) present initially to private or informal (traditional) providers.⁴ Engaging private sector health care providers is therefore important for early diagnosis and treatment of childhood TB in these settings.

Myanmar, with an estimated childhood TB incidence of 23 000 in 2017, is one of the high TB burden

countries.¹ Myanmar's National TB Programme (NTP) aims to deliver quality TB prevention and care to all TB patients (including children) by collaborating and partnering with all public and private sector health care providers.⁵ As a result, several public-private mix (PPM) partnerships and projects have been initiated from 2004 onwards.⁶ Two non-government organisations—the Myanmar Medical Association (MMA) and Population Services International (PSI)—are involved in implementing childhood TB PPM projects.

In Myanmar, the proportion of childhood TB cases among all notified TB cases increased from 3% in 2003 to 25% in 2015.⁷ This increase is due to improvements in the childhood TB diagnosis and treatment policies of the NTP as well as the contribution from private health care providers.⁶ The contribution of the private sector to the increased notification rate for childhood TB has not been quantified. In addition, the aggregate data, reported at the national level, do not provide information about the profile and treatment outcomes of childhood TB diagnosed and treated in the private sector.⁶

We undertook an operational research study 1) to assess the trends in childhood TB notification and quantify the contribution of the private sector to the childhood TB cases notified in Myanmar from 2014 to 2017; and 2) to describe the profile and treatment outcomes of childhood TB cases diagnosed and treated by private health care providers in 2016. The conduct of this study is in line with the WHO recommendation, which in its global research priorities for childhood TB, recommends research on the role of the private sector in childhood TB management,⁷ especially in countries with a high TB burden.

METHODS

Study design

This was an observational study that reviewed the records and reports of routinely collected data under the NTP, the MMA and PSI.

Setting

The private sector in Myanmar is frequently the first point for medical care (due to proximity to the patients' residences and convenient opening hours) and a large number of TB patients including children (0–14 years) seek care from the private sector.^{8,9}

To date, there have been two PPM projects for TB across the country, the MMA-PPM-TB project and the PSI/Myanmar PPM-DOTS programme, which address

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childhood TB.⁶ Each PPM project maintains individual patient-wise records of TB patients diagnosed and treated by private general practitioners (GPs) engaged as a result of their Scheme I (health education and referral of suspected TB case) and Scheme III (referral, diagnosis and treatment) activities and submits a quarterly report to the NTP on the aggregate number of TB patients diagnosed and treated by private GPs, who follow the NTP guidelines and operational definitions for diagnosis, TB classification and outcome reporting, which are in accordance with the WHO recommendations.^{10,11} Figure 1 shows the algorithm for the diagnosis of pulmonary TB in children in Myanmar.

Myanmar Medical Association—public-private mix TB project

The MMA is implementing Scheme I PPM projects in 145 townships and 'Scheme I' and 'Scheme III' PPM projects in 51 townships and 9 private hospitals across the country.¹⁰ The MMA has 1526 GPs actively involved under Scheme I and 280 GPs under Scheme III. The main activity under Scheme I is to identify and encourage private practitioners to refer persons with TB symptoms to the NTP facilities. The main activities under Scheme III are to facilitate the diagnosis and treatment of TB in private clinics, appoint treatment supporters, report patients who are lost to follow-up to the MMA field coordinator, provide social support to multidrug-resistant (MDR) TB patients, raise community awareness about MDR-TB, provide counselling and testing for human immunodeficiency virus (HIV) infection, encourage the involvement of private hospitals in TB control and promote operational research.¹⁰ TB treatment is free of charge for patients and the MMA provides an incentive of 6000 Myanmar kyats (approximately US\$4) to the private GPs for diagnosis and treatment. The data from the TB register have

been entered into an electronic database at the MMA-PPM-TB project central office since 2010. From these data, central office prepares a quarterly report and submits it to the NTP officials at the township, regional and central levels.

Population Services International, Myanmar TB programme

PSI provides TB diagnostic and treatment services in 196 townships under Scheme III and PPM DOTS clinics through the Sun Quality Health (SQH) franchise network. The network comprises of more than 1300 private medical doctors trained by PSI/Myanmar in reproductive health, tuberculosis, pneumonia, diarrhoea, malaria and sexually transmitted infections, including HIV, which monitors their activities. Two key activities under this project are 1) the training of private providers in NTP diagnosis and treatment guidelines; and 2) providing supportive supervision and monitoring to ensure that SQH clinic services follow NTP guidelines. PSI medical officers visit SQH clinics on a monthly basis for provide supportive supervision, supply drugs and IEC (import export code) material and collect data. All verified patient data are submitted to the PSI central management information system (MIS) unit for electronic entry. The MIS unit enters the data into standard software (archiving soft copies) and generates various reports. TB treatment is free of charge for patients and PSI provides an incentive of US\$10 to the private GPs (US\$5 at the time of diagnosis and US\$5 after treatment completion).

Study site and study population

For the first objective of this study, the population was the aggregate numbers of all childhood TB cases notified under the NTP in Myanmar between 2014 and 2017. For the second objective, all childhood TB cases

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FIGURE 1 Algorithm for childhood TB diagnosis under the PPM Project in Myanmar. HIV = human immunodeficiency virus; TB = tuberculosis; EPTB = extrapulmonary TB; Xpert = GeneXpert® assay; CXR = chest X-ray.

FIGURE 2 Trend in the total number of childhood TB cases notified in Myanmar, 2014–2017 and the contribution of NTP public-private mix partners in childhood TB notification. *Public-public mix hospitals (collaboration between public hospitals and the NTP), other implementation partners (MSF Holland, MSF Switzerland, AHRN, MDM, MAM and SMRU). TB = tuberculosis, NTP = National TB Programme, NGO-1 = non-government organisation 1; NGO-2 = non-government organisation 2; MSF = Médecins Sans Frontières; AHRN = Asian Harm Reduction Network; MDM = Médecins du Monde; MAM = Medical Action Myanmar; SMRU = Shoklo Malaria Research Unit.

registered and treated under MMA-PPM-TB clinics and PSI PPM DOTS clinics in Myanmar in 2016 were included.

Data variables and sources of data

For the first objective, we collected the year-wise number of childhood TB patients reported under the NTP, MMA and PSI. For the second objective, we collected the individual patient-wise data that include TB code, age (year), sex, type of TB patient (new, re-treated), type of regimen (initial regimen, childhood regimen, retreatment regimen), HIV status (positive, negative, unknown/not tested), TB site (pulmonary, extra-pulmonary), treatment outcomes (cured, completed, failure, lost to follow-up, death, not evaluated) and body weight in kg (at the time of diagnosis).

Analysis and statistics

For the first objective of our study, we analysed the year-wise disaggregated number and proportion of childhood TB patients notified by the private sector. We performed a simple linear time trend analysis to assess the average annual increase/decrease in 1) the number of all childhood TB cases notified in the country; and 2) the number and proportion of childhood TB cases notified by the private sector over the study period 2014–2017.

For the second objective, we imported the routinely collected patient-wise data in an Excel database (Microsoft, Redmond, WA, USA) into EpiData analysis (v 2.2.2.183, EpiData Association, Odense, Denmark) and Stata v14.2 (StataCorp, College Station, TX, USA) and analysed. We summarised the demographic and clinical characteristics using frequencies and proportions for categorical variables and means (and standard deviations [SD]) for continuous variables. Patients were classified in three age groups: 0–4 years, 5–9 years and 10–14 years. We assessed the association between demographic and clinical factors with the treatment outcomes by dichotomising the treatment outcomes into favourable (cured, treatment completed) and unfavourable (death, lost to follow-up, failure, switched to second-line treatment and not evaluated). We described the association using relative risks (RRs) and adjusted relative risks (aRRs), and 95% confidence intervals (CIs)

derived from multivariable log binomial models. Demographic and clinical variables with $P < 0.15$ or those known to be strong predictors of unfavourable outcomes were included in the model; bivariate analysis were included in the multivariable model to obtain the adjusted risks.

Ethics approval

We obtained approval for this study from the Ethics Advisory Group of The International Union Against Tuberculosis and Lung Disease (Paris, France; EAG No: 27/18, 23/04/2018) and from the Ethical Review Committee of Department of Medical Research, Yangon, Myanmar (Ethics/DMR/2018/132, 05/10/2018). As our operational research involved a review of existing programme records, we obtained a waiver for informed consent. In order to protect the confidentiality of the data, the names of the two non-governmental organisations (NGOs) were not mentioned in the results section. Instead they are referred to as NGO-1 and NGO-2.

RESULTS

The total number of childhood TB cases notified per year during 2014–2017 and the contributions of the NTP and the private sector are shown in Figure 2. The total number of childhood TB cases notified showed a linear declining trend from 36 314 in 2014 to 28 723 in 2017, an average of 2607 per year. The simple linear equation for the trend in the decline of TB case notifications (from 2014 to 2017 is the number of cases in year (i) = $39418 - 2607 \cdot i$, where $i = 1, 2, 3, 4$ corresponds respectively to the four years 2014, 2015, 2016 and 2017. A declining trend was observed in all three age groups (Figure 3), with a steep decline among the 5–9-years age group. TB notifications in the 0–4 years and 5–9 years age groups was higher than in the 10–14 years age group over the 4-year period.

The NTP was the predominant contributor (77–80%) to the notification of childhood TB cases in Myanmar during this time

FIGURE 3 Trend in the total number of childhood TB notified in Myanmar from 2014–2017 disaggregated by age groups.

period. The private sector contribution ranged from 19% in 2014 to 17% in 2017. The contributions of others (PPM health hospitals and other implementing partners) ranged 3–4% from 2014 to 2017. The notification rate contribution of the various childhood TB partners within the private sector for 2014–2017 is shown in Figure 4. NGO-1 and NGO-2 contributed respectively 71% and 11%.

Table 1 and Table 2 show the profile, treatment outcomes and factors associated with unfavourable treatment outcomes for childhood TB diagnosed in the year 2016 and treated in the private sector NGO-1 and NGO-2. The mean age (SD) of these childhood TB patients was 5.5 years (3.3) and 57.5% were male. The successful TB treatment outcomes (cured and treatment completed) in this cohort was 97.7%.

Children aged ≥ 10 years, males, those with bacteriologically confirmed TB and those treated under NGO-1 had a relatively higher risk of unfavourable outcome compared to the children without these characteristics. Compared to children diagnosed and treated in the Yangon region, the risk of adverse outcomes was higher in four regions/states (Chin, Mandalay, Shan) and lower in Ayeyarwaddy.

DISCUSSION

This study revealed three important findings. First, the number of childhood TB cases notified in Myanmar is greater than the WHO's estimated number of childhood TB cases published in the Global TB reports.^{1,12,13} Second, the trend in the overall childhood TB cases notified in Myanmar decreased. The relative contribution of the private sector to childhood TB notification was constant at approximately 17–19% over the past 4 years. Third, the profile of the childhood TB patients diagnosed and treated in the private sector indicated that 99% of the childhood TB cases were diagnosed clinically and the treatment success rate was very high.

The major strength of this study is that we used routinely collected data from NTP and the PPM project partners without any exclusion criteria; therefore the study represents all recorded/reported data that were available within the country at the time of the study.

There are two major limitations to this study. First, we did not validate the patient data with any other external sources and we are not aware of the magnitude of errors in the routine recording and reporting systems. Given the strong supervision and monitoring systems under the PPM projects, we believe that these errors are likely to be unintentional, minimal and random and

FIGURE 4 Contribution of the different NTP Public Private Mix partners towards childhood TB notification from the private sector in Myanmar (2014–2017) [$n = 28,046$]. *Public-public mixed hospitals, other implementation partners (MSF Holland, MSF Switzerland, AHRN, MDM, MAM and SMRU). TB = tuberculosis; NTP = National TB Programme; NGO-1 = non-government organisation 1; NGO-2 = non-government organisation 2; MSF = Médecins Sans Frontières; AHRN = Asian Harm Reduction Network; MDM = Médecins du Monde; MAM = Medical Action Myanmar; SMRU = Shoklo Malaria Research Unit.

therefore unlikely to bias the interpretation of the results. Second, our study variables were restricted to only those variables that were routinely collected by the programme. We did not have information on clinical/diagnostic tests that the children underwent prior to clinical diagnosis with TB. We are unable, therefore, to comment on this aspect in our study. Despite these limitations, we feel the study findings have the following public health implications.

First, there was a large gap (~25%) between the actual number of childhood TB cases notified in the country in 2017 ($n = 28\,723$) and the WHO estimates of childhood TB for Myanmar in 2017 ($n = 23\,000$, 95% CI 21 000–26 000). We are not sure whether this represents an over-diagnosis of childhood TB in Myanmar or an underestimate by the WHO.¹ Given that more than 99% of the children were clinically diagnosed in this cohort of private sector treated childhood TB patients, there is a possibility of over-diagnosis in our setting. The reasons for possible over-diagnosis and whether the diagnostic algorithm (Figure 1) is being followed are unknown. Estimating the magnitude of the reasons for over-diagnosis is an area for future research. The higher proportion of TB notified in children aged 0–4 and 5–9 years could be related to the poor immune system secondary to undernutrition.^{14–16} According to the Myanmar Demographic and Health Survey (2015–2016), 19% of children aged > 5 years were underweight.¹⁷

The second implication for public health is the declining trends in childhood TB notifications of about 7–8% every year since 2014. The NTP has been engaged in advocating the importance of childhood TB diagnosis and treatment, isoniazid preventive therapy for children aged > 5 years and children living with HIV in all states and regions since 2014. The other major interventions implemented by the NTP since 2014 were the development of guidelines and standard operational procedures for the diagnosis of childhood TB cases and training for the programme staff. A similar declining trend was not seen in adult TB patients during this time period. Although we are unable to specify the reasons for the decline in childhood TB patients, the declining trend could be real (as it was seen uniformly in both the public sector and the private sector) and could be an indicator of the ef-

TABLE 1 Profile of childhood TB diagnosed and treated in the private sector in Myanmar in 2016 and factors associated with unfavourable treatment outcome

Characteristics	Total		Unfavourable outcome*		RR (95% CI)	P value	aRR (95% CI)
	n	Col %	n	Row %			
	5616†		157	2.8			
States/regions							
Ayeyawady	571	10.2	5	0.9	0.3 (0.1–0.8)‡	0.015	0.4 (0.1–0.9)‡
Bago	542	9.7	12	2.2	0.9 (0.5–1.6)	0.815	1.0 (0.6–1.8)
Chin	94	1.7	14	14.9	5.3 (2.9–9.6)‡	<0.001	6.1 (3.2–11.5)‡
Kachin	91	1.6	0		NA	NA	NA
Kayah	39	0.7	2	5.1	1.8 (0.5–7.3)	0.397	1.6 (0.4–6.6)
Kayin	31	0.6	2	6.5	2.3 (0.6–9.2)	0.239	2.1 (0.6–8.4)
Magway	142	2.5	1	0.7	0.3 (0.0–1.8)	0.171	0.3 (0–2.1)
Mandalay	409	7.3	16	3.9	1.4 (0.8–2.5)	0.271	2.0 (1.1–3.6)‡
Mon	384	6.8	6	1.6	0.6 (0.2–1.3)	0.183	0.6 (0.2–1.4)
Nay Pyi Taw	11	0.2	0		NA	NA	NA
Rakhine	64	1.1	0		NA	NA	NA
Sagaing	1351	24.1	30	2.2	0.8 (0.5–1.3)	0.349	1.1 (0.6–1.9)
Shan	29	0.5	2	6.9	1.9 (1.2–3.2)‡	0.008	3.3 (2–5.5)‡
Tanintharyi	16	0.3	0		NA	NA	NA
Yangon	1139	20.3	32	2.8	Reference	Reference	Reference
Age, years							
0–4	2329	41.5	65	2.8	1.2 (0.9–1.7)	0.241	1.1 (0.8–1.6)
5–9	2562	45.6	58	2.3	Reference	Reference	Reference
10–14	725	12.9	34	4.7	2.1 (1.4–3.1)‡	0.001	1.6 (1.1–2.5)‡
Sex							
Male	3232	57.5	103	3.2	1.4 (1–1.9)‡	0.040	1.4 (1.0–2.0)
Female	2384	42.5	54	2.3	Reference	Reference	Reference
Diagnosis							
Bacteriological	44	0.8	6	13.6	5.0 (2.4–10.8)‡	<0.001	2.9 (1.2–6.7)
Clinical	5572	99.2	151	2.7	Reference	Reference	Reference
Type of TB							
New	5613	99.9	156	2.8	Reference	Reference	Reference
Previously treated	3	0.1	1	33.3	12.0 (2.4–59.9)‡	0.002	1.4 (0.9–26)
Site of TB							
Pulmonary	3904	69.5	116	3.0	1.2 (0.9–1.8)	0.229	1.4 (0.9–2.2)
Extrapulmonary	1712	30.5	41	2.4	Reference	Reference	Reference
Regimen§							
Initial	177	3.2	14	7.9	3.0 (1.8–5.1)‡	<0.001	Not estimated
Retreatment	3	0.1	1	33.3	12.8 (2.6–63.7)‡	0.002	Not estimated
Childhood	5436	96.8	142	2.6	Reference	Reference	Not estimated
HIV status							
Negative	1825	32.5	54	0.5	Reference	Reference	Reference
Positive	18	0.3	2	11.1	3.8 (1.0–14.2)	0.052	3.3 (0.9–11.9)
Unknown/not tested	3773	67.2	101	2.7	0.9 (0.7–1.3)	0.547	1.0 (0.7–1.5)
PPM							
NGO-1	4864	86.6	153	3.1	5.9 (2.2–15.9)‡	<0.001	8.6 (3.1–23.6)‡
NGO-2	752	13.4	4	0.5	Reference	Reference	Reference

*Treatment failure, died, loss to follow-up, moved to second-line treatment, not evaluated.

†The total number of childhood TB cases notified in 2016 from two private sectors as shown in Figure 2 and Table 2 differ because of difference in the reporting period. The aggregate data for the year 2016 in Figure 2 are from mid-December 2015 to mid-December 2016. The individual data presented in Table 2 are from January to December 2016.

‡Statistically significant ($P < 0.05$).

§The regimen variable was not included in the adjusted model although it is significant in the unadjusted analysis; this is due to the multicollinearity with type of TB patients.

TB = tuberculosis; Col = column; RR = relative risk; CI = confidence interval; aRR = adjusted relative risk; NA = not applicable; PPM = public-private mix project; HIV = human immunodeficiency virus; NGO-1 = non-government organisation 1; NGO-2 = non-government organisation 2.

TABLE 2 Treatment outcomes of childhood TB diagnosed and treated in two private sectors* in Myanmar in 2016

Treatment outcomes	<i>n</i>	(%)
Total	5616	
Cured	30	(<1)
Completed	5429	(97)
Treatment failure	4	(<1)
Died	8	(<1)
Loss to follow-up	113	(2)
Not evaluated	31	(<1)
Moved to second line treatment	1	(<1)

*NGO-1 = non-government organisation 1; NGO-2 = non-government organisation 2.

fort made by the NTP to strengthen the quality of childhood TB diagnosis.

Third, the treatment success rate reported in our study is very high (>97%) compared to treatment success rates reported elsewhere.^{18–21} The high treatment success rate found in our study could be due to better training of private health care providers under the PPM projects, the availability of treatment adherence supporters for tracing patients lost to follow-up, the provision of incentives to providers, flexible clinic hours and geographical accessibility. Anecdotal evidence indicates that private health care providers refer severe forms of childhood TB (including MDR-TB) for treatment at public health facilities and treat only the non-severe forms of childhood TB. This could explain the high treatment success rates in the private sector.

Finally, despite the high treatment success rates, an analysis of the factors associated with unfavourable treatment outcomes suggests that the care provided for childhood TB can be further improved. Notable areas for improvement are the HIV testing rates of childhood TB patients from the current levels of 32%, the treatment outcomes particularly in Chin state and the Shan and Mandalay regions, in children aged 10–14 years and among males. All of these factors could be addressed by improvements in supportive supervision and monitoring. The high aRR of the unfavourable outcomes in patients treated under the NGO-1 compared to the low levels of unfavourable outcomes under the NGO-2 does not indicate relatively poor NGO-1 project implementation, but is due to the implementation of the project in hard-to-reach areas.

In conclusion, this study shows that the number of childhood TB cases notified in Myanmar is higher than the WHO estimates, the number of notified patients is declining by 7–8% every year, approximately one of five childhood TB cases notified are diagnosed and treated in the private sector and the treatment success rate of these cases is very high. The declining trend needs to be

monitored; assessing the reasons for the decline is an area for future research.

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Contexte : Programme national de lutte contre la tuberculose (NTP) du Myanmar.

Objectif : Décrire 1) les tendances de la notification de la TB de l'enfant (≤ 14 ans) de 2014 à 2017 et quantifier la contribution du secteur privé à cette notification; et 2) le profil et les résultats du traitement de la TB prise en charge dans le secteur privé en 2016.

Schéma de l'étude : Etude d'observation impliquant une revue des registres et des rapports de routine du NTP, des projets conjoints Public-Privé (PPM) gérés par la Myanmar Medical Association et par Population Service International.

Résultats : Le nombre total de cas de TB de l'enfant notifiés a décliné de 36 314 en 2014 à 28 723 en 2017 (déclin annuel moyen = 2607

cas par an). La contribution du secteur privé à la notification est restée entre 17 et 19%. Sur les 5616 TB de l'enfant diagnostiquées et traitées dans le cadre des deux projets PPM en 2016, 99% ont été diagnostiquées sur la clinique et 5459 (97,7%) ont eu un bon résultat du traitement. Les enfants âgés de >10 ans, de sexe masculin, ceux ayant une TB confirmée par bactériologie, ceux traités dans les régions/états de Mandalay, Chin et Shan ont eu un risque plus élevé de mauvais résultats (pertes de vue, décès, passage à un traitement de deuxième ligne et non évalués).

Conclusion : La notification de la TB de l'enfant montre une tendance déclinante. Une TB notifiée dans les cinq ans a été diagnostiquée et traitée dans le secteur privé et le taux de succès du traitement a été très élevé.

Marco de referencia: El Programa Nacional contra la Tuberculosis (PNT) de Birmania.

Objetivo: Describir 1) la tendencia en la notificación de la TB de los niños (<14 años) del 2014 al 2017 y cuantificar la contribución del sector privado a esta notificación; y 2) el tipo de TB y el desenlace del tratamiento antituberculoso de los niños tratados en el sector privado en el 2016.

Métodos: Fue este un estudio observacional a partir del examen de las historias clínicas corrientes y las notificaciones del PNT, los proyectos de colaboración publicoprivada (PPM) dirigidos por la Asociación Médica de Birmania y de la organización *Population Service International*.

Resultados: El número total de casos de TB notificados en los niños disminuyó de 36 314 en el 2014 a 28 723 en el 2017 (promedio de

disminución anual: 2607 casos). La participación del sector privado a la notificación permaneció entre 17% y 19%. De los 5616 niños con diagnóstico de TB y tratados en los dos PPM en el 2016, el 99% obtuvo un diagnóstico clínico y 5459 niños (97,7%) alcanzaron el éxito terapéutico. Los niños con el mayor riesgo de desenlace desfavorable (pérdida durante el seguimiento, muerte, cambio a fármacos de segunda línea y sin evaluación) fueron los niños de edad de ≥ 10 años, los niños con confirmación bacteriológica de la TB y los que recibieron tratamiento en las regiones o estados de Mandalay, Chin y Shan.

Conclusión: La notificación de casos de TB en los niños exhibe una tendencia hacia la baja. Uno de cada cinco casos notificados recibió el diagnóstico y el tratamiento en el sector privado y la tasa de éxito fue muy alta.