Leprosy & MDT in children

A factsheet and a call for action

We will beat leprosy together

Rationale

Multidrug therapy (MDT) for leprosy is safe for children. However, there are potential safeguarding concerns related to the treatment of those children under 10yrs and/or children weighing under 40kg. This is due to the lack of a single World Health Organization's (WHO's) reference MDT guideline, and **the routine and inappropriate use of MDT blister packs in children under the age of 10 years and / or children weighing under 40 kg**.

Having observed first-hand the difficulties faced by children under 10 years in taking the paediatric over 10 years MDT blister pack (Figure 1), we urge for this issue to be addressed with appropriate urgency.

Below are our key supporting facts, followed by a set of short- and medium- to longer-term recommendations.

Does leprosy affect children under 10 years?

Leprosy among children is considered rare, affecting children in areas where there is a high transmission of leprosy.

The official pre-Covid data reported by the World Health Organisation (WHO[1]) indicated that at least 15,000 new leprosy cases a year globally were among children under 15 years, and that about 70% lived in India, Brazil or Indonesia. Between 2019 and 2022, inclusive, 4.2-11.5% of all new leprosy cases in India, Brazil and Indonesia were among children, and grade 2 disability among them varied between 0.8% and 5.3% (Appendix I, Tables I.1 and I.2). In the rest of the countries where the cumulative number of child cases in the last four years was also at least 100 child cases, under 15 years group represented between 1.3% (Myanmar in 2021) and 56.5% (Comoros in 2019) of all cases.

Although the data on age are routinely collected, the reporting does not disaggregate under 10 years group from older children. The available data, including the publicly accessible database on reportable diseases from Brazil and Lepra-funded referral centres in five states in India, indicate that around 30% of all child cases are those under 10 years old (Appendix II, Table II.1). Applying the 30% figure to the reported global number of new leprosy cases in 2019, we estimated that there are around 5,000 new cases in the youngest group each year. In highly endemic areas this could be

[1] The World Health Organisation Indicators https://www.who.int/data/gho/data/indicators/indicator-details/GHO/leprosy---number-of-new-child-(less-than-15-years-of-age)-cases, , last accessed on 23.10.2023

higher: in one study in Brazil the average age of child cases was 10 years old[2] and an ongoing active case finding study in Bihar, India, recorded 7.5% of *all new leprosy cases* being under the age of 10 within the first six months of their population screening efforts (ASPIRE, April 2023) (Appendix II, Table II.1).

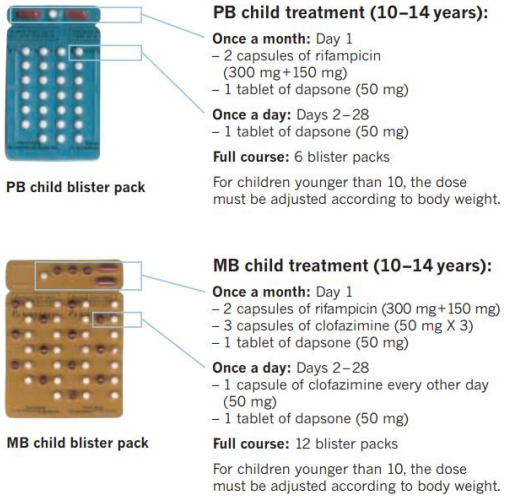
There are inherent uncertainties around the national leprosy figures reported to the WHO, related to biological, social, clinical and system factors, resulting in a highly likely underestimate of the true number of leprosy cases and uncertainties around child cases (Appendix III).

How is MDT used in children?

Like adults, children are treated with MDT, which has a good safety record, although adverse reactions can happen[3].

MDT is donated by Novartis to national governments via an annual request form sent to the WHO[4], specifying adult and child MDT requirements, and the type of leprosy prevalent in the country. Consequently, for the past few decades, MDT is being distributed in blister packs for children aged 10-14 years for the two types of leprosy, paucibacillary (PB) and multibacillary (MB), applicable to children weighing at least 40kg (Figure 1)[5,6]. More recent guidelines recommend MB treatment is used for all types of leprosy, but that hasn't been yet put into practice (more below).

Figure 1. Paediatric MDT blister packs for children (Source: Guide to Eliminate Leprosy as a Public Health Problem, WHO, 2000)



The guideline for children under 10yrs and / or those less than 40 kg issued by the WHO[6,7] is spread across two documents: the WHO 2018 Guideline on Leprosy Treatment and the Global Leprosy

[2] Santos MB, Santos ADD, Barreto AS, *et al* Clinical and epidemiological indicators and spatial analysis of leprosy cases in patients under 15 years old in an endemic area of Northeast Brazil: an ecological and time series study *BMJ Open* 2019;**9:**e023420. https://pubmed.ncbi.nlm.nih.gov/31352408/, Accessed on 23.10.2023

[3] Cited in Oliveira MB, Diniz LM. Leprosy among children under 15 years of age: literature review. An Bras Dermatol. 2016 Apr;91(2):196-203. PMID: 27192519; PMCID: PMC4861567. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4861567/, Accessed on 23.10.2023

[4] Annual request for the supply of free anti-leprosy medicines https://www.who.int/teams/control-of-neglected-tropical-diseases/leprosy/annual-request-for-the-supply-of-free-anti-leprosy-medicines , last accessed on 03/07/2023.

[5] WHO (2000) Guide to Eliminate Leprosy as a Public Health Problem https://www.who.int/publications/i/item/WHO-CDS-CPE-CEE-2000.14, Accessed on 23.10.2023

[6] WHO (2016) Global Leprosy Strategy. Operational Manual https://apps.who.int/iris/bitstream/handle/10665/250119/9789290225256-Eng.pdf?sequence=5, Accessed on 23.10.2023 on 29/06/2023.

[7]WHO (2018) Guidelines for the Diagnosis, Treatment and Prevention of Leprosy Available from: 9789290226383-eng.pdf Accessed on: 10/01/23

[8] NLEP (2019) National Leprosy Eradication Programme (NLEP) Training Manual for Medical Officers. Available from: MO_Training_Manual.pdf.pdf (webnishwebsites.com) Accessed on 10.01.23

Strategy 2016-2020. The three key related issues to the MDT guidelines for children are outlined below.

1. No single source WHO guidance available-existing guidance documents provide different recommendations.

There is a lack of a single WHO reference guideline for MDT treatment for children. In addition to this, the two guidelines that are provided, are neither clear nor aligned, and include different recommendations on the dose and / or frequency of administration (Table 1). This, in turn, creates confusion and there is further misalignment in the guidelines issued by the national leprosy programmes[8]. The latest 2021-2030 Global Leprosy Strategy hasn't reconciled or rectified this.

2. The lack of availability of formulations renders it difficult to follow either guidance

For children under 10 years and those under 40kg weight, one of the two WHO guidelines[6] recommends administering a single formulation of each drug treatment, in lieu of an MDT pack. The regime prescribes doses per kg weight, which generally suggests a soluble medicine. However, in practice, **no such MDT treatment is available**. Furthermore, within the Global Leprosy Strategy 2016-2020, the advice provided is for those children weighing 20-40kg, the MDT paediatric blister pack can be used with adaptations, none of which are operationally viable.

In addition, there is no definitive guidance on children below 10 years of age but above 40 kg body weight.

Table 1 Comparison of Child Dose MDT Regimens based on the WHO 2018 leprosy treatment guideline cited in the Global Strategy 2021-2030, Global Leprosy Strategy Recommendations and India's National Leprosy Eradication Programme (NLEP)

	WHO 2018 leprosy treatment guideline	*WHO Global Leprosy Strategy 2016-2020 Operation Manual		India NLEP
	Under 10 years of age *or* weighing under 40kg	**Children weighing 20-40kg** - relying on free MDT blister packs	**Children weighing below 20kg** - free MDT blister packs not applicable	Children **under 10 years** of age can be decided on the basis of body weight
Rifampicin	10mg/kg once per month, single formulation*	Single formulation 300mg (instead of 450mg pill included in the blister pack)	10mg/kg/per month	10mg/kg once per month
Clofazimine	100mg once a month, 50mg twice weekly, single formulation*	Clofazimine twice weekly, instead of every other day	1mg/kg/day & 6mg/kg/month	6mg/kg/month and 1mg/kg/day *(to be given the weekly capsule as the lowest available dose is 50mg)*
Dapsone	2mg/kg daily, single formulation*	Half of dapsone 50mg tablet (thus 25mg)	2mg/kg/day	2mg/kg daily

* WHO 2018 guideline on leprosy treatment refers readers to the Leprosy Global Strategy 2016-2020 for instructions on how to use MDT blister pack for treatment of children weighing between 20kg and 40kg, shown in the next column.

To circumvent the problem, the guidance provided in the Global Leprosy Strategy 2016-2020[5] gives an alternative for the children weighing between 20kg and 40kg, where it recommends using free

10–14-year-old MDT blister packs with modifications to the drug regime, so that the tablets are either halved or used on alternate days. This also proves unworkable for the following two reasons: the guideline again relies on a single formulation of rifampicin 300mg, which would have to be halved, but these are capsules and are not scored, rendering it challenging to cut for accurate dosage. Similarly, to reach the 25mg dose of dapsone, the tablet would have to be halved, these tablets are very small and are also not scored, and therefore it would be challenging to achieve the correct dosage. In reality, due to the lack of clear guidance, health workers resort to using the 10-14 blister packs - as they are.

3. Lack of evidence on adherence to child MDT, by type of formulation

The above has implications not only for over-dosing the youngest patients, but also the ongoing challenges for children to swallow the tablets, in particular rifampicin, which is large and insoluble (Figure 1, two long capsules at the top). This, in turn, has potential implications for adherence to MDT[7, 8] and research is needed to understand the magnitude of this issue. Without alternative solutions being explored, such as introducing scored or soluble single formulations for this age group of patients, the scale of non-adherence to MDT is unknown.

Summary

There is a lack of a single, clear WHO guideline for treatment of leprosy for under 10 years old / under 40kg. There is also a lack of appropriate paediatric formulations such as in soluble form for the treatment of the youngest children.

Given the circumstance, the paediatric (10-14years) MDT blister packs are being used for children of all ages, including for those who will struggle to swallow the medication, and may receive an inappropriately high dose.

Finally, and most significantly, this has not been considered a problem. Paediatricians have occasionally raised concerns over MDT medicines with children finding MDT medicines hard to swallow and the corresponding lack of adherence and the need for syrups to address this[9, 10]. These problems however are not impossible to overcome, as demonstrated by the tuberculosis community

[7] Oliveira MB, Diniz LM. Leprosy among children under 15 years of age: literature review. An Bras Dermatol. 2016 Apr;91(2):196-203. PMID: 27192519; PMCID: PMC4861567. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4861567/, Accessed on 23.10.2023

[8] Narang, Tarun; Kumar, Bhushan. Leprosy in Children. Indian Journal of Paediatric Dermatology 20(1):p 12-24, Jan–Mar 2019. https://journals.lww.com/ijpd/Fulltext/2019/20010/Leprosy_in_Children.3.aspx, Accessed on 23.10.2023

[9] Oliveira MB, Diniz LM. Leprosy among children under 15 years of age: literature review. An Bras Dermatol. 2016 Apr;91(2):196-203. PMID: 27192519; PMCID: PMC4861567. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4861567/, Accessed on 23.10.2023

[10] Narang, Tarun; Kumar, Bhushan1,. Leprosy in Children. Indian Journal of Paediatric Dermatology 20(1):p 12-24, Jan–Mar 2019. https://journals.lww.com/ijpd/Fulltext/2019/20010/Leprosy_in_Children.3.aspx., Accessed on 23.10.2023

where dispersible child-friendly formulations have been available since 2015, including rifampicin[11,12].

Recommendations

To address the shortcomings of the current guidelines and practices, we recommend the following:

1. **Immediate action required:**
   a. The WHO to provide clear and practical guidance within **one** document, without room for misinterpretation and without ambiguity;
   b. The WHO requests that cases on children under 10 are disaggregated from older children in routine reporting to enable planning and accountability;

   followed by:

   c. National leprosy programmes to ensure all health workers who diagnose and prescribe leprosy are aware of updated WHO guidance, as in (a, b) above. To facilitate, the patient card should require recording weight for all children under 15.
   d. District / local level administrators and Medical Officers to ensure funding for, and access to scales for weighing children.

2. **Mid-term action required**:
   a. WHO to convene key stakeholders: international and national experts (including representatives of affected individuals and family members), health system leaders, clinical pharmacologists, paediatricians and practitioners to produce recommendations along these identified needs:

      i. Ensure that dose calculations are clear and consistent within and across guidelines.

      ii. Consider weight bands for monthly rifampicin (10-20mg/kg)

      [8-15 kg – 150mg]
      [>15-30 kg -300mg]
      [>30 - <40 kg – 450 mg]

      and / or Investigate the feasibility of height-based dosing.

      iii. No calculations needed for determining the dose for clofazimine (see Table 1)
      iv. Dapsone – consider less than daily dosing i.e., twice per week.
      v. Under 10 years old but greater than 40 kg
      vi. Develop prescribing aids for health care workers / responsible adults and carers.
      vii. Develop patient information leaflets.

[11] World Health Organization, WHO Consolidated Guidelines on Tuberculosis, 2022 https://www.who.int/publications/i/item/9789240046764, Accessed on 23.10.2023
[12] TBFacts.org, TB treatment for Children – Drugs, FDCs (webpage) https://tbfacts.org/tb-treatment-children/, Accessed on 23.10.2023

viii. Recommend tools and communication strategies for health care workers to counsel responsible adults about MDT for children
ix. Develop instruments to measure adherence to MDT among children, and reasons for non-adherence.
x. Review recommendation for a uniform MDT for children based on a proper consideration of informed patient / carer preferences.

followed by:

b. National leprosy programmes to adapt the global prescribing aids for health care workers, communication strategies for health care workers to counsel responsible adults about MDT for children culturally appropriate patient information leaflets, appropriate for different literacy levels, involving carer and patient representatives.

3. Mid- to long-term action required:
   a. WHO to convene drug companies and key stakeholders, including carer and patient representatives, to explore the utility of other formulations to promote ease of prescribing and administration

   followed by

   b. National-level health administrators ensure the adoption of all of the above, and the district-level health administrators ensure their implementation, with technical assistance from non-governmental organisation as needed, and involving carer and patient representatives.

Appendix I. WHO Leprosy Indicators

Table I.1 Summary of child cases in countries with 100+ child cases in 2019, 2020, 2021 or in 2022

	Number child cases				Number all cases				Percent child cases			
Location	**2022**	**2021**	**2020**	**2019**	**2022**	**2021**	**2020**	**2019**	**2022**	**2021**	**2020**	**2019**
India	5,586	4,107	3,753	7,859	103,819	75,394	65,147	114,451	5.4%	5.4%	5.8%	6.9%
Indonesia	1,226	1,133	1,126	2,009	12,441	10,976	11,173	17,439	9.9%	10.3%	10.1%	11.5%
Brazil	836	761	878	1,545	19,635	18,318	17,979	27,863	4.3%	4.2%	4.9%	5.5%
Ethiopia	364	288	390	507	2,966	2589	2591	3201	12.3%	11.1%	15.1%	15.8%
DR of the Congo	328	498	578	158	3,720	4148	3385	3032	8.8%	12.0%	17.1%	5.2%
Mozambique	221	221	212	211	2,608	2,639	2,065	2,220	8.5%	8.4%	10.3%	9.5%
Nigeria	155	212	87	276	2,393	2398	1417	2424	6.5%	8.8%	6.1%	11.4%
Sri Lanka	155	109	130	176	1,401	1025	1212	1658	11.1%	10.6%	10.7%	10.6%
Bangladesh	148	169	189	210	2,988	2872	3766	3638	5.0%	5.9%	5.0%	5.8%
Papua New Guinea	113	99	107	180	495	475	473	577	22.8%	20.8%	22.6%	31.2%
Angola	106	93	56	116	860	797	422	721	12.3%	11.7%	13.3%	16.1%
Comoros	76	86	78	270	263	239	236	478	28.9%	36.0%	33.1%	56.5%
Nepal	73	126	142	293	2,285	2394	2304	3844	3.2%	5.3%	6.2%	7.6%
South Sudan	63	56	84	120	955	713	682	1152	6.6%	7.9%	12.3%	10.4%
Somalia	33	106	108	35	2,307	2030	2638	2425	1.4%	5.2%	4.1%	1.4%
Myanmar	25	8	47	105	1,234	595	1877	2488	2.0%	1.3%	2.5%	4.2%
Liberia	-	135	-	28	-	357	-	99	-	37.8%	-	28.3%

Source: WHO WHO, link child leprosy cases WHO, link all leprosy cases

Table I.2 Summary of Grade 2 Disability among child cases in countries with 100+ child cases in 2019, 2020, 2021 or in 2022

	Number G2D child cases				Number child cases				Percent G2D child cases			
Location	**2022**	**2021**	**2020**	**2019**	**2022**	**2021**	**2020**	**2019**	**2022**	**2021**	**2020**	**2019**
India	55	41	35	63	5,586	4,107	3,753	7,859	1.0%	1.0%	0.9%	0.8%
Indonesia	28	16	24	30	1226	1,133	1,126	2,009	2.3%	1.4%	2.1%	1.5%
Brazil	44	29	35	50	836	761	878	1,545	5.3%	3.8%	4.0%	3.2%
Ethiopia	42	32	55	77	364	288	390	507	11.5%	11.1%	14.1%	15.2%
DR of the Congo	0	5	0	-	328	498	578	158	0.0%	1.0%	0.0%	-
Mozambique	12	33	51	13	221	221	212	211	5.4%	14.9%	24.1%	6.2%
Nigeria	8	8	-	19	155	212	87	276	5.2%	3.8%	-	6.9%
Sri Lanka	1	2	1	1	155	109	130	176	0.6%	1.8%	0.8%	0.6%
Bangladesh	1	1	2	3	148	169	189	210	0.7%	0.6%	1.1%	1.4%
Papua New Guinea	2	2	9	11	113	99	107	180	1.8%	2.0%	8.4%	6.1%
Angola	9	72	6	0	106	93	56	116	8.5%	77.4%	10.7%	0.0%
Comoros	-	-	-	-	76	86	78	270	-	-	-	-
Nepal	4	1	6	2	73	126	142	293	5.5%	0.8%	4.2%	0.7%
South Sudan	-	0	1	0	63	56	84	120	-	0.0%	1.2%	0.0%
Somalia	0	0	0	0	33	106	108	35	0.0%	0.0%	0.0%	0.0%
Myanmar	3	0	0	7	25	8	47	105	12.0%	0.0%	0.0%	6.7%
Liberia	-	0	-	0	-	135	-	28	-	0.0%	-	0.0%

Source: WHO link to child leprosy cases with G2D link to all child cases

Appendix II. Rapid literature review

Table II.1 Selected studies and figures on child leprosy cases

	Age category							
Type of source	**Child (<15)**	**10-14**	**Under 10**	**Geography**	**Source**	**Time period**	**Reference**	**Author conclusion**
Peer reviewed literature		44.15% - 70.3% child cases	29.7%-54.54% child cases	Global	Varied	Overall spanning 1995 -2013	Oliveira MB, Diniz LM. An Bras Dermatol. 2016 Apr;91(2):196-203. link	Prevalence: given long incubation period, 10-14 age group is more affected; however, in one study in Brazil 54.54% cases were in fact in 5-9 year old patient group. "The lack of medicines made for children in the form of oral solutions is a limiting factor of the treatment. "
National surveillance database	n=991, 3.9% of all cases	665 67.1% child cases	326 32.9% child cases	Brazil	SINAN / Ministry of Health link	2022	N/A	N/A (Note: there is discrepancy between SINAN / Ministry of Health database leprosy figures, and those reported to and published by the WHO.)
Programmatic data	169	111 65.7% child cases	58 34.3% child cases	Six states in India	Clinical records of Lepra Society Referral Centres	April 2022-March 2023	Available upon request	N/A (Note: In the whole state of Bihar, 32.1% of all child cases were under 10 years old. ASPIRE confirms that active cases finding results in diagnoses at an earlier age)
Published Study	538	Age: mean and standard deviation 10.07±3.38 PB 10.5±2.81 MB		Reported cases of patients under 15, link	SINAN / Ministry of Health	2002-2015	Santos MB, Santos ADD, Barreto AS, Souza MDR, Goes MAO, Barreto Alves JA, Barreto IDC, Silva JS, Oliveira DT,	Child leprosy patients detected by examination in household contacts presented lower mean of age, affected nerves, number of lesions, occurrence of leprosy-

		(Note: if symmetric around the mean, half of the participants are expected to be 10 and under and half 10 or older)					Araújo KCGM, Duthie MS, Jesus. BMJ Open. 2019 Jul 27;9(7):e023420. link	related reactions and no physical disability, when compared with passive case detection or referral by others
Published Study	103	73 70.9% child cases	30 29.1% child cases	Cuba	Reported cases	1st April, 2010 to 31st March, 2015. A	Gitte SV, Sabat RN, Kamble KM. Indian Pediatr. 2016 Mar;53(3):221-4. link	
Published Study	11% of the total number	N/A	N/A	India, national sample survey	Active case finding	2011	Katoch K, Aggarwal A, Yadav VS, Pandey A. Indian J Med Res. 2017 Nov;146(5):585-605. link	The proportion of children higher than in official figures and this requires special focus in the Programme.
Ongoing operational research	75 (15.9% all new cases)	42 56.0% child cases (8.9% all new cases)	33 44.0% child cases (7% all new cases)	Jamui District, Bihar, India	Rapid Enquiry Survey	Nov 2022-August 2023	ASPIRE link	One in 6 new cases are children, one in 16 under 10 year old. Children attending schools haven't been screened yet.

Appendix III. Rapid assessment of accuracy of national leprosy figures published by the WHO

There are inherent uncertainties around the official WHO leprosy figures related to biological, social, clinical and system factors. Most often, the uncertainties are expected to lead to underestimate in the official figures (e.g. lack of active case finding, under-reporting), and a few factors may lead to inaccuracies with either over- or under-estimation (not knowing child's exact age, diagnostic uncertainty). Further detail is in the table below.

Table III.1 Sources of uncertainty in the number of leprosy cases reported to the WHO: overall and child leprosy cases

	Setting	Example Estimate	Reference	Author conclusion
Source of under-estimation				
Lack of active case finding	India	. Total number of cases nearly three times higher than officially reported across India. . Child cases estimated at 11% (double than in official figures)	Katoch K, Aggarwal A, Yadav VS, Pandey A. Indian J Med Res. 2017 Nov;146(5):585-605. link	The proportion of children and adolescents detected in the survey were higher than in official figures and this requires special focus in the Programme. There was no significant difference between rural and urban areas.
	Brazil	Modelling suggests that the true number of leprosy cases is about two times higher than the reported	Blok, D. J., de Vlas, S. J., & Richardus, J. H. (2016). *Lancet Infect Dis, 16*(10), 1113. link	
Under-reporting of diagnosed new cases	India	.41% of all new cases detected go unreported, mostly from the private sector . Child patients were 159 out of 3,701 (4.29%)	Rao PN, Rathod S, Suneetha S, Dogra S, Gupta SK, Vora R, Kamoji S, Tambe S. Indian Dermatol Online J. 2020 Sep 19;11(5):701-711. link	Extrapolating from 201 dermatologists to 5,000 private registered dermatologists, and from a 3 to 12 months study period, 2017
	Brazil	. 9.6% new leprosy cases went unreported in the country, varying from 8.4% to 14.1% across the Brazilian States. . Under-reporting was positively associated with poverty and with household contacts	de Oliveira GL, Oliveira JF, Pescarini JM, Andrade RFS, Nery JS, Ichihara MY, Smeeth L, Brickley EB, Barreto ML, Penna GO, Penna MLF, Sanchez MN. PLoS Negl Trop Dis. 2021 Aug 25;15(8):e0009700. link	

	Nepal	Under-reporting associated with poverty among children . The number of new leprosy cases was under-reported by 5.5%. . Under-reporting was observed in released-from-treatment cases (19.2% variation) and transfer-out cases (21.4% variation).	Vieira MCA, Nery JS, Paixao ES, Freitas de Andrade KV, Oliveira Penna G, Teixeira MG. PLoS Negl Trop Dis. 2018;12(10):e0006788. link Rabindra Baskota, Rashmi Baral, P46 *British Journal of Dermatology*, Volume 188, Issue Supplement_4, June 2023, ljad113.074, abstract only link	Full paper not available yet, no explanation on how variation was estimated
Lack of awareness among health professionals	Global India	Misdiagnosis was a core healthcare factor related to delays Delays in diagnosing	Dharmawan Y, Fuady A, Korfage IJ, Richardus JH (2022) PLoS Negl Trop Dis 16(9): e0010756. link Muthuvel T, Govindarajulu S, Isaakidis P, Shewade HD, Rokade V, Singh R, et al. (2017) PLoS Negl Trop Dis 11(1): e0005192. link	
Children depend on adults for access to health care	India	Access to care is poor especially in rural areas In many rural areas, women need to seek permission from a man in the family before being allowed to travel or use money to pay for either healthcare consultations or drug treatment. The financial autonomy of women is a key determinant of child health.	Pappachan B, Choonara I. Inequalities in child health in India. BMJ Paediatr Open. 2017 Aug 4;1(1):e000054. link	
Source of over or under-estimation				
Indeterminate cases	India	56 (1.59%) of all cases found to be indeterminate	Rao PN, Rathod S, Suneetha S, Dogra S, Gupta SK, Vora R, Kamoji S, Tambe S. Indian Dermatol Online J. 2020 Sep 19;11(5):701-711. link	N/A (Note: if self-healed but treated – over-diagnosis; If lost to follow-up but later developed symptoms and not treated – underdiagnosis. Indeterminate cases are dwarfed by

				the number of undiagnosed and unreported cases)
Not knowing child's age	India	20% of children born in 2015-16 don't have a birth certificate; this was more the case in previous years	UNICEF link	(Note: Parents may over- or under-estimate the age of their children)
Data reporting errors	Nepal	.Over-reporting was observed in re-treatment cases (7% variation), defaulter cases (10.6% variation) and new paediatric cases (38% variation).	Rabindra Baskota, Rashmi Baral, P46 *British Journal of Dermatology*, Volume 188, Issue Supplement_4, June 2023, ljad113.074, abstract only link	Full paper not available yet, no explanation on how variation was estimated