

Strongiloidosi



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strongyloidiasis and other
Neglected Tropical Diseases



Previous estimates of global prevalence

Genta et al (1989) reported a range **from 3 to 30 million infected people**, although the author referred to these estimates as “little more than inspired guesses”.

Bethony et al (2006) reported a range of **30-100 million people**, but neither the source nor the methods at the basis of these estimates were reported in the paper

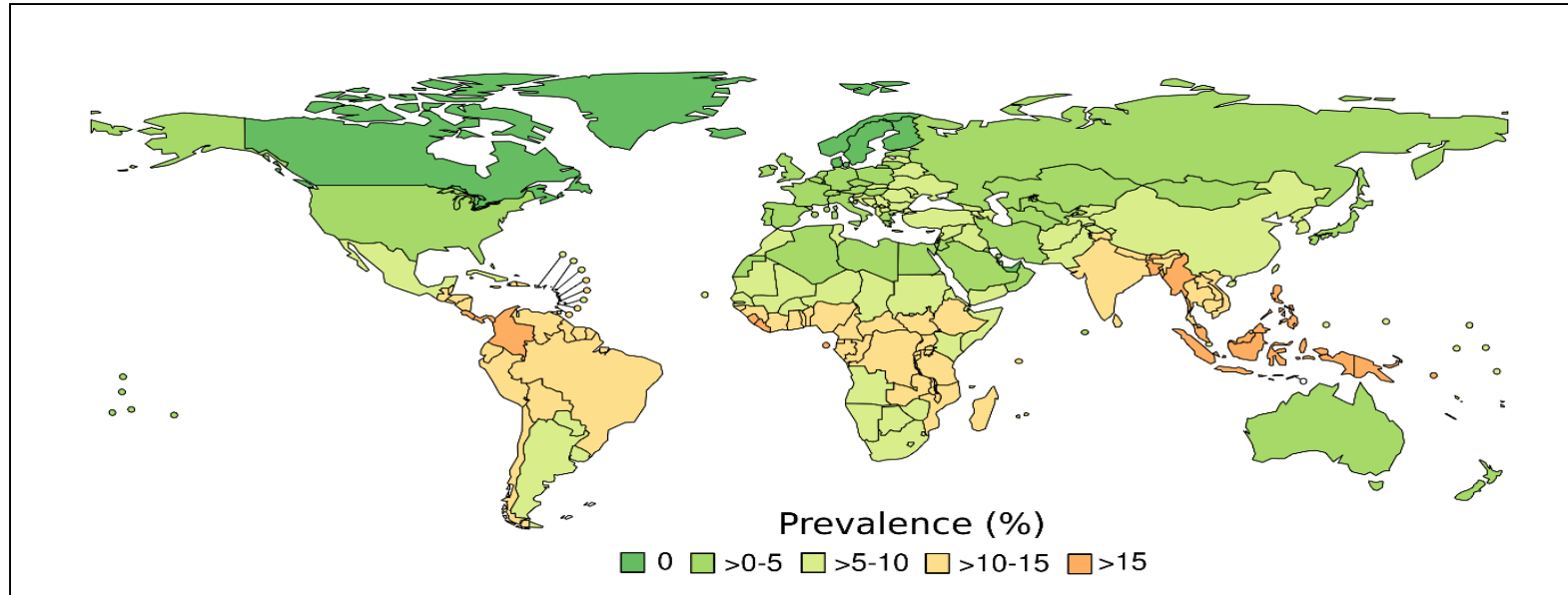
Bisoffi et al (2013) reported a prevalence of “**at least 370 million people**” infected worldwide, calculated as a ratio to hookworm

Genta RM.
Global prevalence of strongyloidiasis: critical review with epidemiologic insights into the prevention of disseminated disease.
-Rev Infect Dis. 1989

Bethony J, Brooker S, Albonico M, Geiger SM, Loukas A, Diemert D, et al.
Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm.
Lancet 2006;367(9521):1521-32.

Bisoffi Z, Buonfrate D, Montresor A, Requena-Mendez A, Munoz J, Krolewiecki AJ, et al. Strongyloides stercoralis: a plea for action.
PLoS neglected tropical diseases. 2013;7(5):e2214.

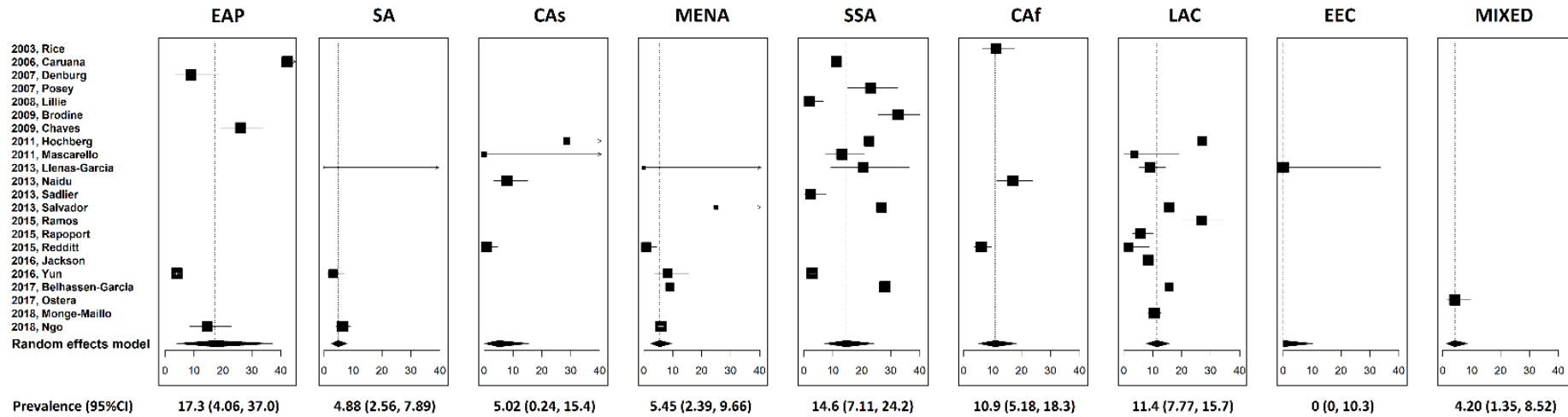
New estimates of global prevalence



613.9 million infected individuals (95% CI: 313.1–910.1 million)

Buonfrate D, et al.
[The Global Prevalence of *Strongyloides stercoralis* Infection.](#)
Pathogens. 2020 Jun 13;9(6):468. doi: 10.3390/pathogens9060468

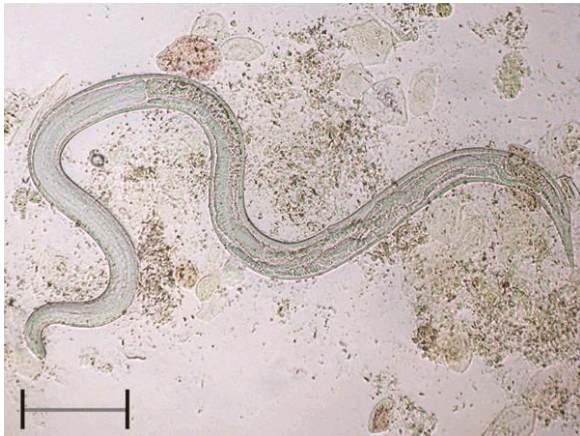
Important health problems in migrants?



17.4%

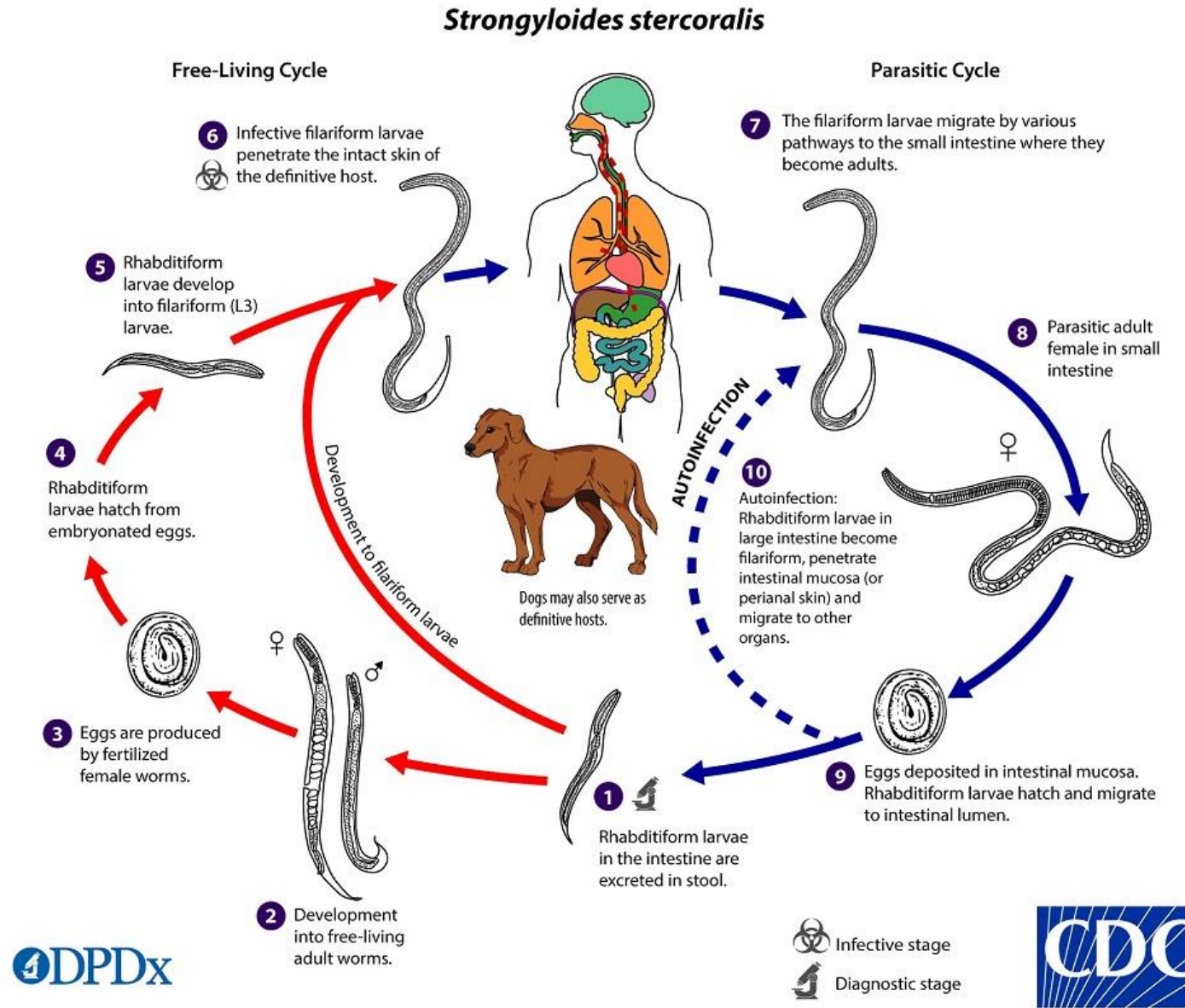
14.3%

11.4%

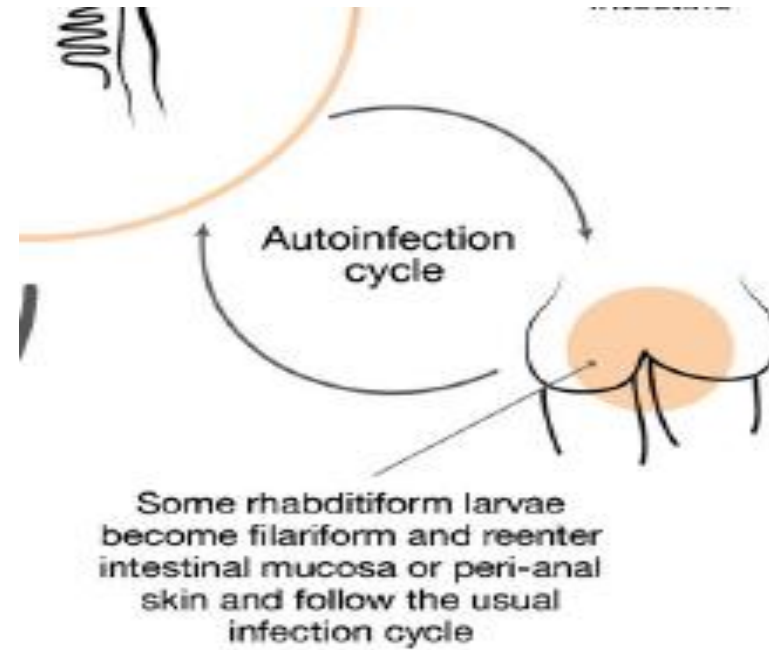


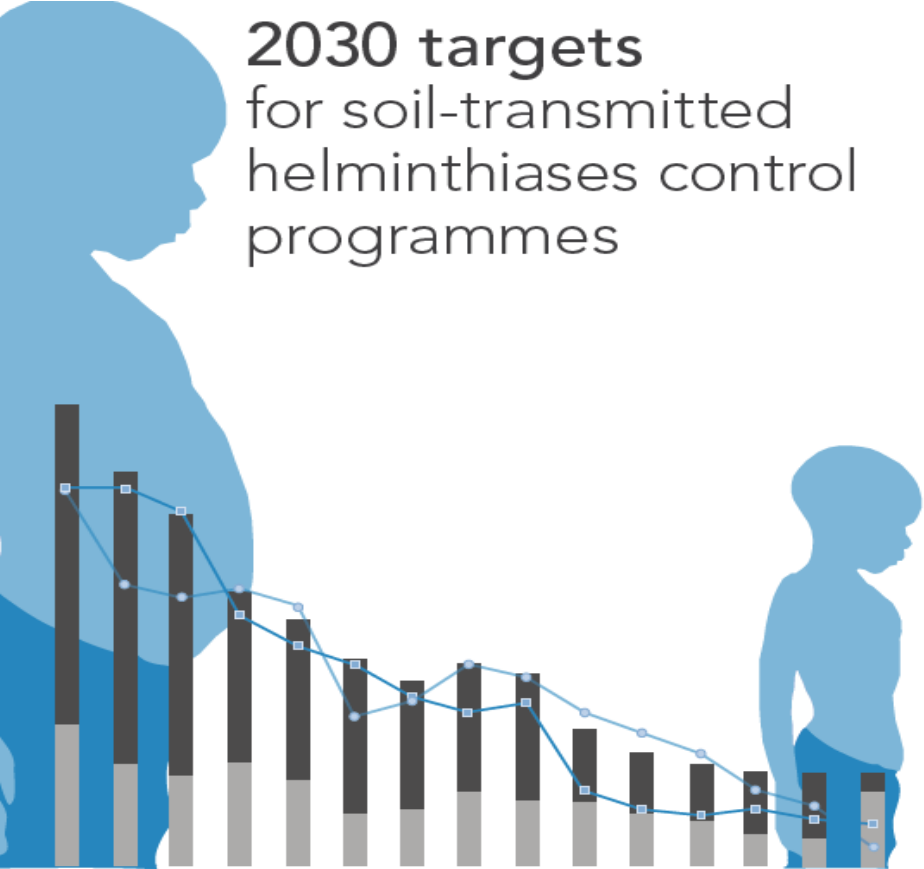
Strongyloidyiasis

Pooled prevalence >10% EAP, SSA and LAC



Autoinfection





3.5. Strongyloidiasis

Groups at risk	SAC (ivermectin is not approved for use in pre-SAC)
Target #4	Establish an efficient strongyloidiasis control programme in SAC
Intention	To recognize the public health importance of strongyloidiasis as a soil-transmitted helminth infection and to include it in STH prevention and control programmes
Activities to achieve the target	In areas of high endemicity of <i>S. stercoralis</i> , to distribute ivermectin together with either albendazole or mebendazole



Karamoja, Uganda, 2005

Zenzelema P.S toilet

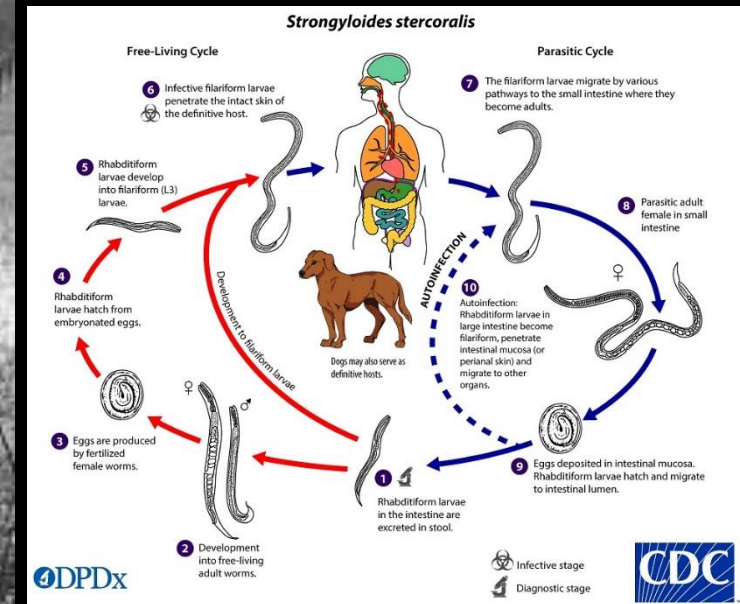


Courtesy of Melaku Anegagrie Mekonen, Mundo Sano Ethiopia, 2021

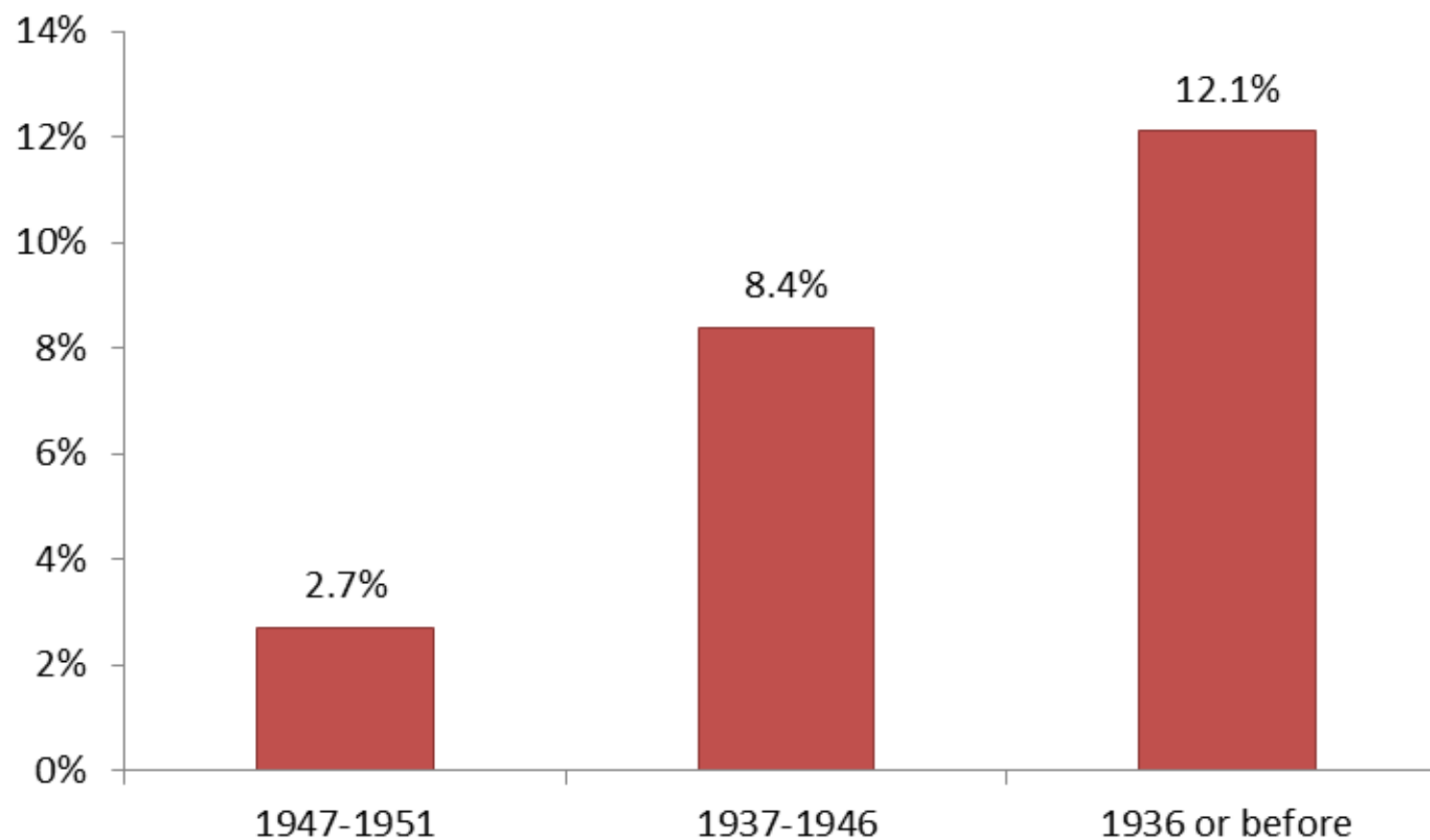
Prevalenza in Italia: memoria del passato...



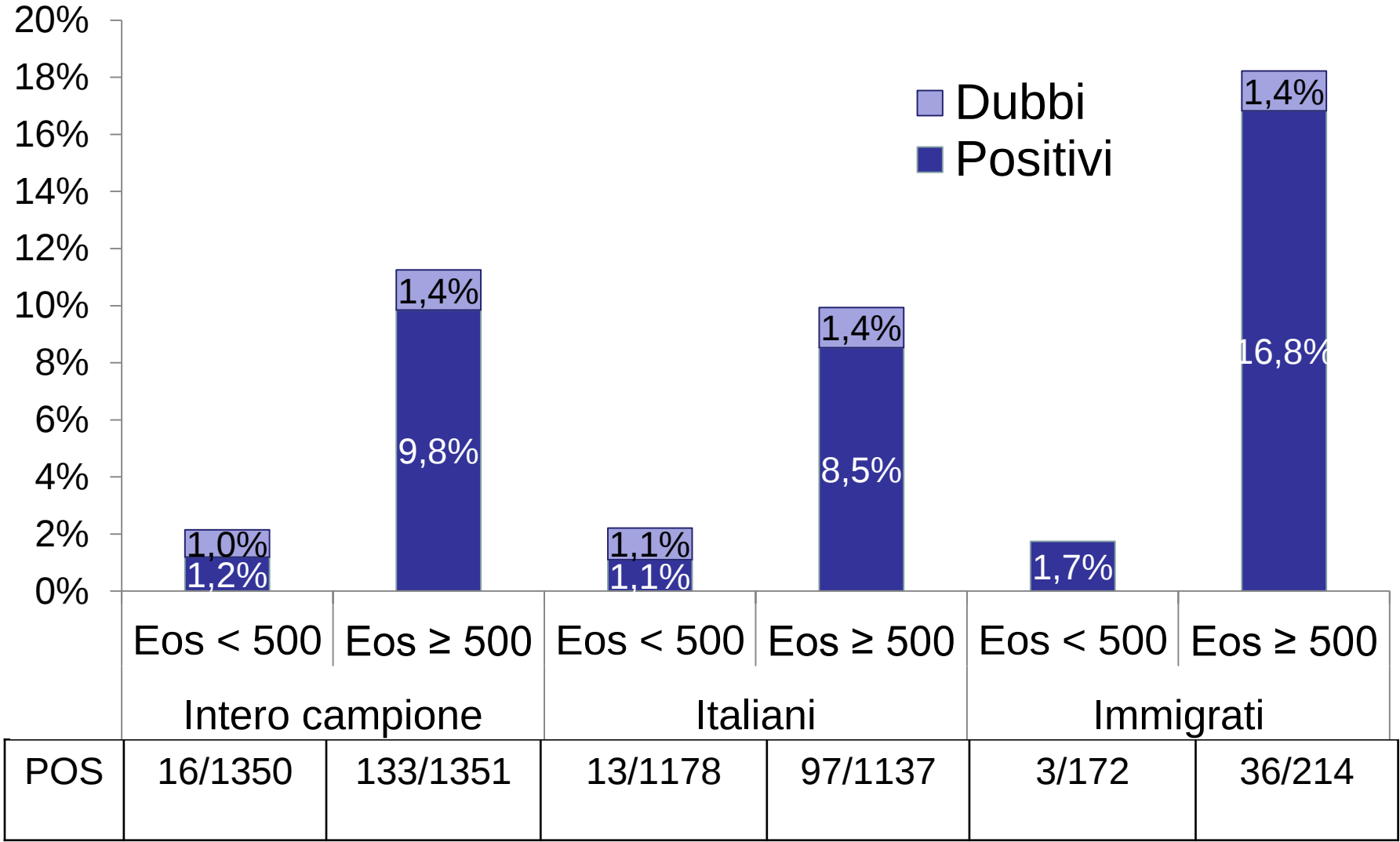
Silvana Mangano in “Riso amaro” (1949)



Prevalenza di strongiloidosi negli italiani in relazione all'età

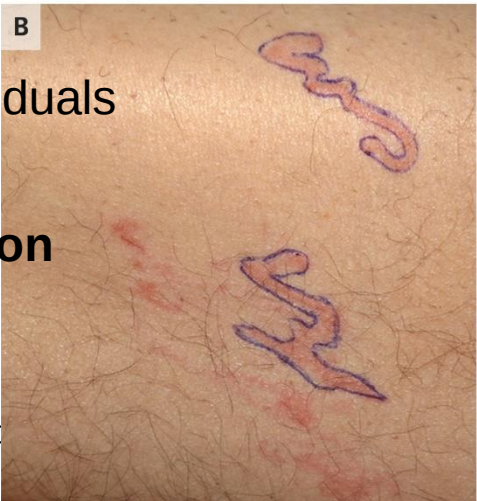
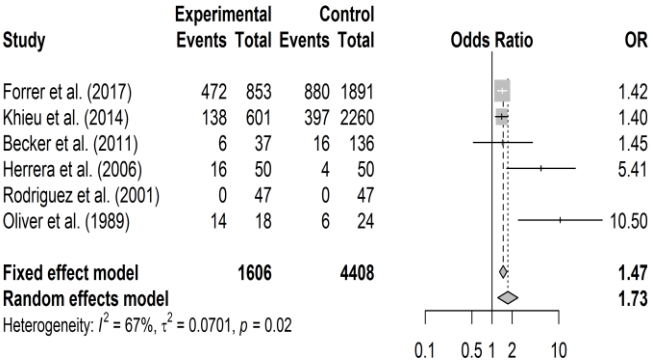


Prevalenza di strongiloidosi nell'intera coorte in base all'eosinofilia



Aspetti clinici

URTICARIA



Abdominal pain: reported by **61.86%** individuals

Diarrhea by **50.54%** individuals

Urticaria/rash by **33.35%** individuals

40-50% asymptomatic infection

Tamarozzi F et al. Morbidity associated with *Strongyloides hyperinfection syndrome*. *Am J Trop Med & Hyg* 2019 Apr 8. doi: 10.4269/ajtmh.18-0895.

Pichard DC, et al. Rapid development of migratory, linear, and serpiginous lesions in association with immunosuppression. *J Am Acad Dermatol*. 2014 Jun;70(6):1130-4. doi: 10.1016/j.jaad.2013.11.036. PMID: 24831316; PMCID: PMC4024165.

Puerta-Peña M, Calleja Algarra A. Larva Currens in *Strongyloides* Hyperinfection Syndrome. *N Engl J Med*. 2022 Apr 21;386(16):1559. doi: 10.1056/NEJMmicr2115708. PMID: 35443110.

Minor clinical problem...?

- 38-year-old Ghanaian migrant
- Lymphoma diagnosis
- Start of immunosuppressive and corticosteroid therapy
- Uncontrollable septic fever, shock
- Paralytic ileus, ARDS.....death

Sputum



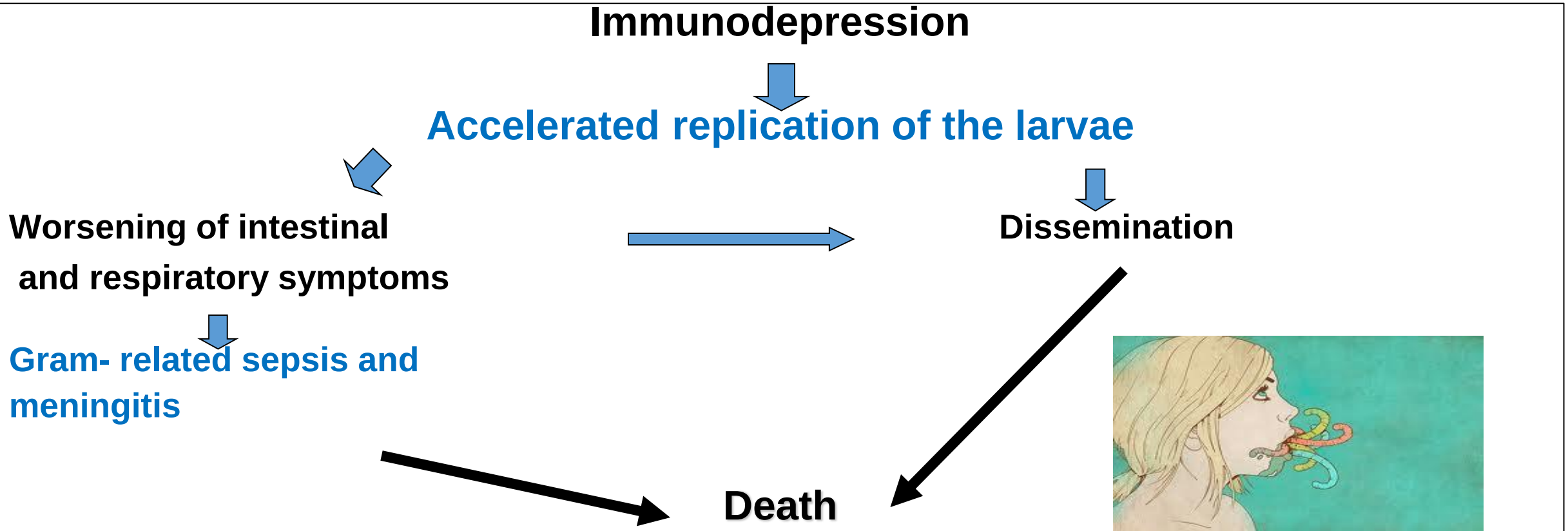
Gastric juice





Adult female of *Strongyloides stercoralis* collected in bronchial fluid. Scale bar = 400 μm .

Iperinfestation e disseminazione



Case fatality rate of disseminated forms: 50-86%

Acute Strongyloidiasis: A Rarity. Chronic Strongyloidiasis: A Time Bomb!

Eric Caumes MD^{1,2,*}, Jay S. Keystone MD^{3,4}. 2011; 18(2):71–72



We must identify those who have the "bomb" in their bodies without knowing it

The treatment can have no other objective than to completely remove the "bomb"

RESEARCH ARTICLE

Open Access

Severe strongyloidiasis: a systematic review of case reports

Dora Buonfrate^{1*}, Ana Requena-Mendez², Andrea Angheben¹, Jose Muñoz², Federico Gobbi¹, Jef Van Den Ende³ and Zeno Bisoffi¹

CASE REPORT

Late post-kidney transplant Strongyloidiasis syndrome

Transpl Infect Dis. 2018;20:e12975.
<https://doi.org/10.1111/tid.12975>

Fatal Multiorgan Failure Syndrome in a *Strongyloides*-HTLV-1 Coinfected Patient, after Treatment with Ivermectin

Case Reports in Critical Care
Volume 2021, Article ID 5554810, 5 pages
<https://doi.org/10.1155/2021/5554810>

Am. J. Trop. Med. Hyg., 101(2), 2019, pp. 418–421
doi:10.4269/ajtmh.19-0347
Copyright © 2019 by The American Society of Tropical Medicine and Hygiene

Case Report: Two Cases of Strongyloidiasis Presenting with Thrombotic Events

Mara Waters,^{1*} Sigmund Krajden,^{2,3} Christie Kim,² Reem Elsobky,² Bohdan Lychacz,² Matthew Cheung,^{1,4} Mark Crowther,⁵ and Jay Keystone^{1,6}

MOF
Sepsi da batteri intestinali
Meningiti da batteri intestinali

doi:10.1111/imj.13940

Strongyloidiasis syndrome in an
review of the literature

Case of *Strongyloides* hyperinfection syndrome

To cite: Kuriakose K, Carpenter K, Wanjalla C, et al. *BMJ Case Rep*
Published online: [please include Day Month Year]
doi:10.1136/bcr-2016-218320

Table 1. Conditions associated with hyperinfection syndrome

Drugs/biologics
Immunosuppressives
Corticosteroids
Azathioprine
Cyclophosphamide
Methotrexate
Anti-neoplastic agents
6-mercaptopurine
Adriamycin
Bleomycin
Carmustine
Chlorambucil
Doxorubicin
Daunorubicin
Ifosfamide
Melphalan
Mitoxantrone
VP16
Vinca alkaloids
Biologics
Etanercept
Inflixumab
Rituximab
Antithymocyte globulin
Anti-CD3 (OKT3)
Mycophenolate mofetil
Total body irradiation
Diseases/syndromes
HTLV-1
Hypogammaglobulinaemia (nephrotic syndrome and multiple myeloma)
Haematologic malignancies and myelodysplastic syndromes
Solid Organ Transplantation
HSCT
HIV/IRIS
Malnutrition

Nutman TB. Human infection with *Strongyloides stercoralis* and other related *Strongyloides* species. *Parasitology*. 2017 Mar;144(3):263-273. doi: 10.1017/S0031182016000834.

Il problema della diagnostica

Esame microscopico diretto delle feci: sensibilità intorno al 20%

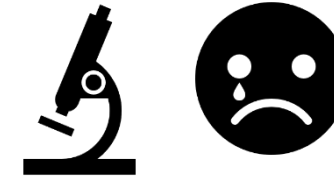


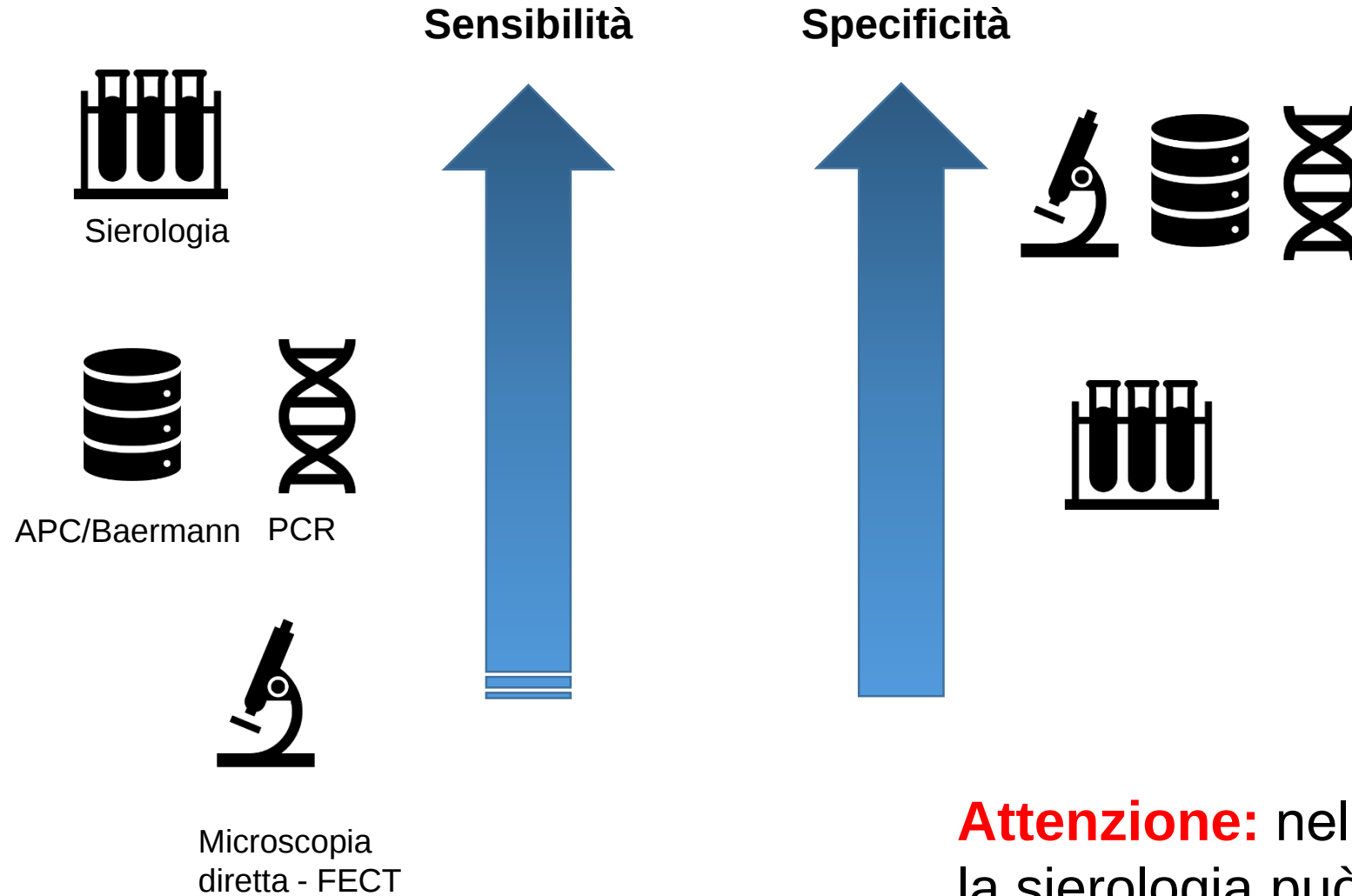
Table 6. GRADE summary of findings on diagnostic tools for screening strongyloidiasis, January 1993–February 2017.

Index Test—at 10% Prevalence *	Sensitivity (95% CI)	Specificity (95% CI)	Post-Test Probability of a Positive Result (95% CI)	Post-Test Probability of a Negative Result (95% CI)	Number of Studies/ Participants	Certainty of Evidence (GRADE)	Reference Standard
Baermann method [51]	0.72 (0.67–0.76) ^a	1.00 (1.00–1.00) ^a	100% (100–100)	3% (4–3)	9/2459	Moderate ^{b,c}	Combination of diagnostic tests
Agar plate—10% prevalence [51]	0.89 (0.86–0.92) ^a	1.00 (1.00–1.00) ^a	100% (100–100)	1% (2–1)	10/3563	Moderate ^{b,c}	Combination of diagnostic tests
NIE LIPS [62] ^d	0.85 (0.79–0.92)	0.95 (0.93–0.98)	65% (56–84)	2% (2–1)	1/399	Low ^{e,f,g}	Stool microscopy or culture
IVD ELISA—commercial test [62]	0.92 (0.87–0.97)	0.97 (0.96–0.99)	77% (71–92)	1% (1–0)	1/399	Low ^{e,f,h}	Stool microscopy
IFAT [62]	0.94 (0.90–0.98)	0.87 (0.83–0.91)	45% (37–55)	1% (1–0)	1/399	Low ^{e,f,h}	Stool microscopy and culture
Bordier-ELISA—commercial kit [62]	0.91 (0.86–0.96)	0.94 (0.91–0.96)	63% (52–77)	1% (2–0)	1/193	Low ^{e,f,h}	Kato–Katz, Flotac, and Baermann method
SS-NIE-1 ELISA [63]	0.95 (0.92–0.97)	0.93 (0.90–0.96)	60% (71–73%)	1% (1–0)	1/583	Low ^{f,g,i}	Stool microscopy and culture

Buonfrate D, et al. Novel approaches to the diagnosis of *Strongyloides stercoralis* infection. Clin Microbiol Infect. 2015 Jun;21(6):543-552. doi: 10.1016/j.cmi.2015.04.001

Agbata NE et al. [Int J Environ Res Public Health](https://doi.org/10.3390/ijerph16010011). 2019 Jan; 16(1): 11. Published online 2018 Dec 20. doi: [10.3390/ijerph16010011](https://doi.org/10.3390/ijerph16010011)

Accuratezza dei metodi diagnostici

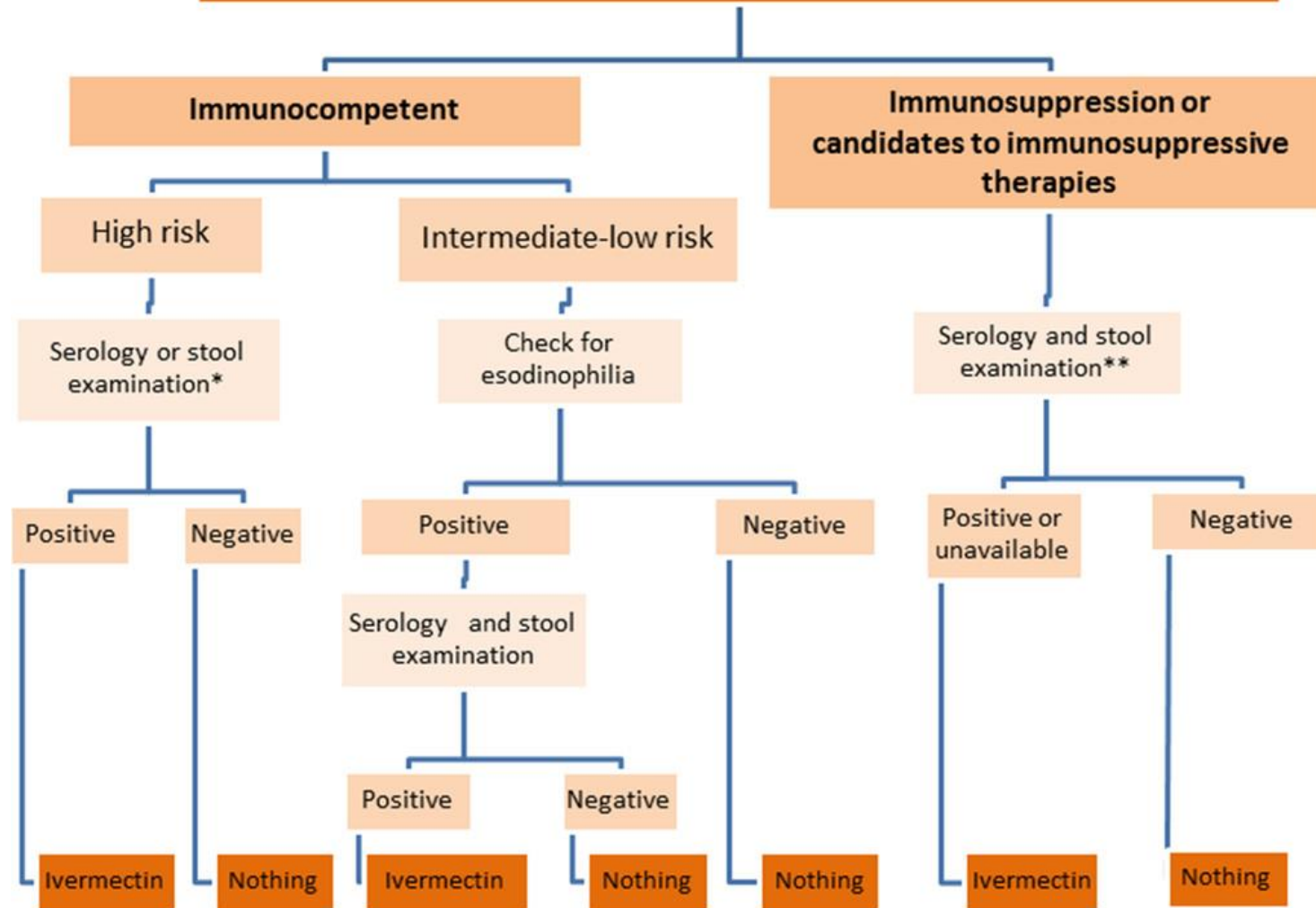


Attenzione: nell'immunocompromesso la sierologia può risultare falsamente negativa

Screening of patients at risk of Strongyloidiasis

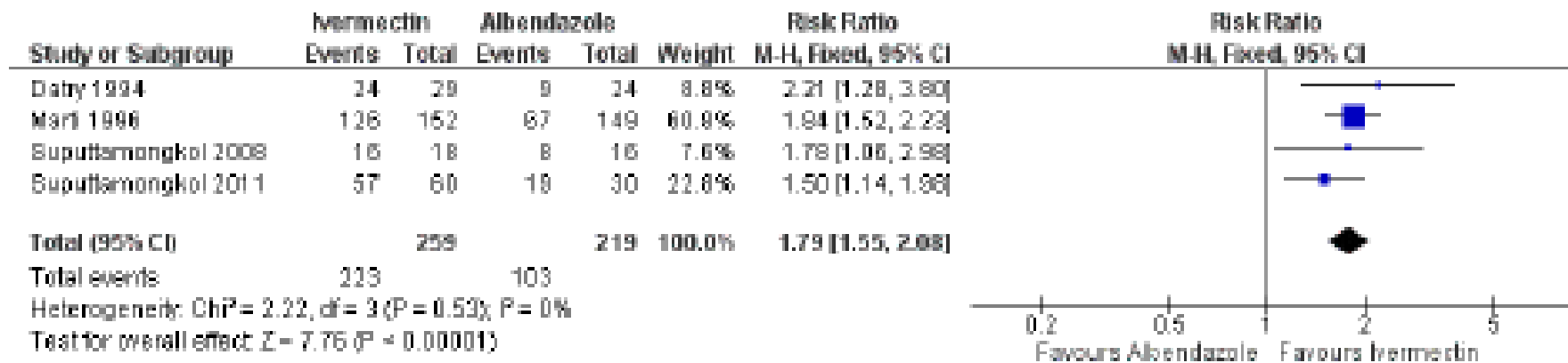
*Serology is preferable but if not available, improved faecal techniques could also be used (Baerman or APC **or PCR**).

When serology or more sensitive stool techniques (Baermann or stool culture **or PCR) is not available, consider empiric treatment with ivermectin.



Terapia

Figure 4. Forest plot of comparison: I Ivermectin versus albendazole, outcome: I.I Parasitological cure.



Multiple-dose versus single-dose ivermectin for *Strongyloides stercoralis* infection (Strong Treat 1 to 4): a multicentre, open-label, phase 3, randomised controlled superiority trial

Dora Buonfrate, Joaquin Salas-Coronas, José Muñoz, Begonia Trevino Maruri, Paola Rodari, Francesco Castelli, Lorenzo Zammarchi, Leila Bianchi, Federico Gobbi, Teresa Cabezas-Fernández, Ana Requena-Mendez, Gauri Godbole, Ronaldo Silva, Marilena Romero, Peter L Chiodini, Zeno Bisoffi

Lancet Infect Dis 2019
Published Online
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[https://doi.org/10.1016/S1473-3099\(19\)30289-0](https://doi.org/10.1016/S1473-3099(19)30289-0)

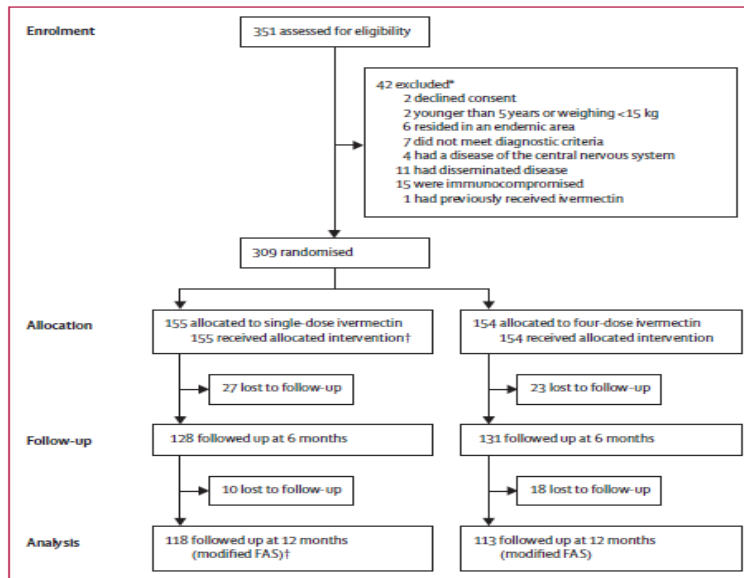


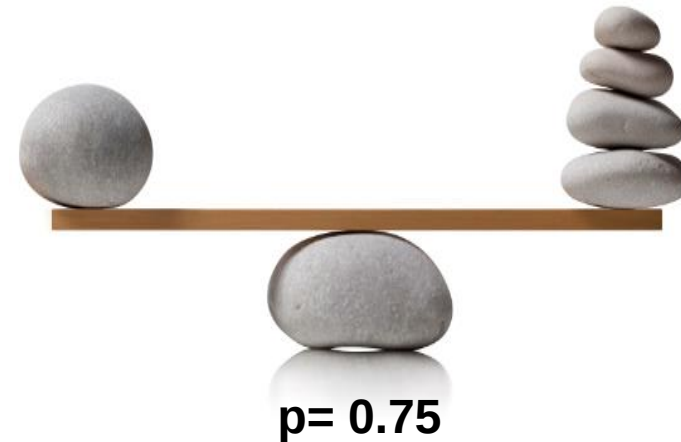
Figure 1: Trial profile
FAS=full analysis set. *Some participants had more than one reason for exclusion. †One patient took a further four doses before the 6-month follow-up visit and was excluded from the per-protocol analysis.

**Dose singola
(200 mcg/kg)
di ivermectina**

86% (95%CI 79-91)

**Dosi multiple
(200 mcg/kg x 4)
di ivermectina**

85% (95%CI 77-90)



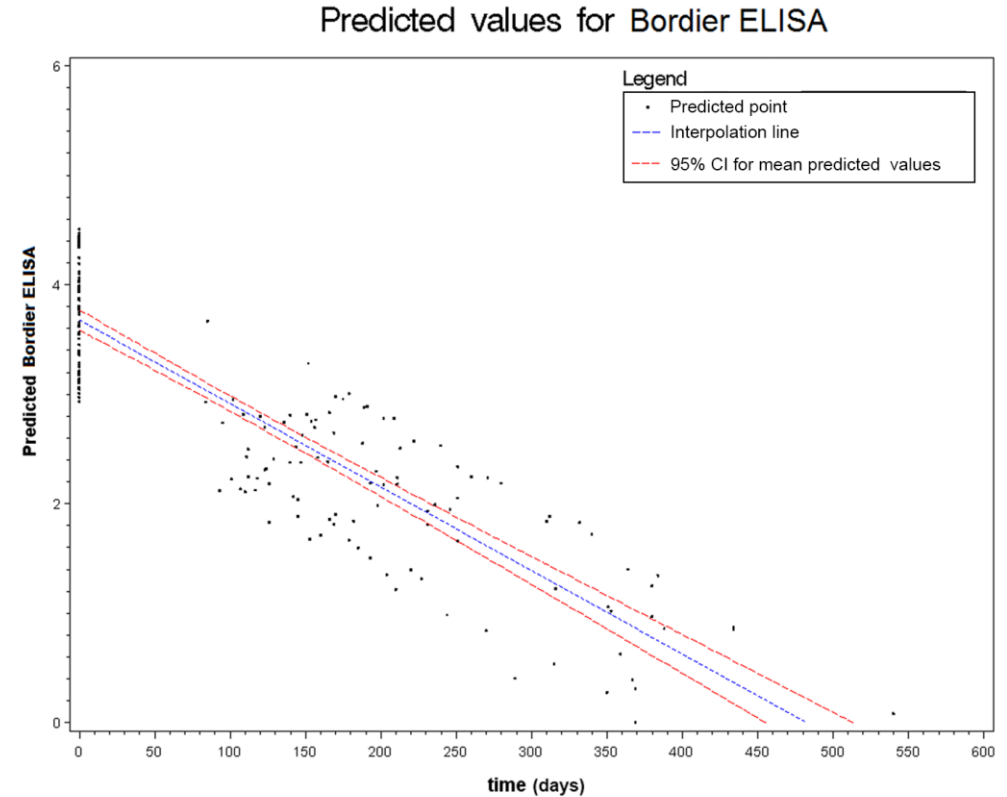
➡ **BASTA UNA DOSE**

Monitoraggio del trattamento

- Se al baseline ho test fecali positivi, vanno ripetuti a breve distanza dal trattamento (anche 1 settimana dopo)



- La sierologia va ripetuta, a distanza però di almeno 3-4 mesi



Grazie per l'attenzione!

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