European Dermatology Forum

Guideline on the Management of Scabies

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European Guideline for the Management of Scabies

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Abstract

Scabies is caused by *Sarcoptes scabiei* var. *hominis*. The disease can be sexually transmitted. Patients’ main complaint is nocturnal itch. Disseminated, excoriated, erythematous papules are usually seen on the anterior trunk and limbs. Crusted scabies occurs in immuno-compromised hosts and may be associated with reduced or absent pruritus. Recommended treatments are permethrin 5% cream, oral ivermectin and benzyl benzoate 25% lotion. Alternative treatments are malathion 0.5% aqueous lotion, ivermectin 1% lotion and sulfur 6-33% cream, ointment or lotion. Crusted scabies therapy requires a topical scabicide and oral ivermectin. Mass treatment of large populations with endemic disease can be performed with a single dose of ivermectin (200 micrograms/kg of body weight). Partner management needs a look-back period of two months. Screening for other STI is recommended. Patients and close contacts should avoid sexual contact until completion of treatment and should strictly observe personal hygiene rules when living in crowded spaces. Written information should be provided to suspected cases.

Key words: scabies, *Sarcoptes scabiei*, sexually transmitted infection, ivermectin, malathion, permethrin, benzyl benzoate.

Guideline development
This guideline has been updated by reviewing the existing guidelines including the European Guideline for the Management of Scabies (2010) [1], the CDC guidelines (2015) [2], [3] and the BASHH guideline (2007) [4]. A comprehensive literature search of publications from 2010 to April 2016 was also conducted (Annex 1. Search strategy).

New information in this guideline since the 2010 edition:
-New treatment recommendations.
-Addition of a section on mass population treatment.
-Audit standards added.

Epidemiology
Scabies is an infectious disease caused by infestation with the parasite *Sarcoptes scabiei* var. *hominis.* The infestation occurs by skin-to-skin contact including sexual contact or, less commonly, by contact with infested fomites (e.g. clothing and towels). *S. scabiei* mites burrow into human epidermis in which the female parasite lays eggs that hatch and develop into adults in 2 weeks. The lifecycle of *S. scabiei* is 4-6 weeks. *S. scabiei* var. *hominis* is an obligate human parasite. Adult parasites die outside their human host within 24-36 hours [5]. Immature mites can survive one week [6]. The mites and mite products (faeces, eggs and dead parasites) generate an immediate or delayed (type IV) hypersensitivity reaction with scabies symptoms typically starting 3-6 weeks after primary infestation and 1-3 days after re-infestation [7], [8]. In classical scabies there are under 5-15 mites/host. Crusted scabies is characterized by a much higher burden of mites in the infested individual [9]. Human infestation with other *S. scabiei* variants (e.g. var. *canis* hosted by dogs and var. *suis* hosted by pigs) are self-limiting and considered non-transmissible from human to human [10], [11].

Clinical features [12]
Specific manifestations include intense itch and disseminated inflammatory papules. Non-specific manifestations which may also occur are skin excoriation, secondary eczematization and impetiginization.

1. Classical scabies [1], [4], [5], [7]
-occurs in patients with normal immune response;
-intense pruritus which is worse at night;
-erythematous papules disseminated on the periumbilical area, waist, genitalia, breasts, buttocks, axillary folds, fingers (including interdigital spaces), wrists and extensor aspects of the limbs. The head, palms and soles are usually spared in adults;
-the papules are small, often excoriated with haemorrhagic crusts on top;
-the burrow (a pathognomonic sign) appears as a thin, brown-grey line of 0.5-1 cm but is rarely observed due to excoriation or secondary bacterial infection;
-other lesions: vesicles (usually at the start of a burrow), nodules (firm, 0.5 cm in diameter, usually on the male genitalia, groin, buttocks), wheals;
-poor hygienic conditions may result in secondary bacterial infection;
-irritant or allergic contact eczema can be induced following topical treatment.

2. Crusted scabies (the term “Norwegian scabies” should no longer be used) [1], [4], [13]
-occurs in patients with severe immune deficiency due to disease (e.g. AIDS, HTLV1-infection, malignancy and leprosy) or therapy (e.g. immunosuppressant drugs and

biologicals [14], [15], [16]), neurological disease causing reduced sensation, immobility with reduced ability to scratch, or in genetically susceptible patients [17];
-pruritus is mild or absent;
-skin lesions consist of generalized, poorly-defined, erythematous, fissured plaques covered by scales and crusts. On bony prominences (e.g. finger articulations, elbows and iliac crest) the plaques have a yellow-to-brown, thick, verrucous aspect;
-diffuse non-crusted scabies with involvement of the back may also occur [12];
-bacterial secondary infection can result in malodorous skin lesions.

Diagnosis

Diagnosis is suspected on the characteristics of itch (generalised, intense at night), clinical findings and suggestive history (e.g. positive context for contamination, disease observed in close contacts). Definitive diagnosis is supported by a positive microscopic examination of skin scrapings which identifies mites, eggs or faecal pellets ("scybala") [18]. To enhance the results, the groove done by the parasite can be opened with a fine needle and Muller oil or immersion oil is applied to bring the acarus at the surface [19], [20]. A negative microscopic result does not exclude scabies [12], [21].
Dermoscopic examination can identify skin burrows, mites (the "delta" sign at the end of the burrow represents the anterior body of the adult female mite) [22], eggs and can orientate the site of skin scrapings [19]. In sexually active patients STI screening (including HIV test) is recommended {level of evidence Ib; grade A recommendation} [23].

General principles of treatment (figure 1)

Ten new clinical trials on scabies treatment have been published since the previous guideline in 2010 [24], [25], [26], [27], [28], [29], [30], [31], [32], [33]. Recent data are focused on mass population treatment, usually with ivermectin. Based on the existing comparative studies addressing the efficacy of different anti-scabetic treatments, a distinction was made only between "recommended" and "alternative" treatments. The availability of antiscabetic drugs differ in European countries therefore, in practice, the choice of the treatment to use is also variable.

Topical treatment should be applied to all skin regions including scalp, groin, navel, external genitalia, finger and toe web spaces and the skin beneath the ends of the nails at night and left in place for 8-12 hours. The skin should be cool and dry. A second application is recommended after 7-14 days. After applying treatment patients should change into clean clothing. All the patient's close personal contacts should be treated simultaneously to avoid re-infestation.

Clothing, bedding, towels and other items should be machine washed (at 50^{o}C or higher), dry-cleaned, or sealed and stored in plastic bag for one week {level of evidence VI; grade C recommendation} [6].

Patients should be given a detailed explanation of their infestation together with clear written information {level of evidence IV; grade C recommendation} [1].
The infestation is considered cleared if one week after the end of treatment there are no manifestations of active scabies (no active lesions, no nocturnal pruritus). Post-treatment itch may persist for up to 2-4 weeks.

Recommended treatments
-Permethrin 5% cream applied head to toe and washed off after 8-12 hours. The treatment must be repeated after 7-14 days {evidence Ib; grade A recommendation} [34].
-Oral ivermectin (taken with food) 200 micrograms/kg as two doses one week apart {level of evidence Ib; grade A recommendation} [35].
-Benzyl benzoate lotion 10-25% applied once daily at night on 2 consecutive days with re-application at 7 days {level of evidence IV; grade C recommendation} [7], [36].

Alternative treatments
-Malathion 0.5% aqueous lotion {level of evidence IV; grade C recommendation} [37].
-Ivermectin 1% lotion was reported to be as effective as permethrin cream 5% {level of evidence Ib; grade A recommendation} [28].
-Sulfur 6-33% as cream, ointment or lotion is the oldest antiscabietic in use [38]. It is effective and requires application on three successive days {level of evidence Ib; grade A recommendation} [1], [38], [39].
-Synergized pyrethrins are available as a foam preparation in some countries and are as effective as permethrin cream 5% {level of evidence IIa; grade B recommendation} [1], [40].
-Lindane is no longer recommended because of its potential to cause neurotoxicity [1].

Crusted scabies [2]
-A topical scabicide (permethrin 5% cream or benzyl benzoate lotion 25%) repeated daily for 7 days then 2x weekly until cure
AND
-Oral ivermectin 200 micrograms/kg on days 1,2 and 8. For severe cases, based on persistent live mites on skin scrapings at follow-up visit, additional ivermectin treatment might be required on days 9 and 15 or on days 9, 15, 22 and 29 {level of evidence IV; grade C recommendation} [2].

Post-treatment itch
Post-treatment itch should be treated with repeated application of emollients. Oral antihistamines and mild topical corticosteroids may also be useful.

Special situations
-Permethrin is safe in pregnancy {level of evidence III; grade B recommendation} [41] and lactation [42], [43] and is licensed for use in children from age 2 months onwards [3], [44].
-Benzyl benzoate and sulfur are considered safe in pregnancy {level of evidence III; grade B recommendation} [1].
-Ivermectin should not be used during pregnancy or in children weighing less than 15 kg [45].
-Malathion was not studied in pregnant women. Animal studies suggest that there is no risk. However animal reproductive studies are not always predictive of human responses [46]. Inappropriate use of agricultural grade malathion for treating human infestations can induce acute toxicity {level of evidence IV; grade C recommendation} [47].

Mass population treatment {level of evidence Ib; grade A recommendation} [24, 26, 33]

-Mass population treatment is recommended for the control of scabies in endemic areas e.g. remote communities or mass population displacements, and in the management of epidemics in closed communities such as nursing homes or jails.
-All individuals should be treated irrespective of symptoms.
-Oral ivermectin is easier to administer than traditional topical scabicides, thus facilitating treatment of large populations.
-A single dose of oral ivermectin 200 micrograms/kg of body weight is effective [24] [33]
-Ivermectin may not sterilise scabies eggs and a second dose given after one week has been shown to increase the response [48]. The administration of a second dose of ivermectin is recommended [47], [49] {level of evidence Ib; grade A recommendation} although the importance of this second dose for scabies control need to be further evaluated [47].
-Drug resistance to scabicides including permethrin and ivermectin is an emerging concern [50], [51], [52], [53] and the impact of mass treatment programmes on development of drug resistance requires future study.

Follow-up
A follow-up visit two weeks after completion of treatment is recommended for a test of cure by microscopy examination {level of evidence IV; grade C recommendation} [1].

Partner management
Patients should be advised to avoid close contact until they and their sexual partners have completed treatment {level of evidence IV; grade C recommendation} [1].
Infestation in children due to sexual abuse is rare and is more usually associated with close non-sexual contact.
Assessment and epidemiological treatment is recommended for sexual partners over the past 2 months {level of evidence IV; grade C recommendation} [54], [55].

Prevention/health promotion
The risk of scabies can be reduced by limiting the number of sexual partners and observing strict personal hygiene when living in crowded spaces (e.g. no sharing of underwear clothing, bedding and towels and avoidance of skin-to-skin contact). Transmission is not prevented by condom use. No additional preventive measures have been shown to be effective [56].

Auditable Outcome Measures
- Patients with scabies should be invited for a follow-up visit: target 95%.
- Suspected cases of scabies should be treated with a recommended regimen: target 95%.
- Suspected cases of scabies should have access to written information about the disease: target 95%.

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Appendices

- Composition of editorial board:
  www.iusti.org/regions/Europe/pdf/2013/Editorial_Board.pdf
- List of contributing organisations:
  www.iusti.org/regions/Europe/euroguidelines.htm
- Tables of levels of evidence and grading of recommendations:
  www.iusti.org/regions/Europe/pdf/2013/Levels_of_Evidence.pdf

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References

[1] Scott GR, Chosidow O; IUSTI/WHO.. European guideline for the management of scabies, 2010. Int J STD AIDS. 2011 Jun;22(6):301-3. doi: 10.1258/ijsa.2011.011112.

[2] Scabies – CDC Resources for Health Professionals. 2015. Available at: http://www.cdc.gov/std/tg2015/ectoparasitic.htm. Accessed 20 June 2016.

[3] Classic scabies – CDC Resources for Health Pofessionals. Available at: http://www.cdc.gov/parasites/scabies/health_professionals/meds.html. Accessed 18 July 2016

[4] Scott G. United Kingdom National Guideline on the Management of Scabies (2007). Available at: www.bashh.org/documents/27/27.pdf. Accessed 20 June 2016.

[5] Arlian LG, Runyan RA, Achar S, Estes SA. Survival and infectivity of Sarcoptes scabiei var. canis and var. hominis. J Am Acad Dermatol. 1984;11(2 Pt 1):210.

[6] Carslaw J, Dobson R, Hood A, Taylor R. Mites in the environment of cases of Norwegian scabies. Br J Dermatol 1975; 92(3): 333-337.

[7] Chosidow O. Scabies and pediculosis. Lancet 2000; 355: 819-826.

[8] Shelley F Walton, Florin I Oprescu. Immunology of scabies and translational outcomes: identifying the missing links. Curr Opin Infect Dis 2013 Apr;26(2):116-22.

[9] Leone AP. Scabies and Pediculosis Pubis: An Update of Treatment Regimens and General Review. Clinical Infectious Diseases 2007; 44:S153–9.

[10] Aydıngöz IE, Mansur AT. Canine scabies in humans: a case report and review of the literature. Dermatology 2011; 223(2): 104-106.

[11] Kemp DJ, Walton SF, Harumal P, Currie BJ. The scourge of scabies. Biologist. Feb2002, Vol. 49 Issue 1, 19-24

[12] Chosidow O. Clinical practices. Scabies. N Engl J Med. 2006;354(16):1718.

[13] Schlesinger L, Oelrich DM, Tyring SK. Crusted (Norwegian) scabies in patients with AIDS: the range of clinical presentations. South Med J. 1994; 87(3): 352-356.

[14] Pipitone MA, Adams B, Sheth A, Graham TB. Crusted scabies in a patient being treated with infliximab for juvenile rheumatoid arthritis. J Am Acad Dermatol 2005;52:719-20.

[15] Baccouche K, Sellam J, Guegan S, Aractingi S, Berenbaum F. Crusted Norwegian scabies, an opportunistic infection, with tocilizumab in rheumatoid arthritis. Joint Bone Spine 2011;78:402-4.

[16] Markovic I, Puksic S, Gudelj Gracanin A, Ivana Culo M, Mitrovic J, Morovic-Vergles J. Scabies in a patient with rheumatoid arthritis treated with adalimumab – a case report. Acta Dermatovenerol Croat 2015;23:195-8.

[17] Roberts LJ, Huffam SE, Walton SF, Currie BJ. Crusted scabies: clinical and immunological findings in seventy-eight patients and a review of the literature. J Infect 2005; 50(5): 375-381.

[18] Burkhart CN, Burkhart CG.. Scabies, other mites, and pediculosis. In: Fitzpatrick's Dermatology in General Medicine, 8th ed, Goldsmith LA, Katz SI, Gilchrest BA et al (Eds), McGraw Hill, 2012. p.2569-2578.

[19] Muller G, Jacobs PH, Moore NE. Scraping for human scabies. A better method for positive preparations. Arch Dermatol. 1973 Jan;107(1):70.

[20] Hoke AW. Scabies Scraping. Arch Dermatol. 1973;108(3):424.

[21] Dupuy A, Dehen L, Bourrat E, Lacroix C, Benderdouche M, Petit A, et al. Accuracy of standard dermoscopy for diagnosing scabies. Journal Of The American Academy Of Dermatology 2007; 56(1): 53-62.

[22] Argenziano G, Fabbrocini G, Delfino M. Epiluminescence microscopy. A new approach to in vivo detection of Sarcoptes scabiei. Arch Dermatol 1997;133:751–753.

[23] David N, Rajamanoharan S, Tang A. Are sexually transmitted infections associated with scabies? International Journal of STD & AIDS 2002; 13(3): 168-170.

[24] Romani L, Whitfeld MJ, Koroivueta J, Kama M, Wand H, Tikoduadua L, Tuicakau M, Koroi A, Andrews R, Kaldor JM, Steer AC. Mass Drug Administration for Scabies Control in a Population with Endemic Disease. The New England Journal Of Medicine [N Engl J Med], 2015; Vol. 373 (24), 2305-13.

[25] Kearns TM, Speare R, Cheng AC, McCarthy J, Carapetis JR, Holt DC, Currie BJ, Page W, Shield J, Gundjirryirr R, Bundhala L, Mulholland E, Chatfield M, Andrews RM. Impact of an Ivermectin Mass Drug Administration on Scabies Prevalence in a Remote Australian

Aboriginal Community. Plos Neglected Tropical Diseases [PLoS Negl Trop Dis], 2015; Vol. 9 (10), e0004151.

[26] Haar K, Romani L, Filimone R, Kishore K, Tuicakau M, Koroivueta J, Kaldor JM, Wand H, Steer A, Whitfeld M. Scabies community prevalence and mass drug administration in two Fijian villages. International Journal Of Dermatology [Int J Dermatol], 2014; Vol. 53 (6), 739-45.

[27] Goldust M, Rezaee E. Comparative trial of oral ivermectin versus sulfur 8% ointment for the treatment of scabies. Journal Of Cutaneous Medicine And Surgery [J Cutan Med Surg], 2013; Vol. 17 (5), 299-300.

[28] Chhaiya SB, Patel VJ, Dave JN, Mehta DS, Shah HA. Comparative efficacy and safety of topical permethrin, topical ivermectin, and oral ivermectin in patients of uncomplicated scabies. Indian Journal Of Dermatology, Venereology And Leprology [Indian J Dermatol Venereol Leprol], 2012; Vol. 78 (5), 605-10.

[29] Mohebbipour A, Saleh P, Goldust M, Amirnia M, Zadeh YJ, Mohamadi RM, Rezaee E. Treatment of scabies: comparison of ivermectin vs. lindane lotion 1%. Acta Dermatovenerologica Croatica: ADC [Acta Dermatovenerol Croat], 2012; Vol. 20 (4), 251-5.

[30] Sharma R, Singal A. Topical permethrin and oral ivermectin in the management of scabies: A prospective, randomized, double blind, controlled study. Indian Journal of Dermatology, Venereology & Leprology. Sep/Oct 2011, Vol. 77 Issue 5, 581-586.

[31] Panahi Y, Poursaleh Z, Goldust M. The efficacy of topical and oral ivermectin in the treatment of human scabies. Ann Parasitol. 2015;61(1):11-6.

[32] Goldust M, Rezaee E, Raghifar R, Hemayat S. Comparing the efficacy of oral ivermectin vs malathion 0.5% lotion for the treatment of scabies. Skinmed. 2014 Sep-Oct;12(5):284-7.

[33] Marks M, Taotao-Wini B, Satorara L, Engelman D, Nasi T, Mabey DC, Steer AC. Long Term Control of Scabies Fifteen Years after an Intensive Treatment Programme. PLoS Negl Trop Dis. 2015 Dec;9(12):e0004246.

[34] Schultz MW, Gomez M, Hansen RC, Mills J, Menter A, Rodgers H, Judson FN, Mertz G, Handsfield HH. Comparative study of 5% permethrin cream and 1% lindane lotion for the treatment of scabies. Arch Dermatol. 1990;126(2):167.

[35] Chouela EN, Abeldaño AM, Pellerano G, La Forgia M, Papale RM, Garsd A, Balian MC, Battista V, Poggio N. Equivalent therapeutic efficacy and safety of ivermectin and lindane in the treatment of human scabies. Arch Dermatol. 1999;135(6):651.

[36] WHO Model Prescribing Information: Drugs Used in Skin Diseases (1997). [cited May 31, 2016]. Available from: http://apps.who.int/medicinedocs/en/d/Jh2918e/27.1.html.

[37] Joint Formulary Committee, 2015. 13.2.3 p.1015. Malathion. In: Joint Formulary Committee. British National Formulary. 70. London: BMJ Group and Pharmaceutical Press.

[38] Singalavanija S, Limpongsanurak W, Soponsakunkul S. Acomparative study between 10 per cent sulfur ointment and 0.3 per cent gamma benzene hexachloride gel in the treatment of scabies in children. J Med Assoc Thai 2003;86 Suppl:531-6.

[39] Avila-Romay A, Alvarez-Franco M, Ruiz-Maldonado R. Therapeutic efficacy, secondary effects, and patient acceptability of 10% sulfur in either pork fat or cold cream for the treatment of scabies. Pediatr Dermatol 1991;8:64.

[40] Amerio P, Capizzi R, Milani M. Efficacy and tolerability of natural synergised pyrethrins in a new thermo labile foam formulation in topical treatment of scabies: a prospective, randomised, investigator-blinded, comparative trial vs. permethrin cream. Eur J Dermatol. 2003;13:69-71.

[41] Mytton OT, McGready R, Lee SJ, et al. Safety of benzyl benzoate lotion and permethrin in pregnancy: a retrospective matched cohort study. Br J Obstet Gynecol 2007;114:582-7.

[42] Porto I. Antiparasitic drugs and lactation: focus on antihelmithics, scabicides, and pediculosis. J Hum Lact 2003 Nov;19(4):421-5

[43] Permethrin. In: Briggs GG, Freeman RK, Yaffe SL. Editors. Drugs in pregnancy and lactation. 7th edition. Baltimore:Lippincott Williams and Wilkens;2005.p1269-70.

[44] Joint Formulary Committee, 2015. 13.2.3 p.1015. Permethrin. In: Joint Formulary Committee. British National Formulary. 70. London: BMJ Group and Pharmaceutical Press.

[45] Workowski KA, Bolan GA. Sexually transmitted diseases treatment guidelines, 2015. Centers for Disease Control and Prevention MMWR Recomm Rep. 2015;64(RR-03):1.

[46] Malathion. Available at: http://lecrat.fr/articleSearchSaisie.php?recherche=malathion. Accessed 12 April 2017.

[47] Strong M, Johnstone P. Interventions for treating scabies. Cochrane Database Syst Rev 2007 Jul 18;(3):CD000320.Review.PMID:17636630.

[48] Usha V, Gopalakrishnan Nair TV. A comparative study of oral ivermectin and topical permethrin cream in the treatment of scabies. J Am Acad Dermatol 2000;42:236-40.

[49] Currie BJ, McCarthy JS. Permethrin and ivermectin for scabies. N Engl J Med 2010;362:717-25.

[50] Walton SP, Myerscough MR, Currie BJ. Studies in vitro on the relative efficacy of current acaricides for Sarcoptes scabiei var. hominis. Trans R Soc Trop Med Hyg 2000;94:92-6.

[51] Currie BJ, Harumal P, McKinnon M, Walton SF. First documentation of in vivo and in vitro ivermectin resistance in Sarcoptes scabiei. Clin Infect Dis 2004 Jul 1;39(1):e8-12.

[52] Pasay C, Arlain L, Morgan M, et al. The effect of insecticide synergists on the response of scabies mites to pyrethroid acaricides. PLoS Negl Trop Dis 2009;3(1):e354.

[53] Andriantsoanirina V, Izri A, Botterel F. Chosidow O, Durand R. Molecular survey of knockdown resistance to pyrethroids in human scabies mites. Clin Microbiol Infect 2014 Feb;20(2):O139-41.doi:10.1111/1469-0691.Epub 2013 Aug 30.

[54] Tiplica GS, Radcliffe K, Evans C, Gomberg M, Nandwani R, Rafila A, Nedelcu L, Salavastru C. 2015 European guidelines for the management of partners of persons with sexually transmitted infections. J Eur Acad Dermatol Venereol. 2015 Jul;29(7):1251-7.

[55] McClean H, Radcliffe K, Sullivan A, Ahmed-Jushuf I. 2012 BASHH statement on partner notification for sexually transmissible infections. Int J STD AIDS. 2013 Apr;24(4):253-61.

[56] FitzGerald D, Grainger RJ, Reid A. Interventions for preventing the spread of infestation in close contacts of people with scabies. The Cochrane Database Of Systematic Reviews [Cochrane Database Syst Rev], ISSN: 1469-493X, 2014 Feb 24; (2); Publisher: Wiley; Cochrane AN: CD009943.

Annex. 1. Search strategy

Resources

- PubMed (http://www.ncbi.nlm.nih.gov/pubmed)
- Biomedical Reference Collection (via EBSCO Host - http://web.ebscohost.com/ehost/)
- Medline (via EBSCO Host - http://web.ebscohost.com/ehost/)
- Cochrane Collaboration Databases (www.cochrane.org).

Keywords

scabies *Sarcoptes scabiei* Pyrethrins Permethrin Malathion Ivermectine Lindane	Combined with AND search	Clinical trial Diagnosis Therapy Resistance Large population Emigrants

Searches were performed in January – May 2016.

2017 European Guideline for the Management of Scabies

CM Salavastru, O Chosidow, MJ Boffa, M Janier, GS Tiplica

Conflicts of interests

The Work Under Consideration for Publication					
		CM Salavastru	**O Chosidow**	**M Janier**	**GS Tiplica**
1	Grant	No	No	No	No
2	Consulting fee or honorarium	No	No	No	No
3	Support for travel to meetings for the study or other purposes	No	No	No	No
4	Fees for participation in review activities, such as data monitoring boards, statistical analysis, end point committees, and the like	No	No	No	No
5	Payment for writing or reviewing the manuscript	No	No	No	No
6	Provision of writing assistance, medicines, equipment, or administrative support	No	No	No	No
7	Other	no	No	No	no

* This means money that your institution received for your efforts on this study.

Relevant financial activities outside the submitted work					
		CM Salavastru	**O Chosidow**	**M Janier**	**GS Tiplica**
1	Board membership	No	No	No	No
2	Consultancy	No	No	No	Pierre Fabre
3	Employment	No	No	No	No
4	Expert testimony	No	No	No	No
5	Grants/grants pending	No	MSD France	No	No
6	Payment for lectures including service on speakers bureaus	No	-MSD France -Sanofi (USA) -KCL		-Alfa Wassermann -Novartis Pharma Services
7	Payment for manuscript preparation	No	No	No	No
8	Patents (planned, pending or issued)	No	No	No	No
9	Royalties	No	No	No	no

10	Payment for development of educational presentations	no	No	No	
11	Stock/stock options	no	No	No	no
no 12	Travel/accommodations/meeting expenses unrelated to activities listed**	-Abbvie	-MSD France -KCL	No	
13	Other (err on the side of full disclosure)	no	Codexial: gift of drug for a RCT	No	no

* This means money that your institution received for your efforts.
** For example, if you report a consultancy above there is no need to report travel related to that consultancy on this line.

Other relationships					
		CM Salavastru	**O Chosidow**	**M Janier**	**GS Tiplica**
1	Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?	No	no	no	no

The Work Under Consideration for Publication					
		M J Boffa			
1	Grant	No			
2	Consulting fee or honorarium	No			
3	Support for travel to meetings for the study or other purposes	No			
4	Fees for participation in review activities, such as data monitoring boards, statistical analysis, end point committees, and the like	No			
5	Payment for writing or reviewing the manuscript	No			
6	Provision of writing assistance, medicines, equipment, or administrative support	No			

7	Other	no			

* This means money that your institution received for your efforts on this study.

Relevant financial activities outside the submitted work					
		M J Boffa			
1	Board membership	No			
2	Consultancy	No			
3	Employment	No			
4	Expert testimony	No			
5	Grants/grants pending	No			
6	Payment for lectures including service on speakers bureaus	No			
7	Payment for manuscript preparation	No			
8	Patents (planned, pending or issued)	No			
9	Royalties	No			
10	Payment for development of educational presentations	no			
11	Stock/stock options	no			
no 12	Travel/accommodations/meeting expenses unrelated to activities listed**	no			
13	Other (err on the side of full disclosure)	no			

* This means money that your institution received for your efforts.
** For example, if you report a consultancy above there is no need to report travel related to that consultancy on this line.

Other relationships					
		M J Boffa			
1	Are there other relationships or activities that readers could perceive to have influenced, or that give the appearance of potentially influencing, what you wrote in the submitted work?	No			