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Funding sources: None.

Conflicts of interest: None disclosed.

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https://doi.org/10.1016/j.jaad.2018.04.051

Host characteristics and dynamics of *Staphylococcus aureus* colonization in patients with moderate-to-severe psoriasis before and after treatment: A prospective cohort study

To the Editor: Although psoriatic lesions are prone to staphylococcal colonization[1] and evidence has suggested that nasal decolonization could reduce recurrent infections,[2,3] the current evidence is insufficient to inform clinical practice on bacterial colonization in patients with psoriasis vulgaris.

In this study, we prospectively followed 50 patients with psoriasis from 2015 to 2017 to quantify changes in staphylococcal colonization after a course of treatment with biologics (n = 42) or nonbiologics (n = 8) for 16 weeks. At enrolment, all eligible patients were evaluated for initiation of biologics such as interleukin monoclonal antibodies (ustekinumab or secukinumab) or tumor necrosis factor inhibitors (adalimumab, golimumab, or etanercept) on the basis of disease severity (Psoriasis Area Severity Index score, >10) and a lack of response to or intolerance of traditional systemic therapeutics, including methotrexate, acitretin, cyclosporine, leflunomide, or a combination of these agents.

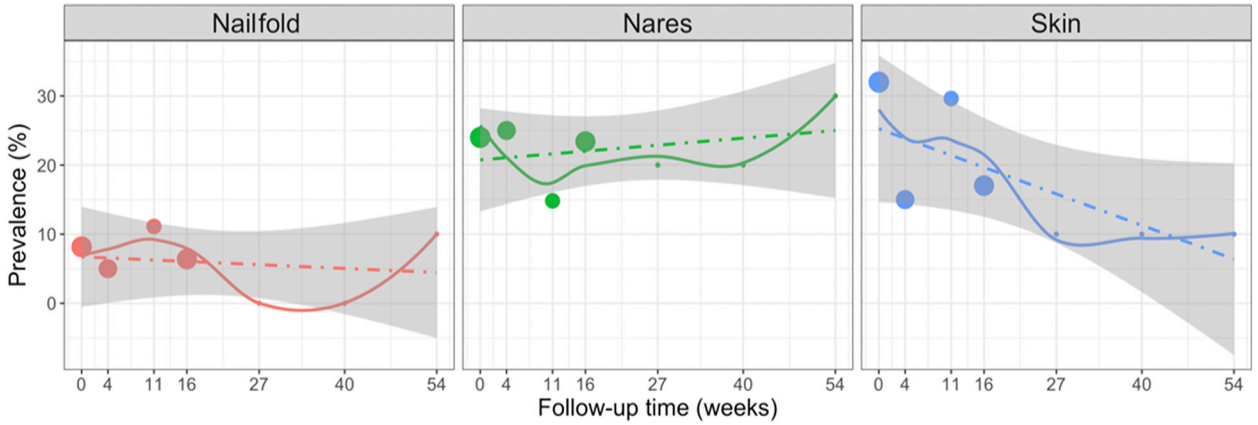
After written informed consent had been obtained, enrolled patients were interviewed for sociodemographic information, medical history, and clinical outcomes. The primary outcome was the culture-based staphylococcal colonization status of selected lesion sites; we also swabbed the anterior nares and nailfolds of the fingers to evaluate cross-site concordance. We reported prevalence estimates and Wilson 95% confidence intervals (CIs) as suggested[4] and performed mixed-effects regression analysis and differential expression analysis to identify host factors associated with colonization dynamics.

The study included 50 participants with an average age of 41 years (interquartile range, 34-46), with the majority being men (86%) and having had psoriasis for 20 years or longer; 7 cases (14%) were newly diagnosed at enrolment. A total of 10 users of biologics were followed for additional 8 months and appeared representative of the others.

At enrolment, 12 patients (24%) carried *Staphylococcus aureus* in their nares and 16 (32%) harbored *S. aureus* on at least 1 lesion (Fig 1, *A*) (average, 12.1% per lesion). After 16 weeks of treatment, the mean rate of lesion colonization decreased to 5.0% (adjusted odds ratio [aOR], 0.35 [$P = .024$]) but colonization of the nares or nailfolds did not decrease (both $P > .05$) (Fig 1, *A*), although site-specific variations existed (Fig 1, *B*). Colonization by methicillin-resistant *S. aureus* followed a similar pattern (data not shown).

Nailfold colonization before (aOR, 4.91 [$P = .017$]) and during (aOR, 6.20 [$P = .002$]) treatment were associated with lesion colonization, as were active smoking (aOR, 3.38 [$P = .019$]) and concurrent nasal colonization (aOR, 3.68 [$P = .002$]). Patient-reported quality of life (as quantified by the Dermatology Life Quality Index [$P = .008$]) and regular use of antiseptic-containing facial cleansers ($P < .001$) correlated with loss of colonization; first-time receipt of systemic therapeutics ($P = .008$) increased the risk of lesion recolonization. Concordance analysis showed temporal correlation of colonization of the nailfolds and nares (aOR, 26.8 [$P = .003$]) as well as temporal correlation of colonization of the nares and hairline (aOR, 4.69 [$P = .044$]); hairline colonization was highly concordant with colonization of other skin lesions (all $P \leq .022$).

Despite a limited power to compare the decolonization effects of systemic agents for treatment of psoriasis, commensal *S. aureus* on psoriatic lesions was reduced in patients receiving systemic



% (LL, UL)	Period	Week 0	Week 4	Week 11	Week 16	Week 27	Week 40	Week 54
No. persons	Prevalence	50	40	27	47	10	10	10
S. aureus, any site	66 (52, 78)	46 (33, 60)	35 (22, 50)	33 (19, 52)	40 (28, 55)	20 (6, 51)	30 (11, 60)	30 (11, 60)
Skin	44 (31, 58)	32 (21, 46)	15 (7, 29)	30 (16, 48)	17 (9, 30)	10 (2, 40)	10 (2, 40)	10 (2, 40)
Anterior nares	46 (33, 60)	24 (14, 37)	25 (14, 40)	15 (6, 32)	23 (14, 37)	20 (6, 51)	20 (6, 51)	30 (11, 60)
Nailfold	16 (9, 29)	8 (3, 19)	5 (1, 17)	11 (4, 28)	6 (2, 17)	0 (0, 28)	0 (0, 28)	10 (2, 40)

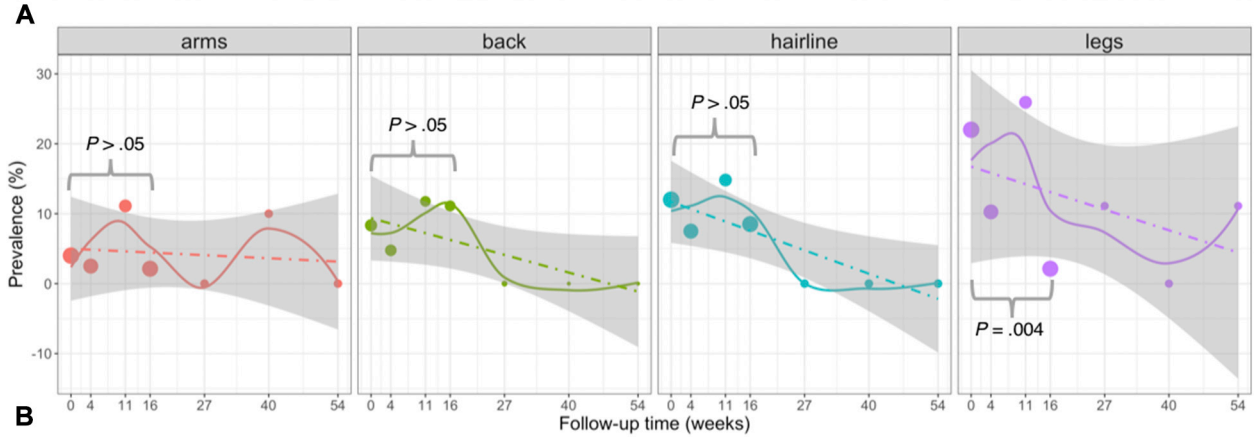


Fig 1. Prevalence of lesional and nonlesional colonization by *Staphylococcus aureus* in patients with psoriasis over a course of treatment with systemic biologics or nonbiologics. Dots are point estimates, the relative size of which represents the numbers of subjects (**A**) or swabs collected (**B**) at each visit. Curved lines are Lowess estimates; dashed lines and gray areas are linear best fits and the associated 95% confidence intervals (CIs) of smoothed conditional means (point estimates), respectively. **A**, By the end of the primary 16-week follow-up, 17% of 47 patients carried *S. aureus* on 1 or more lesion sites (age-, sex-, and site-adjusted odds ratio [aOR], 0.44; $P = .656$). **B**, When all skin lesions were considered, the average rate of colonization by *S. aureus* decreased significantly (aOR, 0.35; 95% CI, 0.14-0.87), particularly in the lower legs (aOR, 0.07; 95% CI, 0.01-0.43). *LL*, Lower limit of 95% CI; *UL*, upper limit of 95% CI.

nonbiologic or biologic agents. Skin type preference by *S. aureus* was not observed as in healthy adults.[5] Controlled trials to assess the benefits of a universal (regardless of colonization status) or targeted (for confirmed colonizers) decolonization program in patients with psoriasis are warranted.

The authors are grateful to the participating patients for their time commitment and support throughout the study. The authors also thank the following dermatologists for patient referral: Drs Y. Y. Chang, C. C. Chi, and Y. Y. Lee. Two previous members of our laboratory, Ms S. C. Yu and Mr Y. H. Lin, are acknowledged for their technical support.

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Funding sources: Supported by Ministry of Science and Technology, Taiwan (MOST 104-2314-B-182-002 and MOST 105-2628-B-182-006 to Dr Liu) and Chang Gung Medical Foundation (CMRPG3E1971, CMRPG3E1972, and BMRPE29 to Dr Liu). The funders, however, had no role in preparing or submitting the current work.

Conflicts of interest: None disclosed.

Dr Liu conceived and designed the study, collected the data, performed statistical analysis, interpreted results of analysis, and prepared and revised the manuscript. Ms Yu participated in data collection, laboratory work, interpretation of the results, and preparation of the manuscript. Dr Chang, Dr Hui, and Dr Yhu-Chering Huang contributed to data collection and manuscript preparation. Dr Yu-Huei Huang conceived and designed the study; collected the data; and contributed to statistical analysis, interpretation of the results, and preparation and revision of the manuscript. All the authors have reviewed and approved the submitted version of the manuscript.

Reprints not available from the authors.

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https://doi.org/10.1016/j.jaad.2018.05.031

Tattooing: A national survey in the general population of France

To the Editor: The prevalence of tattooing in France was estimated at 14% in 2016.[1,2] We report a national survey among a nonselected sample of the general French population. The survey was conducted online between April and August 2017 among 5000 individuals age 15 years and older who were selected with use of a stratified random sampling method from a database including more than 1 million Internet users who agreed to participate in various panel surveys. We inquired about sociodemographics, smoking, skin conditions, tattoo(s) and body piercings (ear lobe excluded), motivations for getting tattooed, and cutaneous side effects. Quality of life was evaluated by using the 12-Item Short Form Health Survey.

The prevalence of tattooed people was 16.8% (9.9% with 1 tattoo and 6.9% with >1) (Table I). Of the tattooed individuals, 37% had 1 or more body piercings. Tattooed individuals were more likely to smoke (44.8% vs 23.5% [$P < .01$]), especially those with more than 1 tattoo (49.3% vs 41.8% [$P = .03$]). Women were more likely to have only 1 tattooed area (51.5% vs 44.1% [$P = .008$]), and men were more likely to be heavily tattooed (13.6% of men but only 8.4% of the women had tattoos on ≥5 areas [$P = .01$]).

Men had their first tattoo at a younger age than women did (24.0 ± 8.9 vs 26.5 ± 10.5 years [$P < .001$]). Age at first tattoo was lower for those who had previously discussed getting a tattoo with their parents (20.4 ± 5.3 vs 26.5 ± 10.4 years) and 28% of those younger than 18 years (minors) made their decision alone. Sexuality was a strong driving factor for men, whereas body reclamation was a strong driving factor for women. Multivariate analysis showed that being age 25 years or younger at the time of tattooing was associated with testing one's own stamina (odds ratio [OR], 10; 95% confidence interval [CI], 3.59-28.5; $P < .0001$) and body embellishment (OR, 1.74; 95% CI, 1.23-2.45; $P = .0002$). Men were more likely to get at a tattoo for individuality (OR, 1.49; 95% CI, 1.08-2.06; $P = .015$), for cultural or religious reasons (OR, 2.37; 95% CI, 1.25-4.50; $P = .008$), and for sexuality (OR, 2.18; 95% CI, 1.27-3.73; $P = .0048$). Regaining control of one's body was a strong driving motivation for women, and the lack of a reason was prominent among the elderly (OR, 2.11; 95% CI, 1.35-3.29; $P < .0001$). Tattooed individuals were more likely to report acne, contact eczema, and atopic dermatitis (Table II), and 17% reported a past or present