which affects the start codon of *SNRPE*. This variant was associated with HHS in our original study.[3]

The fact that we identified mutations in three ethnically diverse families suggests that mutations in *SNRPE* are a relatively frequent occurrence. It is thus surprising that no additional cases have been reported since our original publication.[3] As also observed in the cases at that time, there was wide phenotypic variation in the present ones.

Concerning the splice site mutation, c.54+2T>A directly affects one of the most conserved nucleotides of the 5′ splice site of intron 1. As the newly activated splice site donor, which allows exon 1 skipping, was found in the vector sequence, we cannot exclude the possibility that another mechanism is taking place *in vivo*. However, if the described aberrant transcript were to be produced, it may be either subjected to RNA decay or, more likely, allow the production of an in-frame 52 amino acid-long protein corresponding to a different small nuclear ribonucleoprotein polypeptide E (SNRPE) isoform (ENST00000 367208·1). We suggest that the lower expression of wild-type protein, or the imbalance between the two isoforms, impacts on SNRPE function with respect to hair growth/development.[3]

Interestingly, a mutation in *SNRPE* was recently identified in a patient with primary microcephaly and intellectual disability.[2] None of the present cases showed either clinical feature. This study identified two novel heterozygous mutations, and one known mutation, in *SNRPE*. This expands the mutational and ethnic spectrum of HHS.

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Risk of COVID-19 infection in adult patients with atopic eczema and psoriasis: a single-centre cross-sectional study

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Dear Editor, Many studies have investigated risk factors for poor outcomes following COVID-19. These studies are important for planning targeted prevention and/or intervention. A UK cohort study found that a composite variable of autoimmune diseases, representing rheumatoid arthritis, lupus or psoriasis, was associated with an increased risk of death owing to COVID-19 [hazard ratio 1·19, 95% confidence interval (CI) 1·11–1·27].[1] In contrast, a case series of patients with COVID-19 in two US centres found that atopic eczema (AE) was associated with a reduction in the risk of hospitalization in patients with COVID-19 [odds ratio (OR) 0·51, 95% CI 0·25–0·90].[2] Most published studies investigated the risk of infection with SARS-CoV-2 and poor COVID-19 outcomes associated with oral or biological treatment for psoriasis/eczema rather than for the condition itself.[3] Our aim was to investigate the risk of COVID-19 infection associated with having psoriasis or AE in a UK tertiary dermatology centre [Salford Royal NHS Foundation Trust (SRFT), Manchester, UK].

We performed a cross-sectional study using data extracted from the SRFT electronic patient records (EPRs) of inpatient and outpatient visits. SRFT hosts one of the largest UK dermatology departments; a tertiary psoriasis clinic; and one of the few inpatient dermatology wards in the country. We included all patients aged ≥ 18 years who had one or more visits to the SRFT dermatology service between June 2018 and February 2021. Our exposure of interest was an inpatient or outpatient diagnosis of psoriasis or AE. We excluded all individuals who did not reside in Salford as they were unlikely to have presented to SRFT for COVID-19 testing.

Table 1 Characteristics of study population by COVID-19 infection status

Patient characteristic	Individuals with no history of COVID-19 infection (N = 12 986)	Individuals with history of COVID-19 infection (N = 176)
Age, years	55·0 (36·0–71·0)	75·0 (59·0–83·0)
Sex		
Male	5464 (42·1)	88 (50·0)
Female	7522 (57·9)	88 (50·0)
Body mass index	27·4 (24·0–31·6)	28·3 (24·9–32·9)
Missing	7609 (57·2)	53 (30·1)
Ethnicity		
White	12 157 (93·6)	173 (98·3)
Afro-Caribbean	69 (0·5)	0 (0·0)
South Asian	154 (1·2)	3 (1·7)
Other Asian	144 (1·1)	0 (0·0)
Mixed	65 (0·5)	0 (0·0)
Other ethnic groups	159 (1·2)	0 (0·0)
Not recorded	238 (1·8)	0 (0·0)
Disease exposures		
Psoriasis	1415 (10·9)	12 (6·8)
Atopic eczema	618 (4·8)	6 (3·4)
Hypertension	100 (0·8)	6 (3·4)
Chronic obstructive pulmonary disease	16 (0·1)	0 (0·0)
Diabetes	63 (0·5)	1 (0·6)
Systemic treatment history		
Tumour necrosis factor inhibitor	68 (0·5)	0 (0·0)
Interleukin 17/23 inhibitor	41 (0·3)	0 (0·0)
Prednisolone	20 (0·2)	0 (0·0)
Dupilumab	18 (0·1)	0 (0·0)
Admission owing to COVID-19	0 (0·0)	38 (21·6)

Continuous data are presented as median and interquartile range; dichotomous/categorical variables are presented as n (%).

Clinical diagnoses were coded using the International Classification of Diseases, 10th Revision codes for inpatient admissions. Outpatient diagnoses [including comorbidities of hypertension, chronic obstructive pulmonary disease and diabetes mellitus (DM)] were extracted from letters. Data on immunosuppressive treatments were extracted from letters when vulnerable adults were identified for targeted protection measures ('shielding'), during the COVID-19 pandemic, on the advice of the UK government in March 2020.[4] The most up-to-date values for age, body mass index (BMI), ethnicity and sex were extracted from the EPR. Our outcome of interest was patients who had a positive polymerase chain reaction SARS-CoV2 swab test. We also identified individuals who were admitted to hospital for management of COVID-19. The descriptive data were summarized by median and interquartile range for continuous data, and by number and percentage for dichotomous/categorical variables. We fitted logistic regression models with COVID-19 diagnosis as the outcome and psoriasis or AE as the exposure, additionally adjusting for potential confounders (median-centred age, sex, ethnicity, BMI) and potential mediators between the exposure and the outcome (hypertension and DM) in separate complete-case and multiply imputed (MI) (20 sets) models.

Information for 56 835 patients was extracted; 13 162 patients were eligible for inclusion. There were 1427 (10·8%) patients with psoriasis and 624 (4·7%) with AE. In total, 176 (1·3%) of the eligible patients had COVID-19, 38 (21·6%) of whom were hospitalized [two with psoriasis (who recovered), none with AE]. Baseline demographic data are presented in Table 1. We did not find a statistically significant elevated risk for infection with COVID-19 in patients with psoriasis [unadjusted OR 0·60 (95% CI 0·33–1·08), complete-case adjusted OR 0·98 (95% CI 0·46–2·08), MI adjusted OR 0·50 (95% CI 0·28–0·92)] or AE [unadjusted OR 0·71 (95% CI 0·31–1·60), complete-case adjusted OR 0·60 (95% CI 0·22–1·64), MI adjusted OR 0·67 (95% CI 0·29–1·53)].

A diagnosis of psoriasis or AE was not associated with an increase in the risk of testing positive for COVID-19 compared with other patients attending the dermatology department for other conditions such as skin cancer. One of the strengths of this study is the inclusion of a generalizable population of patients with psoriasis and AE, regardless of treatment. The limitations of this study include potential misclassification of confounders (owing to missing information from letters) and outcome (community COVID-19 test results were not available), lack of adjustment for potential confounders such as smoking, and effect estimate imprecision. Additionally, patients with inflammatory skin diseases may practice stricter shielding measures, which could explain the halving in risk for psoriasis in the MI adjusted analysis. It has been shown that people with psoriasis receiving targeted biological and systemic therapies are likely to follow the most stringent risk-mitigating behaviours.[5] In conclusion, psoriasis and AE were not associated with an increased risk of testing positive for COVID-19. On this evidence, it appears that psoriasis and AE should not be considered as risk factors for contracting COVID-19. Further research in larger cohorts with representative denominators is needed to confirm this finding.

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The association between schizophrenia spectrum disorders and psoriasis: a large-scale population-based case–control study

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Dear Editor, Psoriasis, an immune-mediated disorder, affects approximately 2–3% of the North American population, while up to one-third of patients with psoriasis may develop psoriatic arthritis (PsA).[1] Both psoriasis and PsA have been associated with schizophrenia spectrum disorders (SSDs). For instance, a recent meta-analysis suggests that individuals with schizophrenia may have a higher risk of developing psoriasis.[2] However, those findings challenge previous case–control studies in which no associations were found between psoriasis and schizophrenia,[3,4] and thus it remains unclear whether SSDs are associated with an increased risk of psoriasis and PsA. Furthermore, observational studies may present biases (e.g. reverse causation and confounding), and hence the analyses of associations between SSD and psoriasis and PsA deserve replication in well-designed, population-based, large-scale studies.

Thus, we investigated whether SSDs were associated with a higher risk for psoriasis and PsA in a large-scale case–control study using a population-wide database, namely the Ontario Health Administrative, held at the Institute for Clinical Evaluative Sciences (ICES). The utilization of data was authorized under section 45 of Ontario's Personal Health Information Protection Act, which exempts review by a research ethics board. We captured all cases of psoriasis or PsA[5] from 1 April 2012 to 31 March 2017. The association between psoriatic disease and SSD was tested using a population-based control sample matched for age, sex, region and neighbourhood income. Cases and controls were excluded if there were missing variables for matching or if participants were not eligible for Ontario Health Insurance Plan (OHIP) coverage, which covers the vast majority of the Ontarian population. We compared the relative exposure to SSDs in three case–control comparisons: the first was between individuals with psoriasis and a population-based control sample; the second was between individuals with PsA and those with rheumatoid arthritis (RA); and the third was between individuals with PsA and the general population.

To select participants with SSDs, hospitalization records were retrieved from the Canadian Institute for Health Information Discharge Abstract Database from April 1988 to March 2012, and psychiatric hospitalizations were retrieved from the Ontario Mental Health Reporting System from its inception in October 2005 to March 2012. Outpatient visits were retrieved from OHIP between July 1991 and March 2012, using a validated algorithm.[6] Medical comorbidities were measured using the Johns Hopkins Adjusted Clinical Groups.[7]

Baseline characteristics were calculated for individuals with psoriasis and PsA compared with controls or individuals with rheumatoid arthritis using χ^2-tests for dichotomous and categorical variables, and one-way ANOVA for continuous variables. The associations between SSDs and psoriasis or PsA were analysed using conditional logistic regression.

Overall, from 1 April 2012 to 31 March 2017, there were 21 770 patients with psoriasis and 2342 with PsA. There were no statistically significant differences in the prevalence of SSDs between patients with psoriasis or PsA and the control groups. Additionally, individuals with psoriasis were not more likely to have a prior diagnosis of SSDs than the general population [adjusted OR (aOR) 1·12, 95% confidence interval (CI) 0·98–1·29]. Furthermore, individuals with PsA were not more likely to have a diagnosis of SSDs than individuals with rheumatoid arthritis (aOR 1·64, 95% CI 0·83–3·21) or from the general population (aOR 0·91, 95% CI 0·59–1·41) (Table 1).

Our results challenge previous studies. For instance, a meta-analysis performed by Ungprasert *et al*. revealed conflicting results, as there was no association between SSDs and psoriasis in case–control studies [relative risk (RR) 1·48, 95% CI 0·82–2·64], while a higher RR for psoriasis in people with SSDs was observed in cohort studies (RR 2·22, 95% CI 1·95–2·52). Those conflicting findings may be explained by the moderate-