

The global challenge for skin health

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The burden of skin disease

The human skin is the largest of the body's organs, with functions that encompass sensation, heat regulation, water conservation and immunological surveillance. It is also the single most important determinant of human appearance and identity, and the interface for much of our physical and social contact with our environment. It is not difficult, therefore, to understand how events that compromise its integrity and health have a profound, and potentially devastating, impact on general well-being and self-respect. Furthermore, illness that directly affects the skin is the fourth most frequent cause of all human disease, affecting some 1.9 billion people at any time, almost one-third of the world's population.¹ It is therefore a leading reason for seeking medical help in all societies.

Skin diseases may be infectious, congenital, degenerative, inflammatory and cancerous, and they affect all ages from cradle to grave, but a disproportionate burden falls on the elderly and young children.^{1,2} One of the more common popular fallacies in the perception of human illness is that, because a disease is very common, it may be of little consequence. Yet intolerable itching and disfigurement are severe consequences of damage to the skin. Furthermore, many of these conditions have long-standing, serious repercussions that impair internal organs from the joints to the kidneys, as well as posing a real threat of mental illness leading to severe depression and even suicide.³

In much of the world there is a gross mismatch between the burden of human ill health and the skills necessary to manage it, through lack of trained individuals, research and medicines, leading to a huge reservoir of untreated, or poorly treated, disease – a major concern for those addressing global inequalities in health.⁴ The major neglected tropical diseases such as leprosy, leishmaniasis, onchocerciasis, lymphatic filariasis and yaws, which affect millions, present with abnormalities of the skin. In many countries their control remains an unfulfilled dream, with a lack of skill in their recognition leading inexorably to a failure to control their spread among vulnerable populations, compromising the hopes for the long-term success of the most comprehensive mass treatment programmes that the world has seen.⁵

Life course and social impact

An individual's journey through life is marked by periods of significant vulnerability to major episodes of skin ill health

(Table 1). In childhood there are immediate challenges. There is a rising incidence of atopic eczema, affecting some 165 million children worldwide and resulting in prolonged episodes of intolerable itching,⁶ leading to disruption of family life, education and play. Secondary infections complicate this picture. The shadow of childhood eczema remains with an individual throughout their life, making them susceptible to episodic flares or chronic dermatitis.

In resource-poor areas, childhood infection with the *Scabies* mite⁷ and streptococci,⁸ affecting over 160 million children, has led to a resurgence of two old enemies, long since controlled in the Western world: rheumatic fever and poststreptococcal nephritis. Evidence has emerged to show that, contrary to what was thought on the basis of early studies with short follow-up, some cases of childhood poststreptococcal renal damage have long-term consequences, contributing to the current epidemic of hypertension in later life. The effects of genetic diseases, such as the widespread blistering due to epidermolysis bullosa and the loss of sun-protecting melanin pigmentation in albinism, are huge, and yet some of the greatest scientific advances have been made in these fields with the delineation of the causal single-gene mutations.⁹ Albinism, as with other skin conditions, leads to great stigma in many lands and is a determinant of early onset and rapidly fatal skin cancers, as well as visual loss, social isolation, persecution and, in some countries, ritual murder. Combating these social consequences is now listed as a high priority in sub-Saharan Africa by the United Nations Commission on Human Rights,¹⁰ but this needs to be linked explicitly to the effects of albinism on health.

In adults, chronic inflammatory skin disease, such as psoriasis, stands out as the most frequent cause of persistent and disfiguring skin change, but in many this is compounded by severe arthritis. There is a growing appreciation that psoriasis is a complex, systemic disease associated with significant morbidity and mortality due to cardiovascular disease and depression.¹¹ Occupational skin disease such as hand eczema is a major cause of work-related disability. Melanoma affects adults in all walks of life and has become the second most frequent cancer in some areas of the world; its incidence increases from early adult life, despite international initiatives to encourage prevention and screening.

The elderly are not immune to skin diseases. Arterial and venous ulceration, complicated by poor wound healing and pruritus or severe itching, rob them of the fruits of a global aspiration to healthy ageing.¹² Nonmelanoma skin cancers are a further threat in old age, with a steadily increasing rise in prevalence in the over 70s despite increased awareness and surveillance, and the proliferation of preventive measures.¹³

Table 1 The impact of common skin diseases

Skin disease	Global distribution	Impact
Atopic eczema	RPS/AE	Predominantly affects children. Itching leading to sleep loss, inattention and disruption of family life
Psoriasis	RPS/AE	Mainly adults. In addition to skin disability, risk of arthritis and cardiovascular disease
Scabies	RPS	All ages but particularly children. High prevalence, e.g. > 50% in some areas. Risk of nephritis and rheumatic fever
Pyoderma	RPS	Associated with scabies. Risk of secondary complications (see above)
Skin ulcers, especially leg ulcers and decubitus ulcers	RPS/AE	Elderly. Associated secondary infection and major loss of mobility
Pruritus, from both dermatological and nondermatological diseases	RPS/AE	Loss of sleep, particularly in elderly; depression and mental illness
Genetic disorders such as epidermolysis bullosa and albinism	RPS/AE	Risks range from severe disability and death, e.g. in epidermolysis bullosa, to aggressive skin cancer in albinos in sub-Saharan Africa
Skin cancers: both melanoma and nonmelanoma	Mainly AE but both for nonmelanoma skin cancer	Rising mortality with melanomas in younger adults. Very high prevalence of SCC in the elderly (> 70–80 years)
Diseases of an ageing population: leg ulceration, pruritus	RPS/AE	See above
The skin as initial indicator of serious medical conditions such as NTDs (RPS), e.g. leprosy, yaws, onchocerciasis etc., or autoimmune damage, e.g. SLE (RPS/AE)	RPS/AE	Risk of mortality or severe morbidity. Early recognition leads to early treatment and prevention of major sequelae. Failure to recognize signs of NTDs may compromise control programmes

RPS, resource-poor settings; AE, advanced economies; SCC, squamous cell carcinoma; NTD, neglected tropical disease; SLE, systemic lupus erythematosus.

This is likely to worsen as the proportion of the world's population in this age bracket increases over the next few decades. Beyond the individual burden, nonmelanoma skin cancer is an economic threat to many health systems.¹⁴ In Australia, for instance, it is the most costly form of cancer.¹⁵

Lack of skills that inform recognition of skin cancer at the clinical front line compromise concerted strategies to improve the situation, in the same way that a similar lack of knowledge of the telltale skin signs of neglected tropical diseases such as leprosy threatens to negate the work of global programmes for their control.¹⁶ Similarly, failure to recognize skin clues of potentially life-threatening illnesses such as systemic lupus erythematosus lead to missed or late diagnosis. In these examples delay in diagnosis leads to greater morbidity and may affect the patient's chances of survival.

At the cutting edge: medical research and the skin

Yet the picture is by no means gloomy. In the past 25 years great strides have been made in the fight to understand and alleviate skin disease. With psoriasis and eczema, an expanding knowledge of the immunology and genetic basis of these conditions has led to the discovery of new families of medicines and biological agents that target immune pathways

important in disease development, leading to effective and safe therapies. In infectious diseases, similar advances in translational research have occurred. Ivermectin is available as a mass treatment for many such diseases, and the extension of its use to the control of scabies, in populations where > 20% of children and families are affected, offers the real possibility of reducing this burden to manageable levels within a few years.

New diagnostic and imaging tools provide powerful weapons to combat skin cancers, from dermatoscopic devices to molecular markers of infection, and from surgical advances including micrographic excision techniques to biological antagonists against the signalling pathways involved in carcinogenesis (e.g. inhibitors of proto-oncogenes such as B-Raf), all coupled with well-designed public education and preventive programmes.^{17,18} In the poorest countries the adoption of simple measures such as integrated care pathways for patients with limb ulceration or lymphoedema due to different causes has the potential to make a huge impact on the lives of patients and their communities.¹⁹ These trends all provide the basis for a firmly held belief, backed by the resolve of international and national bodies whose purpose is to improve the lives of patients with skin disorders, that these problems are soluble with defined and concerted action backed by policy makers and by investment.

The future: the Grand Challenges in Global Skin Health initiative

How then do we achieve these goals? There are four key measures to achieve success: (i) research, (ii) education, (iii) clinical application through translation and (iv) the support of those responsible for the management and delivery of health care at local and national levels. Financial support for basic and translational research is fragmentary on the global stage. While it is true that not all skin diseases are lethal, they contribute significantly to the global disease burden, and the persisting failure to address their management accounts for a huge loss of production and increased medical expenditure. In Europe the annual cost of occupational dermatitis – including the direct costs of treatment and industrial compensation, as well as the indirect costs of sick leave and loss of productivity – is estimated to be greater than €5 billion.²⁰

In moderate-to-severe psoriasis the annual cost of the disease in the U.S.A., including treatment and loss of productivity, was estimated to be \$11.25 billion.²¹ At the other end of the spectrum the cost of inappropriate and ineffective scabies treatment over a 3-month period in resource-poor settings is enough to eliminate household cash reserves.²² Increasing the availability of cost-effective measures would have a major impact on both personal and institutional economies.

Education of frontline health workers in the elements of skin disease is also key to successful management. However, competing priorities in medical and nursing training have squeezed the opportunity to address this issue. A new drive to integrate the core skills and knowledge needed to ensure freedom from skin problems into undergraduate and postgraduate teaching for health professionals could provide the answer. Innovation in healthcare delivery has frequently ignored the needs of the whole patient and the populations in which they live. Skin disease has been a casualty in this respect. However, perhaps the most powerful contribution to making skin health a realizable objective over the next 25 years is the recognition, among leaders of governments and nongovernmental organizations, that it is a realistic, affordable and achievable goal, integral to future health and research strategies.

The recent actions by the World Health Organization in framing a resolution to member states for concerted action on psoriasis²³ and in recognizing scabies as a neglected disease²⁴ provide a huge impetus for change. The international dermatological community is committed to this goal and is resolved to see the adoption of these strategies at all levels of research, education and health care. With this objective in mind the International League of Dermatological Societies has embarked on a focused programme, the Grand Challenges in Global Skin Health, to tackle these issues. This has started with initiatives in data collection and analysis, ageing research and the formation of international alliances in scabies control and the care of those with albinism. Other schemes will follow over the next few years as members of the international dermatological community respond to these challenges that face our patients.

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Conflicts of interest

None declared.

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*See Appendix for more details.

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Appendix

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