Recommendations	Level/grade
Pre-biologic evaluation	
Pre-biologic assessments include: Disease severity • PASI (or BSA and PGA) • DLQI Exclude contraindications Cardiovascular • 2D echocardiography if heart failure based on NYHA class III/IV (anti-TNFs) Neurologic • Exclude demyelination in personal or first-degree relatives in the family history (anti-TNFs) Infections • Exclude active or chronic infections Tuberculosis • Screen for active or latent TB by clinical and diagnostic investigations Malignancy • Refer to primary care physicians for age- and sex-appropriate cancer screening if indicated **Tests** • FBC, creatinine, LFT, HBsAg, HBsAb, and HBcAb, anti-hepatitis C IgG and CXR • IGRA (e.g. T-SPOT®.TB or QuantiFERON®-TB Gold). Mantoux test may be more difficult to administer and interpret and less reliable in patients already on immunosuppressants. • HIV screening if clinical suspicion of HIV exists • Urine pregnancy test (if at risk) **Financial counselling and assessment** Patients must be informed regarding the cost of the biologic therapy. When the cost of therapy is an issue, subsidised patients in restructured hospitals who meet the medical criteria for biologics under SDL or MAF should be assessed for financial assistance. SDL biologics: adalimumab biosimilar and infliximab biosimilar MAF biologics: secukinumab and ixekizumab	4, C
Monitoring on biologics	
An IGRA is conducted annually. If too costly or not available, CXR can be considered as an alternative.	GPP
FBC and LFT at 4 weeks (2 weeks for infliximab) and then 3–6 monthly	2+, B
Creatinine: 6 monthly	2+, B
Hepatitis B, Hepatitis C, HIV, periodic urine pregnancy test, if at risk	2+, B
Switching from nonbiologic systemic therapy to biologic therapy in the management of moderate-to-severe psoriasis	
General considerations • When switching due to safety reasons, a washout period is desirable until the safety parameter is stabilised or normalised. • An overlap period or a direct transition may be considered if the switch is due to a lack of efficacy. • An approved induction dose must be used when initiating biologic therapy.	3, D
Switching from acitretin • It does not need a washout period. • Contraception must be continued in women of childbearing age for 3 years.	3, D
Switching from cyclosporine • It does not require a washout period. • A brief overlap period along with biologic therapy (such as for 2–8 weeks) could be considered to reduce the risk of rebound in partial responders. However, the dose of cyclosporine should be tapered at the earliest.	3, D
Switching from MTX • It does not require a washout period. • MTX to be used concomitantly or may be overlapped with approved biologics.	3, D

Recommendations	Level/grade
Switching between biologics	
General considerations	
• It is generally recommended to fully optimise a biologic before switching to another.	
• In cases where efficacy is lost over time (secondary non-responders) or the patients do not respond adequately (do not achieve a minimum of PASI75) by the end of the induction phase (primary non-responders), switching must be performed with considerations to dose adjustments.	
• A washout period is necessary when safety concerns are the reason for switching until the safety parameter is stabilised or normalised.	
• A washout period is unnecessary when the reason for switching is a lack of efficacy; a switch can be made to the new biologic when the next dose of the original therapy is scheduled.	
• A maintenance dose must follow after the approved induction dose for the new biologic.	3, C
• Patients failing to respond to a biologic may respond to another biologic (even if the biologic belongs to the same class as the previous one, e.g. anti-TNF).	4, D
• If a response is achieved to the biologic therapy, then a standard therapy must be rationalised (e.g. dose reduced or stopped).	4, D
• MTX and acitretin (limited data for the latter) do not show increased toxicity when combined with anti-TNFs.	
How to stop biologics?	
Biologics may be stopped abruptly if required.	4, D
Continuous therapy is more efficacious and associated with less development of antidrug antibodies (with associated loss of efficacy and side effects).	3, C
Biologic therapy in special situations	
Surgery	
• The risk of a psoriatic flare needs to be balanced with the advantage of postoperative infection prevention achieved by stopping the treatment.	4, D, GPP
• When wound healing is optional and there is no sign of infection, then biologics may be restarted postoperatively.	4, D, GPP
Retreatment after stopping biologics	
• Continuous therapy is more efficacious than interrupted therapy, but situations may arise where patients need to interrupt treatment and restart again later.	4, D, GPP
• Etanercept, adalimumab, ustekinumab, secukinumab, guselkumab and risankizumab: most patients regain their initial response on retreatment.	
Drug interactions	
• In patients on immunosuppressives, biologics should be used with great caution and concomitant use should be avoided if possible.	4, D, GPP
Pregnancy	
• Patients planning conception should discuss with their dermatologist the benefits versus risks of continuing biologic treatment during pregnancy. Certolizumab pegol has minimal placental permeability and is the safest and preferred biologic treatment option throughout pregnancy.	
• Certolizumab is an unregistered therapeutic product in Singapore and if required, drug approval should be obtained via the special access route. Other biologics may be used with caution in pregnancy, with TNF-alpha inhibitors as the preferred class.	4, D, GPP
• If TNF-alpha inhibitors or other biologic therapies (excluding certolizumab) are given after week 22 of pregnancy, live vaccines, such as BCG, should be delayed until the infant is more than 6 months old.	

2D: two dimensional; BCG: Bacillus Calmette-Guerin; BSA: body surface area; CXR: chest X-ray; DLQI: Dermatology Life Quality Index; FBC: full blood count; GPP: good practice points; HBcAb: Hepatitis B core antibody; HBsAb: Hepatitis B surface antibody; HBsAg: Hepatitis B surface antigen; HIV: human immunodeficiency virus; IgG: immunoglobulin G; IGRA: interferon-gamma release assay; LFT: liver function test; MAF: medication assistance fund; MTX: methotrexate; NYHA: New York Heart Association; PASI: Psoriasis Area and Severity Index; PGA: Physician Global Assessment; SDL: standard list; TB: tuberculosis; TNF: tumour necrosis factor