Scottish Paediatric Endocrine Group (SPEG)

Clinical Guidance

Adrenarche

Management of children presenting with signs of early onset pubic hair/ body odour/ acne

Includes guidance for the distinction between adrenarche, precocious puberty and other abnormalities of secondary sexual development

NOTE

This guidance is not intended to be construed or to serve as a standard of care. Standards of care are determined based on all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guidance recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guidance or any local guidance derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

This guidance has been prepared by NHS National Services Scotland (NSS) National Networks. Accountable to Scottish Government, NSS works at the heart of the health service providing national strategic services to the rest of NHSScotland and other public sector organisations to help them deliver their services more efficiently and effectively. Working across professional and organisational boundaries, National Networks support the delivery of safe, effective healthcare that's designed around patients, carers and families.

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Contact: nss.speg@nhs.scot

Background

Authors	**Dr Sarah Kiff**, Consultant Paediatric Endocrinologist, NHS Lothian
Stakeholders involved	Consultant Paediatric Endocrinologists, Consultant Paediatricians with an Interest in Endocrinology, Paediatric Endocrine Nurse Specialists, Biochemistry Consultants
Methodology used	• Literature search • Review of evidence (see references) • Review of available national and international guidance • Engagement with key stakeholders (see above) • Guidance drafted with review date • Submitted to Steering Group (see appendix) for comment then approval
Rationale	This is an area of frequent referral and there was no existing guidance within Scotland. This was identified as a gap by the SPEG Clinical Guidance and Steering Groups.
Scope	To guide evaluation of a child presenting with features suggestive of adrenarche and to guide the distinction between adrenarche, precocious puberty and other abnormalities of secondary sexual development. This document applies to children presenting with pubic hair growth, axillary hair, body odour and acne before the expected age of puberty. This document should be used by General Practitioners, Paediatricians and Paediatric Endocrinologists.
Approval process	The guidance was approved by the SPEG Steering Group on 23 September 2025. See appendix for list of Steering Group members.

Definition of adrenarche

Adrenarche is the gradual increase in adrenal androgen secretion after approximately the age of 6 years in girls and 7 years in boys. It occurs independently from the gonadotrophin-dependent activation of the gonads in central puberty.

Clinical features

Adrenarche results in the development of pubic hair, axillary hair, body odour and acne. (It does not result in the enlargement of the breasts, penis or testes).

Biochemical findings

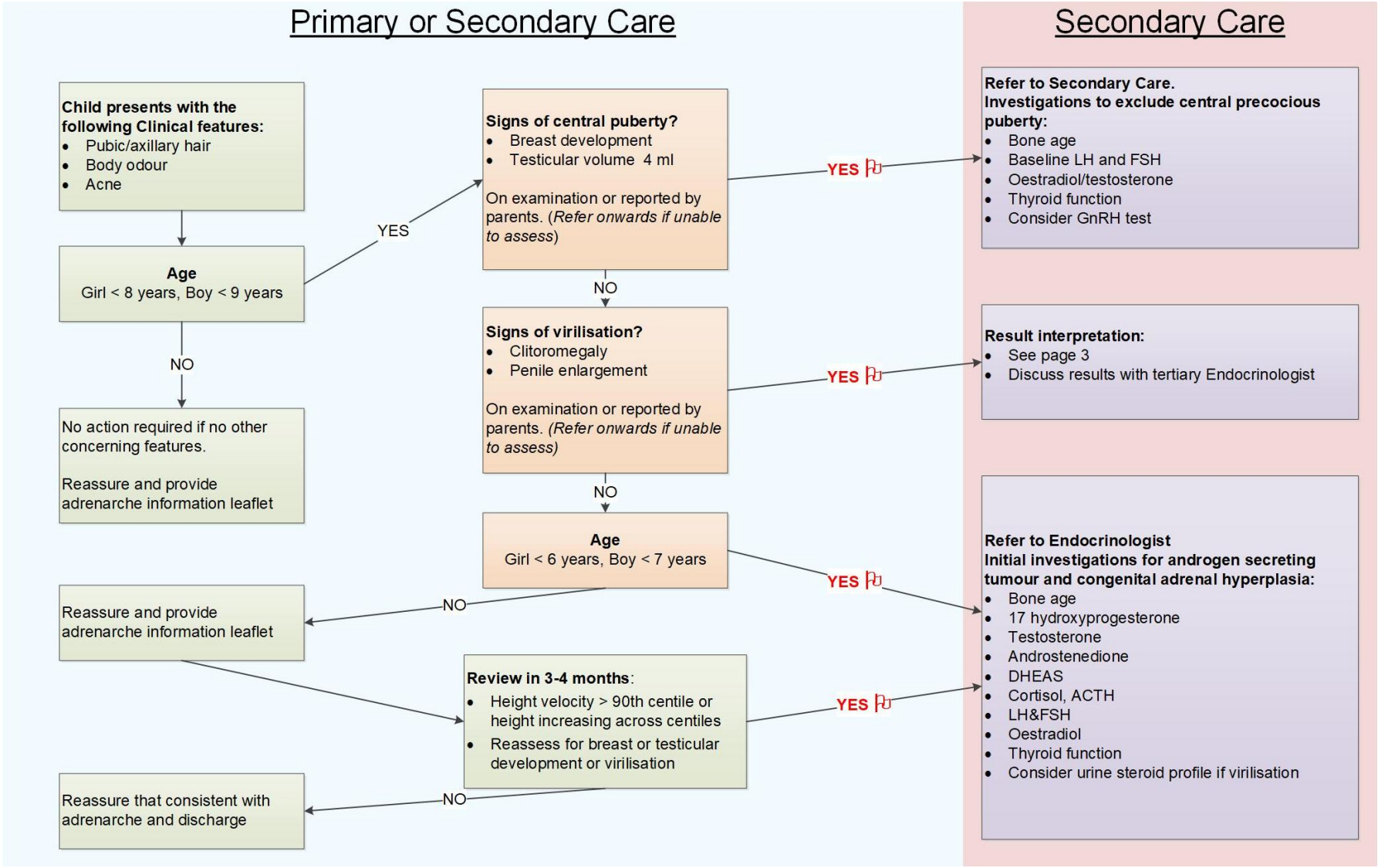
At the time of adrenarche, there is maturation of the adrenal glands, with increased production of dehydroepiandrosterone sulphate (DHEAS) relative to cortisol. The serum concentration of DHEAS can be used as a marker for the presence of adrenarche, with serum testosterone and androstenedione levels being near the upper limit of the normal range. However, the diagnosis can be made on clinical features without further investigations (see next page)

Clinical significance

Adrenarche is a normal variant of pubertal development. It is important to distinguish this from precocious puberty and virilising conditions such as androgen secreting tumours and Congenital Adrenal hyperplasia. Adrenarche itself does not require treatment*.

*There has been previous concern that adrenarche may be associated with the development of insulin resistance, polycystic ovarian syndrome, and metabolic syndrome, but this does not alter management or follow-up.

Management of Adrenarche in children flowchart (NSD610-016.13)



Interpretation of clinical findings and investigation results

	Breast/ testicular development	Clitoral/ penile growth	Linear growth acceleration	Bone Age	Androgens	Gonadotrophins
Premature adrenarche	Absent	Absent	Absent, or slight initial acceleration	Up to 2 years advanced on chronological age Correlated with height age	Early pubertal, DHEAS may be moderately elevated	Prepubertal
Precocious puberty	Stage 2+ breast development 4ml testicular volume	Absent or early	Progressively accelerated	Progressively accelerated	May be normal or elevated for age Oestradiol may be elevated	Early pubertal (If suppressed consider oestrogen secreting tumour)
Congenital adrenal hyperplasia	Absent	Enlargement	Moderately to markedly accelerated	Moderately or markedly advanced for age and pubertal stage	Moderately to markedly elevated	Prepubertal
Virilising tumours	Absent	Marked and progressive enlargement	Markedly accelerated	Markedly and progressively advanced	Markedly elevated	Prepubertal or suppressed
Iatrogenic	Absent	Marked and progressive enlargement	Markedly accelerated	Markedly and progressively advanced	Markedly elevated testosterone	Prepubertal or suppressed

References

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Appendix A - Steering Group Membership

Name	Designation	Role	Area Representing
Amalia Mayo	Consultant Paediatrician	Steering Group Member	NHS Grampian
Anthony Tasker	Consultant Paediatrician	Steering Group Member	NHS Fife
Arlene Smyth	Third Sector Representative	Steering Group Member	Third Sector
Ching Chen	Consultant Paediatrician	Education Group Chair	NHS Greater Glasgow & Clyde
Craig Oxley	Consultant Paediatrician	Steering Group Member	NHS Grampian
Graeme Eunson	Consultant Paediatrician	Steering Group Member	NHS Borders
Guftar Shaikh	Consultant Paediatric Endocrinologist	Steering Group Member	NHS Greater Glasgow & Clyde
Harriet Miles	Consultant Paediatric Endocrinologist	Steering Group Member	NHS Lothian
Ian Hunter	Consultant Paediatrician	Steering Group Member	NHS Lanarkshire
Jane McNeilly	Clinical Biochemist	Steering Group Member	NHS Greater Glasgow & Clyde
Jill Gibb	Paediatric Endocrine Nurse Specialist	Nurses' Group Chair	NHS Tayside
Julie Lucas	Paediatric Diabetes & Endocrine Nurse	Steering Group Member	NHS Forth Valley
Kathryn Cox	Consultant Paediatrician	Quality Indicators Group Chair	NHS Lothian
Kerstin Norman	Paediatric Endocrine Nurse Specialist	Steering Group Member	NHS Highland
Mike Crane	Principle Biochemist	Steering Group Member	NHS Lothian
Nicky Conway	Consultant Paediatrician	SPEG Lead Clinician	NHS Tayside
Rohana Wright	Consultant Physician Endocrinology & Diabetes	Steering Group Chair	NHS Lothian
Roisin Boyle	Paediatric Endocrine Nurse	Steering Group Member	NHS Greater Glasgow & Clyde
Ruth Magowan	Paediatric Nurse	Steering Group Member	NHS Borders
Sabine Grosser	Consultant Paediatrician	Steering Group Member	NHS Forth Valley
Sarah Kiff	Consultant Paediatric Endocrinologist	Clinical Guidance Group Chair	NHS Lothian
Sarah Smith	Clinical Scientist	Steering Group Member	NHS Greater Glasgow & Clyde
Scott Williamson	Consultant Paediatrician	Steering Group Member	NHS Ayrshire & Arran
Stephen Bowhay	Clinical Pharmacist	Steering Group Member	NHS Greater Glasgow & Clyde
Stuart Henderson	Consultant Paediatrician	Steering Group Member	NHS Highland