EAACI Guideline on management of adolescents and young adults with allergy and asthma

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Key words: adolescent, asthma, food allergy, rhinoconjunctivitis, transition, teenager, young adult, allergy.

Word count: ≈4500
ABSTRACT

Adolescent and young adult (AYA) patients need additional support while they experience the challenges associated with adolescence. Furthermore, they need specific training to learn the knowledge and skills required to self-manage their allergies and/or asthma. Transitional care is a complex process which should address the psychological, medical, educational and vocational needs of AYA. The European Academy of Allergy and Clinical Immunology (EAACI) has developed a clinical practice guideline to provide evidence-based recommendations for healthcare professionals to support the transitional care of AYA with allergy and/or asthma. This guideline was developed by a multi-disciplinary working panel of experts and patient representatives based on two recent systematic reviews. It sets out a series of general recommendations on operating a clinical service for AYA, which include: (i) starting transition early (11-13 years), (ii) using a structured, multidisciplinary approach, (iii) ensuring AYA fully understand their condition and have resources they can access, (iv) active monitoring of adherence and (v) discussing any implications for further education and work.

Specific allergy and asthma transition recommendations include (1) simplifying medication regimes and the use of reminders; (2) focusing on areas where AYA are not confident and involving peers in the training of AYA patients; (3) identifying and managing psychological and socioeconomic issues impacting disease control and quality of life; (4) enrolling the family in assisting AYA to undertake self-management and (5) encouraging AYA to let their friends know about their allergies and asthma. These recommendations may need to be adapted to fit into national healthcare systems.

Abbreviations

AGREE II - Appraisal of Guidelines for Research & Evaluation
AYA- Adolescent(s)and young adult(s)
CBT- Cognitive behavioural therapy
EAACI – European Academy of Allergy and Clinical Immunology
HCP- Healthcare professional(s)
HEADSS – Home, Education/ Employment, peer group, Activities, Drugs, Sexuality, Suicide/ depression) assessment

HCP – healthcare professionals

HRQL – health related quality of life

MI- Motivational interviewing

QOL- Quality of life

TF – Task Force
INTRODUCTION

Adolescents and young adults (AYA) represent a large group of patients with allergy and/or asthma. Their medical care is complicated by the biological and psycho-social changes that occur over adolescence. As AYA gain increasing autonomy, they also have to become more socially and financially independent, whilst their primary relationships switch from family to peer-based interactions. It is now acknowledged that these changes encompass a much longer period than previously thought\(^1\) so this guideline will focus on a 11-25 year age range. During this time, this complex context may have an impact on the symptoms associated with allergy and/or asthma and, more significantly, on how they are managed. The critical objective is for AYA to acquire the knowledge, skills and confidence that are required to become independent, competent and expert adult patients. This process is known as

<table>
<thead>
<tr>
<th>Box 1. Glossary</th>
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<tr>
<td><strong>Adolescents and young adults</strong>: patients with allergy and/or asthma aged 11-25 years</td>
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<td><strong>Adolescents and young adult-centred care</strong>: medical care that is focused on the needs of the adolescent and young adult, the specific format will depend on the developmental level of the patient</td>
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<tr>
<td><strong>Cognitive behavioural therapy</strong>: psychological approach to changing people's beliefs and behaviours by focusing on the interaction between thoughts, images, beliefs, emotions, physical symptoms and behaviours.</td>
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<td><strong>Developmentally-appropriate</strong>: format takes into account the developmental level of the patient</td>
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<td><strong>Health literacy</strong>: ability to obtain, read, understand and use healthcare information in make appropriate healthcare decisions including following treatment plans.</td>
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<td><strong>Health related quality of life</strong>: quantification of the impact of illness on physical, mental, emotional and social life of a patient.</td>
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<td><strong>Motivational interviewing</strong>: psychological approach that aims to help an individual develop motivation to make positive decisions and achieve specific goals.</td>
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<td><strong>Multi-systemic approach</strong>: psychological, family-based intervention adapted for the treatment of poor illness management.</td>
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<td><strong>Patient activation measures</strong>: assessment of patient’s knowledge, skill and confidence for managing their health and healthcare.</td>
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<td><strong>Transition</strong>: process of empowering adolescent patients into becoming competent, expert adult patients.</td>
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<td><strong>Transfer</strong>: moving from paediatric to an adult healthcare system.</td>
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<td><strong>Transition readiness assessment tool</strong>: questionnaire completed by the patient or healthcare professional to assess their competency with self-management of their allergy and asthma (e.g. ‘ready, steady, go’ or hospital’s own document)</td>
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<td><strong>Transition report</strong>: detailed written medical report to adult colleague summarising the paediatric care.</td>
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<td><strong>Self-management</strong>: decisions and behaviours that a patient with allergy and asthma takes to manage their health conditions.</td>
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<tr>
<td><strong>Stakeholders</strong>: people or groups of people have an interest in the area.</td>
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transition (Box 1) and entails much more than the simple transfer of a patient from paediatric to adult care. The process of transition is also important when an allergy clinic caters for all age groups. If effectively learned and utilised, constructive self-management skills will serve to support patients throughout their adult lives to reach better health outcomes. We know from a recent European survey that healthcare professionals (HCP) find AYA to be a challenging group to manage. To understand how to approach this age group, one has to understand what is happening during adolescence.

**What is happening during adolescence?**

Research in developmental psychology and neuroscience reveals that adolescence is a sensitive period of social-affective development, characterized by biological, neurological, and social changes. In postnatal brain development, the maximum density of grey matter is reached first in the primary sensorimotor cortex, and the prefrontal cortex matures last. So during adolescence, there is an imbalance between systems supporting reactivity and regulation. Prefrontal areas are still developing until late adolescence (>18–21 years), while hypersensitive reward systems have already evolved, creating a disparity between emotions and control.

Development from conception onwards is vulnerable to environmental influences with long-lasting impact and this is also true during adolescence. Experience may affect not only the number of brain cells - and the number of connections among them - but also the way these connections are "wired". For example, significant fear-eliciting experiences, particularly in middle childhood and early adolescence, can disrupt the typical development of stress regulation as well as learning, memory, and social behaviour.

The ‘back to front’ nature of adolescent development has long been understood as accounting for typical adolescent behaviour patterns, particularly risk-taking, however more recent research has suggested a complex picture. Adolescent decision-making is optimized for attaining specific developmental goals and some processes that inform decision-making are uniquely amplified during adolescence including learning from direct experience, reward reactivity and tolerance of ambiguity.
Behavioural economics has shown that risk-taking is not a simple process, and is not only affected by attitudes toward known risks but also by attitudes toward unknown or ambiguous situations, in which the likelihood of positive and negative outcomes are not known.\textsuperscript{6} It is not that adolescents choose to engage in risks, but, rather, they are willing to gamble when they lack complete knowledge. When adolescents meaningfully understand a risky situation, they are even more risk-averse than adults.\textsuperscript{6}

In addition, adolescent decision-making typically occurs in busy environments that often involve complex motivations. Prominent motivations at this age, which can compete and conflict with one another, include maintaining status with peers, achieving goals in academic, athletic, or other areas, finding independence and maintaining harmony within the family.

**The guideline for managing adolescents and young adults**

This guideline has been prepared by the European Academy of Allergy and Clinical Immunology’s (EAACI) Task Force on Adolescents and Young Adults. It aims to assist HCP to manage patients in the 11-25 year age group with allergic conditions (including chronic urticaria and atopic dermatitis) and asthma. In addition, the Task Force aims to identify gaps in knowledge and implementation, unmet needs and potential future perspectives. The primary audience for this guideline is clinical allergists (specialists and subspecialists), physicians from other related disciplines, nurses, dieticians, social workers and psychologists working across a range of primary, secondary, and tertiary care settings. Healthcare managers, research funding bodies and health policy makers may also find this guideline useful. The development of the guideline has been informed by two formal systematic reviews\textsuperscript{7,8} with systematic review principles being used to identify additional evidence, where necessary.
METHODOLOGY

This Guideline was generated using a structured Appraisal of Guidelines for Research & Evaluation (AGREE II) approach \(^9,10\) (see online supplement – appendix 1). The process started in January 2018 with a web-based discussion about the process and the key clinical areas to address, followed by face-to-face meetings and regular web conferences in which HCP and lay representatives participated.

Ensuring appropriate stakeholder involvement

Members of the EAACI Task Force (TF) on Adolescents and Young Adults from 10 European countries represented a range of disciplinary and clinical backgrounds, including allergists (specialists and subspecialists), paediatricians, psychologists, primary care, dermatologists, otolaryngologists, nurses and patient representatives. Additionally, a survey of stakeholders was undertaken in June 2019 to understand how adolescents and young adults are currently managed and the challenges faced by their HCP.\(^2\)

Systematic reviews of the evidence

Three key questions were addressed: (i) What are the challenges and specific needs of adolescents and young adults with allergic conditions, including asthma, food allergy and anaphylaxis, allergic rhinitis, atopic dermatitis, chronic urticaria, allergic gastrointestinal disease, as well as those with complex multisystem allergic disease? (ii) What specific strategies have proven useful to improve self-management and wellbeing in this population? (iii) What generic approaches are helpful when managing adolescents and young adults? The first two were pursued through two formal systematic reviews (SRs) of the evidence with a cut-off date of February 10, 2019.\(^7,8\) The final question was assessed by a systematic review (SR) of the evidence-based adolescent and young adult guidelines from the last 5 years with a cut-off date of June 21, 2019. The TF members continued to track evidence published after our systematic review cut-off date and, where relevant, studies were considered by the TF chairs.
Box 2. **Assigning levels of evidence and strength of recommendations**

**Level of evidence**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>Level I</td>
<td>Systematic reviews, meta-analysis, randomized controlled trials</td>
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<tr>
<td>Level II</td>
<td>Two groups, non-randomized studies (e.g., cohort, case–control)</td>
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<tr>
<td>Level III</td>
<td>One group, non-randomized (e.g., before and after, pre-test, and post-test)</td>
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<tr>
<td>Level IV</td>
<td>Descriptive studies that include analysis of outcomes (single-subject design, case series)</td>
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<tr>
<td>Level V</td>
<td>Case reports and expert opinion that include narrative literature, reviews, and consensus statements</td>
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**Grades of recommendation**

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<tr>
<th>Grade</th>
<th>Description</th>
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<tr>
<td>Grade A</td>
<td>Consistent level I studies</td>
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<tr>
<td>Grade B</td>
<td>Consistent level II or III studies or extrapolations from level I studies</td>
</tr>
<tr>
<td>Grade C</td>
<td>Level IV studies or extrapolations from level II or III studies</td>
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<tr>
<td>Grade D</td>
<td>Level V evidence or troublingly inconsistent or inconclusive studies at any level</td>
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**Strength of recommendations**

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<th>Strength</th>
<th>Description</th>
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<tr>
<td>Strong</td>
<td>Evidence from studies at low risk of bias</td>
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<tr>
<td>Moderate</td>
<td>Evidence from studies at moderate risk of bias</td>
</tr>
<tr>
<td>Weak</td>
<td>Evidence from studies at high risk of bias</td>
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Recommendations are phrased according to the grade of recommendation:

- Grade A: “is recommended”
- Grade B: “can be recommended”
- Grade C: “may be recommended”
- Grade D: “may be considered”

Approach adapted from Oxford Centre for Evidence-based Medicine—Levels of Evidence and Grades of Recommendations. The adaptation involved providing an assessment of the risk of bias, based on the Cochrane risk of bias tool, of the underpinning evidence and highlighting other potentially relevant contextual information plus basing recommendation phrases on the grade.

Formulating recommendations

The TF members graded the strength and consistency of the key findings from the SRs.\(^7,8\)

These were used to formulate evidence-based recommendations for clinical care based on the relative balance between potential benefits, side effects and risks.\(^11\) (Box 2). This involved formulating clear recommendations with the strength of evidence underpinning each recommendation (Box 2). For many recommendations, there was only level V evidence available. To ensure that these recommendations were robust, a modified Delphi approach was used to achieve consensus within the task force (see online supplement). The TF aimed...
to minimise bias at every step. TF members identified the resource implications of implementing the recommendations, barriers, facilitators, potential approaches to the implementation of each recommendation and suggested audit criteria to help with assessing organizational compliance.

**Peer review and public comment**

The draft Guideline was externally peer-reviewed by invited experts from a range of professional backgrounds. The draft was also made available on public domain on the EAACI web site for a 3-week period in February 2020 to allow a broader array of stakeholders to comment. All feedback was considered by the TF members and, where appropriate, revisions were made. Further feedback should be addressed to the corresponding author. Additionally, adolescents and young adults and their parents/carers were invited to consider the importance that they attached to each draft recommendation during the development of the guideline (for further details see online supplement).

**Identification of evidence gaps**

The process of developing this guideline has identified a number of evidence gaps which were prioritized (Table 8).

**Editorial independence and managing conflict of interests**

This Guideline was funded and supported by EAACI. The funder did not have any influence on the guideline production process, on its contents or on the decision to publish. TF members’ conflicts of interest were declared and taken into account by the TF chairs as recommendations were formulated.

**Updating the Guideline**

EAACI plans to update this Guideline in 2025 unless there are important advances before then.
GENERAL TRANSITION (Table 1)

Eight guidelines focusing on the transition of AYA with juvenile-onset rheumatic arthritis, coeliac disease, gastroenterological conditions, liver diseases, young people using health or social care services and AYA with special health care needs were identified from the last five years. Most of the evidence stemmed from expert opinion derived from clinical experience or qualitative studies reviewed systematically; very few randomized controlled trials were referenced.

Starting transition

Preparation for transition may be considered from early adolescence (11-13 years) in accordance with the patient’s developmental stage. This will allow AYA to gradually acquire new knowledge about their disease and develop self-management skills, allowing them to take increasing responsibility for their medical care. It is generally agreed that the optimal timing for initiation of the transition process cannot be based on chronological age. An individualised, flexible approach is required. The following factors might be considered by HCPs to determine the ideal age to start the transition process: mental and physical development, disease activity, health literacy, adherence to treatment, autonomy in disease management, family’s socioeconomic circumstances and school format.

Transition readiness questionnaires are tools which consist of a list of desirable skills and educational targets that AYA should ideally meet before transfer to adult care. There is a lack of validated readiness assessment tools for AYA with allergy and/or asthma but several generic tools are available such as Transition Readiness Assessment Questionnaire, “Ready, Steady, Go” and TR(x)ANSITION Scale. HCP may consider using one throughout the transition process to track progress and identify areas where AYA need more help to build knowledge and understanding, autonomy and self-management skills.

Involving the AYA, family and other HCP

Collaboration and engagement of all stakeholders are essential for a successful and smooth transition process. Transition can be complex and more difficult in patients with multiple allergic diseases. It is important that the family are involved in supporting AYA self-
management, thereby encouraging independence. During the transition process, HCPs may consider helping AYA (with their parents/caregivers) to understand their allergy and asthma, possible complications, treatment rationale (including medication name, dosing, possible side effects), effective management strategies and how to recognise higher risk symptoms (Grade D). Important skills for AYA to learn are how to make appointments, identify when and whom to contact in case of relapse, how to negotiate and understand the transition process and how to access the support available. AYA should ideally be offered portable, accessible information in the form of leaflets, web-pages, or audio for disabled AYA. It may be also helpful for AYA to have their own personal transition plan, developed together with a HCP and written in a form of a ‘roadmap’ towards agreed short and long term goals and desired outcomes for transition. As adolescents are generally characterised by low levels of adherence to therapy, HCP may consider monitoring this more closely during the transition process (Grade D). It has been shown that AYA are more likely to follow treatment plans and attend adult service medical appointments when they have a good knowledge of their disease and the reasons for treatment and good family support.

Wider aspects to consider

Another important aspect that HCP may consider covering during the transition process is developing skills related to self-management of allergy and/or asthma, within current and potential future education or work (Grade D). Other area for discussion may be life skills, future health concerns, educational and employment goals, independent living and housing options, financial needs, psychosocial aspects, mental health, drugs and alcohol, healthy sexuality and reproduction. HEADSS is a helpful framework for such discussions.

Other options for communication between HCP and AYA, such as web-based or mobile technologies, can be recommended to improve the effectiveness of the transition process (Grade B).

Integrated regional approach involving paediatric and adult services

For optimal outcomes, a structured, multidisciplinary transition programme with a shared regional or network protocol developed by HCP, AYA, and parents/carers may be considered (Grade D). This could include age-appropriate written information. Several
guidelines have suggested that regular meetings between paediatric and adult HCP improve the effectiveness of the transition programme (Grade D). If transfer to another clinical service is required, a transition report should be prepared covering the AYA’s medical history, treatments, emergency care plan, follow-up, comorbidities and any other relevant information. Furthermore, an integrated transition programme is needed with input from paediatric and adult providers and primary care, ideally as part of the well-coordinated multidisciplinary team. This may include a period of overlap between these services to help build relationships and establish effective adult care and management (Grade D).

Feedback from the adult to the paediatric clinic and primary care about AYA’s attendance and any changes in management is essential for continuity of the medical care and flow of information between all HCPs involved in the individual’s care.

**Training and audit**

To achieve a good transition pathway, HCPs need training to help them understand the developmental aspects of AYAs, the transition process, and how to engage AYA in behavioural change (Grade C). It may be useful to have a lead HCP to coordinate the transition process and training as well as being the contact person for AYA and parents/carers. Lastly, regular audit of a transition service may be recommended to assess key performance indicators and improve service provision (Grade C). Audits should involve AYAs and families, policy and decision makers, administrators, researchers, HCPs and government agencies.
### Table 1. Generic recommendations for adolescents and young adults with allergy and/or asthma

<table>
<thead>
<tr>
<th>Generic recommendations</th>
<th>Other considerations</th>
<th>References*</th>
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<tbody>
<tr>
<td>Preparation for transition may be considered from early adolescence (11-13 years) in accordance with the patient’s developmental stage (D, IV-V)</td>
<td>HCP may want to consider the following when deciding when to start the transition process: mental and physical development, disease activity, health literacy, adherence to treatment, autonomy in disease management and family’s socioeconomic circumstances and school format.</td>
<td>Foster(^1); Elli(^1); CAPHC(^1); Vajro(^1); NICE(^1); Brooks(^1); Ludvigsson 2016(^1)</td>
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<tr>
<td>For a transition model to be effective, the following may be considered for inclusion:</td>
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<tr>
<td>- the use of a structured, multidisciplinary transition programme within the clinic/healthcare unit (D, I-V)</td>
<td>Shared regional protocol agreed with HCP, AYA, parents/careers, HCP and regularly updated at least every 5 years. This could include age-appropriate written information and structured transition communication/reports between all paediatric and adult HCP. It may be helpful to have a lead person to coordinate the transition process and be a contact person for HCP, AYA and parents/carers.</td>
<td>Calvo, 2015(^2); Foster, 2016(^1); Brooks(^1); CAPHC(^1); NICE(^1); Vajro(^1)</td>
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<tr>
<td>- informing AYA and parents/caregivers about allergy and/or asthma as well as the transition processes and the support available in a form that is appropriate for their developmental stage (D, I-V)</td>
<td>HCP may want to consider including the following information: purpose of transfer to an adult setting; location of available adult centres, disease characteristics, treatments (including side effects), how to recognize alarm symptom, how to assist AYAs to take on their own care and support available. Ideas for formats: leaflets, web-page, audio for disabled AYA. It may be helpful for AYA to have their own personal transition plan.</td>
<td>Brooks(^1); Calvo(^1); Elli(^1); CAPHC(^1); NICE(^1)</td>
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<td>- a checklist of skills and knowledge to assess AYA readiness for transition (D, I-V)</td>
<td>Tools can be used several times throughout the transition process in order to identify which areas of AYA self-management and well-being need to be addressed and improved. There are no specific allergy and asthma tools but generic ones are available: Transition Readiness Assessment Questionnaire(^2), &quot;Ready, Steady, Go&quot;(^2) and TR(x)ANSITION Scale.</td>
<td>CAPHC(^1); Vajro(^1); Brooks(^1); Foster(^1)</td>
</tr>
<tr>
<td>- more active monitoring of adherence to treatment through the transition process (D, I-V)</td>
<td>Adherence may benefit from targeted specific educational and organisational interventions, e.g. more frequent appointments.</td>
<td>Calvo(^1); Brooks(^1); Vajro(^1); Ludvigsson(^1); Elli(^1)</td>
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<td>- a period of overlap between paediatric and adult care providers before AYA is transferred, then feedback from the adult to the paediatric clinic about their care</td>
<td>Where AYA care needs to be moved to another service clinic, AYA medical information (ideally in the form of a transition report) should be transferred to the adult medical service. Where possible, AYA should be seen in a joint paediatric-adult clinic, AYA should ideally see the same HCP in adults’ services for at least the first 2 attended appointments after transfer.</td>
<td>Calvo(^1); Foster, 2016(^1); Elli(^1); CAPHC(^1); NICE(^1); Ludvigsson(^1); Brooks(^1); Vajro(^1)</td>
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<tr>
<td><strong>attendance and any changes in management (D, I-V)</strong></td>
<td>Particular focus should be placed on more complex patients. Meetings could be virtual. Process could be informed by areas of the assessment tools e.g. adherence, disease activity outcomes, HEADSS&lt;sup&gt;26&lt;/sup&gt;.</td>
<td>Elli&lt;sup&gt;16&lt;/sup&gt;; Vajro&lt;sup&gt;17&lt;/sup&gt;</td>
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<tr>
<td><strong>- regular meetings between paediatric and adult care providers (D, I-V)</strong></td>
<td>Particular focus should be placed on more complex patients. Meetings could be virtual. Process could be informed by areas of the assessment tools e.g. adherence, disease activity outcomes, HEADSS&lt;sup&gt;26&lt;/sup&gt;.</td>
<td>Elli&lt;sup&gt;16&lt;/sup&gt;; Vajro&lt;sup&gt;17&lt;/sup&gt;</td>
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<tr>
<td><strong>Other options for effective communication between HCP and AYA can be recommended (eg web-based, mobile technologies) (B, I-V)</strong></td>
<td>Options may include web-based communication boards and digital communication tools such as text.</td>
<td>Vajro&lt;sup&gt;17&lt;/sup&gt;; Brooks&lt;sup&gt;15&lt;/sup&gt;; NICE&lt;sup&gt;18&lt;/sup&gt;</td>
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<tr>
<td><strong>Discussion of self-management of AYA allergy and/or asthma within current and potential future college, university, work or social environments may be considered (D, I-V)</strong></td>
<td>Areas that HCP may want to consider discussing lifestyle, future health concerns, educational and employment goals, independent living and housing options, financial needs, psychosocial, mental health, sexuality and reproduction.</td>
<td>Calvo&lt;sup&gt;12&lt;/sup&gt;; CAPHC&lt;sup&gt;19&lt;/sup&gt;; NICE&lt;sup&gt;18&lt;/sup&gt;; Brooks&lt;sup&gt;15&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Specific training in transitional and AYA care may be recommended for all HCP involved in transition process (C, II-V)</strong></td>
<td>Training in generic transition process, disease-specific and developmentally-appropriate care (e.g. clinical experience, e-learning, workshops) as part of the continuing professional development.</td>
<td>Calvo&lt;sup&gt;12&lt;/sup&gt;; Foster&lt;sup&gt;13&lt;/sup&gt;; CAPHC&lt;sup&gt;19&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Regular audit of a transition service may be recommended to assess key performance indicators and improve service provision (C, I-V)</strong></td>
<td>Audit should involve AYA and families, policy and decision makers, administrators, researchers, HCP and government agencies.</td>
<td>Brooks&lt;sup&gt;15&lt;/sup&gt;; CAPHC&lt;sup&gt;19&lt;/sup&gt;; NICE&lt;sup&gt;18&lt;/sup&gt;</td>
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*Recommendations: Foster 2017<sup>11</sup>, juvenile-onset rheumatic diseases; Ludvigsson 2016<sup>14</sup>, coeliac disease, Brooks 2017<sup>15</sup>, chronic digestive diseases; Vajro 2018<sup>17</sup>, liver; NICE 2015<sup>18</sup>, young people using health or social care services; Calvo 2015<sup>12</sup>, rheumatic patients with childhood onset; Elli 2015<sup>16</sup>, gastroenterological patients; CAPHC 2016<sup>19</sup>, AYA with special health care needs.**

AYA, adolescents and young adults; HCP, healthcare professionals; NICE, National Institute for Health and Care Excellence; CAPHC, Canadian Association of Paediatric Health Centres, HEADSS (Home, Education/ Employment, peer group, Activities, Drugs, Sexuality, Suicide/ depression) assessment.
Recommendations specific to allergic conditions and/or asthma were developed by the Task Force based on the two underpinning systematic reviews.\textsuperscript{7,8}

**Improving adherence (Tables 2, 4 and 5)**

There are numerous data documenting poor adherence to therapy during adolescence. This is therefore an important issue to consider. There is weak evidence to show that simplifying medication regimes, such as the use of a single inhaler combining inhaled corticosteroid and long-acting \(\beta_2\) agonists, may be recommended to improve adherence (Grade C)(Table 2).\textsuperscript{27}

Several studies indicate that low self-efficacy (confidence in performing a specific activity) is related to poor medication adherence, both in AYA with asthma and/or food allergy.\textsuperscript{28,29,30-33}

One controlled study showed that text reminders to take medication could improve medication adherence in AYA with asthma\textsuperscript{34}; however, the number of participants was small and this finding needs to be confirmed by larger studies. Other types of reminders, such as prompts to take medication, mobile applications and web-based applications, monitors or routines can be recommended to improve adherence, symptom control and quality of life (Grade B)(Table 2).\textsuperscript{35-38} One study with a large sample looked at the effect of cognitive behavioural therapy (CBT) using a multi-systemic approach on functional asthma outcomes in adolescents. The results showed a positive effect on asthma treatment adherence, as well as on asthma knowledge, self-management and symptom control (Grade B)(Table 4).\textsuperscript{39-42}

Finally, data suggest that amending family routines to give AYA time to fit in their therapy may be recommended to improve adherence with medication in AYA (Grade C)(Table 5).\textsuperscript{43,44}
Table 2. Adherence recommendations for adolescents and young adults with allergy and/or asthma

| Simplifying medication regimes may be recommended to improve adherence (Grade C, Evidence level IV) |
|-------------------------------------------------|--------------------------------------------------|
| **Strength of recommendation:** Weak recommendation with evidence coming from a single study involving participants with asthma from 22 years of age. | **Other considerations:** Evidence comes from the use of combined corticosteroid and long-acting bronchodilator inhalers for asthma but is likely to be generalizable. |
| **References:** Axelsson. |

| Medication reminders, mobile applications and web-based applications, monitors or routines can be recommended to improve adherence, symptom control and quality of life (Grade B, Evidence level I-IV) |
|-------------------------------------------------|--------------------------------------------------|
| **Strength of recommendation:** Weak recommendation for smartphone-based health applications, medication reminders or monitors as only suggested by qualitative studies. | **Other considerations:** A smartphone-based personalized health app, medication reminders or monitors were suggested in qualitative studies. All studies focused on asthma but likely to also be applicable to allergy. |
| **References:** Naimi, Blaakman, Koster, Johnson. |

AYA, adolescents and young adults.
Optimising self-management (Table 3)

Empowering AYA with self-management skills can help them become autonomous expert patients, minimising their dependency on parents and HCP. It is therefore essential that AYA have the knowledge and skills to ensure they constructive self-manage their allergies and/or asthma. Focusing consultations on areas where AYA say they are not confident may be recommended to improve self-management including adherence (Grade C).28-33 Barriers to successful self-management such as poor symptom perception and failure to take responsibility need to be addressed.7 Facilitators to self-management which could be employed are the use of routines, simple treatment regimes, better knowledge, a positive attitude and support from family, friends and school/college.7

To facilitate self-management, a personal action plan may be recommended to assist AYA in self-managing their allergy and/or asthma (Grade C).29,31,45,46 Plans should be developed with the AYA and parents/carers. They could be smartphone-based.46

Peer-led interventions are recommended to improve asthma-related quality of life, asthma knowledge, and to reduce asthma-related doctor visits and school absence (Grade A).47-51 Adolescents are likely to mirror the behaviour of their peers. To date, these peer-led interventions have been demonstrated in asthma randomised controlled asthma trials; they may also be useful for other allergic conditions.

AYA with allergy and/or asthma are frequently excluded from activities, which may have an impact on their developing social skills. Consideration should be given to supporting the AYA, family and the wider community to allow AYA to be included in social events (Grade D).52-55 This may involve focusing on sports that are less likely to exacerbate asthma (e.g. swimming) or undertaking sport at times when symptoms are less likely to be triggered (e.g. avoiding cold mornings). Ensuring that the menu for school trips or parties does not contain relevant allergens such as peanuts and tree nuts will be helpful for some AYA; it is therefore important that AYA have the communication skills to inform organisers about their allergy. Additionally, educating teachers, club staff, and other parents about allergy/or and asthma is important as mistaken beliefs can present a barrier to effective communication and integration in social contexts.52,55
Motivational interviewing (MI) can be recommended to improve asthma symptoms and quality of life (Grade B). MI has been widely used in medicine and other settings in this age group. The approach seeks to increase motivation to change behaviours and then encourages the AYA to set goals for themselves. Training is required for HCP to effectively utilise MI.
### Table 3. Self-management recommendations for adolescents and young adults with allergy and/or asthma

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Strength of recommendation</th>
<th>Other considerations</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focusing consultation on areas where AYA say they are not confident may be recommended to improve self-management including adherence (Grade C, Evidence level IV)</td>
<td>Weak recommendation based on low risk of bias in cross-sectional and qualitative studies. These included AYA with both asthma and food allergy.</td>
<td>Barriers to self-management associated with poor self-efficacy should be identified so that specific measures can be taken to overcome these.</td>
<td>Rhee, Saleh-Langenberg, Jones, Macadam, Holley</td>
</tr>
<tr>
<td>Formulation of a personal action plan with the AYA and their family to enable them to self-manage their allergy and asthma may be recommended (Grade C, Evidence level 1-IV)</td>
<td>Weak to moderate recommendation based on high risk of bias in one randomized controlled trial and on low risk bias in cross-sectional studies. These included AYA with both asthma and food allergy.</td>
<td>Smartphone based personalized action plan may lead to improvement in asthma control test. The plan should be regularly reviewed.</td>
<td>Perry, Jones, Warren</td>
</tr>
<tr>
<td>Peer-led interventions are recommended to improve asthma related quality of life, asthma knowledge, and to reduce asthma related doctor visits and school absence (Grade A, Evidence level I)</td>
<td>Strong recommendation based on low and moderate risk of bias interventional studies focusing on AYA with asthma. Three studies assessed the impact of the Triple A programme.</td>
<td>Peers here are older AYA from similar backgrounds, either with or without asthma, trained to ‘teach’ allergic teens. This is also likely to be useful for other allergic conditions.</td>
<td>Al-Sheyab, Gibson, Rhee, Rhee, Shah</td>
</tr>
<tr>
<td>Supporting the AYA, family and the wider community to allow the AYA inclusion in social events may be considered (Grade D, Evidence level IV)</td>
<td>Weak recommendation based on low risk of bias in a cross-sectional study and qualitative studies. These included AYA with either asthma or food allergy.</td>
<td>Aim for better participation, less bullying and gaining fitness. For example, there are sports, such as swimming, that less likely to trigger asthma. Adopting specific strategies may allow AYA with food allergy or asthma to safely participate in trips, parties and other social events.</td>
<td>Winn, Mackenzie, Mammen, Mammen</td>
</tr>
<tr>
<td>Motivational interviewing can be recommended to improve asthma symptoms and quality of life (Grade B, Evidence level I)</td>
<td>Moderate recommendation based on one randomised controlled asthma trial. Motivational interviewing has been demonstrated to be effective across many areas and is likely to also be helpful with allergy.</td>
<td>Motivational interviewing includes strategies to increase motivation, shared decision making and goal setting.</td>
<td>Seid</td>
</tr>
</tbody>
</table>

AYA, adolescents and young adults.
Many AYA with allergy and/or asthma have co-existing psychological issues, including anxiety, depression, suicidal ideation, and relational difficulties. These problems may magnify the complexities of self-management, care coordination and treatment planning in AYA with allergy and/or asthma. Therefore, the identification and management of psychological issues impacting disease control and health-related quality of life may be recommended (Grade B).

It is known that the social context of a person’s life determines the risk of exposure, as well as their susceptibility, the course and outcome of illness. Socioeconomic factors and stressful life events can impact disease control and HRQL in allergic diseases. Therefore, the identification and management of socioeconomic issues and stressful life events impacting disease control and HRQL may be recommended (Grade C).

Where AYA are struggling to successfully self-manage their asthma, psychological interventions using a CBT based or multi-systemic therapy approach can be recommended to improve asthma knowledge, improve adherence, self-management and symptom control (Grade B). This is based on a small number of randomised controlled asthma trials. Similar approaches are likely to be helpful where allergy is the key problem.
Table 4. Psychosocial recommendations for adolescents and young adults with allergy and/or asthma

<table>
<thead>
<tr>
<th>Identification and management of psychological issues impacting disease control and health related quality of life can be recommended (Grade B, Evidence level II-III)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strength of recommendation:</strong> Moderate recommendation based on low risk of bias in quantitative cross-sectional and quantitative cohort studies. These included AYA with asthma, atopic dermatitis, and food allergy.</td>
</tr>
<tr>
<td><strong>Other considerations:</strong> Many AYA with asthma and allergy have associated psychological issues. Tools such as HEADSS and YouthCHAT may be helpful in identifying problems that can then be addressed and managed in an appropriate way.</td>
</tr>
<tr>
<td><strong>References:</strong> Bruzzeze, Halvorsen, Kim, Lee, Lu, Noh, Polloni, Shankar, Hullmann.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identification and management of socioeconomic issues and stressful life events impacting disease control and health related quality of life may be recommended (Grade C, Evidence level II-IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strength of recommendation:</strong> Moderate recommendation based on low risk of bias in quantitative cross-sectional, quantitative cohort, and quantitative case series studies. AYA had asthma, atopic dermatitis, and food allergy.</td>
</tr>
<tr>
<td><strong>Other considerations:</strong> Examples include factors that may impact on quality of life including divorce, bankruptcy, bereavement and recent severe allergic reactions. Potential financial barriers should be explored in young adults.</td>
</tr>
<tr>
<td><strong>References:</strong> Ferro, Hedman, Amaral, Noh, Stridsman, Sundel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Psychological interventions using a cognitive behavioural therapy based or multi-systemic therapy approach can be recommended to improve adherence, asthma knowledge, self-management and symptom control (Grade B, Evidence level I)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strength of recommendation:</strong> Moderate recommendation due to specific population based on low to intermediate risk of bias in one randomized controlled trial and a randomized pilot trial. Psychological interventions can be considered for AYA who are struggling to successfully self-manage their asthma.</td>
</tr>
<tr>
<td><strong>Other considerations:</strong> Evidence for asthma knowledge, self-management and symptom control, mainly involving African American AYA with asthma in one study. It is possible that findings may be extrapolated to other conditions. However, more studies are needed.</td>
</tr>
<tr>
<td><strong>References:</strong> Naar, Ellis, NaarKing, Bruzzeze.</td>
</tr>
</tbody>
</table>

AYA, adolescents and young adults; HEADSS (Home, Education/ Employment, peer group, Activities, Drugs, Sexuality, Suicide/ depression) assessment.
Obtaining support (Table 5)

Supportive relationships have shown to have a positive impact on the management and control of asthma and/or allergic disease and in the overall well-being of AYA. Effective communication and fostering positive views about treatment can improve self-management, adherence, asthma control and quality of life. An unsupportive family atmosphere has been associated with poor outcomes. Adolescents tend not to report asthma symptoms to their parents and care-givers. Enrolling the family in assisting the AYA to undertake self-management of their asthma and allergy may be recommended (Grade C). This can be gradually achieved over time, as appropriate to the age of the AYA. Simple modifications to the family’s routines to create time to take treatment may assist with adherence to therapy.

From early adolescence onwards, along with growing independence, relationships decentralise from the core family to peers, friends and other social networks. Social comparison and being part of the group becomes increasingly important. As a result, the AYA may feel embarrassed about their allergy and/or asthma due to fear of being perceived as different from their peers. To prevent this, it may be recommended to encourage AYA to let their friends know about their allergy and/or asthma and how they can help in an emergency (Grade C). Friends may be invited to clinic or practical workshops where they can be provided with hands-on training in symptom recognition, the use of adrenaline auto-injectors and other aspects of emergency management of allergy and asthma.

Promoting allergy and/or asthma awareness (e.g. triggers and treatment) among peers/ coworkers and teachers/managers to support the AYA patient with self-management may be recommended (Grade C). Information about the nature of the allergic conditions, possible triggers and correct treatment may change their self-perception, and the perceptions of others, and enable improvements in self-management. Increased awareness may also help reduce allergy- and/or asthma-related bullying in schools and online.

Teenagers like to use applications on their mobiles and look for information on the internet; moreover patients have reported finding online support networks helpful. Signposting AYA to high quality reliable online resources about allergy and/or asthma
(eg websites, moderated forums) where they can obtain age-appropriate information and advice may be recommended (Grade C).
### Table 5. Support recommendations for adolescents and young adults with allergy and/or asthma

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Strength of recommendation: Moderate recommendation based on low to moderate risk of bias in qualitative and observational studies. These included AYA with both asthma and food allergy.</th>
<th>Other considerations: Support the family to slowly empower the AYA to take on more self-management as appropriate to the individual. Ask the AYA how they would like their parents/carers to be involved throughout their transition and help them develop confidence in working with the adult’s services. Give AYA the chance to raise any concerns and queries separately from their parents/carers. This may take more clinic time. Adherence may be improved if the family’s routines are modified to assist AYA self-management activities.</th>
<th>References: Bruzzese, Bruzzese, Holley, Koster, Naimi, Rhee, Rhee, Steensgaard, Stewart, Wamboldt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolling the family in assisting the AYA to take on the self-management of their allergy and asthma may be recommended (Grade C, Evidence level IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strength of recommendation:</strong> Moderate recommendation based on low to moderate risk of bias in qualitative and observational studies. These included AYA with both asthma and food allergy.</td>
<td>Other considerations: Support the family to slowly empower the AYA to take on more self-management as appropriate to the individual. Ask the AYA how they would like their parents/carers to be involved throughout their transition and help them develop confidence in working with the adult’s services. Give AYA the chance to raise any concerns and queries separately from their parents/carers. This may take more clinic time. Adherence may be improved if the family’s routines are modified to assist AYA self-management activities.</td>
<td>References: Bruzzese, Bruzzese, Holley, Koster, Naimi, Rhee, Rhee, Steensgaard, Stewart, Wamboldt.</td>
<td></td>
</tr>
<tr>
<td><strong>Encouraging AYA to let their friends know about their allergy and asthma and how to manage emergencies may be recommended (Grade C, Evidence level IV)</strong></td>
<td><strong>Strength of recommendation:</strong> Moderate recommendation based on low to moderate risk of bias in qualitative and observational studies. These included AYA with both asthma and food allergy.</td>
<td>Other considerations: Provide practical training in symptoms recognition, the use of adrenaline autoinjectors and other aspects of emergency management for friends. Some AYA may want to bring a friend to the clinic for support.</td>
<td>References: Gallagher, Jones, Jones, Macadam, Warren.</td>
</tr>
<tr>
<td><strong>Promoting allergy and asthma awareness (e.g. triggers and treatment) among peers/ co-workers and teachers/ managers to support the AYA patient with self-management may be recommended (Grade C, Evidence level IV)</strong></td>
<td><strong>Strength of recommendation:</strong> Moderate recommendation as based on low risk of bias in qualitative and one observational study. These included AYAs with both asthma and food allergy.</td>
<td>Other considerations: Efforts should be made to reduce asthma and allergy related bullying especially in schools and online.</td>
<td>References: Fong, Gibson-Young, Holley, Monks, Warren.</td>
</tr>
<tr>
<td><strong>Signposting AYA to high quality online resources about allergy and asthma (websites, moderated forums) where they can obtain age-appropriate information and advice may be recommended (Grade C, Evidence level IV)</strong></td>
<td><strong>Strength of recommendation:</strong> Moderate recommendation based on low to moderate risk of bias qualitative and observational studies. These included AYA with both asthma, anaphylaxis, and food allergy.</td>
<td>Other considerations: Patients consider online supportive networks to be helpful. Peer support groups may be helpful, for example, voluntary- and community-sector organisations, such as condition specific support groups or charities. Social networks via virtual platforms or electronic</td>
<td>References: Bruzzese, Gallagher, Gibson-Young, Hullmann, Holley, Jones, Jones, Jonsson, Koster, Monks, Rhee.</td>
</tr>
</tbody>
</table>
AYA, adolescents and young adults.

| communication may be helpful[^13,18]. Moderation of the group is desirable to ensure that interactions within the group are positive. | Stewart[^88], Steensgaard[^18], Suorsa[^91] 2016, Warren[^45], Wombald[^44]. |

[^13]:
[^18]:
[^44]:
[^45]:
[^91]:
Discussion

The EAACI Task Force on Adolescents and Young Adults has developed an evidence-based, clinical practice guideline to help HCP to manage AYA with allergy and/or asthma. Adolescence can be a critical time for AYA as they need to become independent, expert adult patients, successfully self-managing their chronic conditions. This can be seen as a challenge but also as an opportunity for HCP. This is because neurodevelopmentally, adolescents are naturally eager to become more autonomous and are able to learn new skills quickly and easily. The guideline sets out a series of general recommendations focused on how to run a clinical service for AYA.

Key recommendations are to consider starting transition early (11-13 years), using a structured, multidisciplinary approach (involving both paediatric and adult clinics where applicable); ensuring AYA fully understand their condition(s) and have resources that they can access; discussing any implications for self-management in real-world contexts such as further education/work and actively monitoring adherence. Specific allergy and/or asthma transition recommendations are categorised according to improving adherence, optimising self-management, addressing psychological issues and obtaining support. Highlights include simplifying medication regimes and the use of reminders; focusing on areas where AYA are less confident; involving peers in training AYA patients; identifying and managing psychological and socioeconomic issues impacting disease control and quality of life; enrolling the family in assisting AYA to take on self-management and encouraging AYA to let their friends know about their allergy and asthma.

How to implement transition

Transition needs to be implemented in a joint approach from paediatric and adult services. The process is simpler where if the allergy service caters for all age groups but a separate AYA clinic is still required to ensure that a transition care process can be put into in place. As most HCP have receive minimal specific training on how to manage this age group, this is likely to require additional staff training (Table 6). Some of the likely barriers and strategies facilitated to delivering a transition service for AYA are detailed in Table 7.
**Box 3. Practical considerations to delivering an adolescent and young adult clinic**

- Ensure that the AYA service is a joint activity between paediatric and adult services
- Use an adolescent and young adult centred approach
- See AYA on their own for part of the clinic
- Ensure that the AYA is an active participant in the consultation
- Talk through barriers to self-management with the AYA and help them to come up with solutions, e.g. alarms on mobile phone to remind them to take medication
- Education directed at AYA (and their peers) rather than their parents/carers
- Enrol family to support AYA to take on self-management of their allergy and asthma
- Encourage AYA to let their friends know about their allergy and asthma
- Utilise peer support groups
- Role play managing an allergic reaction or asthma attack
- Practice with dummy adrenaline autoinjector / asthma inhaler
- Use a personalised written management plan – AYA may find it easier to keep it as a photo on their mobile phone

A list of resources :

- ON TRAC (Transitioning Responsibly to Adult Care). Available at: [http://ontracbc.ca/](http://ontracbc.ca/) (last accessed 18th January 2020).
Recommendations for policy and training

This guideline has important implications for policy makers, managers and commissioners of both child- and adult-centred care in allergy and/or asthma patients. The recommendations could be implemented at a patient, family and society level, through education, training, resources and service delivery design. Commissioners need to focus on and understand the important components of integrated AYA care that can be shown to improve outcomes. Self-management is a core component of transition. It is associated with cost savings, a more sustainable health system with less utilisation of health services and subsequent easing of workforce pressures. Promoting self-management is in line with international health policy aims which support a ‘life course approach and people empowerment’.

Gaps in the evidence

Our systematic review summarises the sizable amount of evidence for the challenges experienced by AYA with allergy/or and asthma. The evidence gaps are predominately in relation to intervention strategies for allergy as the systematic review only found interventional asthma studies. Evidence is urgently needed to help determine the best format for an AYA transition clinic and for the most effective and cost-effective interventional strategies for allergy and asthma (Table 8).

Conclusions

The EAACI Task Force on Adolescents and Young Adults presents recommendations to support the development of a transition clinic for adolescents and young adults with allergy and/or asthma. This should support HCP to help AYA develop into competent and confident adult patients who can successfully self-manage their allergy and/or asthma. Special emphasis is placed on the difference between transition and transfer. Transitional care is required even when AYA are managed in an allergy clinic dealing with all age groups. While it is possible to make evidence-based recommendations, the evidence for some is minimal. Larger, well designed, randomised controlled trials are required in this area. If optimal care is delivered for AYA, they should become expert adult patients with the knowledge and skills to manage their allergy and/or asthma throughout their lives.
### Table 6. Implementation: barriers, facilitators, audit criteria and resource implications

<table>
<thead>
<tr>
<th>Recommendation areas</th>
<th>Barriers to implementation</th>
<th>Facilitators to implementation</th>
<th>Audit criteria</th>
<th>Resource implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of a structured, multidisciplinary transition programme involving paediatric and adult HCP for 11-25 year age group</td>
<td>Organisation challenges reorganising service to deliver a paediatric/adult clinic.</td>
<td>Training for staff, checklist of skills and knowledge for AYA patients, regular meetings between adult and paediatric teams, audit process.</td>
<td>Existence of a 11-25 year transition clinic.</td>
<td>Some initial investment may be required to reorganise the clinical service.</td>
</tr>
<tr>
<td>Medication reminders, mobile applications and web-based applications, monitors or routines to improve adherence, symptom control and quality of life</td>
<td>Convincing families to change their routines. Expense of information technology applications or monitors.</td>
<td>The use of alarm functions on devices such as mobile phones.</td>
<td>Adherence to therapy.</td>
<td>Simple changes to routines to facilitate adherence or the use of alarm functions on devises such as mobile phones are inexpensive. Separate mobile or web-based applications would be expensive.</td>
</tr>
<tr>
<td>Focusing consultation on areas where AYA say they are not confident to improve self-management including adherence</td>
<td>Changing HCP approach which focuses on a set approach to history taking in clinic.</td>
<td>Training for HCP so they understand the mindset of AYA and behavioural change approaches.</td>
<td>Survey of AYA patients to assess their confidence in self-management.</td>
<td>Resources for training HCP.</td>
</tr>
<tr>
<td>Formulation of a personal action plan with the AYA and their family to enable them to self-manage their allergy and asthma</td>
<td>Time to develop patient specific self-management plans.</td>
<td>Generic personal action plans that can be personalised to the needs of specific patients.</td>
<td>Possession of personal action plan by individual patients.</td>
<td>Time to develop patient specific self-management plans.</td>
</tr>
<tr>
<td>Peer-led interventions to improve asthma related quality of life, asthma knowledge and to reduce asthma related doctor visits and school absence</td>
<td>Resistance and expense of involving peers in training AYA. Availability of peers who have the same condition.</td>
<td>Education of HCP about the benefit of peer-led interventions.</td>
<td>Asthma related quality of life and control after peer-led interventions.</td>
<td>Expense of involving peers in training AYA.</td>
</tr>
<tr>
<td>Supporting the AYA, family and the wider community to allow the AYA inclusion in social events</td>
<td>Resistance from teachers, sport club leader and others in the community.</td>
<td>Education of teachers, sport club leader and others in the community as to how to safely manage the risks</td>
<td>Access to social events by patients with allergy and asthma.</td>
<td>Costs associated with training and education.</td>
</tr>
<tr>
<td>Intervention</td>
<td>Associated with allergy and asthma.</td>
<td>Motivational interviewing to improved asthma symptoms and quality of life</td>
<td>Lack of time and expertise.</td>
<td>Training for HCP and knowledge about how improved self-management can reduce further healthcare utilisation.</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Identification and management of psychological and socioeconomic issues impacting disease control and health related quality of life</td>
<td>Lack of time in clinic to identify and assist in managing these.</td>
<td>Training in AYA care and awareness of importance of psychological and socioeconomic issues.</td>
<td>Survey of psychological and socioeconomical issues.</td>
<td></td>
</tr>
<tr>
<td>Psychological interventions using a cognitive behavioural therapy based or multi-systemic therapy approach to improve adherence, asthma knowledge, self-management and symptom control</td>
<td>Lack of time and expertise.</td>
<td>Training for HCP and knowledge about how improved self-management can reduce further healthcare utilisation.</td>
<td>Health related quality of life and symptom control after use of these psychological interventions.</td>
<td></td>
</tr>
<tr>
<td>Enrolling the family in assisting the AYA to take on the self-management of their allergy and asthma</td>
<td>Inflexible family routines and lack of time.</td>
<td>Involvement of families in clinic and explanation of benefits of their support.</td>
<td>Health related quality of life and symptom control after use of these psychological interventions.</td>
<td></td>
</tr>
<tr>
<td>Encouraging AYA to let their friends know about their asthma and allergy and how to manage emergencies</td>
<td>AYA embarrassment and concern that they will be seen as different.</td>
<td>Explanation that friends will be interested in helping them.</td>
<td>Survey of the involvement in friends in supporting self-management.</td>
<td></td>
</tr>
<tr>
<td>Signposting AYA to high quality online resources about allergy and asthma where they can obtain age-appropriate information and advice may be recommended</td>
<td>Information on websites or from forums that provided an inaccurate picture of allergy and asthma.</td>
<td>High quality websites or moderated forums that can inform and support AYA with allergy and asthma.</td>
<td>Survey the use of website and moderated forum.</td>
<td></td>
</tr>
</tbody>
</table>
AYA: adolescent and young adult. HCP: healthcare professionals.

**Table 7. Training requirements for HCP working with AYA with allergy and asthma**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>An understanding of AYA development including physical, psychological,</td>
<td>Skills and knowledge to address emotional, mental health and social</td>
</tr>
<tr>
<td>cognitive and emotional aspects</td>
<td>issues</td>
</tr>
<tr>
<td>An understanding of the lifestyle of AYA such as education, vocation,</td>
<td>Skills to assess adherence and assist AYA to improve this</td>
</tr>
<tr>
<td>employment, work, sports, recreation and future vision</td>
<td></td>
</tr>
<tr>
<td>An understanding of AYA relationships both inside and outside the family</td>
<td>Skills and knowledge to recognise and deliver behavioural change for</td>
</tr>
<tr>
<td></td>
<td>common risk-taking behaviours in the adolescence and young adulthood</td>
</tr>
<tr>
<td>A knowledge of allergic diseases and asthma management in the adolescence</td>
<td>Communication skills (with parents/carers and AYA), promotion of self-</td>
</tr>
<tr>
<td>and young adulthood</td>
<td>management and shared decision making</td>
</tr>
</tbody>
</table>

AYA: adolescents and young adults.
### Table 8. Research gaps in the management of adolescent and young adults with allergy and asthma

<table>
<thead>
<tr>
<th>Research gap</th>
<th>Plan to address</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness and cost-effectiveness of different transition formats for allergy and asthma – should include patient and parent perspectives with quantitative and qualitative outcomes</td>
<td>Cluster randomised controlled studies focused on different clinic formats with a process evaluation to assess which components are most important</td>
<td>High</td>
</tr>
<tr>
<td>Effectiveness and cost-effectiveness of educational interventions for AYA with allergy and asthma</td>
<td>Randomised controlled trials with a process evaluation to assess which components are most important</td>
<td>High</td>
</tr>
<tr>
<td>Effectiveness and cost-effectiveness of motivational interviewing for allergy and asthma</td>
<td>Randomised controlled trials</td>
<td>High</td>
</tr>
<tr>
<td>Effectiveness and cost-effectiveness of psychological interventions (eg CBT) for allergy and asthma</td>
<td>Randomised controlled trials</td>
<td>High</td>
</tr>
<tr>
<td>Smart phone applications or other information technology interventions to improve self-management in AYAs with allergy and asthma</td>
<td>Large randomised controlled trials as follow on from current small pilot studies</td>
<td>High</td>
</tr>
<tr>
<td>The best time for the transfer of responsibilities of care for each facet to management</td>
<td>Cross sectional studies looking at competence to deliver each facet of management at different ages</td>
<td>Medium</td>
</tr>
<tr>
<td>Development and validation of disease-related knowledge/ transition readiness tools for AYA with allergy and asthma</td>
<td>Projects using standard questionnaire development and validation principles</td>
<td>Medium</td>
</tr>
<tr>
<td>Most effective way of training HCP in AYA management</td>
<td>Randomised controlled trials of different training modalities with a process evaluation to assess which components are most important</td>
<td>Medium</td>
</tr>
<tr>
<td>Value of personal actions plans for AYA to improve outcomes in allergy</td>
<td>Randomised controlled trials</td>
<td>Medium</td>
</tr>
<tr>
<td>Value of patient activation measures in allergy</td>
<td>Randomised controlled trials</td>
<td>Medium</td>
</tr>
<tr>
<td>Role of the identification and management of psychological and socioeconomic issues in AYA to improve health related quality of life and disease control</td>
<td>Randomised controlled trials with a process evaluation to assess which components are most important</td>
<td>Low</td>
</tr>
<tr>
<td>Strategies to successfully enrol AYA friends to support self-management</td>
<td>Qualitative studies to develop an intervention with small follow on pilot study</td>
<td>Low</td>
</tr>
</tbody>
</table>

AYA: adolescents and young adults. CBT: cognitive behavioural therapy. HCP: healthcare professionals.
ACKNOWLEDGMENTS

The EAACI Adolescent and Young Adult Taskforce would like to thank XXXXX for their help with this Guideline, XXXXX for their advice; XXXXX for their constructive, expert review of the draft guidelines; all the EAACI members who commented on the draft guideline via the public Web site and EAACI for funding. We would like to thank Paula Sands for her assistance in optimising the search strategy for the generic evidence-based guidelines. We would like to take XXXXX for their assistants in generating the different language versions of the adolescent and parent survey as well as XXXXX for assisting in the dissemination of the survey. Analysis of the adolescent and young adult survey and the systematic review of the generic adolescent and young adult data were undertaken by Ekaterina Khaleva as part of her Allergy MSc (University of Southampton).

AUTHOR CONTRIBUTIONS

Guideline concept and design: G.R., M.V-O., KK. Acquisition of data including search, all authors. Analysis and interpretation of data, all authors. Critical revision of the manuscript for important intellectual content, all authors. Obtained funding, G.R., M.V-O.

CONFLICT OF INTEREST

GR and RK report research funding from Asthma UK and National Institutes of Health Research into the challenge associated with asthma during adolescents. FT reports being a parent of a young adult with food allergy. None of the other authors have anything to disclose.
References


19. Canadian Association of Paediatric Health Centres. A Guideline for Transition From Paediatric to Adult Health Care for Youth with Special Health Care Needs: A National Approach. 2016 Available from: [https://ken.childrenshealthcarecanada.ca/xwiki/bin/view/Transitioning+from+Paediatric+to](https://ken.childrenshealthcarecanada.ca/xwiki/bin/view/Transitioning+from+Paediatric+to)


Heery E, Sheehan AM, While AE, Coyne I. Experiences and Outcomes of Transition from Pediatric to Adult Health Care Services for Young People with Congenital Heart Disease: A Systematic Review. Congenit Heart Dis. 2015;10(5):413-427.


44. Wamboldt FS, Bender BG, Rankin AE. Adolescent decision-making about use of inhaled asthma controller medication: results from focus groups with participants from a prior longitudinal study. *J Asthma*. 2011;48(7):741-750.


EAACI Guideline on management of adolescents and young adults with allergy and asthma

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ONLINE SUPPLEMENT

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APPENDIX 1. AGREE II CRITERIA
METHODS

Search for generic recommendations on transition from paediatric to adult medical services

This was designed to retrieve evidence-based papers about general transition of adolescents and young adults from pediatric to adult medical services. The search strategy was developed on OVID MEDLINE and then adapted for other databases. The following databases were searched Medline (OVID), Embase (OVID) and Psychinfo. Databases were searched for guidelines published within five years until June 21, 2019. Additional references were identified by searching the references cited in the evidence-based papers.

Inclusion criteria

Study design included papers (e.g. guidelines, position papers and statements, consensuses, clinical protocols, clinical pathways, practice parameters, policy statements) which reported evidence-based recommendations on the general transition of adolescents and young adults (11-25 years) from pediatric to adult medical services.

Exclusion criteria

The following were excluded: abstracts, reviews, discussion papers, non-research letters and commentaries, editorials, randomized controlled trials, cross-sectional studies, cohort studies, case reports and series. In addition, non-English, evidenced-based papers were not reviewed.

Selection

Paper titles were independently checked by two reviewers according to the above selection criteria and categorized as included, not included or unsure. Any discrepancies were resolved through discussion and, if necessary, a third reviewer (MVO) was consulted. Full text copies of potentially relevant papers were examined by two reviewers for eligibility, with discrepancies again resolved through discussion involving if necessary, a third reviewer (MVO).

Quality assessment strategy

All guidelines had different methodological approach and in order to access evidence level and grade of the recommendations, the study design of each study included in the evidence-based papers was independently assessed by two reviewers. Any discrepancies were resolved by discussion or a third reviewer (MVO).
Medline search strategy

1. adolescent/
2. young adult/
3. (teen* or adolescen*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
4. (young adj (adult* or people or person)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
5. pediatrics/
6. (pediatric* or paediatric*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
7. 1 or 2 or 3 or 4 or 5 or 6
8. transition to adult care/
9. (hand-over or handoff or transfer* or transition*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
10. 8 or 9
11. 7 and 10
12. exp clinical pathway/
13. exp clinical protocol/
14. exp consensus/
15. exp consensus development conference/
16. exp consensus development conferences as topic/
17. critical pathways/
18. practice guideline/ or clinical handover/ or clinical pathway/ or clinical protocol/ or consensus development/ or good clinical practice/ or nursing care plan/ or nursing protocol/
19. guidelines as topic/
20. exp practice guideline/
21. practice guidelines as topic/
22. health planning guidelines/
23. (guideline or practice guideline or consensus development conference or consensus development conference, NIH).pt.
24. (position statement* or policy statement* or practice parameter* or best practice*).ti,ab,kw.
25. (standards or guideline or guidelines).ti,kw.
26. ((practice or treatment* or clinical) adj guideline*).ab.
27. (CPG or CPGs).ti.
28. consensus*.ti,kw.
29. consensus*.ab. /freq=2
30. ((critical or clinical or practice) adj2 (path or paths or pathway or pathways or protocol*)).ti,ab,kw.
31. recommendat*.ti,kw.
32. 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31
33. 11 and 32
34. limit 33 to english language
35. limit 34 to yr="2014 -Current"
**Embase search strategy**

1. adolescent/

2. young adult/

3. (teen* or adolescen*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

4. (young adj (adult* or people or person)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

5. pediatrics/

6. (pediatric* or paediatric*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

7. 1 or 2 or 3 or 4 or 5 or 6

8. transition to adult care/

9. (hand-over or handoff or transfer* or transition*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword, floating subheading word, candidate term word]

10. 8 or 9

11. 7 and 10

12. exp clinical pathway/

13. exp clinical protocol/

14. exp consensus/

15. exp consensus development conference/
16. exp consensus development conferences as topic/

17. critical pathways/

18. practice guideline/ or clinical handover/ or clinical pathway/ or clinical protocol/ or consensus development/ or good clinical practice/ or nursing care plan/ or nursing protocol/

19. guidelines as topic/

20. exp practice guideline/

21. practice guidelines as topic/

22. health planning guidelines/

23. (guideline or practice guideline or consensus development conference or consensus development conference, NIH).pt.

24. (position statement* or policy statement* or practice parameter* or best practice*).ti,ab,kw.

25. (standards or guideline or guidelines).ti,kw.

26. ((practice or treatment* or clinical) adj guideline*).ab.

27. (CPG or CPGs).ti.

28. consensus*.ti,kw.

29. consensus*.ab. /freq=2

30. ((critical or clinical or practice) adj2 (path or paths or pathway or pathways or protocol*)).ti,ab,kw.

31. recommendat*.ti,kw.

32. 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31

33. 11 and 32

34. limit 33 to english language

35. limit 34 to yr="2014 -Current"
Psychinfo search strategy

1. (young N (adult* OR person OR people) ) OR teen* OR adolescen*
2. pediatric* OR paediatric*
3. 1 OR 2
4. ("hand-over" OR handoff OR transfer* OR transition* ) AND "Transition to Adult"
5. 3 AND 4
6. DE "Treatment Guidelines" OR DE "Reporting Standards" OR DE "Clinical Governance"
7. guideline* OR consensus OR "critical pathway*" OR ("position statement*" OR "policy statement*" OR "practice parameter*" OR "best practice*") OR standard* OR ((critical or clinical or practice) N2 (path OR paths OR pathway OR pathways OR protocol) ) OR recommendation*
8. 6 OR 7
9. 5 AND 8
10. Limiters - Published Date: 01.01.2014-31.06.2019; English

Delphi process among members of the task force

Delphi methodology

We conducted an online, 3-round Delphi survey among members of the Task Force which aimed to receive anonymous comments for each D level recommendation and achieve a consensus among panel of experts. It involved a feedback process in which comments obtained during one round were returned to the participants during the next round. The level of agreement was set at 80% for acceptance.

Data collection

The on-line survey was held between 12th November and 30th November with the third round involving a teleconference on 5th December 2019.
In the first round, Task Force members were asked to rate each recommendation on the basis of inclusion in the guideline (yes/no) and give their comments. In the second round, all recommendations including those not reaching 80% consensus were included for further comments. The third round was conducted via a webconference where all recommendations had been discussed and further alterations were made as required. Agreement was reached for each recommendation with exception of one which was dropped.

Survey of adolescents and young adults with allergy and asthma and their parents/carers

Participants

We invited AYA with allergy and asthma and their parents/carers across Europe who were able to read English, Dutch, Danish, German, Spanish, Portuguese, Italian or Russian to participate in the survey.

Data collection

The survey was distributed through national allergy and asthma patients organisations in Europe (UK, The Netherlands, Italy, Portugal, Spain, Ireland, Germany, Russia, Denmark) via a link to the survey in SurveyMonkey. In addition, the survey was advertised on social media (e.g. Facebook, Twitter) and in clinics. Before accessing the questionnaire, potential respondents were informed about the study’s purpose, organisation conducting the survey and average time required to complete the survey. The survey was conducted between \( x \) and \( y \) February 2020.

The questionnaire

The anonymized survey consisted of 24 questions which consisted of two parts: minimal demographic information (AYA or parent, age, gender, allergic diseases) and opinions on the level of importance of each recommendation. Participants were asked to rank the level of importance for each recommendation using 5-point Likert scale: 1 “Not important,” 2 “Slightly Important,” 3 Fairly important” 4 “Important,” and 5 “Very Important,” plus a “No opinion” option. The level of importance was set at an average score of at least 2 for acceptance.
questionnaire was adapted to the lay audience, translated into eight languages (English, German, Spanish, Portuguese, Italian, Danish, Dutch and Russian) and backtranslated into English to ensure validity and accuracy. An option for other free-text response was permitted in each question.
APPENDIX 1. AGREE II CRITERIA

<table>
<thead>
<tr>
<th>AGREE II criteria</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOMAIN 1. SCOPE AND PURPOSE</strong></td>
<td></td>
</tr>
<tr>
<td>1. The overall objective(s) of the guideline is (are) specifically described.</td>
<td>Last paragraph of background</td>
</tr>
<tr>
<td>2. The health question(s) covered by the guideline is (are) specifically described.</td>
<td>Last paragraph of background</td>
</tr>
<tr>
<td>3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described</td>
<td>Last paragraph of background</td>
</tr>
<tr>
<td><strong>DOMAIN 2. STAKEHOLDER INVOLVEMENT</strong></td>
<td></td>
</tr>
<tr>
<td>4. The guideline development group includes individuals from all relevant professional groups.</td>
<td>Methodology - Ensuring appropriate stakeholder involvement</td>
</tr>
<tr>
<td>5. The views and preferences of the target population (patients, public, etc.) have been sought.</td>
<td>Methodology - Ensuring appropriate stakeholder involvement &amp; Peer review and public comment</td>
</tr>
<tr>
<td>6. The target users of the guideline are clearly defined.</td>
<td>Last paragraph of background</td>
</tr>
<tr>
<td><strong>DOMAIN 3. RIGOUR OF DEVELOPMENT</strong></td>
<td></td>
</tr>
<tr>
<td>7. Systematic methods were used to search for evidence.</td>
<td>Methodology - Systematic reviews of the evidence</td>
</tr>
<tr>
<td>8. The criteria for selecting the evidence are clearly described.</td>
<td>Details given in the systematic review publications and online supplement</td>
</tr>
<tr>
<td>9. The strengths and limitations of the body of evidence are clearly described.</td>
<td>General transition and Specific allergy and asthma transition</td>
</tr>
<tr>
<td>10. The methods for formulating the recommendations are clearly described.</td>
<td>Methodology - Formulating recommendations and Box 2</td>
</tr>
<tr>
<td>11. The health benefits, side effects, and risks have been considered in formulating the recommendations.</td>
<td>Methodology - Formulating recommendations and Box 2</td>
</tr>
<tr>
<td>12. There is an explicit link between the recommendations and the supporting evidence.</td>
<td>Tables 1-5</td>
</tr>
<tr>
<td>13. The guideline has been externally reviewed by experts prior to its publication.</td>
<td>Methodology - Peer review and public comment</td>
</tr>
<tr>
<td>14. A procedure for updating the guideline is provided.</td>
<td>Methodology - Updating the guidelines</td>
</tr>
<tr>
<td><strong>DOMAIN 4. CLARITY OF PRESENTATION</strong></td>
<td></td>
</tr>
<tr>
<td>15. The recommendations are specific and unambiguous.</td>
<td>Tables 1-5</td>
</tr>
<tr>
<td>16. The different options for management of the condition or health issue are clearly presented.</td>
<td>Tables 1-5</td>
</tr>
<tr>
<td>17. Key recommendations are easily identifiable.</td>
<td>Abstract and Summary, Gaps in the evidence and Future perspectives - Summary</td>
</tr>
<tr>
<td><strong>DOMAIN 5. APPLICABILITY</strong></td>
<td></td>
</tr>
<tr>
<td>18. The guideline describes facilitators and barriers to its application.</td>
<td>Table 6</td>
</tr>
<tr>
<td></td>
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<td>---</td>
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</tr>
<tr>
<td>19.</td>
<td>The guideline provides advice and/or tools on how the recommendations can be put into practice.</td>
</tr>
<tr>
<td></td>
<td>Box 3, Table 6</td>
</tr>
<tr>
<td>20.</td>
<td>The potential resource implications of applying the recommendations have been considered.</td>
</tr>
<tr>
<td></td>
<td>Table 6</td>
</tr>
<tr>
<td>21.</td>
<td>The guideline presents monitoring and/or auditing criteria.</td>
</tr>
<tr>
<td></td>
<td>Table 6</td>
</tr>
<tr>
<td><strong>DOMAIN 6. EDITORIAL INDEPENDENCE</strong></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>The views of the funding body have not influenced the content of the guideline.</td>
</tr>
<tr>
<td></td>
<td>Methodology - Editorial independence and managing conflict of interests</td>
</tr>
<tr>
<td>23.</td>
<td>Competing interests of guideline development group members have been recorded and addressed.</td>
</tr>
<tr>
<td></td>
<td>Methodology - Editorial independence and managing conflict of interests and Conflicts of interests</td>
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</table>