MRCGP
Applied Knowledge Test

Prepared by the AKT Core Group
November 2019
Objectives

- An overview of the content and structure
- To give examples of current question formats
- To describe how questions are constructed
- To advise on how to prepare and pass the AKT
- To explain practicalities of computer-based tests
AKT Background

The AKT:
- Is a summative assessment of the knowledge base underpinning independent UK general practice.
- Tests the application of this knowledge
- Tests the critical interpretation of information
- Is mapped to the latest RCGP Curriculum updates and AKT content guide

Each question is intended to explore a topic of which an ordinary GP in the UK could be expected to have a working knowledge.
Format

- 200-item multiple-choice test lasting 190 minutes (3 hours 10 minutes)
  - No multiple true/false questions
  - No negative marking

- Delivered on a computer terminal* at an invigilated test centre

- Offered three times a year:
  Jan/Feb, April/May, Oct/Nov.

* Please see the RCGP website for any reasonable adjustments
Rules

Applicable if starting specialty training from 1/8/10 onwards:

- Only trainees in the ST2 and ST3 stages of training will be eligible to take the AKT
- A maximum number of four attempts will be permissible in the AKT
- In accordance with GMC guidance* an AKT pass is valid for seven years

* https://www.gmc-uk.org/education/postgraduate/9813.asp#Currency
Rules – exceptions

Applicable from 1/8/16 onwards, for those unsuccessful at AKT after 4 attempts:

● In certain circumstances candidates are allowed to make exceptional fifth attempts at examinations on the basis of additional educational attainment.

● Full details of this policy are available from the MRCGP webpages.

For further information: http://www.rcgp.org.uk/training-exams/mrcgp-exams-overview.aspx
Vital Statistics – Nov 2019

AKT 37 pass mark = 136/199 (68.34%)

Overall pass rate = 66.7%
UK first-time takers pass rate = 84.1%
(Pass rates vary in different diets of the AKT taken at different times throughout the training year)

The cumulative pass rate after four attempts for all those who take the AKT is just under 95%
Topics causing most difficulty for candidates in AKT 37

**Being a GP**
- Identifying and analysing ethical issues, particularly end of life issues

**Improving quality, safety and prescribing**
- Safe monitoring of long-term medications
- Potential drug interactions
- Ongoing use of traditional medications, such as warfarin

**Evidence-based practice, research and sharing**
- Understanding of concepts such as relative and absolute risk

**Clinical Topic Guides**
- Incidents posing risk to the health of healthcare workers
- Investigating and prescribing for common childhood infections
- Primary care management of eye disease, common fundal abnormalities
- Diagnosis of neurological symptoms’ presentation of multisystem disease
Topics causing most difficulty for candidates in AKT 36

Evidence-based practice, research and sharing knowledge
  • Vaccination programmes and staff health

Clinical Topic Guides
  • Childhood infections and ear problems
  • Distinguishing between serious and non-serious disease
  • Familiarity with common secondary care management
  • Normal variants and the management of children
  • Pregnancy-related conditions and prescribing when breast-feeding
  • Principles of prescribing in diabetes
Topics causing most difficulty for candidates in AKT 35

Improving quality, safety and prescribing
  • MHRA safety alerts

Evidence-based practice, research and sharing knowledge
  • General understanding of qualitative research methodology

Clinical Topic Guides
  • Management and drug treatment of acute life-threatening conditions
  • Drug treatment in end-of-life care
  • Physical symptoms as presentations of mental health disease
  • Diagnosis and management of common oral conditions
Summary of topics causing most difficulty in recent AKT exams – (1)

These topics have been highlighted several times over recent years:

Consulting in General Practice
- Communication of risk and use of risk tools

Improving quality, safety and prescribing
- Antibiotic indications and resistance
- Safe prescribing and medicines management
- Death certification
- Drugs: monitoring; adverse reactions; dose calculations
- Health and safety in the workplace

Evidence-based practice, research and sharing knowledge
- Data interpretation (both research and other data sources)
- Research methodology
- Basic understanding of concepts and terms in research
Summary of topics causing most difficulty in recent AKT exams – (2)

These are the topics causing difficulty for candidates that have been highlighted several times over recent years:

Clinical Topic Guides
- Diagnosis of common oral conditions
- Eye problems
- Immunisation schedules
- Recognising presentations of mental ill health
- Management of hearing loss
- Normal findings and minor illness in childhood
- Physical symptoms presenting as part of a psychological diagnosis
- Respiratory medicine – including asthma, COPD and rarer diagnoses
- Suspected cancer: diagnosis & investigation (incl. less common presentations)
- Timely but appropriate referral (incl. emergencies and when to do nothing)
- Type 1 diabetes (primary care level of knowledge expected)
Question writing (1)

- Topical
- Practice issues
- Scenarios derived from clinical work
Question writing (2)

- All questions are referenced and the draft questions are then carefully scrutinised by a panel of experienced question writers.

- Care is taken to consider any conflict between national guidance and regulations across the four devolved nations.

- Remember that all question writers are working GPs.
Common Reference Material (1)

- GMC Good Medical Practice
- NICE guidelines
- SIGN guidelines
- CKS (NICE clinical knowledge summaries)
- BMJ Review articles & original papers
- BJGP
- Cochrane
- Vaccine update (www.gov.uk) / Green Book
Common Reference Material (2)

- BNF – including the initial ‘generic’ chapters in the print version
- A recent review (to be published) has recently highlighted that up to 27% of AKT questions require a knowledge of therapeutics.
- For example, although items might appear to be about a respiratory, cardiovascular or endocrine issue, the management will often involve recommending the correct medication – also requiring an awareness of the potential for interactions and monitoring requirements.
GP Curriculum

Where to find


How the AKT links to the curriculum

* Questions in the AKT sample across the breadth of the curriculum
* The previous ‘AKT Content Guide’ has been subsumed within the GP Curriculum and details can be found in the Knowledge and Skills subsections of each Topic Guide
GP Curriculum

How to use the GP Curriculum

- Don’t be put off by the lengthy list of topics!
- Use the topic guides as needs assessment tools
- Carefully review the sections relevant to:
  - Organisational – including administrative, statutory, ethical and regulatory frameworks
  - Evidence interpretation – including research, statistics and epidemiology
MRCGP AKT Exam website

Please look carefully at our website

- The ‘How to prepare for the AKT’ section contains helpful resources, including:
  - ‘Preparing to take the AKT’ pdf
  - 50 AKT Sample questions with answers
  - How trainers can help with AKT preparation
  - Evidence and data interpretation in the AKT

- The section ‘AKT Summary Reports’ from Nov 2019 dating back to October 2007 should help guide your revision plans
Exam Construction ensures:

- Reliability, validity, and fairness
- Adequate coverage of the topics that appear in the blueprint
- The correct balance of question formats
Principles of exam construction

- **Relevance:** the AKT should be relevant to general practice

- **High prevalence:** any topic covered can be one which occurs commonly

- **High impact:** any topic covered can be one that is significant but less common
AKT content

- **80% of questions**
  
  Core clinical medicine and its application to problem solving in a general practice context

- **10% of questions**
  
  Critical appraisal and evidence based clinical practice

- **10% of questions**
  
  Ethical and legal issues as well as the organisational structures that support UK general practice
Clinical Medicine (1)

- The broad topic of clinical medicine is subdivided into groups of body systems, in approximately equal numbers.

- Each group will comprise questions on:
  - disease factors
  - symptoms
  - investigation
  - management
Clinical Medicine (2)

- Cardiovascular
- Dermatology
- Endocrinology
- ENT
- Gastroenterology
- Genetics
- Haematology
- Immunology
- Infection
- Mental health & learning disability
- Musculo-skeletal
- Neurology
- Ophthalmology
- Paediatrics
- Renal
- Reproductive male/female
- Respiratory
- Therapeutic indications and adverse reactions
Clinical Medicine (3)

- Common, (mostly) low impact – e.g. sore throat, contraception, irritable bowel syndrome

- Rare, high impact – e.g. child abuse, meningitis, phaeochromocytoma

- Topical – e.g. guidance, management of type 2 diabetes, optimum use of antibiotics
Critical appraisal and evidence-based clinical practice

- Understanding the principles of audit and its application in assessing the quality of care
- Understanding the application of critical appraisal skills which will be tested in a number of formats including:
  - the interpretation of research data using results in published papers
  - the understanding of terms used in both statistics and evidence based medicine
  - understanding epidemiology relevant to general practice
These questions are written to be applicable UK-wide

- NHS organisation
- Legal aspects e.g. DVLA
- Medical certification e.g. death certificates
- Professional regulation, e.g. GMC
- Business aspects e.g. GP contract
- Prescribing e.g. Controlled drugs
- Appropriate use of resources e.g. drugs
- Health & Safety e.g. needlestick injury
- Social services e.g. safeguarding
- Ethical e.g. Mental capacity, consent
Question Formats

- Single Best Answer (SBA)
- Multiple Best Answer (MBA)
- Extended Matching Questions (EMQ)
- Photographic image
- Data interpretation
- Free text
- Drug calculation
Single Best Answer (SBA)

“According to national guidelines” means recommended by nationally accepted guidelines or the BNF, not local practice.

Often uses a clinical scenario.

Only ONE answer is correct.

Other options may be plausible but not “MOST likely/ MOST appropriate”.
SBA example: *Respiratory disease*

A 37-year-old man suddenly develops chest pain and dyspnoea after a morning swim. There is hyper-resonance and decreased breath sounds on the right side.

Which is the MOST likely diagnosis? Select ONE option only.

A. Asthma  
B. Intercostal muscle strain  
C. Pleural effusion  
D. Pneumothorax  
E. Pulmonary embolus
Multiple Best Answer (MBA)

- Often uses a clinical scenario
- **TWO** answers are correct
- **BOTH** answers must be chosen to score **ONE** mark
- Other options may be **plausible** but not the “**MOST likely/ MOST appropriate**”
A 35-year-old man has persistent dyspepsia. A stool test for *Helicobacter pylori* is positive. He is allergic to penicillin.

According to national guidance, which are the MOST appropriate antibiotics to combine with omeprazole to eradicate *H. pylori*? Select TWO options only and both must be correct to score ONE mark.

A. Amoxicillin  
B. Cefalexin  
C. Clarithromycin  
D. Co-amoxiclav  
E. Doxycycline  
F. Erythromycin  
G. Lymecycline  
H. Metronidazole
Extended matching questions (EMQ)

- These questions have a list of possible options
- There will usually be two or more scenarios
- Choose the **MOST** likely/ **MOST** appropriate option that **BEST** matches each given scenario
- Each option can be used once, more than once, or not at all.
EMQ example: Dietary advice

A. Elemental diet
B. FODMAP
C. Food elimination
D. Gluten-free
E. High fibre
F. Lactose-free
G. Low purine
H. Mediterranean

For the patient described, select the MOST appropriate diet from the list of options.

1. A 23-year-old woman has had mild diarrhoea, abdominal pain and bloating for several years. Her bloods are normal, including IgA anti-tTG antibodies test.
EMQ example: Dietary advice

A. Elemental diet
B. FODMAP
C. Food elimination
D. Gluten-free
E. High fibre
F. Lactose-free
G. Low purine
H. Mediterranean

For the patient described, select the MOST appropriate diet from the list of options.

2. A 62-year-old man has recurrent swelling of his great toe which responds to naproxen. He drinks 18 units of alcohol a week and his urate level is 540 μmol/L (Normal < 450 μmol/L).
Picture Format example: *Skin disease*

A 32-year-old man has noticed painless non-itchy patches of hair loss on his beard area and scalp.

Ref: Dermnet.com
Picture Format example: **Skin disease**

Which is the SINGLE MOST likely diagnosis? Select ONE option only.

A. Alopecia areata  
B. Eczema  
C. Lichen sclerosus  
D. Tinea infection  
E. Vitiligo
Data Interpretation

- Interpretation of data, e.g. for groups of patients with chronic conditions
- Interpretation of research and audit results
- Understanding and application of common statistical terms, e.g. sensitivity and number needed to treat (NNT)
Data Interpretation example

A meta-analysis comparing levonorgestrel and Yuzpe emergency contraception to prevent pregnancy

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Levonorgestrel: Events Total</th>
<th>Yuzpe: Events Total</th>
<th>Weight</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farajkhoda 2009</td>
<td>0 62</td>
<td>5 60</td>
<td>8.1%</td>
<td>0.09 [0.00, 1.56]</td>
</tr>
<tr>
<td>Ho 1993</td>
<td>12 410</td>
<td>15 424</td>
<td>21.3%</td>
<td>0.83 [0.39, 1.75]</td>
</tr>
<tr>
<td>Hoseini 2013</td>
<td>4 263</td>
<td>3 266</td>
<td>4.3%</td>
<td>1.35 [0.30, 5.97]</td>
</tr>
<tr>
<td>Sheng 2008</td>
<td>1 100</td>
<td>1 100</td>
<td>1.4%</td>
<td>1.00 [0.06, 15.77]</td>
</tr>
<tr>
<td>Sun 2007</td>
<td>11 557</td>
<td>14 553</td>
<td>20.3%</td>
<td>0.78 [0.36, 1.70]</td>
</tr>
<tr>
<td>WHO 1998</td>
<td>11 976</td>
<td>31 979</td>
<td>44.6%</td>
<td>0.36 [0.18, 0.70]</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>2368</strong></td>
<td><strong>2382</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>0.57 [0.39, 0.84]</strong></td>
</tr>
<tr>
<td>Total events</td>
<td>39</td>
<td>69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: $\chi^2 = 6.46, df = 5 (P = 0.26); I^2 = 23%$

Test for overall effect: $Z = 2.83 (P = 0.005)$

Which SINGLE study shows SUPERIORITY of levonorgestrel over Yuzpe in preventing pregnancy? Select ONE option only.

A. Farajkhoda
B. Ho
C. Hoseini
D. Sheng
E. Sun
F. WHO
Free text questions

- Require the candidate to generate the correct answer without a list of options to choose from.
- For example:
  - dose calculation
  - name of first-line medication
- Eliminates guessing from a list of answers.
- All answers are screened manually to check for minor typographical errors which may be counted as correct. Candidates will be expected to spell drug names correctly.
A 67-year-old man has type 2 diabetes and a BMI of 33 kg/m². His HbA₁c is 62 mmol/mol on diet alone and his renal function is normal.

Which is the SINGLE BEST INITIAL drug treatment? Give ONE answer only.
An on-screen calculator is available

Any arithmetic required in an AKT question (e.g. drug dose calculations) is basic and simple and most candidates do not need to use it

Remember to check that your given answer is credible!
Calculation example

A 12-year-old boy is to start carbamazepine 2.5 mg/kg bd. He weighs 40 kg and carbamazepine liquid is available as 100 mg/5 ml.

What VOLUME of liquid is required for thirty days use?

Type your answer in the following text box. Use figures not words. Percentages and fractions are not acceptable.

mls
Scoring

- All question formats have equal weighting
- Each correctly answered question is awarded one mark
- Total score on the paper is the number of correct answers given
- No negative marking – it is important to answer all the questions
Once candidates have registered with the RCGP to sit the AKT, they will be given instructions about booking their exam at a Pearson VUE test centre.

There is a limited booking window with ‘first come, first serve’ choice of test session and venue.

There are approximately 150 test centres covering all parts of the UK.
Computer Based Testing Rules

- Candidates **MUST** bring identity documents **WHICH MATCH** their application details.
- Candidates should arrive in good time.
- Candidates who either arrive late or fail to provide matching ID, will **NOT** be admitted to sit the AKT.
Computer Based Testing

- Security at each centre will be robust:
  - Identity checks
  - Invigilated
  - Video monitoring
- Separate morning and afternoon sittings with a ‘quarantine’ period at lunchtime.
- Morning candidates will not be allowed to leave before the end of the test
Computer Based Testing

- It is STRONGLY recommended that candidates familiarise themselves with the demonstration tutorial on the Pearson VUE website
  - http://www.pearsonvue.com/rcgp/

- Every AKT will begin with a short tutorial to remind candidates how to select answers and ‘mark’ questions – screen shots follow of the live tutorial
Responses will be uploaded to a central server and then passed to the RCGP for post-test analysis.
Computer Based Testing

Results and feedback will be sent individually to the candidate’s ePortfolio and will be available on the published results date.
Feedback to candidates

- The following feedback will be provided to every candidate with their result

  - Their overall score
  - The pass mark
  - Their performance in each of the 3 main subject areas
More general feedback on overall performance will continue to be forwarded to all UK deaneries and saved on the RCGP website.

It is helpful to look at these Summary Reports to identify topics which commonly cause difficulty:

AKT tutorial

• At the test centre, before starting an AKT exam, all candidates have to complete a ten-minute Pearson VUE tutorial comprising example clinical questions.
• These are not part of the exam and are not marked
• The following slides show example screenshots from the pre-exam Tutorial, but this can be viewed in advance, in its entirety, from a link on the AKT exam webpages
Tutorial

You will be presented with a short tutorial to familiarise yourself with the format of the Applied Knowledge Test (AKT). This is the same tutorial as the one on the RCGP website link.

These questions are NOT part of the exam and will not be scored.

The tutorial questions will include examples of the question types you may encounter in the AKT, but not all types will appear in every exam. You will be given 10 minutes to complete the following practice questions and information screens. You will then be warned before the test actually starts.

Click the Next button (or press Alt + N) to begin the tutorial.
Test Day Tutorial: Opening Screen

Navigation

Use the **Previous** (Alt + P) and **Next** (Alt + N) buttons at the bottom of each screen to navigate through the test.

Time and Progress

- The time remaining is displayed in the top right corner of the screen.
- The current question position (for example "1 of 13") is displayed underneath.

By clicking on the or icons, you can hide the time remaining or current question position. When you have five (5) minutes remaining during the exam, they will automatically reappear.

Click the **Next** button to continue.
Flagging items for review

You are able to 'flag' questions you wish to return to later. Review of questions must be carried out during the testing period.

To flag a question for review:
- use the mouse to click on Flag for Review in the top right-hand corner
- press ALT + F on the keyboard

A yellow flag will appear when a question has been flagged.

To unflag a question, click it again or press ALT + F

Click the Next button to continue.
Test Day Tutorial: Using the review screen

Using the Review Screen

At the end of the exam, the Review Screen is automatically displayed. A flag will appear next to questions you have flagged. Unanswered questions will be displayed as 'Incomplete'.

<table>
<thead>
<tr>
<th>Applied Knowledge Test Section</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Incomplete</th>
<th>Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Question 4</td>
<td>Question 5</td>
<td>Incomplete</td>
<td>Question 6</td>
</tr>
<tr>
<td></td>
<td>Question 7</td>
<td>Incomplete</td>
<td>Question 8</td>
<td>Question 9</td>
</tr>
<tr>
<td></td>
<td>Question 10</td>
<td>Question 11</td>
<td>Question 12</td>
<td>Question 15</td>
</tr>
<tr>
<td></td>
<td>Question 13</td>
<td>Question 14</td>
<td>Incomplete</td>
<td></td>
</tr>
</tbody>
</table>

The following buttons are available on the Review Screen:

<table>
<thead>
<tr>
<th>Review All</th>
<th>Click to review all questions and answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Incomplete</td>
<td>Review only the questions that were left incomplete</td>
</tr>
<tr>
<td>Review Flagged</td>
<td>Review the questions that are flagged for review</td>
</tr>
</tbody>
</table>

To end the exam, click the 'End Review' button on the Review Screen. Once you click this button, you can no longer go back to review or change your responses.

Click the Next button to continue.
Example 1: Single Best Answer Question

Select the ONE best answer by:
- using the mouse to click the radio button next to the answer
OR
- using the keyboard to press the corresponding letter

The last selection you make is your recorded answer

Diagnosis of diabetes mellitus

Which **SINGLE** threshold fasting plasma glucose level (on two occasions) is diagnostic of diabetes mellitus? Select ONE option only.

- **A.** Fasting plasma glucose \( \geq 5 \text{ mmol/L} \)
- **B.** Fasting plasma glucose \( \geq 6 \text{ mmol/L} \)
- **C.** Fasting plasma glucose \( \geq 7 \text{ mmol/L} \)
- **D.** Random plasma glucose \( \geq 10 \text{ mmol/L} \)
- **E.** Random plasma glucose \( \geq 8 \text{ mmol/L} \)
Example 2: Extended Matching Question (1 of 2)

These multi-part questions share a common list of options. Each option may be used once, more than once, or not at all.

You select the one best option by
- using the mouse to click the radio button next to the answer
OR
- using the keyboard to press the corresponding letter

When you are ready to see part 2 of 2, click the Next Button.

Visual disturbance (1 of 2)

A 39-year-old woman attends the out of hours centre at 11pm. During a meal at a restaurant earlier that evening, she noticed bright lines of light followed by a loss of vision affecting a small area of the visual field in both eyes. By the time she is seen, all her symptoms have resolved apart from slight nausea.

For the patient described, select the SINGLE MOST likely diagnosis from the list of options.

- A. Acute glaucoma
- B. Central retinal artery occlusion
- C. Central serous retinopathy
- D. Migraine
- E. Optic neuritis
- F. Retinal detachment
- G. Retinal vein thrombosis
- H. Vitreous haemorrhage
**Example 4: Multiple Best Answer Question**

For these questions, a specified number of responses is required to score ONE mark. Selecting fewer options than stated will score zero. A warning message will be displayed if you attempt to move on with fewer than the required number of responses selected.

You select the multiple answers by
- using the mouse to click the check box next to the answers
OR
- using the keyboard to press the corresponding letter

**Body mass index**

Which are the TWO MOST appropriate clinical examinations required to calculate a patient's body mass index? Select TWO options only:

- A. Abdominal fat fold thickness (cm)
- B. Ankle circumference (cm)
- C. Height (m)
- D. Triceps fat fold thickness (cm)
- E. Waist measurement (cm)
- F. Weight (kg)
- G. Wrist circumference (cm)
Example 5: Free Text Question (numerical)

These questions require you to type in the answer rather than selecting a given option. The answer may be text or numerical and should be typed in the text box.

Answers are manually checked for minor typographical errors which may be counted as correct. Candidates will be expected to spell drug names correctly.

An on-screen calculator will be available but any arithmetic will be simple and you may not need to use it. If you wish to use it, click on the Calculator and it will appear on the screen. It can be dragged to a convenient position.

Data interpretation

What is the MEAN of the following series of numbers?

5
10
10
10
15

Type your NUMERICAL answer in the box below.
Exam technique 1

- **Time management** – this is everything
- Keep watching the countdown clock on the computer
- 200 questions in 3 hours 10 minutes = average of 57 seconds per question
- You should skip questions you find difficult rather than waste time. Electronically ‘flag for review’ the ones you have left out but don’t forget to leave time to go back before the end.
Exam technique 2

- Cover test – can you answer the question with the option list covered? If so, it’s probably the correct answer.
- Go through unanswered questions 2\textsuperscript{nd} time round using the review facility.
- Do not leave any questions unanswered – educated guessing is worthwhile.
- Check for silly mistakes if you still have time.
Exam technique 3

- All the AKT question formats, apart from the free text, require the candidate to identify the best answer(s) from a given list of plausible alternatives, using all of the information in the question.

- There may be other answers which are not included in the option list, but you have to focus on the best available answer for the specific question asked.
Further preparation

- Small revision groups to share the workload of reviewing national guidance, BNF chapters etc
- Learn from clinical experience – check the guidelines and references
- AKT Exam website feedback (summary reports published for every AKT sitting)
- AKT Exam website podcast, preparation guide and sample material
- RCGP eLearning website – Essential Knowledge Updates and Challenges
And finally….

- Remember that most people pass this exam first time…..
- But you do need to prepare for it
- So make effective use of the GP Curriculum Topic Guides