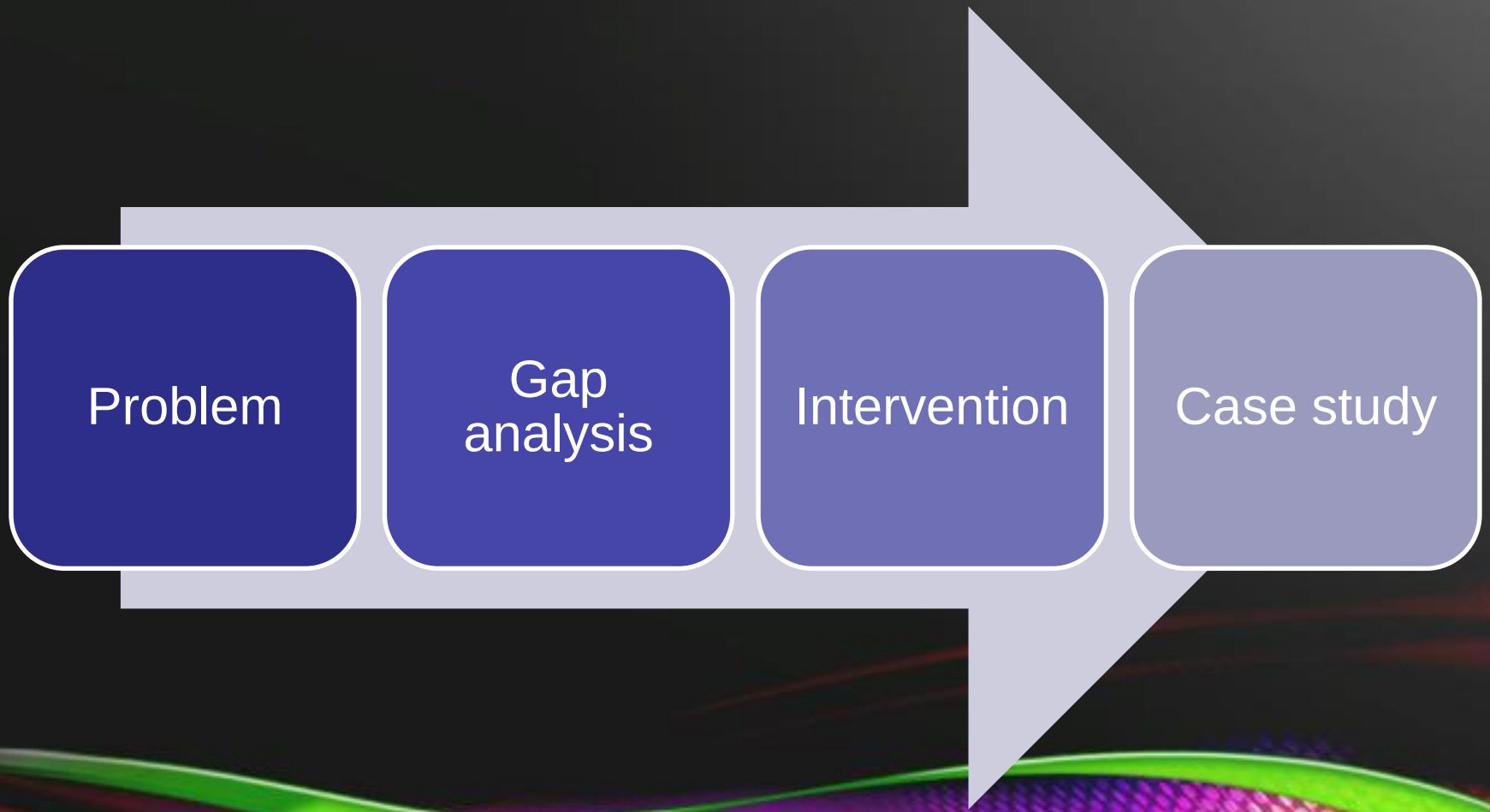
Performance science in elite track and field athletics and its support of world class coaching practice

Dr Barry Fudge – UKsem – November 2011

UKA Physiologist

- Employed by English Institute of Sport
- Deliver 100% UKA
- Based in Loughborough at the NPC
- Responsibility for all event groups but primarily endurance

Overview



The Problem

Endurance running

The Problem

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The Problem – 2008 – 4 years to home Olympics

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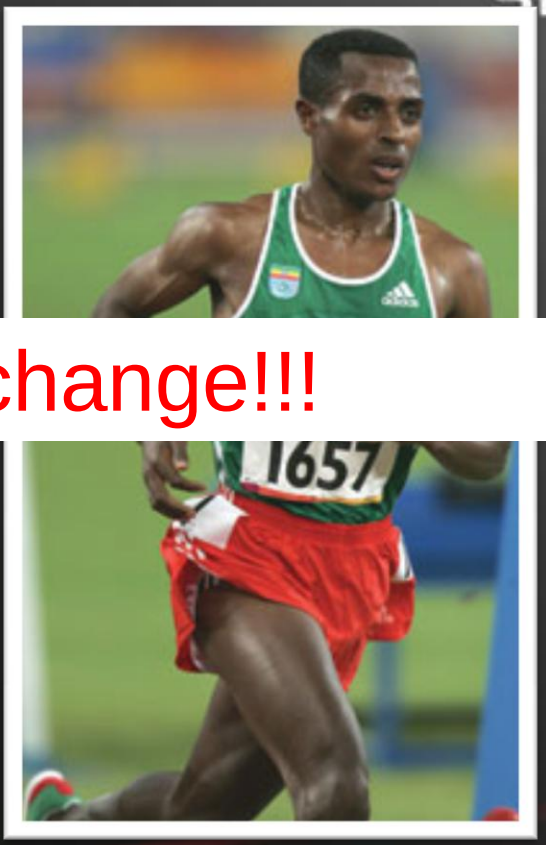

Something has to change!!!

Mo Farah	Event	Kenenisa Bekele
13:08.11 (Rank 43)	5000m	12:50.18 (Rank 1)
27:44.54 (Rank 79)	10000m	26:25.97 (Rank 1)

2011 – 1 year to go to home Olympics

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Amazing result but not the Olympics!
Don't lose sight of your goal!

Section main points

- 2008: Athletes from east African countries dominate endurance running
- Clock ticking to home Olympics: success required
- 2011: British athletes making progress but not accomplished goal
- Next sections detail one part of a massive process undertaken by UKA teams to change our fortunes **(i.e. Coaches, athletes & support staff)…**

Gap analysis

East African running

PhD work program…
Kenya running phenomenon

- Diet
- Hydration
- Physiological testing
- Genetics
- Physical activity & lifestyle
- Haematology
- Develop Technology

Long Term Athlete Development

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Optimisation

Testing

Marginal gains

Scientific Principles

Refinement of environment

Progression of key determinants

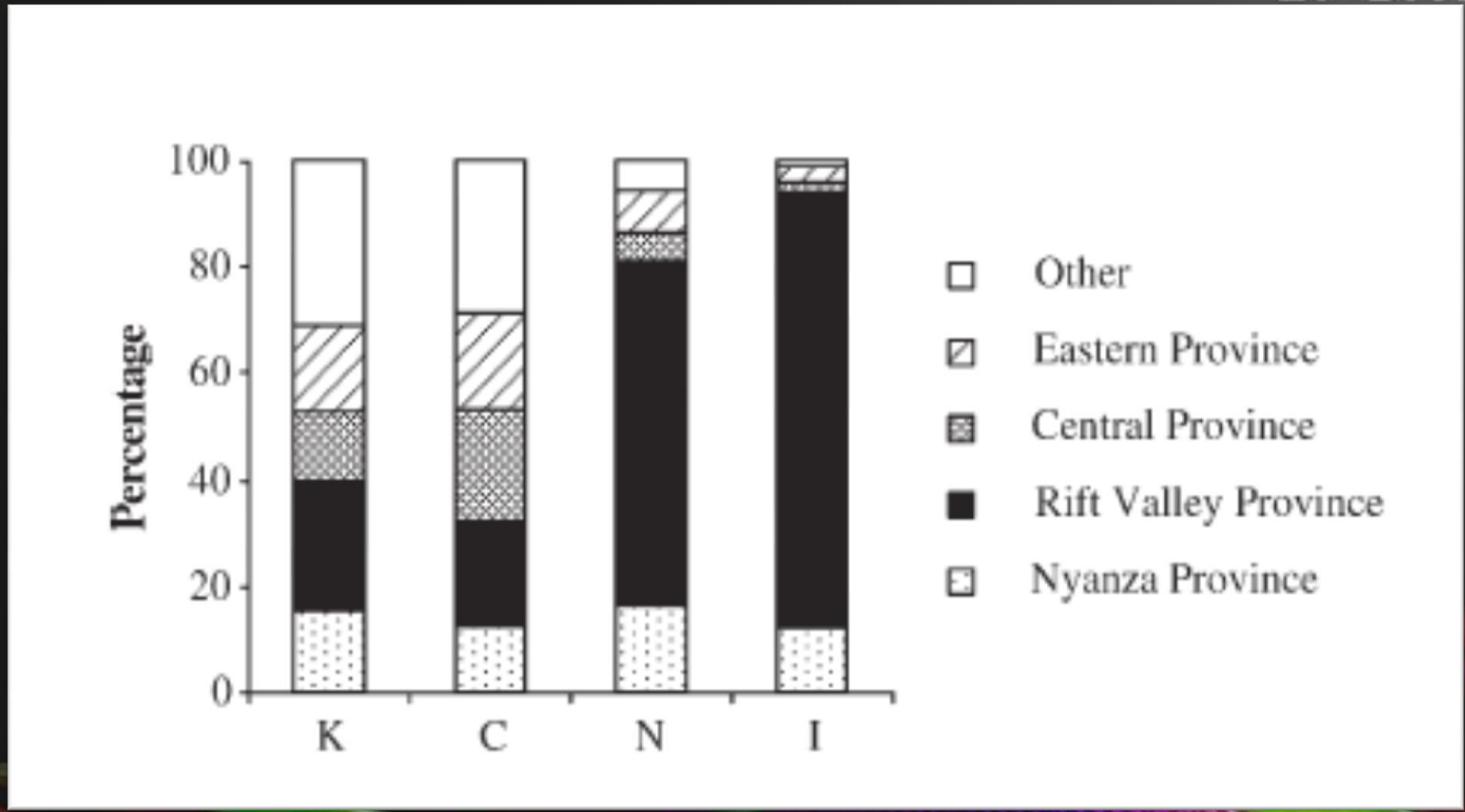
"Correct" environmental interaction

"Correct" genetic potential

Sub - section summary

- The “correct” genotype for elite performance is of course fundamental
- It is then the interaction of each genetic element with the environment that is likely to be a determining factor
- Kenyan athletes have a conducive environment for developing as an endurance runner...

Kenya – importance of location



Onywera et al, 2006

Ethiopia – importance of location

Scott et al, 2003

UK/USA

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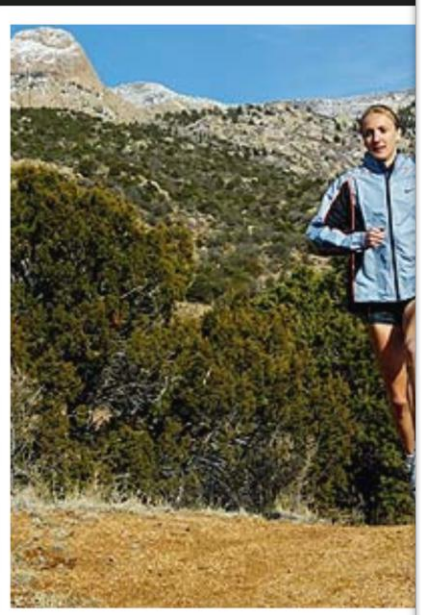
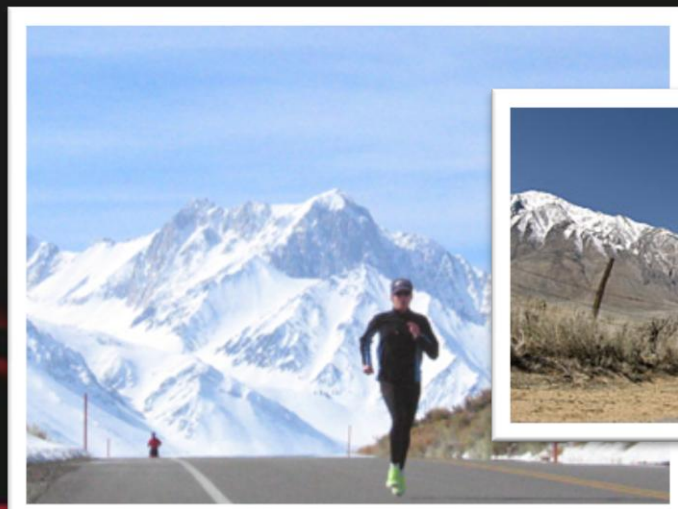
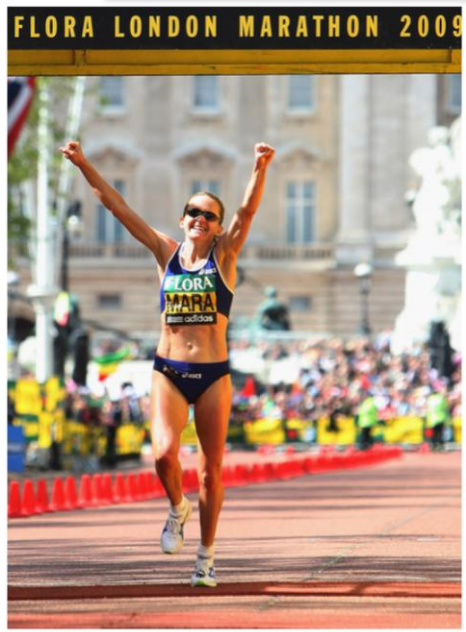




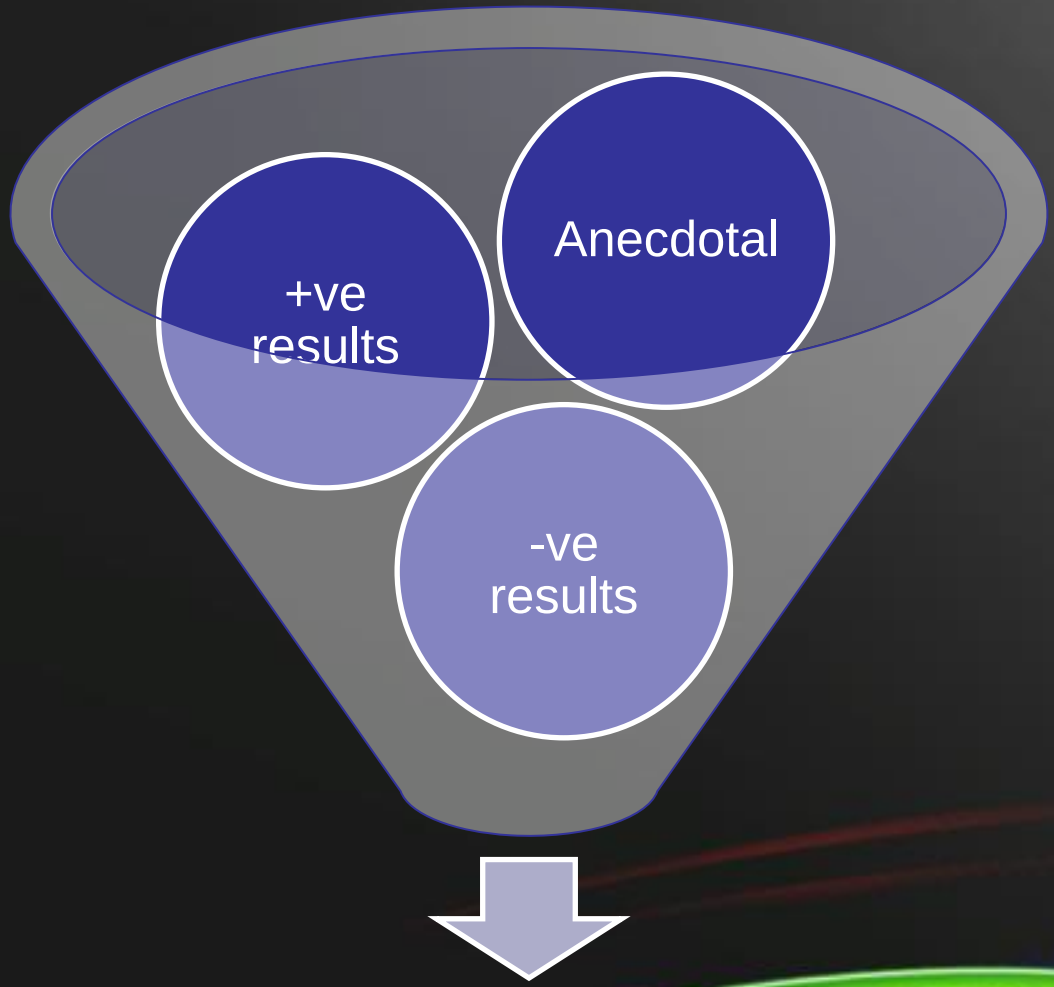


Science

Bonetti & Hopkins, Meta-analysis of sea level performance following adaptation to hypoxia. Sports Medicine 39: 107-27, 2009

	Natural-Altitude Protocols		Live High 8-18 h.d^{-1}
	Live High, Train High	Live High, Train Low	Continuous, Train Low
Effect of Mean Protocol[a] (%); ±90%CL[b]			
Elite	1.6; ±2.7	4.0; ±3.7	0.6; ±2.0
Subelite	0.9; ±3.4	4.2; ±2.9	1.4; ±2.0
Effect of Enhanced Protocol[c] (%); ±90%CL			
Elite	5.2; ±4.1	4.3; ±4.1	4.0; ±5.5
Subelite	4.5; ±4.1	4.6; ±3.3	4.8; ±5.3
Study characteristics changed by +1 SD or -1 SD for enhanced protocol	+altitude –days exposure +test day	–altitude –test day	+altitude +hours hypoxia –days exposure

Piecing it all together



Altitude recommendations for endurance running

Section main points

- Typically the best endurance runners in the world are based at altitude
- Science appears to corroborate anecdotal evidence
- Altitude training may be a vehicle to optimally modify the aerobic phenotype
- But by no more than the limit set by an individuals genotype
- Generally altitude training required for world class performance in endurance running

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Intervention: Altitude

Creation of a conducive environment

ALTITUDE TRAINING OPPORTUNITIES

UKA and London Marathon are pleased to announce the 2012 altitude training camp programme for UK endurance athletes.

The UKA/London Marathon altitude camps have become an important fixture in the training programmes of the majority of leading UK endurance athletes, providing them with the opportunity to train at altitude three to four times per year.

The established training bases in Font Romeu (France) and Iten (Kenya) have provided the ideal environment for athletes and coaches to work together, supported by a team of UKA staff including coaches, physiotherapists, doctors, soft tissue therapists and exercise physiologists.

Building on the success of 2010, the UKA/London Marathon altitude programme has continued to have a positive impact on endurance performances throughout the 2011 season, with highlights including Mo Farah's World Championships gold at 5,000m and silver at 10,000m, Hannah England's World Championships silver at 1500m, Helen Clitheroe's European Indoor Championships gold at 3,000m, Adam Cotton's European Junior Championships 1500m title and James Shane's 1500m silver at the European Under-23 Championships, with all athletes having spent periods training at the UKA/London Marathon camps in Iten and Font Romeu.

The UKA/London Marathon altitude training camps will continue to play an important role in the training and preparation phase of each of the athletes who attend the camps.

The UKA/London Marathon altitude training camps are open to all UK endurance athlete and coach pairings, however, the availability for places funded by UKA/London Marathon for 2012 will be prioritised from the list below. If availability allows at each altitude venue, athletes and coaches are welcome to attend the camps on a self funded basis.

UKA/London Marathon funded places will be prioritised as follows:

1. World Class Performance Programme (WCPP) athletes
2. UKA 'Futures' Programme athletes
3. Current Aviva GB&NI team athletes (GB&NI representation in the 12 months prior to the start of each camp)
4. UKA/London Marathon nominated athletes and coaches
5. Home Country Federation nominated coaches (linked to the coach development initiatives through the National Coach Mentor Programme)

The UKA/London Marathon altitude camp programme is detailed below. Any UK endurance athletes who fulfil the above criteria and are interested in attending any future altitude training camps should in the first instance express their interest before the relevant closing dates with UKA National Endurance Manager Spencer Barden by email sbarden@uka.org.uk with details of the camp they would like to attend.

Description (2012 altitude camps)	Departure and return dates	Location	Closing date for expression of interest	@Altitude
Winter Training Camp (Indoor/Cross Country/ Road Race season)	Depart: 10 January 2012 Return: 8 February 2012 (option for early departure/ later return date for WCPP athletes with a focus on the indoor season)	Iten, Kenya	15 November 2011	4 weeks
Marathon Training Camp (Also available to WCPP athletes)	Depart: 13 March 2012 Return: 19 April 2012	Iten, Kenya	15 January 2012	4-5weeks
Spring Training Camp	Depart: 10 or 16 April 2012 Return: 1 or 17 May 2012	Font Romeu, France	15 February 2012	3-6weeks
Summer Training Camp (Preparation camp for London Olympics)	Opens: 26 June 2012 Closes: 2 Aug 2012 (alternative departure/return dates for Diamond League fixtures and London Olympics)	Font Romeu, France	N/A	3-5weeks
Winter Training Camp	Late October to early December 2012	Iten, Kenya	TBC	4-6weeks

George Gandy (National Event Coach – Endurance), Ian Stewart (Head of Endurance), Spencer Barden (National Endurance Manager) and David Bedford (Race Director London Marathon) will make the final decision on who will be offered the available places on each of the altitude camps.

If you have any questions on the above please contact:
UKA National Endurance Manager - Spencer Barden
by email sbarden@uka.org.uk

ALTITUDE TRAINING OPPORTUNITIES

As part of its funding partnership with London Marathon, UKA Endurance is pleased to announce the altitude training camp programme for UK endurance athletes for the remainder of 2010 and early 2011.

The key objective of the UK Endurance Altitude Strategy is to provide UK endurance athletes and coaches with the opportunity to train at altitude in a group environment within a managed, supported and sustainable long term altitude programme. Altitude training has been adopted by the majority of the world's best endurance athletes from 800m to the Marathon and is an area that is integral to the endurance strategy.

Following consultation with some of the world's leading endurance athletes and coaches and further discussion with UKA exercise physiologists, UKA Endurance and London Marathon are pleased to confirm that Font Romeu in France and Iten in Kenya, at heights of 1850m and 2100m above sea level respectively, will form the two main UKA/London Marathon altitude bases for UK endurance athletes and coaches.

The main camps will be supported by a team of UKA support staff, including physiotherapists, doctors, soft tissue therapists, coaches and exercise physiologists.

The camps will be open to UK endurance athlete and coach pairings with availability of supported places prioritised as follows:

1. World Class Performance Programme athletes
2. UKA 'Futures' Programme athletes
3. UKA endurance house athletes (Loughborough)
4. Current Aviva GB&NI team athletes (GB&NI representation in the 12 months prior to the start of each camp)
5. London Marathon nominated athletes and coaches (primarily road running/Marathon)
6. UKA Endurance Performance Centre athletes part of the Loughborough endurance training groups
7. Regional endurance training centre athletes
8. Invited developing and aspiring athletes
9. Home Country Federation nominated coaches (National and Area Coach Mentors)

The UKA and London Marathon altitude camp programme is detailed below. Athletes and coaches should express interest before the relevant closing dates by emailing UKA National Endurance Senior Coordinator Spencer Barden on sbarden@uka.org.uk with details of their main event and current performances and details of the camp they would like to attend.

Description (2010 and early 2011 altitude camps)	Departure and return dates	Location	Closing date for expression of interest	@Altitude
European track season camp	2 August (post European Champs) to 3 September 2010 (various depart/return dates depending on individual race programme)	Font Romeu, France	15-July-10	3-4 weeks
World Half/autumn Marathon/cross country preparation training camp	Depart: 3 September or 10 September or 20 September 2010 Return: 24 September or 8 October 2010 or 15 October	Font Romeu, France	2-Aug-10	3-6 weeks
Main endurance winter training camp	Depart: 28 October or 4 November 2010 Return: 25 November or 9 December 2010	Iten, Kenya	30-Aug-10	3-5 weeks
Winter training camp - Indoor/cross country/ road running season	Depart: 3 January or 31 January 2011 Return: 27 January or 17 February 2011 or 24 February 2011	Iten, Kenya	5-Nov-10	3-6 weeks
Main London Marathon preparation training camp (race Sunday 17 April) & Summer season	Depart: 1 March or 15 March 2011 Return: 1 April or 15 April 2011	Iten, Kenya	7-Jan-11	4-6 weeks
Main endurance spring training camp	Mid April to Mid/Late May 2011 (Exact dates TBC)	Font Romeu, France	18-Feb-11	3-5 weeks

George Gandy (National Event Coach – Endurance), Ian Stewart (Head of Endurance) and David Bedford (Race Director London Marathon) will make the final decision on who will be offered the available places on each of the altitude camps.

If you have any questions on the above please contact:
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Altitude model aims

Type	Aim	Duration
A	Improve general fitness – especially aerobic capabilities	21-28 days
B	To prepare for high intensity training following altitude	21-28 days
C	Improve competitive performance	17-21 days

Optimal training camps

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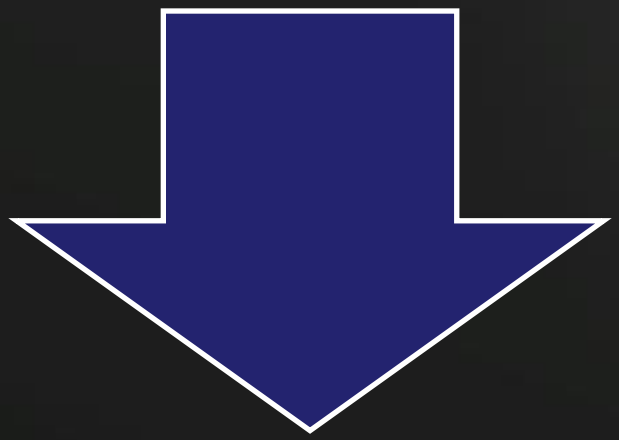

High enough for blood adaptation

Low enough to train when quality required

Optimal Camp Venues

2500m

A

B

C

1800m

0m

Iten, Kenya:
-2350m (8000ft)
- Typically winter camp
- Live High Train High

Font Romeu, France:
-1800m (6000ft)
- Typically spring/summer camp
- Live High Train High & Live High Train Low

Multiple altitude locations are required

Altitude –mixed strategy

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Physiology – Avoiding Pitfalls

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Altitude Training Camp:

Information and recommendations for coaches and athletes

Contents:


USA
LAGAT
Daegu 2011
TDK
FARAH
Daegu 2011


TOYOTA
ENGLAND
Daegu 2011


Clitheroe
PARIS 2011

Section main points

- Mixed altitude strategy in order to provide coaches the best possible opportunity to prepare their athletes for the world stage
- Coach education and testing essential
- Multiple training venues required
- Multiple exposures required for most athletes
- Other benefits important
  - Training camp effect

General summary

- Correct environment is required to realise true genetic potential
- UKA altitude program aims to provide a conducive environment for adaptation
- Program relatively successful but no cigar
- Physiology service provides coaches with objective data regarding their program


Thank you for listening!
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