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d. The unit or Brigade were to also notify Conduct Branch, APSG at the same time as the respective Higher Authority⁴². APSG Conduct Branch were to inform the Army Secretariat if the incident was likely to attract media or ministerial interest.

1.4.358. Enclosure 19 directed the following mailing list for the distribution of all RG INCREPs:

Exhibit 305

- a. RG HQ complaints email address.
- b. RG HQ 2IC email address.
- c. RG HQ Operations Security Manager email address.
- d. RG HQ SO2 G1 (Personnel) email address.
- e. RG HQ Information Security and Data Protection email address.

1.4.359. The two distribution lists above show that the RG INCREP was designed to be distributed purely to RG personnel, while the Army INCREP had a broader Army distribution list.

1.4.360. Following the accident involving Candidate 1, RG/LA/003 stated that the use of the RG INCREP had 'prevented key stakeholders outside of RG / ARITC being informed in an appropriate manner', due to the different distribution lists for RG INCREPs and Army INCREPs. The use of the RG INCREP to report Candidate 1's accident was categorised by the PPSI as an 'Aggravating Factor' on the basis that failing to ensure the right stakeholders were aware of the incident may have made the situation worse.

Exhibit 332

1.4.361. It was the opinion of the SI Panel that the use of the RG INCREP instead of the Army INCREP did not have any bearing on the outcomes of accidents involving the four candidates. This was because the key stakeholders included in the Army INCREP distribution list did not include the DAIB or the DCDSDO. Therefore, these two key stakeholders would not have been notified by either version of the INCREP.

Exhibit 342-343

1.4.362. In addition, it was the opinion of the SI Panel that earlier notification of the key stakeholders listed in the AGAI 62 distribution list would not, on their own, have resulted in any action, such as notification of the DAIB, that would have had a positive impact on the accidents involving any of the candidates. However, the SI Panel concluded that using the RG INCREP, whilst shown to have played no part in the

⁴² A Higher Authority was defined as any Officer in the CO's disciplinary Chain of Command (CoC) who was superior in that CoC to the CO.

accidents in question, was noteworthy in that it could contribute to reporting delays in the future.

1.4.363. The Service Inquiry Panel finds that the use of the Recruiting Group Incident Report forms, rather than the directed version contained within AGAI 62, was an **Other Factor**.

1.4.364. **Recommendation. The General Officer Commanding Army Recruiting and Initial Training Command should mandate the use of the incident report form (INCREP) directed by Army General Administrative Instruction 62, in order to ensure the correct and timely distribution of INCREPs.**

Report formats

1.4.365. ACSO 3216 detailed the Army policy for accident reporting. It directed that, except for accidents to be reported to the JCCC with a NOTICAS report, 'all other accidents and incidents are to be reported to the AINC using the AF510'.

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1.4.366. The AF510 formed part of a program by the Army and RAF to enhance the current reporting system used by both Services. By utilising drop-down menus, the AF510 aimed to simplify and sequence information for capture and analysis by the AINC in the INS database⁴³.

Exhibit 353

1.4.367. The Army Safety Centre (ASCen) could, irrespective of a DAIB Investigation, request a Unit Investigation Report (AF510A) be completed. Requests for an AF510A were 'sent to the originator of the AF510 for all incidents that carry the caveats of Serious and Specified injuries.'

Exhibit 309

1.4.368. RG policy stated: 'within RG, all accidents and major incidents are reporting [reported] on CASPER via DII [Defence Information Infrastructure] to the RG Business Continuity Team.' The reports generated in the CASPER system were formatted to allow for data capture and analysis within the CASPER database, and differed from the formats used within the Army INS system.

Exhibit 305

1.4.369. The process that was then followed was for a PDF copy of the CASPER report to be sent to the AINC by the RG H&S Manager via email. As the CASPER reports were in a PDF format, and not in the Excel format of the AF510 required for automatic upload, the information would not have been automatically uploaded. AINC confirmed that information provided to them in incorrect formats could have been manually uploaded to the INS database. However, AINC commented

Exhibit 99
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Exhibit 427

⁴³ The Incident Notification System (INS) was the database used by the AINC to record incident and accident information. The system served as a way of recording and tracking incident and accident trends and occurrences.

that this was a laborious process which they discouraged, outside of exceptional circumstances. RG explained that it had not been made clear to them that the use of CASPER reports was an issue or challenge for the AINC and they believed that they were providing all the necessary information in a suitable format.

1.4.370. The Army and Capita utilised two distinct methods of incident and accident reporting within their organisations. It was the opinion of the SI Panel that for a military and civilian partnership, like RG, to operate a successful reporting system, the systems should have been integrated or used concurrently. The decision to use the CASPER system was made in order to avoid the inefficient double reporting that the use of concurrent systems would have involved. Integration of the two systems had not occurred beyond the emailing of CASPER reports to AINC, and this resulted in a breakdown of the information flow that could only have been addressed by additional actions by AINC.

1.4.371. It was the opinion of the SI Panel that the non-inclusion of the accidents discussed in this report in the INS database demonstrated the difficulties involved in the integration of two systems involving incompatible data formats. Using the AF510 to report the accidents would have included them in the INS database.

1.4.372. It was the opinion of the SI Panel that the breakdown in reporting, caused by incompatible reporting formats and by not using the AF510, denied the ASCen the opportunity to request a Unit Investigation Report be completed following the accidents involving Candidate 3 and Candidate 4, and prior to the accidents involving Candidate 1 and Candidate 2.

1.4.373. The Service Inquiry Panel finds that using CASPER reports instead of AF510s to report incidents and accidents to the Army Incident Notification Cell was a **Contributory Factor**.

1.4.374. **Recommendation. The General Officer Commanding Army Recruiting and Initial Training Command should ensure that the incident and accident reporting processes used within Recruiting Group are fully compliant with Army reporting policy and are coherent with Army reporting processes, in order to ensure effective integration between the Army and the Capita reporting systems.**

Incident categories

1.4.375. CASPER reports contained several drop-down menu options for key information fields. One of these was the 'incident category'. The 'incident category' drop-down menu had five options:

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- a. Accident at Work.
- b. Clinical Incident (clinical environments only).
- c. Environmental, Natural Disaster / Damage to Property (eg fire / flood).
- d. Near Miss / Safety Observation.
- e. Non-Work-Related Ill Health.

1.4.376. Each of the incident categories was followed by other drop-down menus specific to the category chosen. Of these, only 'Accident at Work' and 'Clinical Incident' offered the option of 'Death / Fatality' and only 'Accident at Work' included the option of raising the incident as a RIDDOR event.

Exhibit 354

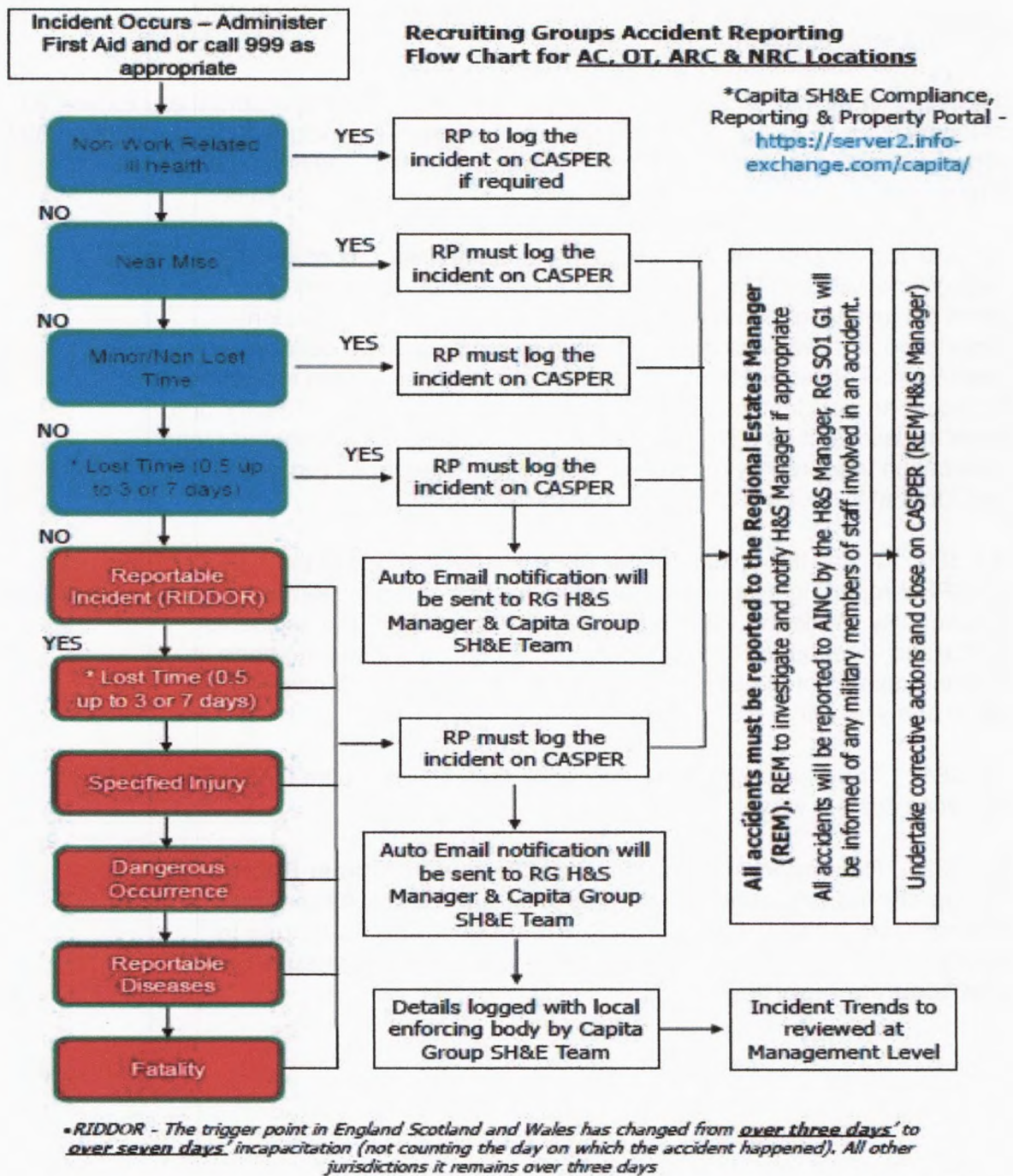


Figure 1.4-23 – RG accident reporting flow chart.

Exhibit 303

1.4.377. As shown by Figure 1.4-23, the category used to identify the accident resulted in differing follow-on actions. CASPER reports using the category 'Non-Work-Related Ill Health' did not trigger the automated email notification of the RG H&S Manager or the Capita Group Safety, Health and Environment team. Although the RG H&S Manager did not receive automated email notifications via CASPER for the four accidents

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involving Candidates 1, 2, 3 and 4, RG personnel were notified shortly following each accident.

1.4.378. In all four of the CASPER reports discussed in this report, the category 'Non-Work-Related Ill Health' was chosen. This included the report submitted for Candidate 1, which was submitted 3 days after the event, and which included the information that Candidate 1 had died.

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1.4.379. If all accidents involving AC candidates were considered as 'Non-Work-Related Ill Health' and not as an 'Accident at Work' due to them not involving members of staff, then AC candidates' accident reports would always have been limited to the drop-down options of 'Non-Work-Related Ill Health'. Therefore, it would have been impossible to record an accident involving an AC candidate as 'Death / Fatality' or to raise the accident as a RIDDOR event. Additionally, the automated email notification triggered by reporting other serious categories (eg by 'Accident at Work') would have not occurred.

1.4.380. It was the opinion of the SI Panel that this use of the CASPER reporting system did not make full use of the system's functionality. While this had no effect on the outcome of the accidents discussed, due to the RG H&S Manager being notified by telephone, it was the opinion of the SI Panel that it was likely that this hindered data trend analysis within RG.

1.4.381. The Service Inquiry Panel finds that the use of the CASPER reporting system was an **Other Factor**.

1.4.382. **Recommendation. The Chief Executive Officer Recruiting Group should implement a training program for key Assessment Centre staff in the use of the CASPER system, should its use in incident and accident reporting continue, in order to ensure timely and accurate reporting.**

Organisational Factors

The Increase in Commonwealth Recruiting

1.4.383. On 5 November 2018 the Minister of State for the Armed Forces released a written submission authorising the increase in CW recruitment. This increase removed a previous 5-year residency requirement for CW recruits and increased the per annum recruitment limit from 200 to 1,350. As a result of this authorised increase, it was the Army's intent to increase the 'annual capped Army inflow [of CW candidates] from 150 Gains to Strength (GTS) to 1,000 Basic Training Starts (BTS) in a 5-year phased implementation'. The term GTS was used in this context to indicate candidates that had successfully completed all stages of selection and had taken up their specified role in the Army. The term BTS was used to indicate candidates that had successfully completed the selection process and had taken up their place at the beginning of BT. Table 1.4-9 indicates the data assumptions made by the Army regarding the number of CW candidates required to attend an AC to achieve 1,000 BTS.

Exhibit 355-356

h	Event	Actuals
1	Booked to attend AC	1,475
2	Attended AC	1,463
3	First time pass	909
4	Deferrals	215
5	Of those deferred, those who subsequently passed	100
6	Total pass	1,009

Table 1.4-9 – Army implementation order data assumptions.

Exhibit 357

1.4.384. The proposed increase in CW recruits was planned to take place using a phased approach over the course of 5 years. Table 1.4-10 indicates the intended number of CW BTS that RG was tasked to deliver.

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Service	Recruiting Year 2018/2019	Recruiting Year 2019/2020	Recruiting Year 2020/2021	Recruiting Year 2021/2022	Recruiting Year 2022/2023
Royal Navy	100	200	300	300	300
Army	476	700	1,000	1,000	1,000
Royal Air Force	24	50	50	50	50
Totals	600	950	1,350	1,350	1,350

Table 1.4-10 – The phased implementation of Commonwealth recruiting targets.

Exhibit 358

AC	Recruiting Year 2016/2017	Recruiting Year 2017/2018	Recruiting Year 2018/2019	Recruiting Year 2019/2020
Lichfield	134	144	1	752
Pirbright	168	371	32	884
Glencorse	0	10	0	509
Belfast	1	6	0	13
Totals	303	531	33	2,158

Table 1.4-11 – Commonwealth recruiting numbers (2016/2017 to 2019/2020).

Exhibit 359

1.4.385. Table 1.4-11 shows the actual number of CW candidates that attended Soldier Selection at one of the four ACs from 2016 to 2020. During the 2017/2018 recruiting year there was a high rate of success at selection and training, prompting a pause in CW recruitment. The result of this was seen in the low numbers attending in the 2018/2019 recruiting year. Following this pause, and the implementation of the CW recruitment uplift, a marked increase in CW recruit attendance at Soldier Selection was seen in the 2019/2020 recruiting year.

Exhibit 360

1.4.386. As the CW uplift was approved late in the 2018/2019 recruiting year, permission was given to all three Services to roll forward unused allocations into the 2019/2020 recruiting year. This resulted in the revised totals that are detailed in Table 1.4-12. With a 10% variance built into planning for candidate travel failures, the revision of CW recruitment allocations accounted for the increased CW attendances

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seen in the 2019/2020 recruiting year. The Army data assumptions shown at Table 1.4-9 were based on 1 BTS requiring, on average, 1.46 (1,475 divided by 1,009) CW candidates being booked to attend. The revised allocation of 1,396 BTS and 2,158 attendances fell within the accepted 10% variance of this ratio.

Service	Original Phased Recruiting Year 2019/2020 Allocation	Unused Recruiting Year 2018/2019 Allocation Rolled Forward	Further In-Year Adjustments	Revised Total
Royal Navy / Royal Marines	200	20	30 pulled forward from Recruiting Year 2020/2021 allocation	250
Army	700	346	350 pulled forward from Recruiting Year 2020/2021 allocation	1,396
Royal Air Force	50	24	-	74

Table 1.4-12 – Tri-Service role forward of unused allocations.

1.4.387. In September 2018, a Change Request (CR) was submitted by the Army, and subsequently approved, regarding the CW recruitment uplift. Part of this CR was that CW soldier candidates would be eligible to attend any of the four ACs. Prior to this CR, all CW soldier candidates were supposed to attend AC (Pirbright), where Capita were required to provide 'Health Technicians and Examining Medical Officers with specific training and experience in identifying the effects of diseases common in other parts of the world, and the impact of childhood trauma.' This was previously discussed in more detail in 'The PSMA for CW Candidates' section at paragraphs 1.4.48 to 1.4.56. Table 1.4-11 demonstrates that prior to this CR being submitted, CW candidates were attending ACs other than AC (Pirbright). Clarification was sought from ARITC regarding why CW candidates had been attending ACs other than AC (Pirbright) prior to this CR. Their response stated: 'It remains unclear why candidates were loaded to ACs other than Pirbright in recruiting years 2016/2017 and 2017/2018.' However, RG later explained that it was done for the convenience of the candidates, based on their sponsor's location, and the CR was then initiated to formalise this approach.

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Exhibit 362-364

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1.4.388. In the Army Implementation Directive, published following the decision to increase CW recruiting, five concerns were raised by the Home Office (HO). These were as follows:

Exhibit 365

- a. 'The increased numbers will increase net immigration.
- b. An increase of visitor visas needed to generate 1350 (1000 Army) basic training starts.
- c. On occasions the HO have exceptionally issued tourist visas linked to military assessment.
- d. The numbers of individuals overstaying their visa period resulting from individuals dropping out of the process, and not returning to their country of origin.
- e. Not all individuals have historically been loaded to training inside their six-month visa period.'

1.4.389. These concerns were accompanied by the statement: 'The current CW recruiting process is not to change and all CW applicants are to continue to be assessed in the UK. The number of applications for the 150 GTS places highlight that this model can deliver the required BTS. Adopting an overseas recruitment model imposes risk on the process with no mitigation of HO concerns above those offered.'

Exhibit 365

1.4.390. Another acknowledgement of additional risk was seen in the following section from the RPP contract discussing the requirement for CW candidates to attend AC (Pirbright) which stated: 'Medical staff shall frame their assessments based on an understanding of the additional risks associated with having lived in foreign countries, and the potentially reduced reliability of medical reports, where provided.'

Exhibit 139

1.4.391. The Change Request that authorised CW soldier candidates to attend any of the four ACs noted that a key difference was 'often a more time consuming Pre-Service Medical Assessment (PSMA)'. The acknowledgement that CW PSMAs often took more time or were required to be 'more in depth', as it was referred to later in the same section, did not necessarily indicate an awareness of an increased risk or that any increased risk had been addressed as CW PSMAs may have taken longer due to the lack of a PHCR and the lack of the Clinical Triage process for CW candidates, as discussed earlier.

Exhibit 366

1.4.392. The RPP contract referred to the 'additional risks associated with having lived in foreign countries', a risk felt at the time of writing the contract to require specially trained medical staff to conduct the medical assessment. The contract directed that candidates should attend AC (Pirbright) as the medical staff in attendance there would be specially trained in 'identifying the effects of disease common in other parts of the world'. However, as can be seen from Table 1.4-11, the direction for CW

Exhibit 139
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candidates to attend the AC (Pirbright) was not strictly followed, including during the period prior to the 2018 CR. Additionally, as discussed in the section 'The PSMA for Commonwealth Candidates', the SI Panel concluded that none of the medical staff conducting PSMA's at any of the ACs were given specific medical training in identifying the effects of diseases common in other parts of the world.

1.4.393. Prior to the 2019/2020 recruiting year, there were no reported incidents of ECAST events during Soldier Selection. However, the 2018 CW recruitment uplift significantly increased the number of CW candidates taking part in the RFT (E), which increased the overall likelihood of an ECAST event occurring because CW candidates are more likely to have SCT. In this report, the SI Panel have identified four reported incidents of ECAST that occurred in 2019, following the CW recruitment uplift. The SI Panel concluded that the inherent risk of ECAST incidents was likely to remain similar to the levels seen in the 2019/2020 recruiting year, if CW recruiting numbers remained high and without additional risk mitigation measures being introduced. In addition, it was the opinion of the SI Panel that there were other medical conditions, such as non-freezing cold injury and compartment syndrome, which were more common in CW candidates. The SI Panel were unable to find evidence that a reassessment of the risks had been conducted, in relation to the potential effects of all such medical conditions, following the uplift in CW candidates.

1.4.394. The Service Inquiry Panel finds that the marked increase in recruitment from the Commonwealth, coupled with the lack of evidence of a more thorough medical risk assessment to identify conditions experienced more commonly or more severely by Commonwealth candidates, was a **Contributory Factor**.

1.4.395. **Recommendation. The General Officer Commanding Army Recruiting and Initial Training Command should undertake a thorough assessment of the risks associated with the increase in Commonwealth recruiting and identify and implement suitable mitigations, in order to reduce those risks to as low as reasonably practicable and tolerable.**

Trend Analysis and Recognition

1.4.396. RG reported that they became aware of a trend of CW candidates experiencing issues during the RFT (E) 2km run in July 2019 and this issue was noted in the RG H&S Manager's Monthly Performance Report (MPR) for July 2019. While RG identified a trend (based on three incidents at this point) in July 2019, subsequent analysis by the SI Panel identified that only one of these three candidates, referred to in this report as Candidate 3, [REDACTED] event. The other two CW candidates identified in this initial trend

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analysis appeared to have suffered from other medical conditions, unrelated to SCT and ECAST.

1.4.397. The SI Panel assessed that there was no actual trend at this stage beyond the fact that all three of these candidates were from CW countries. It was the opinion of the SI Panel that it was likely that the two other cases may have distracted focus from the serious hospitalisation of Candidate 3 [REDACTED] possibly implying a broader problem, such as issues with acclimatisation, where one did not necessarily exist. Nevertheless, the SI Panel concluded that RG was correct to identify a potential trend in July 2019; while early recognition and analysis was important, in this case the correlation lacked causation.

1.4.398. A potential trend of four CW candidates experiencing accidents on the RFT (E) 2km run was again raised in the September 2019 MPR, following the accident involving Candidate 4. In this report it was noted that two of the four candidates had experienced [REDACTED] ([REDACTED]). As discussed in the medical section of this report, [REDACTED] is a serious medical condition which can result from [REDACTED]

Exhibit 368

1.4.399. In addition to the MPR, the issue was raised with the Support Services Director and discussed at the RG H&S meeting in October 2019. The minutes of this meeting indicated a focus on CW candidates completing the required acclimatisation period prior to attending Soldier Selection. However, no medical personnel were present at this meeting.

Exhibit 369

1.4.400. RG also reported that discussions regarding this issue were held at Senior Leadership Team (SLT) level, and the conclusion reached was that no significant commonalities existed amongst the cases. The decision made at this stage was that the extension to the CW candidates' acclimatisation period from 7 to 10 days was appropriate. The SI Panel could find no evidence that this decision was made in consultation with medical personnel.

Exhibit 98

1.4.401. It was the opinion of the SI Panel that the lack of medical expertise during the H&S and SLT discussions regarding the accident trend amongst CW candidates reduced RG's ability to identify [REDACTED] as a common factor in the accidents involving Candidate 3 and Candidate 4. It was the opinion of the SI Panel that it was likely that the presence of medical expertise during these discussions would have improved RG's ability to identify the trend of CW candidates experiencing exertional collapse and AKI on the RFT (E) 2km run. Had this trend been identified, risk mitigation measures could have been put in place and the likelihood of the accidents involving Candidate 1 and Candidate 2 may have been reduced.

1.4.402. The Service Inquiry Panel finds that the lack of medical expertise during the Health and Safety and Senior Leadership Team discussions, during the period July 2019 to October 2019, regarding the

emerging accident trends amongst Commonwealth candidates was a **Contributory Factor**.

1.4.403. Recommendation. The Chief Executive Officer Recruiting Group should ensure that medical expertise is included during discussions in the Health and Safety and Senior Leadership Team review processes, in order to ensure that a thorough understanding and review of the medical factors is considered.

The Organisational Relationship Between ARITC and RG

1.4.404. ARITC was a two-star Army HQ which consisted of five delivery elements⁴⁴, one of which was RG. Although RG was part of ARITC, it was a civilian organisation led by a civilian Chief Executive Officer, who was an employee of Capita. RG consisted of approximately two-thirds civilian (Capita) staff and approximately one-third embedded military (Army) staff.

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Exhibit 434

1.4.405. During the period from 2012 to 2018, RG had been experiencing issues with delivering the Army recruitment target, with an average annual shortfall of approximately 30%. In 2018, in order to address some of these issues, senior Army and Capita personnel implemented a change of culture. The aim of this change was to improve performance and remove a previously 'adversarial' relationship between the Army and Capita, through what was described as the 'zippering up approach'⁴⁵. The aim of this approach was to create closer working relationships between ARITC and RG. In order to facilitate this, HQ ARITC and HQ RG were moved into the same building in Upavon. In addition, ARITC and RG personnel were given each other's organisational charts and encouraged to identify and work closely with their civilian or military counterparts.

Exhibit 131
Exhibit 388-389

1.4.406. The 'zippering up approach' was intended to create closer working relationships between the senior civilian staff of RG and the senior military staff of ARITC. Examples of these 'zippering up' partnerships were those between the two-star GOC ARITC and the RG CEO, and between the one-star DOps ARITC and the RG Chief Operating Officer. However, as can be seen in the organisational chart provided to the SI Panel by ARITC in Figure 1.4-4, RG was part of ARITC and not strictly a parallel organisation. The organisational command relationship between ARITC and RG was therefore asymmetrical rather than hierarchical. RG was a civilian organisation, with embedded military personnel, which operated under the governance mechanisms and requirements of the RPP contract.

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⁴⁴ In military terminology these were known as Operating Groups.

⁴⁵ In February 2018, the CEO of Capita coined the phrase 'zippering up' to reflect the fact that he and the Chief of the General Staff wanted the leadership teams of ARITC and RG to form a series of close working partnerships, which was to extend all the way down to the most junior team members.

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Therefore, ARITC used the mechanisms of the RPP contract to request or require action from RG, as opposed to issuing orders, as they did to the other Operating Groups within their command structure.

1.4.407. The asymmetrical relationship between ARITC and RG meant the relationship did not conform to the 'normal' military chain of command. This was, in part, due to the strategic commercial supplier relationship and in part due to the tactical 'zippering up approach'. One example of this was the contrast between the monthly two-star Governance Board within ARITC, which was jointly chaired by GOC ARITC and the RG CEO, and the routine meetings of GOC ARITC's Command Group, where the RG CEO acted in a role which was most easily compared to that of a one-star Operating Group Commander. It was the opinion of the SI Panel that a working relationship where GOC ARITC was partnered with the RG CEO had the potential to lead to some confusion regarding the organisational command structure and organisational relationship between the two organisations. This, in turn, had the potential to lead to misunderstandings with regards to the alignment of policies, procedures and standards between the two organisations.

Exhibit 434

1.4.408. Within ARITC, a team of Army personnel was established to act as the key contract management function and to provide the interface between the mainly civilian Capita RG team and the Army. In 2019, this team was known as Recruiting Branch (RB) within HQ ARITC and was led by the Assistant Director (AD) Recruiting. This team was responsible for managing any changes to the RPP contract, which included the implementation of Defence and Army policy changes, alongside any amendments to policy, process or structure which were detailed within the contract. Under Schedule 6 of the RPP contract, there was a requirement to follow specific codes and standards which included JSPs, AGAIs, Queen's Regulations and other relevant Defence and Army policies.

Exhibit 434

1.4.409. However, the SI Panel found evidence of a lack of knowledge of some key Defence policy requirements by RG. Those related to WBGT monitor training were discussed in paragraph 1.4.182. In addition, during correspondence between RG and the SI Panel in October 2020 regarding the reporting requirements in JSP 375 and ACSO 3216, RG stated that, as a civilian organisation, they were not subject to the requirements directed in these military documents. This statement was later corrected, with RG acknowledging that, as a civilian organisation working within the military organisational command structure, they were subject to the requirements directed by military policy. It was the opinion of the SI Panel that this misunderstanding was significant.

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Exhibit 348

1.4.410. In addition, the Human Factors report stated that, at the AC level, there were 'two different organisational cultures in operation, a

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Capita “blue” culture and an Army “green” culture’ and ‘two distinct chains of command, one Capita and one Army’. These cultural differences were described as differences in attitudes and behaviours of the staff, differences in organisational values and differences in how work tasks were prioritised. The report also commented on ‘a lack of a shared culture of psychological safety whereby all staff could raise concerns and ideas’ and stated that both organisations wanted to ‘keep their own cultures and remain independent’. The Human Factors report stated that there was ‘little observed cultural or behavioural assimilation’ and it concluded that this could have resulted in a diffusion of responsibility and accountability, leading to differences, for example in the reporting procedures, that potentially contributed to the accident involving Candidate 2.

1.4.411. The use of the RG INCREP, rather than the directed version contained within AGAI 62, was found to have been an **Other Factor** by the SI Panel and the use of CASPER reports instead of AF510s to report incidents and accidents to the AINC was found to have been a **Contributory Factor** by the SI Panel. In response to a SI Panel query related to incident reporting, RG stated: ‘We now have a more comprehensive approach in place, and as a result have a revised incident reporting process which mirrors the Army policy to ensure that there is consistency across the whole operation.’ Not notifying the DAIB of the earlier accidents (involving Candidate 3, Candidate 4 and Candidate 1) and not notifying the DCDSDO of Candidate 1’s death were found, by the SI Panel, to have been **Contributory Factors** in the accident involving Candidate 2. It was the opinion of the SI Panel that the asymmetrical relationship between ARITC and RG and the ‘zippering up approach’ implemented in 2018 were likely to have resulted in a blurring of the organisational relationship between ARITC and RG. Together with the different organisational cultures highlighted in the Human Factors report, the SI Panel assessed that this was likely to have been a factor in the deviations from the reporting requirements expressed in JSP 375, DSA01 and ACSO 3216. While not solely causative of any specific deviation from military policy, it was the opinion of the SI Panel that it was likely that the asymmetrical organisational relationship and organisational cultural differences resulted in these deviations going unnoticed and / or unchallenged.

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1.4.412. The SI Panel concluded that the asymmetrical organisational relationship between ARITC and RG, together with the different organisational cultures highlighted in the Human Factors report, was likely to have been a factor in the deviations from the reporting requirements, which have already been found within this report to have been **Contributory Factors** in the accident involving Candidate 2.

1.4.413. The Service Inquiry Panel finds that the asymmetrical organisational relationship between Army Recruiting and Initial Training Command and Recruiting Group, alongside organisational cultural

differences, was a **Contributory Factor** in the accident involving Candidate 2.

1.4.414. **Recommendation.** The **General Officer Commanding Army Recruiting and Initial Training Command** should clarify the organisational command relationship and promote a shared organisational culture between Army Recruiting and Initial Training Command and Recruiting Group, in order to ensure that there is a shared understanding and alignment of policies, procedures and standards.

A Review of ECAST and Potential Measures to Prevent Reoccurrence

Introduction

1.4.415. This section of the report will review historical deaths from ECAST in the UK military. It will then summarise the initial progress the Army made in mitigating against the risk factors that can precipitate ECAST and discuss some of the ongoing challenges of SCT risk management in the UK military. Finally, it will review the experiences of the US military and recent academic and organisational publications and guidelines in order to make evidence-based recommendations to prevent reoccurrence of ECAST deaths during Defence activities.

Historical ECAST Deaths in the UK Military

1.4.416. A Loose Minute produced by Defence Statistics Health (dated 5 December 2019) and sent to APSG and the Army Senior Health Advisor's team titled 'UK Armed Forces Sickle Cell Diseases, Rhabdomyolysis, Heat Illness; Prevalence, Deaths and Medical Discharges' identified that between 1 January 1984 and 4 December 2019 there were two deaths amongst UK Armed Forces personnel where SCT was present in the cause of death. These details are captured below:

- a. '18 September 1998 – Soldier A (Born Sierra Leone). Died due to exertional collapse with sickle cell trait whilst on an endurance march.'
- b. '31 January 2013 – Soldier B (Born Kenya). Died due to rhabdomyolysis and sickle cell trait related exertional collapse whilst taking part in a fire team assessment.'

1.4.417. **Case 1 – Soldier A.** Soldier A was a 21-year-old British infantry soldier, whose family origin was from Sierra Leone. He joined the Army in January 1998. He attended the Army Training Regiment Winchester for his initial Phase 1 training before continuing his Phase 2 training at the Infantry Training Centre Catterick. He was initially due to complete this phase of his training in early August 1998, but it was considered that he would benefit from further training before being released to the Field Army, so he was sent on leave and posted to G Company, joining them at the beginning of Week 9 of their 14-week training programme.

1.4.418. On 18 September 1998, Soldier A collapsed at the end of a 2 mile loaded march during a Fire Team Assessment (FTA). At the time, the aim of a FTA was described as 'to identify the Fire Team's ability to put down effective fire whilst under physical stress, having completed an

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Exhibit 400

approach march typical of the kind that they may be required to perform on operations.'

1.4.419. The Board of Inquiry report described how Soldier A sat down ('collapsed') once he reached the range at 13:06. His webbing was removed, he was given sips of water, he was placed in the shade and his temperature was taken which was found to be high. His clothes were removed, and water was poured over him to cool him down. He was found to have a weak pulse and a military ambulance (on standby at the range) was used to take him to the Duchess of Kent's Hospital, Catterick, departing the range at 13:20.

Exhibit 399

1.4.420. The Training Accident Investigation Team Army Report described Soldier A as 'semi-conscious' initially but it stated that he appeared to be responding to the initial treatment. He stabilised and appeared to have cooled down before his pulse suddenly became very weak and his condition rapidly deteriorated, which resulted in the ambulance being used. Once in the back of the ambulance 'artificial respiration and CPR' was administered. The Board of Inquiry Report stated that he arrived at the Duchess of Kent's Hospital at 13:45 and he was pronounced dead at 14:50.

Exhibit 400

1.4.421. The pathologist concluded that Soldier A suffered a cardio-pulmonary arrest from which he could not be resuscitated. There was no specific cardiac abnormality, but the lungs showed marked congestion and sickling. The pathologist stated that had he not had SCT, he may well have recovered from the collapse and therefore his SCT status was relevant to his death. The medical cause of death recorded at the post-mortem was as follows:

Exhibit 401

- a. 1a – Exertional collapse and sickling.
- b. 1b – Sickle Cell Trait.

1.4.422. Reviewing the Board of Inquiry report into the death of Soldier A, the SI Panel noted the written comment made by the Garrison Commander, on 10 January 2000, which stated: 'Consideration should be given by the Military Medical Authorities for the screening for Sickle Cell Anaemia of all potentially susceptible recruits', and the written comment made by the General Officer Commanding 2nd Division, on 4 February 2000, which stated: 'I believe that the screening for sickle cell anaemia has merit.'

Exhibit 402

1.4.423. **Case 2 – Soldier B.** Soldier B was a 29-year-old Installation Technician, of Kenyan origin, serving with 214 Signal Squadron. At approximately 10:15 on 31 January 2013, Soldier B collapsed at the end of a 1.5km loaded march, during a FTA on Warcop Training Area, Cumbria. At the time, the purpose of a FTA was to present the soldiers to the range slightly more physically exerted than they would be normally,

Exhibit 403

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in order to test their shooting ability and the management ability of the Fire Team commander under pressure.

1.4.424. Over the last few hundred metres of the route, Soldier B began to slow down markedly and was obviously struggling. When asked what was wrong, he stated that his legs hurt but gave no other indication that anything was wrong. His condition quickly deteriorated as his pace slowed further, he became unsteady and, shortly afterwards, he could no longer support his own weight. He became less responsive, his breathing became more laboured and an ambulance was called.

Exhibit 403

1.4.425. Soldier B was helped into the back of a minibus and driven from Warcop Training Area to Warcop Camp. A few minutes later, whilst driving between Warcop Medical Centre and the Regimental Headquarters building, it appeared that he was no longer breathing and no pulse could be felt. The vehicle was stopped, Soldier B was laid on his back by the side of the road and CPR was started. Soldier B was taken to James Cook Hospital in Middlesbrough where he died at approximately 08:00 on 1 February 2013. Soldier B had no known pre-existing medical conditions at the time of the accident.

Exhibit 403

1.4.426. The medical cause of death recorded at the post-mortem was as follows:

Exhibit 404

- a. 1a – Brain swelling and Cerebral Anoxia.
- b. 1b – Cardiac arrest with fluid electrolyte imbalance.
- c. 1c – Rhabdomyolysis and Sickle Cell Trait related Exertional Collapse.

1.4.427. The Post Inquest Report produced by the DIU in July 2014 explained that the Coroner felt that the issue of SCT testing was one which he should formally follow up. The Coroner explained that he would not be submitting a Regulation 28 report to prevent future deaths, but that he would write a letter to the DIU to enquire as to the current situation regarding SCT testing.

Exhibit 404

1.4.428. On review of these two cases, the SI Panel noted that the weather in both cases was quite different. The ambient temperature on 18 September 1998 was recorded as 19°C by the Medical Centre (it was unclear from the evidence provided whether a WBGT reading was taken) and Soldier A's initial temperature at the range was described as high. However, following cooling at the range, his core temperature at the Duchess of Kent's Hospital was recorded as 32°C, which indicated a significant hypothermia. In contrast, the conditions on 31 January 2013 were described as 'although dry it was a cold morning' and there being a 'low ambient temperature'. The presence of significant hypothermia on arrival at hospital in the case of Soldier A (32°C) was similar to the

Exhibit 405
Exhibit 406

findings of a lower than normal body temperature on arrival at hospital in the cases of Candidate 1 (35.8°C), Candidate 2 (34.7°C) and [REDACTED] [REDACTED]). The SI Panel were unable to find evidence of the temperature of Soldier B or Candidate 4 for comparison.

1.4.429. In addition, it was noted that Soldier A was on Guard Duty the night before the FTA from 18:00 to 06:00 with a rota of 2 hours on and 4 hours off. The Board of Inquiry report stated: 'The shift system employed in the Guardroom would have allowed [Soldier A] sufficient rest periods for him to effectively participate in the March and Shoot Practice.' However, there was no evidence in the report regarding how much rest he actually got during the night before the FTA.

Exhibit 405

1.4.430. These two cases demonstrated that although death following ECAST was rare in the UK military, it has been shown to occur in Service personnel after the completion of the initial stages of basic training. These two cases also demonstrated that, as in the cases of Candidates 1, 2, 3 and 4, ECAST can occur in hot weather and in cold weather. The role of fatigue was not established in either of the two cases discussed above, but it was not conclusively ruled out.

1.4.431. Soldier B (on 31 January 2013), Candidate 1 (on 17 November 2019) and Candidate 2 (on 27 November 2019) all collapsed and subsequently died secondary to ECAST following intense exertion in cold, winter weather. The SI Panel was also informed about a US military death from ECAST that occurred after a 1.5 mile timed fitness assessment run in cold weather (9°C) during the winter in early 2013. This led the SI Panel to consider whether cold weather⁴⁶ could make ECAST more likely to occur during maximal physical exertion or whether cold weather could make ECAST more severe if it were to occur. Discussions with several ECAST experts from the US suggested that it was more likely that in the cold, sustained, maximal exertion (the trigger for ECAST in military fitness runs and in college football drills) required more intensity, just as it has been shown to require in the heat. A well-known study in 1997 looked at the effects of ambient temperature on the capacity to perform prolonged cycle exercise. This demonstrated that there was a clear effect of temperature on exercise capacity which appeared to follow an inverted U-shaped relationship. The cyclists performed best at 11°C, but their performance reduced when it was colder (4°C) or warmer (21°C) and reduced substantially when it was very hot (31°C). Therefore, insisting that a candidate with SCT runs the same distance in the same time regardless of the ambient temperature, may increase the risk of ECAST both in very hot and in very cold weather.

Exhibit 430-432

⁴⁶One theory from academic literature was that the effects of vasoconstriction in the cold could lead to a reduced velocity of blood flow, a greater deoxygenation of the blood, HbS polymerisation occurring more readily and more rigid, sickled red blood cells causing vaso-occlusion.

1.4.432. In addition, patients with Sickle Cell Disease (HbSS) exhibit hypersensitivity to thermal stimuli and often report cooler weather or exposure to the cold as the most important precipitating factor for vaso-occlusion. The authors of a study in 2015 hypothesised that problems could be precipitated by rapid temperature changes, such as leaving a heated building in cold, winter weather. While the SI Panel could find no definitive evidence in published academic literature that cold weather could make ECAST more likely to occur or make it more severe if it were to occur, it was the opinion of the SI Panel that it was more likely than not that it could. The SI Panel concluded that this was an important area for further research.

Exhibit 432

1.4.433. The Service Inquiry Panel finds that cold environmental conditions on the mornings of both accidents was an **Aggravating Factor**.

1.4.434. **Recommendation. The Head of Research and Clinical Innovation (Defence Medical Services) should conduct further research, in partnership with the Front Line Commands and other appropriate stakeholders, to better understand the effects of cold environmental conditions on those who have Sickle Cell Trait, in order to reduce the risk of Exertional Collapse Associated with Sickle Cell Trait to as low as reasonably practicable.**

1.4.435. In the six ECAST cases discussed in this report, four had their family origin in West Africa (Ghana, Cameroon and Sierra Leone) and two had their family origin in East Africa (Malawi and Kenya). None had their family origin in the Caribbean. It was the opinion of the SI Panel that this was also an important area for further research as some academic papers hypothesise that the interaction between SCT and another, as yet-unidentified, genetic co-factor, might predispose an individual with SCT to be at greater risk of ECAST.

Exhibit 182
Exhibit 431

The Regulation 28 (Reg 28) Report to Prevent Future Deaths

The Reg 28 report

1.4.436. On 6 December 2019, HM Senior Coroner, Birmingham and Solihull Areas, wrote to the DIU to inform them that a report to prevent future deaths had been issued under Regulation 28 of the Coroners (Investigations) Regulations 2013. The report stated: 'I was made aware that [Candidate 1] and [Candidate 2] were both taking part in different military selection processes at Whittington Barracks. During their respective assessments on 17/11/19 and 27/11/19 they took part in a run during which both collapsed and were taken to Good Hope Hospital. Both were found to be suffering from metabolic acidosis, acute kidney injury and Rhabdomyolysis with each man dying on 17/11/19 and 27/11/19 respectively. Both were found to have sickle cell trait. Both men came from abroad for the selection process [Candidate 1] from Ghana

Exhibit 141
Exhibit 370

and [Candidate 2] from Malawi. Forensic post-mortem examinations were conducted on 04/12/19. The final cause of death remains under investigation however it has been confirmed by the forensic pathologist that the most likely cause of each man's collapse was the sickle cell trait in combination with military exercise. The forensic pathologist has advised that there is a link in the literature between sickle cell trait and deaths during military exercise. I have been advised that 3 other men have also collapsed in similar circumstances requiring intensive treatment however they did not die. As a result, I am concerned that there is a group of non-UK candidates who are at serious risk of death or harm if further steps are not taken immediately.'

1.4.437. HM Senior Coroner raised two matters of concern in the report to prevent future deaths:

Exhibit 141

a. **Matter of concern 1.** 'Consideration should be given to all non-UK selection candidates being screened for SCT before embarking on any selection process. A blood test can be undertaken to assess whether candidates have SCT.'

b. **Matter of concern 2.** 'Consideration should be given to all non-UK selection candidates who have been through the process already having an urgent blood test to check whether they have SCT. If a person has SCT they are [at] a significant increased risk of death / collapse during military exercise.'

The initial Army response to the Reg 28 report.

1.4.438. The response to the Reg 28 report to prevent future deaths came from the Secretary of State for Defence (SofS) and the Chief Executive of Capita on 30 January 2020. It responded to both matters of concern in detail.

Exhibit 371

1.4.439. **Matter of concern 1.** The MOD's response stated that several actions were taken after the two deaths and before HM Senior Coroner issued the report to prevent future deaths. It described the two most pertinent actions as follows:

Exhibit 371

a. As the first death was believed to be cardiac related, it was decided that any candidate, regardless of origin, who presents with an abnormal electrocardiogram (ECG) (as directed within current Army Cardiology protocol) would undergo a full echocardiogram.

b. The 2000m RFT (E) best effort run was suspended on 28 November 2019 for all Commonwealth (CW) candidates. CW candidates completed the rest of the selection activities as normal. These CW candidates were placed 'on hold' pending a way forward.

1.4.440. The response then stated the actions taken since the issue of the HM Senior Coroner's report to prevent future deaths. This described the implementation of a screening process to identify those candidates with SCT prior to them attempting the RFT (E) 2km run. This process involved two stages as follows:

Exhibit 371

a. **Stage 1 – A screening questionnaire to identify those at risk of having SCT.** The Army adapted an NHS Family Origins Questionnaire (FOQ), used to identify individuals whose family background indicated a high risk of having SCT, for use in all Army ACs by all candidates regardless of origin.

b. **Stage 2 – A blood test.** The FOQ was used to identify those candidates who were at 'high risk' of having SCT. Those 'high risk' candidates then underwent a blood test at Army Training Centre Pirbright (ATC(P)) (through an interim process set up between Defence Primary Healthcare (DPHC) and Frimley Park Hospital) to determine if they had SCT or not.

1.4.441. The response then explained what happened to those candidates who tested positive for SCT. In April 2019, the Army established a 4-week Soldier Development Course (SDC) which was designed to assist candidates who had marginally failed at an AC, in order to develop them in a range of areas (including physical fitness) to meet the Army's entry standards. Candidates with SCT were to be loaded on a bespoke, 4-week SDC, alongside the other 'marginal-fail' candidates in order that they could undergo a bespoke, 4-week period of physical conditioning prior to them attempting the RFT (E) (including the 2km run) at the end of the 4-week course. There was a specific focus on avoiding over exertion by using individual heart rate monitors to create individual heart rate training zones to ensure that candidates kept their heart rate below specific thresholds during activities involving exertion. The response stated that unless proven to not have SCT, no candidates deemed at 'high risk' of having SCT on the FOQ would attempt the RFT (E) 2km run without attending the 4-week SDC pre-conditioning course first.

Exhibit 371

1.4.442. The first SDC to take individuals with SCT took place in January 2020 and it included seven candidates with SCT from an initial group of twenty-four 'high risk' candidates identified by the FOQ in December 2019. These seven candidates with SCT were joined on the SDC by several other candidates who had marginally failed an aspect of Soldier Selection at an AC. During the SCT stakeholder meeting at Army HQ, Andover on 6 February 2020, the SI Panel were informed that four of the seven candidates with SCT had passed the SDC, including the RFT (E).

Exhibit 371

1.4.443. The SI Panel visited the SDC on Tuesday 28 January 2020, during the last week of the 4-week course. Although the SDC usually

took place at the Army Training Centre (Pirbright), this course was taking place at the Army Training Regiment (Winchester) in Hampshire. The SI Panel were told the reason for this was due to staff availability. The SI Panel spoke with the staff responsible for delivering the training and with the candidates on the course. The intent to treat everyone on the course the same way was evidenced by the fact that all the candidates (whether they had SCT or not) were issued an individual heart rate monitor and were told to stick to strict heart rate training zones advice. While there, the SI Panel were told all candidates should not exceed 70% of their maximum heart rate during week 1, they should not exceed 80% of their maximum heart rate during week 2 and week 3 and they should not exceed 90% of their maximum heart rate during week 4. They then attempted the RFT (E) 2km run towards the end of week 4.

1.4.444. **Matter of concern 2.** The MOD's response described the implementation of an Interim Training Direction on 13 December 2019 which was partly based on US military practice at the time. It was designed to mitigate the risk for those who might be at risk of ECAST. It explained how to recognise the symptoms of ECAST and advised what immediate treatment was needed if ECAST was suspected. Contained within the document were universal precautions designed to reduce the risk of those factors believed to contribute to the onset of ECAST. These factors included dehydration, previously suffering minor episodes of ECAST, exercising with a cold or when feverish, a lack of appropriate acclimatisation, a high ambient temperature and humidity, taking certain medications, taking dietary supplements containing stimulants and undertaking exercise at altitude.

Exhibit 371

1.4.445. The response also described future actions that were planned to be taken and these included SCT screening for all personnel not captured during the application process by the end of the first week of Basic Training (BT). The response stated that this would be in place no later than 1 April 2020 and that this would be delivered by DPHC. It also stated that the Army was considering an Army-wide screening programme for serving personnel. Unfortunately, SCT blood testing in the Army, both for new recruits and for serving personnel, was not implemented by April 2020 due to the lack of laboratory capacity (both within the NHS and within private laboratory facilities) to process SCT blood tests due to their commitment to COVID-19 activity.

Exhibit 371
Exhibit 372

The Ongoing Challenges of SCT Risk Management

1.4.446. The Army held a SCT Risk Management Military Judgement Panel (MJP) on 22 April 2020 to discuss SCT management in the military. During the MJP, they considered eight focused questions, within which were four topics that the SI Panel considered particularly pertinent to the ongoing challenges of SCT risk management in the military. These

Exhibit 372

four topics are discussed in more detail in this section of the report. The four topics were as follows:

- a. SCT screening.
- b. The identification of personnel with SCT.
- c. Universal Training Precautions.
- d. A 'Bad Day' physical activity opt-out policy.

SCT screening

1.4.447. A paper titled 'Screening for Sickle-Cell Trait at Accession to the United States Military' in *Military Medicine* (November 2014) contained a detailed review of SCT screening in the US military from 1969 to 2014. It asked several questions to review the available evidence relating to SCT screening in order to make recommendations regarding SCT policy in the US military. It concluded the following:

'The current evidence is insufficient to support a conclusive recommendation for or against universal SCT screening on military accession. As personal awareness of SCT status continues to increase given mandatory new-born screening policies in the United States, the DoD [Department of Defense] and military services may want to develop standardised educational platforms for addressing SCT-related safety concerns during training. Evaluating whether or not standardized education increases knowledge of potential complications in those with SCT, and whether that knowledge leads to behaviour change, should be part of any new program implemented in the DoD. Furthermore, if screening does continue in some segments of the military population, prospective studies of the effects of screening on morbidity and mortality are warranted. Regardless of any specific policy decisions on this issue, the emphasis should be placed on providing the safest environment for all trainees, irrespective of SCT status, to mitigate exertional illness and death.'

1.4.448. This same paper noted several conflicting SCT screening recommendations from prominent sporting and medical organisations within the United States at the time. These included the following:

- a. 'The National Collegiate Athletic Association (NCAA) began a mandatory SCT screening program for all incoming Division 1 student-athletes in August 2010, exempting those who have documentation of a prior test or who opt-out and sign a waiver of liability.'

Exhibit 373

Exhibit 373

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- b. 'Members of the American Medical Society for Sports Medicine and American Academy of Pediatrics favour targeted (ie based on race / ethnicity and sport) rather than universal SCT screening for collegiate athletes.'

1.4.449. During the SI Panel's visit to Washington DC in March 2020, the SI Panel was told that the US Air Force, the US Navy and the US Marine Corps all screened new recruits for SCT. At the time, the US Army were intending to begin screening all new recruits and this was confirmed in a later email, dated 1 July 2020 but, at that time, this had not yet been enshrined in policy. A summary of the United States DoD SCT policy evolution was provided and this is summarised below. Of note is the DoD Instruction (DoDI) 6465.1 (1981) which mandated the accession screening of all accessions, and the Defense Health Agency (DHA) Procedural Instruction (PI) Number 6025.14 (2018) which established DHA procedures to implement SCT screening at appropriate points: during entry to the military Services; at pre-deployment; and at other points as indicated for validation of results.

Exhibit 374
Exhibit 375

- a. **1969:** The US Navy experienced four exertional deaths at moderate altitude.
- b. **1970:** The Aviation Safety Committee placed occupational restrictions on personnel with SCT in specific high-risk trades. This included aviation, diving, special forces, high-altitude parachuting.
- c. **1981:** DoDI 6465.1, which mandated SCT screening of all accessions, was introduced.
- d. **1996:** Accession SCT screening was halted based on input from the Armed Forces Epidemiological Board and Service data on SCT related mortality. This was based on the presumption that deaths could be prevented by universal precautions. However, SCT screening did continue for high-risk trades after their entry into the military.
- e. **2015:** DoDI 6450.01 directed that Services could screen those who 'meet demographic, clinical, or operational criteria' for SCT. Those who had SCT underwent mandatory education.
- f. **2018:** DHA PI 6025.14 established DHA procedures to implement SCT screening at appropriate points in Service. This included SCT screening at specific points like pre-deployment or pre-training and SCT screening for pregnant women. Education for those who had SCT had to include education regarding the diagnosis, the cause, Service-specific restrictions, risk factors for ECAST and the genetic implications of the diagnosis.

1.4.450. Both the US Navy and the US Air Force accepted individuals who had SCT, provided that the proportion of HbS was less than or equal to 45%. When the percentage of HbS exceeded 45%, it was indicative of an underlying HbSS (SCD) and / or another heterozygous sickling disorder. These individuals were barred from accession to the military because the risk of adverse clinical outcomes was thought to exceed the threshold for military service. However, there were certain trades (including aviation, diving, special forces and high-altitude parachuting) that did have occupational restrictions relating to either having SCT (eg diving, special forces) or having SCT and having a history of symptoms related to SCT (eg aviation), even if the proportion of HbS was less than or equal to 45%.

Exhibit 373-374
Exhibit 378-380

1.4.451. In February 2020, the Senior Health Advisor (Army) in the UK commissioned a review of the evidence base of ECAST in military populations in the published literature to help inform the UK Armed Forces of effective interventions to reduce the risk of exercise-related sudden death from ECAST to as low as reasonably practicable. The review concluded the following:

Exhibit 179

- a. 'The risk of exertional rhabdomyolysis and exertion-related death is higher in SCT carriers compared with non-carriers, but the risk is no higher than other more prevalent risk factors, including obesity and tobacco use. The absolute risk for ECAST is low.
- b. Several mitigation strategies have been recommended by an expert panel, many of which are currently adopted by the US Army, but experimental data regarding their effectiveness is limited. The suggested mitigations are likely to benefit all Service personnel by reducing the risk of heat and exercise-related illness.
- c. There is no empirical evidence that screening is necessary to avoid the risk of ECAST, and the validity of screening tools needs to be determined.'

1.4.452. The 2021 paper which provided an expert consensus on ECAST, following a summit in October 2019 hosted by the Uniformed Services University (USU) Consortium for Health and Military Performance (CHAMP), noted that after the NCAA implemented universal SCT screening (alongside targeted education and tailored precautions) the rate of ECAST-related deaths amongst their athletes decreased markedly. However, it did highlight how screening mandates for SCT in athletes and concerns about stigmatisation had induced controversy.

Exhibit 429

1.4.453. The debate around SCT screening in both the military and in civilian medical and sports organisations is complex and controversial, and the evidence to support a recommendation for or against universal

SCT screening is currently inconclusive. However, it was the opinion of the SI Panel that had SCT screening been in place and had Candidate 1 and Candidate 2 been identified as having had SCT, then it was more likely than not that they would have received the optimal pre-hospital treatment and that the receiving hospital would have had a clearer idea of the differential diagnosis on admission. Without SCT screening, the process of identifying the cause of the exertional collapse and providing the correct treatment as soon as possible was much more challenging.

1.4.454. It was the opinion of the SI Panel that SCT screening for potential recruits would enable the identification of those who have SCT and it would facilitate allowing those who have SCT to be safely managed to reduce the risk of ECAST occurring. In addition, it was the opinion of the SI Panel that conducting universal SCT screening for all potential recruits, and in all Service personnel across Defence who have not had their status confirmed previously, prior to any physical fitness assessments, would likely reduce the risk of death from ECAST. Therefore, the SI Panel concluded that universal SCT screening was likely to reduce the risk of death from ECAST in the UK military.

1.4.455. The Service Inquiry Panel finds that the absence of Sickle Cell Trait (SCT) screening for potential recruits was a **Contributory Factor**. The Service Inquiry Panel had previously found that having SCT and experiencing Exertional Collapse Associated with Sickle Cell Trait were **Causal Factors** in the accidents involving of Candidate 1 and Candidate 2.

1.4.456. **Recommendation. The Chief of Defence People should ensure that Sickle Cell Trait screening is conducted, prior to any physical fitness assessments, for all potential recruits and offered to all Service personnel across Defence who have not had their status confirmed previously, in order to reduce the risk of death from Exertional Collapse Associated with Sickle Cell Trait.**

The identification of personnel with SCT

1.4.457. Some branches of the US military required individuals with SCT to wear identifying tags during training. For example, US Air Force recruits previously used to wear a white armband throughout training, but they changed this to wearing coloured dog tags, while US Navy recruits wore a red belt or a red dog tag during exercise. A red dog tag, as used by the US Navy, was also used to record medical allergies, is shown at Figure 1.4-24.

Exhibit 373
Exhibit 376
Exhibit 378-
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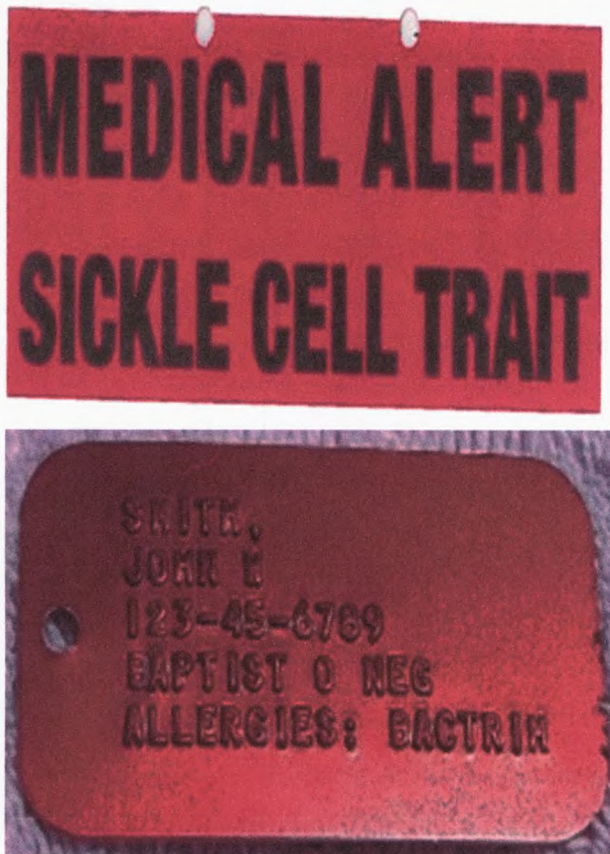


Figure 1.4-24 – Examples of identification methods for individuals with SCT in the US Navy.

Exhibit 374

1.4.458. A summit meeting report published in 2012 described the US Navy's approach as follows:

Exhibit 381

'Navy recruits with SCT are issued a red wrist band to demarcate light duty, until completion of electrophoresis testing. Recruits with HbS greater than or equal to 45% are separated from military service, whereas those with HbS less than 45% are issued red dog tags and a red-orange belt to wear during strenuous physical activities. They are also counselled on [the] risk of exertion-induced symptoms / episodes when at altitude and the importance of proper hydration practices.'

1.4.459. Based on the evidence discussed above, it was the opinion of the SI Panel that the identification of all personnel with SCT would be important during all activity which might precipitate ECAST, in order to enable them to receive prompt and appropriate medical treatment. This would include throughout BT, during all exertional physical training, during all physical fitness assessments and whilst on deployments. The SI Panel noted that the use of red dog tags (either worn around the neck or in the laces of the shoe / boot) would be one means of doing this. During the SI Panel's visit to the US Marine Corps Recruit Depot at

Exhibit 409
Exhibit 433

Parris Island, the use of discrete identifiers (eg red dog tags, 'glow belts' or 'sleeve tags') to identify those at risk of all causes of exertional collapse was discussed. Conditions that might result in the issue of a red dog tag included a history of heat illness, a history of pneumonia (within 30 days), a history of stress fractures or shoulder dislocations, a current upper respiratory infection, and recruits with known SCT. It was the opinion of the SI Panel that this list could potentially be expanded to include previous exertional collapse, recent illness, recent physical fitness assessment fails, recent time spent away from the course and other medical conditions that might pre-dispose to exertional collapse such as asthma and morbid obesity.

1.4.460. The SI Panel concluded that the identification of all personnel during activity which might precipitate ECAST would make it more likely that they would receive timely and effective medical treatment should they suffer ECAST.

1.4.461. The Service Inquiry Panel finds that the lack of identification of personnel with Sickie Cell Trait during the Role Fitness Test (Entry) 2km run was an **Aggravating Factor**.

1.4.462. **Recommendation. The Chief of Defence People should introduce a suitable form of identification for all candidates, recruits and Service personnel with Sickie Cell Trait, and any other at risk categories of personnel, undertaking all fitness tests and other training that could be expected to require at least moderate exertion, in order to reduce the risk of Exertional Collapse Associated with Sickie Cell Trait and death.**

Universal Training Precautions

1.4.463. The idea of Universal Training Precautions (UTPs) for mitigating the risk of ECAST started in the 1990s after several ECAST deaths were shown to be associated with dehydration and exercise in the heat. These UTPs were intended to apply to everyone and were intended to reduce the risk of all-cause exertional collapse. Most commonly, UTPs focused on physical fitness states and progressive and graduated increases in exercise load / intensity, proper acclimatisation (particularly to heat and altitude), hydration and work / rest cycles and the careful evaluation of drugs, medications and dietary supplements (particularly those containing stimulants) that could impact on the cardiovascular system. Other general precautions included a cool-down period, a buddy system to promote early identification of those exhibiting signs of exercise distress, the recognition of those under pressure to perform, general education on the signs and symptoms of the common causes of exertional collapse, knowing how to activate emergency medical assistance and having access to an AED and emergency oxygen.

Exhibit 429

1.4.464. In 2014, Webber and Witkop stated: 'Regardless of any screening program, it is critical that military training sites implement universal precautions not only to reduce injury and death among SCT positive recruits but also to reduce similar adverse outcomes among SCT negative recruits. The primary recommendations to prevent and treat exertional sickling collapse could and should be applied to all trainees, regardless of SCT status.'

Exhibit 373
Exhibit 184

1.4.465. In May 2019, following a second ECAST death at the US Navy Recruit Training Command, the US Navy published 'NAVADMIN 108/19'. This alerted all personnel of the importance of UTPs to reduce the risk of exercise-related collapse and death. This included the following UTPs advice that was to be applied to all Service personnel undertaking all fitness tests or other training evolutions that were expected to require at least moderate exertion:

Exhibit 410

- a. 'Allow acclimatization, outside of the new accession training environment, giving 2 to 4 weeks, to adapt to a warmer environment or higher altitude. The wet bulb globe temperature (WBGT) is the gold standard to measure environmental heat stress. Commands may rely on heat stress meters to provide WBGT information when available.
- b. Ensure progressive and graduated increases in exercise duration and intensity to the greatest extent possible in the training environment.
- c. Adhere to current guidelines for hydration, promote water consumption when thirsty and to maintain clear or light-yellow urine colour.
- d. Follow DoD guidelines for rest-work cycles.
- e. Prior to and during exercise, avoid stimulants, alcohol, energy shots or drinks, antihistamines, diuretics, pre-workout products, weight loss and performance enhancing supplements.
- f. After PFA⁴⁷ testing, participants should be observed for no less than 10 minutes post exertion, during an active cool down period.
- g. At the early signs of distress, provide prompt medical attention, and when deemed necessary, transfer to an appropriate level of medical care.'

1.4.466. In 2010, the NCAA introduced a program of SCT screening and sensible, tailored training precautions. During the period from 2000

Exhibit 425

⁴⁷ Physical Fitness Assessment. This was also known as the Physical Readiness Test (PRT).

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to 2010, there were 10 deaths in NCAA Division 1 football conditioning attributed to ECAST but in the period from 2010 to 2020 there was only one such death and in that ECAST death, the university admitted their negligence. This demonstrated the beneficial effect that SCT screening and UTPs could have on reducing the risk of ECAST death.

1.4.467. A 2010 article in 'Current Sports Medicine Reports' described precautions that were based on the evidence that sickling collapse was caused by undue, 'all-out' exertions, sustained for at least a few minutes. It was described as being precipitated by a 'heroic effort' that exceeded the physical limits of that athlete with SCT, on that day, in that setting. It listed the following precautions:

Exhibit 411

- a. 'Athletes with SCT should set their own pace.
- b. Athletes with SCT should build up slowly in training, with paced progressions and longer periods of rest.
- c. Extreme performance tests should be avoided. Athletes with SCT should not be urged to perform all-out exertion of any kind beyond 2-3 minutes without a rest period.
- d. Athletes with SCT should stop immediately upon struggling, or upon any unusual muscle pain or weakness, cramping, breathlessness, discomfort or undue fatigue. They should get immediate medical help.
- e. Pre-disposing factors include heat, altitude, dehydration, asthma, and other illness, because they make any workout harder. These settings or conditions demand a greater intensity to complete a given workout, and so they narrow the margin of safety against sickling.
- f. Athletes with SCT who feel ill should not start a workout.'

1.4.468. A 2017 article in the Journal of Athletic Training stated: 'Sickle cell trait status knowledge and tailored precautions are preventing deaths from exertional collapse associated with sickle cell trait. Adherence to established principles of exercise physiology and best-practice training standards, which is long overdue, will help to prevent not only deaths from exertional collapse associated with sickle cell trait but also sudden cardiac, exertional heat stroke, and asthma deaths.'

Exhibit 426

1.4.469. The evidence listed above clearly demonstrated that there was a consensus of expert opinion that UTPs were an evidence-based risk mitigation to reduce all-cause exertional collapse. It was the opinion of the SI Panel that UTPs were widely accepted to be important in the prevention of exertional collapse of all causes and that there was sufficient evidence in published literature that UTPs can prevent

exertional collapse (including ECAST) and death. While it was impossible to know if the lack of UTPs at the time played a part in the accidents in question, the SI Panel assessed that UTPs were noteworthy in that the lack of them could contribute to or cause a future accident.

1.4.470. The SI Panel concluded that UTPs were an evidence-based risk mitigation measure to reduce the risk of exertional collapse (including ECAST) and death. The SI Panel further concluded that consideration should be given to mandating the use of UTPs for all candidates, recruits and Service personnel undertaking all fitness tests and all other training activity that would be expected to require at least moderate exertion, in order to reduce the risk of exertional collapse (including ECAST) and death.

1.4.471. The Service Inquiry Panel finds that the lack of Universal Training Precautions during the Soldier Selection process was an **Other Factor**.

1.4.472. **Recommendation. The Chief of Defence People should mandate the use of Universal Training Precautions for all candidates, recruits and Service personnel undertaking all fitness tests and other training that could be expected to require at least moderate exertion, in order to reduce the risk of exertional collapse (including Exertional Collapse Associated with Sickle Cell Trait) and death.**

A 'Bad Day' physical activity opt-out policy

1.4.473. 'NAVADMIN 108/19', published by the US Navy in May 2019, described the US Navy's 'Bad Day' policy for Service personnel undertaking the Navy Physical Readiness Test (PRT). All commanders were encouraged to exercise a liberal 'Bad Day' makeup⁴⁸ PRT policy for those impacted by any signs of distress or who felt unwell and to allow those individuals to opt-out of the PRT prior to failing or completing the test. This allowed commanders to prioritise health safety over a score by authorising a 'Bad Day' makeup PRT prior to individuals failing or completing the test. This policy included the following guidance:

- a. 'Those who do not complete any portion of the PRT, fail or demonstrate any early signs of exercise distress. These Sailors are authorized, at commander's discretion, a 'Bad Day' makeup PRT and are required to be screened by medical staff. Sailors must be cleared by medical staff to participate in the 'Bad Day' makeup PRT.

Exhibit 410

⁴⁸ A makeup PRT was a PRT conducted at a later date (within 7 days), after being medically cleared.

- b. Those who are medically cleared. They must conduct the 'Bad Day' makeup PRT within 7 days from medical clearance.
- c. Those who participate in but do not complete the 'Bad Day' makeup PRT. They must be screened by medical again, and if medically cleared (no medical waiver), the Sailor will receive a failure for the PRT and will be enrolled in Fitness Enhancement Program (FEP).
- d. Those who participate in and complete the 'Bad Day' makeup PRT. They will have only their final PRT scores recorded and there is no longer a requirement to record the initial PRT scores for 'Bad Day' makeup PRT participation.'

1.4.474. As mentioned in paragraph 1.4.467, a 2010 article titled 'Sickle Cell Trait in Sports' in 'Current Sports Medicine Reports' included the following statement: 'Athletes with SCT who feel ill should not start a workout.' In addition, within the 'Risk factors for exertional collapse and ECAST' section of this report, a recent or current illness and accumulated fatigue were discussed as important personal risk factors for exertional collapse and ECAST. The early signs and symptoms of the start of an illness or of fatigue may not be obvious externally but a person with SCT may recognise that they just do not feel right. In these circumstances, having the option of using a physical activity opt-out policy gives them the chance to wait until they feel better before attempting any physical fitness assessment or other arduous activity.

Exhibit 411

1.4.475. Based on the evidence listed above, it was the opinion of the SI Panel that a physical activity opt-out policy was likely to be an important risk mitigation for Service personnel with SCT who do not feel physically able to take part in or complete physical fitness assessments or other arduous activities. In addition, the SI Panel concluded that a physical activity opt-out policy could be an important risk mitigation measure for all Service personnel. This would require the discretion of commanders and access to medical assessment.

1.4.476. The Service Inquiry Panel finds that the absence of a system by which Service personnel could opt-out of physical fitness assessments or other arduous activities, if unwell, was an **Other Factor**.

1.4.477. **Recommendation. The Chief of Defence People should investigate the benefits of introducing an opt-out policy for Service personnel who do not feel well, in order to reduce the risk of casualties during physical exertion.**

Reducing the Risk of ECAST Reoccurrence

Lessons identified from the United States

1.4.478. The SI Panel visited the US from 9 to 13 March 2020. The purpose of this visit was to better understand how the US military screened for individuals with SCT, how this affected recruitment and training across the four Services (the US Army, the US Air Force, the US Navy and the US Marine Corps) and how Service personnel who had SCT were managed within the US military, in order to prevent ECAST.

1.4.479. Prior to the SI Panel's arrival in the US, a list of advice to reduce military ECAST deaths was sent to the SI Panel from a leading US expert in the field of ECAST. This advice was as follows:

- a. 'Screen all recruits for SCT. Educate those with SCT.
- b. Re-educate the cadre on ECAST and how to spot it early.
- c. It is not the heat; it is the sustained intensity that causes the problems.
- d. Universal precautions can devolve over time into universal non-precautions.
- e. Do not run recruits before you get their SCT status.
- f. Mark those with SCT and do not lose them in the running pack.
- g. Decelerate aerobic training. Those with SCT are the canaries in the coal mine.
- h. Never pace them.
- i. Institute a 'Bad Day' policy.
- j. If SCT positive individuals fall off the pace or begin to struggle, stop them immediately and help them quickly.
- k. Never run alongside or urge them on. No 'running buddy' either.
- l. Emergency treatment should consist of rest, supplemental oxygen, monitor vital signs and be prepared to transport them quickly to hospital.
- m. Institute a 'hot day' policy. It is not the heat per se that causes the problem but the fact it takes greater sustained intensity to 'make your time' when the temperature is high.

Exhibit 408

OFFICIAL SENSITIVE

- n. Do not tell recruits or Service personnel to 'make their time' soon after being assigned to a base at altitude.
- o. If a recruit or Service person just misses their time and suffers ECAST but survives, do not make them try again a few months later.'

1.4.480. In the same US expert's 2010 academic paper titled 'Sickle Cell Trait in Sports', he noted that exertional sickling can begin in 2-5 minutes of 'all-out exertion' and commented that it was an intensity syndrome that differed from other common causes of collapse. He suggested that tailored precautions could prevent sickling collapse and enable athletes with SCT to thrive.

Exhibit 411

1.4.481. Many of these points were discussed in more detail during the SI Panel's visit to the US and expanded upon via the use of case studies involving several US military personnel who had died following ECAST in 2019. In total there were nine exertional deaths in the US Military in individuals with SCT attributed to ECAST in 2019: five from the US Air Force and four from the US Navy.

Exhibit 378-380
Exhibit 409-410

1.4.482. In September 2011, the American College of Sports Medicine (ACSM) and the USU CHAMP convened a summit on SCT in Bethesda, Maryland, to provide specific recommendations to further mitigate the risk of strenuous exercise in 'Warfighters / Athletes' (WA) with SCT and to develop clinical guidelines to identify and treat ECAST. A paper was published in 2012 which identified research priorities from this summit and established recommendations regarding exercise and SCT to improve the health of all, not just those with SCT. They noted the following:

Exhibit 381

'Basic training involves rapid and sustained exercises for many conditioning exercises, intense and focused military-specific training, and testing for 1 to 3-mile run times. Kark et al. measured the excess risk of exercise-related death associated with SCT for Armed Forces recruits in basic training from 1977 to 1991, and subsequent studies provided mortality rates for recruits for a 25-year period. Overall, the Armed Forces recruit studies indicated SCT was not associated with trauma, suicide, natural death unrelated to exercise (mainly infections), or deaths from pre-existing disease (principally hidden congenital cardiovascular disease). However, SCT was associated with unexplained (by pre-existing disease) exercise-related death. The major findings were that unexplained exercise-related death rates among black recruits with SCT were 30 times higher than among black recruits without SCT and 39 times higher than all recruits.'

1.4.483. This paper listed the following strategies for mitigating risk in all WA (those with and those without SCT):

Exhibit 381

- a. 'Encourage WA to participate in strength and conditioning programs consistent with their individual needs and abilities, before enlistment and / or beginning / returning to sport activity. Emphasize the importance of year-round periodized conditioning.
- b. Use gradual training progressions and program longer periods of rest and recovery between repetitive sprints / drills, especially during preseason / basic training and after periods of extended rest and / or illness / injury.
- c. Focus initial basic training and preseason conditioning on the progressive establishment of an aerobic fitness base and environmental (heat or altitude) acclimatization.
- d. Avoid timed runs, repeated intervals, or preseason conditioning tests early in the training cycle and / or immediately after field / sport training exercises. A minimum of 48 hours should elapse between field training and fitness testing.
- e. Decrease the total volume of activity and adjust work / rest intervals during hot and / or humid conditions.
- f. Stop activity immediately with the onset of symptoms (ie muscle pain and / or cramping, swelling, weakness, tenderness, breathlessness, and fatigue).
- g. Encourage WA to report any symptoms immediately to appropriate medical and / or leadership personnel.
- h. Provide and promote consumption of readily accessible fluids at regular intervals before, during and after activity.
- i. Monitor WA who are new to altitude and adjust activity accordingly.
- j. Prohibit / adjust activity if WA are currently or were recently ill.
- k. Educate WA with SCT on conditions (ie heat stress, altitude, dehydration, illness, dietary supplements, medications) that increase their risk for ECAST.
- l. Ensure that personnel and facilities for treating heat illness are readily available on site and that a proper emergency action plan has been developed and rehearsed before the occurrence of an ECAST event.'

1.4.484. The 2021 paper which provided an expert consensus on ECAST following a summit in October 2019 recommended a 'chain of survival' and a proper emergency action plan. They described this as consisting of rapid recognition, early treatment, transportation to hospital and effective communication with Emergency Department staff regarding the suspected diagnosis. They described this last step as critical, as patients with severe ECAST can rapidly develop explosive rhabdomyolysis, acute kidney injury, very high levels of potassium in their blood (hyperkalaemia) and lethal cardiac arrhythmias within minutes to hours of presentation.

1.4.485. Based on the evidence discussed above, it was the opinion of the SI Panel that there was still much that the medical profession did not know or understand about ECAST and how it was triggered. However, there was much to be learned from the experiences and expertise of the USU CHAMP and the NCAA, both of which have influenced the approach taken by the DoD and the US military. What was clear from the SI Panel's visit to the US was their proactive approach to all-cause exertional collapse, which included ECAST and exertional heat illness. The SI Panel witnessed how the importance of early recognition of the pathological process, early treatment (with oxygen and with rapid cooling and IV fluids (if clinically appropriate)), and early transfer to specialist medical care was critical to slowing and stopping the explosive, pathological, metabolic cascade these conditions can cause. This was supported by education and training for everyone from Warfighters, commanders and instructors to medical personnel, in order to reduce the risk of death from ECAST to as low as reasonably practicable.

1.4.486. Based on this evidence, the SI Panel concluded that it is very likely that the risk of ECAST events and deaths could be reduced by the following:

- a. Widespread education and training on UTPs throughout the MOD.
- b. Widespread education and training on SCT and ECAST. This would include identification (through universal SCT screening) and education for those who have SCT so that they know what to do to minimise the risk of suffering ECAST and so that they recognise the early symptoms and know to stop, education for those who do not have SCT so that they know how to recognise the early symptoms of ECAST in others, and education for medical personnel in how to recognise, treat and manage those suffering from ECAST.
- c. The use of discrete identifiers (eg red dog tags, medical alert bracelets) for those who have SCT so that if they did suffer exertional collapse and were unconscious it would be apparent to first responders, medical personnel, civilian paramedics and

Emergency Department staff that explosive rhabdomyolysis and ECAST were potential diagnoses.

- d. Establishing a recognised 'chain of survival' for ECAST, involving early recognition of the explosive and rapid pathological, metabolic process of ECAST, early treatment (with oxygen and with rapid cooling and IV fluids (if clinically appropriate)), and early transfer to specialist medical care.

The SI Panel included these opinions in this report in order to try to reduce the risk of reoccurrence of ECAST in personnel with SCT.

The recognition of and the education and training about ECAST

1.4.487. A 2010 article on 'Sickle Cell Trait in Sports' from the University of Oklahoma Health Sciences Centre described the symptoms of ECAST as follows:

'By and large, if an athlete takes the field healthy and no trauma is involved, almost all ominous sudden collapses are either cardiac, exertional heat stroke, asthma or sickling. Not all sickling collapses are the same, and not all football players describe them the same, but they tend to be unique enough to differentiate them from these other three causes. Some players report that symptoms begin with leg and / or low back pain. Some call it 'cramps that spread up my body.' Some stop with disabling low back pain, and we have seen four cases of lumbar paraspinal myonecrosis from this. Some complain of weakness more than pain; they might say, 'My legs got wobbly, like Jello.' Some say their chest muscles are 'tight' and 'I can't catch my breath,' or 'I just don't feel right.' By this point, they may be on hands and knees, very anxious, with very rapid breathing (not asthma) to try to offset the lactic acidosis. Some stoic players will just stop, for example, after 700m of a planned 800m sprint, and sit or lie down, saying 'I can't go on.' or 'My legs won't go.' The instinctual wisdom to stop activity or exercise likely has saved the lives of many players with SCT.'

1.4.488. The Korey Stringer Institute at the University of Connecticut was established to provide research, education, advocacy and consultation to maximise performance, optimise safety and prevent sudden death for the athlete, Warfighter and labourer. They published guidance on exertional sickling which described the following common signs and symptoms of an exertional sickling episode:

- a. 'Cramping with muscle weakness that exceeds the muscle pain.

Exhibit 411

Exhibit 412

OFFICIAL SENSITIVE

- b. The athlete 'slumps' to the ground rather than a sudden collapse (as opposed to a cardiac collapse).
- c. They are able to speak.
- d. The muscles look and feel normal (as opposed to heat cramps).
- e. Rapid breathing but a pulmonary examination reveals normal air movement (as opposed to an asthma attack).
- f. Rectal temperature less than 103 degrees Fahrenheit (as opposed to heat stroke).'

1.4.489. The 'Commanders' Guide to Exertional Collapse', published by the British Army in April 2020, described the symptoms of ECAST as follows:

Exhibit 184

'An ECAST victim may have been a front runner, or off to a strong start, but will be noted somewhere before the collapse as slowing down, falling behind and struggling. They begin to lose smooth coordination, they evolve into an awkward running posture and gait, with legs that may look wooden or wobbly. The victim may complain of progressive weakness, pain, cramping or shortness of breath. Distinct from the cramping of exercise associated muscle cramping, in ECAST, there is generally no visible muscle twitching and the muscles do not 'lock up.' The pain of muscle cramping is generally excruciating, whereas the predominate symptom of ECAST is weakness over pain. The ECAST victim will initially be mentally clear, before the onset of confusion and loss of consciousness.'

1.4.490. Another Army publication from 2020 called 'Sickle Cell Trait: The Facts' listed the symptoms of ECAST as follows:

Exhibit 424

- a. 'Key symptoms include excessive muscle pain and weakness (weakness is the main symptom).
- b. Early symptoms include weakness, excessive muscle pain, falling behind.
- c. Later symptoms include becoming progressively unsteady on your feet and slowly collapsing.
- d. Additional symptoms of ECAST can include abdominal pain, chest tightness and difficulty breathing.'

1.4.491. The RAF produced medical information leaflets on 'Sickle Cell Trait (SCT) – Information for Individuals (RAF) 19 Jan 20' and 'Sickle

Exhibit 371

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Cell Trait (SCT) – Information for Instructors and Medical Staff (RAF) 19 January 2020'. These listed the symptoms of ECAST as follows:

- a. 'Muscle pain.
- b. Weakness.
- c. Rigidity or swelling of the thighs or calves.
- d. Falling behind.
- e. Becoming unsteady on your feet.
- f. Feeling faint.
- g. Abdominal pain.
- h. Chest tightness.
- i. Difficulty breathing.
- j. Collapse.'

1.4.492. The Project Glass report following the two fatalities recommended that, 'Actions should be taken to review measures to prevent rhabdomyolysis in candidates, in advance of additional questioning / testing being planned jointly with the Army. This action should include urgent communication to all assessment centre staff and review / revision of current procedures as necessary.' These actions were annotated as complete, alongside a comment which stated, 'Staff and candidates have received handouts from CMO. AC CMs [Assessment Centre Managers] required to confirm that candidates and staff are aware of what it is, and how [t]he symptoms might look and when it may occur.'

Exhibit 231

1.4.493. USU CHAMP, the US Department of Defense (DoD) (via Human Performance Resources by CHAMP (HPRC), a DoD initiative promoting Total Force Fitness and Human Performance Optimization) and the NCAA produced SCT and ECAST education and training videos. The USU CHAMP education video called 'Sickle Cell Trait and Military Service' was narrated by the Medical Director of the USU CHAMP, who chaired the SCT conference the SI Panel attended during the SI Panel's visit to Washington DC in March 2020. The US Air Force Medical Service also produced an education video called 'Sickle Cell Trait'. The DoD HPRC produced three educational videos on SCT. These were called 'What the Warfighter Needs to Know About Sickle Cell Trait', 'What the Cadre & First Responder Need to Know About Sickle Cell Trait', and 'What the Healthcare Provider Needs to Know About Sickle Cell Trait'. These educational videos provided tailored information in an easily understandable format that was relevant for their target audience. It was the opinion of the SI Panel that these educational videos provided

Exhibit 423

a very useful, additional layer of risk mitigation aimed at preventing illness and death from ECAST in Service personnel with SCT. Therefore, the SI Panel concluded that the MOD should consider the use of educational videos to provide education across all three Services on SCT and ECAST.

1.4.494. The 2021 paper which provided an expert consensus on ECAST following a summit in October 2019 listed the differentiating features of ECAST compared to other common causes of exertional collapse such as muscle cramping, Exertional Heat Illness and cardiac collapse. These included: slumping to the ground, weakness greater than pain, the ability to talk initially (ie a 'conscious collapse'), normal muscles, a temperature below 39.4°C and the fact ECAST usually occurs after several minutes of exercise (ie early rather than later).

Exhibit 429

1.4.495. Based on the evidence above, it was clear that the signs and symptoms of ECAST have been well documented. It was the opinion of the SI Panel that education in the signs of symptoms of ECAST for all Service personnel has the potential to make this condition more easily identifiable in a Service person who has suffered exertional collapse. Rapid identification of these symptoms would allow the correct treatment to be given and the correct medical management, both in the pre-hospital setting and on arrival at the Emergency Department, to be initiated as soon as possible.

1.4.496. The Army and ARITC made significant efforts to provide education to individuals and to commanders during 2020. However, while their approach was similar to other Services, it did highlight different approaches to SCT and ECAST education and training in all three Services, similar to the different approaches the three Services had taken to SCT screening and ECAST mitigations following the Reg 28 report to prevent future deaths. The SI Panel received an update from the RAF Medical Services on 29 June 2020. This explained that UTPs (for candidates and Phase 1 and Phase 2 trainees) and 'pace, pass, stop' non maximal-effort MSFTs (for candidates and Phase 1 trainees) had been implemented in January 2020. While advice sheets had been circulated to training establishment medical centres for the education of healthcare staff, there was no plan at that time to provide education and training on SCT and ECAST to all RAF Service personnel. The SI Panel received an update from the RN Medical Services on 26 June 2020. This explained that at that time the RN had no plans to screen for SCT. Their rationale for this was that all RN personnel were managed in the same way for the risk of exertional collapse, through appropriately graduated training and education about training. They explained that their pre-Service selection tests (also MSFTs) were no longer maximal-effort tests and were performed in controlled conditions as 'test, pass, stop' with the pass criteria set at a sub-maximal level, designed to identify recruits with a sufficient level of cardiovascular fitness to start training. They also explained that recruits

Exhibit 176
Exhibit 371
Exhibit 413

did not attempt maximal exertional activity until after four weeks of training and they were taught about how to train safely and how to monitor themselves.

1.4.497. The SI Panel concluded that the different approaches to SCT and ECAST screening, education and training in all three Services was likely to make the management of Service personnel within a joint environment more challenging.

1.4.498. The Service Inquiry Panel finds that the different approaches to Sickle Cell Trait and Exertional Collapse Associated with Sickle Cell Trait screening, education and training across the three Services was an **Observation**.

Treatment algorithms for ECAST

1.4.499. Several algorithms had been produced for the treatment and management of ECAST and exertional collapse. Most had been aimed at the treatment of exertional collapse or exertional rhabdomyolysis, but a few were specific to ECAST. The SI Panel received a US Marine Corp ECAST treatment algorithm during the Panel's visit to the Officer Candidates School at Quantico and several algorithms on exertional collapse and exertional rhabdomyolysis during the Panel's visit to the US Marine Corps Recruit Depot at Parris Island. The SI Panel were given the latest ECAST treatment algorithm by the Medical Director of the USU CHAMP, who was also the Professor and Chair of Military and Emergency Medicine at the USU in Maryland. This was used within the US Military and is shown below at Figure 1.4-25.

Exhibit 182
Exhibit 414-
421

EXERCISE COLLAPSE ASSOCIATED WITH SICKLE CELL TRAIT (ECAST)

INITIAL MANAGEMENT ALGORITHM

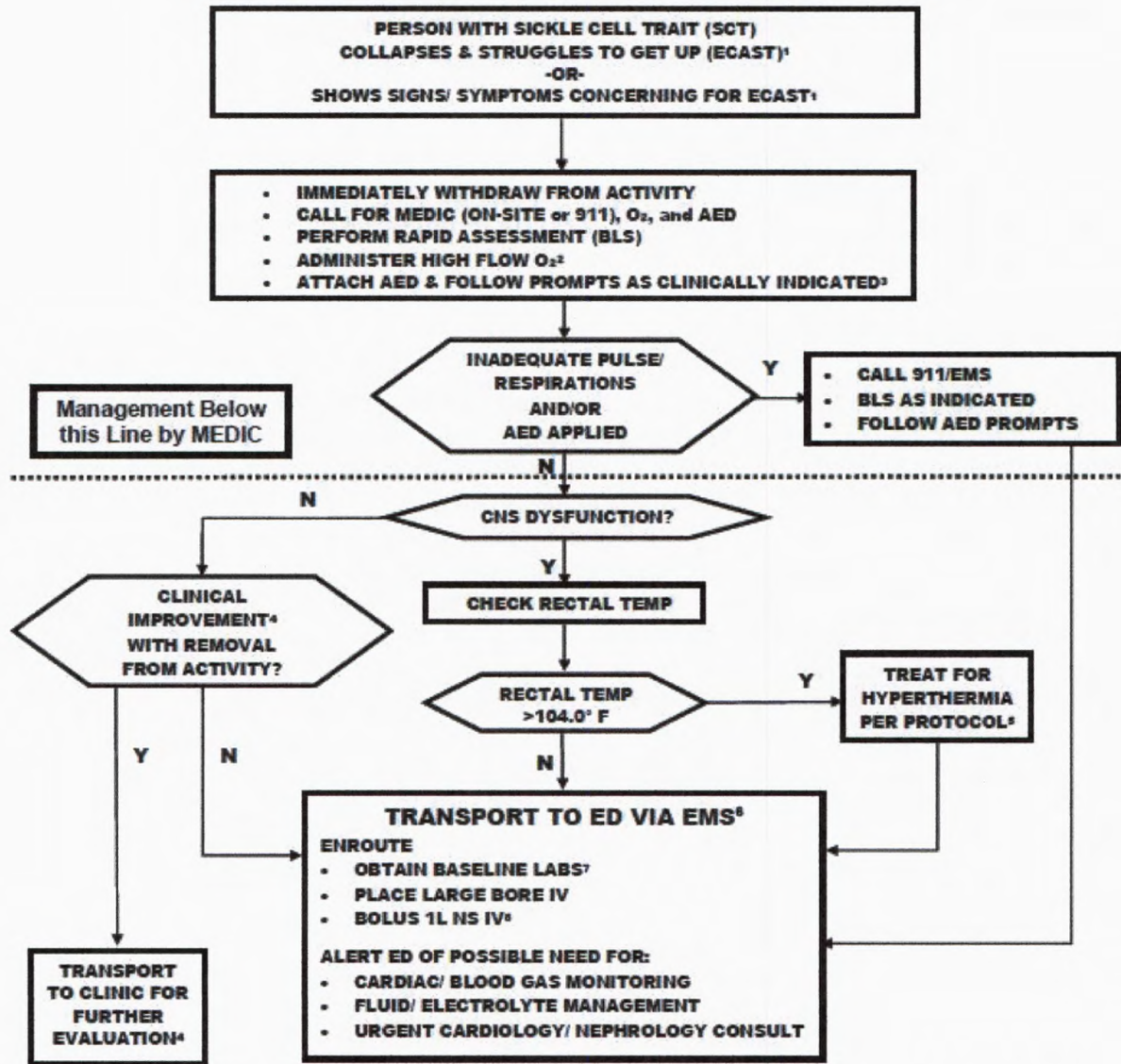


Figure 1.4-25 – CHAMP treatment algorithm for ECAST.

Exhibit 422

1.4.500. The Korey Stringer Institute at the University of Connecticut advised the following treatment for exertional sickling:

Exhibit 412

- a. 'Stop the activity.
- b. Check vital signs (heart rate, blood pressure, breathing).
- c. Activate the emergency medical services and prepare for cardio-pulmonary resuscitation (CPR).

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- d. Administer high-flow oxygen (15L/min).
- e. Cool the athlete if necessary.
- f. Call ahead to the hospital and tell staff to expect explosive rhabdomyolysis.
- g. Extended care will be needed to assess body damage (eg to the kidney, to the liver etc).'

1.4.501. Key points from both treatment protocols were the requirement for high flow oxygen and the requirement to call ahead to the hospital or emergency department to alert them to the patient and to warn them of the what to expect. It was the opinion of the SI Panel that this was only possible because the medical responder was aware that the patient had SCT and that they were trained to recognise and diagnose ECAST and trained to administer oxygen. Based on the evidence discussed above, it was the opinion of the SI Panel that the provision of properly trained medical personnel, trained to recognise and diagnose ECAST, trained to administer oxygen and CPR / AED, and trained to notify the receiving hospital / emergency department were critical steps in the chain of survival following an ECAST event.

1.4.502. The 2021 paper which provided an expert consensus on ECAST following a summit in October 2019 described education as 'the foundation for prevention and early intervention in ECAST'. It recommended that all first responders should be educated about the risks associated with SCT (including ECAST) as well as the potential benefit of delivering oxygen to personnel with SCT who were exhibiting any signs or symptoms or exercise distress or ECAST, even those with normal oxygen saturation. They also stated that excessive motivation was 'equally important to recognise as a risk factor, as an individual can push too hard while ignoring the onset of physical signs and symptoms of distress.' While this paper highlighted the critical importance of health care professionals being trained to recognise, diagnose and treat ECAST it also emphasised the role of non-clinical leadership as perhaps being 'the most important consideration and critical for minimising ECAST risk'.

Exhibit 429

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1.4.503. The SI Panel concluded that, in order to reduce the risk to candidates and Service personnel with SCT of dying as a result of ECAST, there was the requirement for military personnel providing medical cover at all arduous events where there is a significant risk of ECAST (and other causes of exertional collapse) to be trained in the following:

- a. Training to recognise and diagnose ECAST.
- b. Training to administer oxygen, perform CPR and use an AED.
- c. Training to provide a clinical handover to the receiving hospital / emergency department.

1.4.504. The Service Inquiry Panel finds that the absence of training to recognise, diagnose and treat Exertional Collapse Associated with Sickle Cell Trait (ECAST) increased the risk of a serious outcome following an ECAST event and was an **Aggravating Factor**.

1.4.505. **Recommendation. The Director General Defence Medical Services should ensure that medical personnel are trained and equipped to recognise, diagnose and treat Exertional Collapse Associated with Sickle Cell Trait (and other causes of exertional collapse), in order to reduce the risk of personnel undertaking Defence activities dying as a result of these conditions.**

1.4.506. **Recommendation. The Chief of Defence People should ensure that sufficient, suitable personnel are trained to recognise Exertional Collapse Associated with Sickle Cell Trait (and other causes of exertional collapse), and appropriately conduct the immediate actions required in the initial management of this condition, in order to reduce the risk of personnel undertaking Defence activities dying as a result of these conditions.**

Summary of Findings

1.4.507. The SI Panel identified several accident factors and observations during the investigation. Once an accident factor had been determined to have been present it was then assigned to one the following categories: causal factors, contributory factors, aggravating factors or other factors. The accident factors and observations identified within the report have been collated and grouped below.

Causal Factors

1.4.508. Causal factors were those factors which, in isolation or in combination with other causal factors and contextual details, led directly to the incident or accident. Therefore, if a causal factor was removed from the accident sequence, the accident would not have occurred.

1.4.509. The following were found to have been causal factors:

- | | |
|--|------------------|
| a. Having Sickle Cell Trait. | 1.4.94 |
| b. Experiencing Exertional Collapse Associated with Sickle Cell Trait. | 1.4.72
1.4.76 |

Contributory Factors

1.4.510. Contributory factors were those factors which made the accident more likely to happen. That is, they did not directly cause the accident. Therefore, if a contributory factor was removed from the accident sequence, the accident may still have occurred.

1.4.511. The following were found to have been contributory factors:

- | | |
|--|---------|
| a. The absence of Health Technicians and Examining Medical Officers with specific training and experience in identifying the effects of diseases common in other parts of the world at Assessment Centres assessing Commonwealth Candidates. | 1.4.55 |
| b. Excessive motivation. | 1.4.86 |
| c. Accumulated mental and physical fatigue. | 1.4.91 |
| d. The lack of a more thorough clinical review of the accidents involving Candidate 3, Candidate 4 and Candidate 1. | 1.4.131 |
| e. The uphill slope on the Role Fitness Test (Entry) 2km running route. | 1.4.231 |

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- | | |
|---|---------|
| f. Using the Role Fitness Test (Entry) 2km run, as the physical fitness assessment during Soldier Selection. | 1.4.252 |
| g. Not notifying the Defence Accident Investigation Branch of the accidents involving Candidate 3 and Candidate 4. | 1.4.322 |
| h. Not notifying the Deputy Chief of the Defence Staff's Duty Officer of Candidate 1's death. | 1.4.342 |
| i. Using CASPER reports instead of AF510s to report incidents and accidents to the Army Incident Notification Cell. | 1.4.374 |
| j. The marked increase in recruitment from the Commonwealth, coupled with the lack of evidence of a more thorough medical risk assessment to identify conditions experienced more commonly or more severely by Commonwealth candidates. | 1.4.394 |
| k. The lack of medical expertise during the Health and Safety and Senior Leadership Team discussions, during the period July 2019 to October 2019, regarding the emerging accident trends amongst Commonwealth candidates. | 1.4.402 |
| l. The asymmetrical organisational relationship between Army Recruiting and Initial Training Command and Recruiting Group, alongside organisational cultural differences. | 1.4.413 |
| m. The absence of Sickle Cell Trait screening for potential recruits. | 1.4.455 |

Aggravating Factors

1.4.512. Aggravating factors were those factors which made the outcome of the accident worse. However, aggravating factors did not cause or contribute to the accident. That is, in the absence of the aggravating factor, the accident would still have occurred.

1.4.513. The following were found to have been aggravating factors:

- | | |
|---|---------|
| a. The lack of a medical plan or medical Standard Operating Instruction, and the training to accompany these. | 1.4.160 |
| b. Cold environmental conditions on the mornings of both accidents. | 1.4.433 |
| c. The lack of identification of personnel with Sickle Cell Trait during the Role Fitness Test (Entry) 2km run. | 1.4.461 |

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- d. The absence of training to recognise, diagnose and treat Exertional Collapse Associated with Sickle Cell Trait. 1.4.504

Other Factors

1.4.514. Other factors were those factors which, whilst shown to have been present played no part in the accident in question but were noteworthy in that they could contribute to or cause a future accident. Typically, other factors would provide the basis for additional recommendations or observations.

1.4.515. The following were found to have been other factors:

- a. The absence of a Clinical Triage process for Commonwealth candidates. 1.4.28
- b. The Recruiting Group Medical Declaration medical pre-screening process for Commonwealth candidates. 1.4.31
- c. Taking dietary supplements. 1.4.97
- d. The lack of a temperature check during the Pre-Service Medical Assessment process. 1.4.100
- e. Candidates developing lowered body temperatures whilst unwell prior to their admission to hospital. 1.4.136
- f. The lack of sufficient first aid training amongst Assessment Centre (Lichfield) Physical Training Instructors. 1.4.175
- g. The absence of a Wet Bulb Globe Temperature monitor on the days of the accidents involving Candidate 1 and Candidate 2. 1.4.186
- h. The absence of Wet Bulb Globe Temperature monitor training for Assessment Centre (Lichfield) Physical Training Instructors. 1.4.186
- i. The limited Career and Personal Development, and the lack of Annual Deficit Training and logbooks for the Assessment Centre Physical Training Instructors. 1.4.194
- j. The lack of clarity regarding individuals' roles and responsibilities relating to the conduct of the Role Fitness Test (Entry) 2km run. 1.4.205

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k. The lack of radios during the Role Fitness Test (Entry) 2km run.	1.4.216
l. The lack of a safety vehicle equipment list and the lack of information regarding the use of the safety vehicle during the Role Fitness Test (Entry) 2km run within Standard Operating Instruction 7.	1.4.223
m. The limited action in relation to audit recommendations during the period 2013 to 2018 and the lack of an audit being conducted in 2019.	1.4.241
n. The inconsistent terminology across Defence relating to incidents and accidents.	1.4.349
o. The use of the Recruiting Group Incident Report forms, rather than the directed version contained within AGAI 62.	1.4.363
p. The use of the CASPER reporting system.	1.4.381
q. The lack of Universal Training Precautions during the Soldier Selection process.	1.4.471
r. The absence of a system by which Service personnel could opt-out of physical fitness assessments or other arduous activities, if unwell.	1.4.476

Observations

1.4.516. Observations were points or issues identified during the investigation that were worthy of note to improve working practices, but which did not relate to the accident being investigated and which could not contribute to or cause future accidents.

1.4.517. The following were found to have been observations:

a. The deviation from the Recruiting Partnering Project contract with regards to conducting the Pre-Service Medical Assessment before a candidate proceeded to the physical assessment section of the Soldier Selection process.	1.4.39
b. The lack of Enhanced Disclosure and Barring Service clearance amongst the Candidate Assessors and Candidate Interviewers at Assessment Centre (Lichfield).	1.4.202
c. The use of personal watches by the Physical Training Instructors to record candidates' finishing times during the Role	1.4.210

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Fitness Test (Entry) 2km runs that Candidate 1 and Candidate 2 participated in.

d. The use of a reporting method outwith Recruiting Group policy. 1.4.355

e. The different approaches to Sickle Cell Trait and Exertional Collapse Associated with Sickle Cell Trait screening, education and training across the three Services. 1.4.498

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PART 1.5

Recommendations

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PART 1.5 – RECOMMENDATIONS

1.5.1. **Introduction.** The following recommendations are made by the SI Panel to reflect the findings of this report in order to enhance safety, noting that progress may have been made in resolving the findings in the period between the accidents and the publication of this report:

1.5.2. **The Chief of Defence People should:**

- | | |
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| a. Investigate whether it is appropriate that civilians taking part in Defence recruitment activities are included within the categories of nominated civilians in Joint Service Publication 751 for reporting to the Joint Casualty and Compassionate Cell, in order to facilitate the reporting of fatalities during Defence recruitment activities to the Deputy Chief of the Defence Staff's Duty Officer. | 1.4.343 |
| b. Ensure that Sickle Cell Trait screening is conducted, prior to any physical fitness assessments, for all potential recruits and offered to all Service personnel across Defence who have not had their status confirmed previously, in order to reduce the risk of death from Exertional Collapse Associated with Sickle Cell Trait. | 1.4.456 |
| c. Introduce a suitable form of identification for all candidates, recruits and Service personnel with Sickle Cell Trait, and any other at risk categories of personnel, undertaking all fitness tests and other training that could be expected to require at least moderate exertion, in order to reduce the risk of Exertional Collapse Associated with Sickle Cell Trait and death. | 1.4.462 |
| d. Mandate the use of Universal Training Precautions for all candidates, recruits and Service personnel undertaking all fitness tests and other training that could be expected to require at least moderate exertion, in order to reduce the risk of exertional collapse (including Exertional Collapse Associated with Sickle Cell Trait) and death. | 1.4.472 |
| e. Investigate the benefits of introducing an opt-out policy for Service personnel who do not feel well, in order to reduce the risk of casualties during physical exertion. | 1.4.477 |
| f. Ensure that sufficient, suitable personnel are trained to recognise Exertional Collapse Associated with Sickle Cell Trait (and other causes of exertional collapse), and appropriately conduct the immediate actions required in the initial management of this condition, in order to reduce the risk of | 1.4.506 |

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personnel undertaking Defence activities dying as a result of these conditions.

1.5.3. The Director General Defence Medical Services should:

a. Ensure that medical personnel are trained and equipped to recognise, diagnose and treat Exertional Collapse Associated with Sickle Cell Trait (and other causes of exertional collapse), in order to reduce the risk of personnel undertaking Defence activities dying as a result of these conditions. 1.4.505

1.5.4. The Head of Research and Clinical Innovation (Defence Medical Services) should:

a. Conduct further research, in partnership with the Front Line Commands and other appropriate stakeholders, to better understand the effects of cold environmental conditions on those who have Sickle Cell Trait, in order to reduce the risk of Exertional Collapse Associated with Sickle Cell Trait to as low as reasonably practicable. 1.4.434

1.5.5. The Director Health, Safety and Environmental Protection should:

a. Update and clarify the reporting measures for fatalities and serious injuries in Joint Service Publication 375, in order to ensure that all civilian casualties injured on the Defence estate or as a result of Defence activities are reported. Within 12 months of the update, the Director Health, Safety and Environmental Protection should conduct third party assurance of the Front Line Commands, Defence Equipment and Support and the Defence Infrastructure Organisation, in order to determine the level of compliance with fatality and serious injury reporting requirements in Joint Service Publication 375. 1.4.344

b. Implement uniform definitions for incidents and accidents (and their reporting), in order to reduce the risk of misreporting across Defence and to assist with trend analysis. 1.4.350

1.5.6. The Deputy Chief of the General Staff should:

a. Ensure that the responsibility, in addition to the requirement, to contact the Defence Accident Investigation Branch (DAIB) is clearly articulated within Army Command Standing Orders, in order to ensure that the DAIB is immediately notified of serious incidents, accidents and fatalities. 1.4.323

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| b. Ensure that a robust reporting process is in place for notification of fatalities to the Deputy Chief of the Defence Staff's Duty Officer, in order to fulfil the reporting requirements in Joint Service Publication 375 for the notification of the Secretary of State. | 1.4.345 |
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| 1.5.7. The Director Personnel (Army) should: | |
| a. Assess the safety and suitability of the Role Fitness Test (Entry) 2km run against alternative methods of assessing aerobic fitness during Soldier Selection which can be conducted in a controlled, repeatable environment and which minimise the time spent at maximal exertion, in order to reduce the risk of exertional collapse during or following these physical fitness assessments. | 1.4.253 |
|
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| 1.5.8. The General Officer Commanding Army Recruiting and Initial Training Command should: | |
| a. Extend Clinical Triage to include Commonwealth (CW) candidates, in order to ensure that the medical information received from CW candidates is sufficient to assess their suitability for military service in the Army. | 1.4.29 |
| b. Improve the Recruiting Group Medical Declaration medical pre-screening process for Commonwealth candidates, in order to ensure that the information received can be verified and assured. | 1.4.32 |
| c. Ensure that an annual audit of Assessment Centres is conducted and all audit recommendations are tracked to closure, in order to provide assurance of the Soldier Selection process. | 1.4.242 |
| d. Ensure that the responsibility, in addition to the requirement, to contact the Defence Accident Investigation Branch (DAIB) is clearly articulated in Army Recruiting and Initial Training Command policies, in order to ensure that the DAIB is immediately notified of serious incidents, accidents and fatalities. | 1.4.324 |
| e. Mandate the use of the incident report form (INCREP) directed by Army General Administrative Instruction 62, in order to ensure the correct and timely distribution of INCREPs. | 1.4.364 |
| f. Ensure that the incident and accident reporting processes used within Recruiting Group are fully compliant with Army reporting policy and are coherent with Army reporting processes, | 1.4.374 |

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in order to ensure effective integration between the Army and the Capita reporting systems.

g. Undertake a thorough assessment of the risks associated with the increase in Commonwealth recruiting and identify and implement suitable mitigations, in order to reduce those risks to as low as reasonably practicable and tolerable. 1.4.395

h. Clarify the organisational command relationship and promote a shared organisational culture between Army Recruiting and Initial Training Command and Recruiting Group, in order to ensure that there is a shared understanding and alignment of policies, procedures and standards. 1.4.414

1.5.9. The Chief Executive Officer Recruiting Group should:

a. Ensure that Commonwealth (CW) candidates are assessed by Health Technicians and Examining Medical Officers with specific training and experience in identifying the effects of diseases common in other parts of the world, in order to reduce the risk of illness or injury to CW candidates. 1.4.56

b. Include a temperature check in the Pre-Service Medical Assessment, in order to reduce the risk of a candidate with a current illness attempting the Role Fitness Test (Entry) 2km run. 1.4.101

c. Improve the process used to medically review the cases of candidates who suffer serious injury or illness during Soldier Selection so that lessons and trends are promptly identified, in order to reduce the risk of reoccurrence. 1.4.132

d. Should introduce a medical plan or Standard Operating Instruction for the management of candidates who suffer injury or illness at any point during the Soldier Selection process, in order to optimise the management and treatment of these candidates. 1.4.161

e. Ensure that all Assessment Centre Physical Training Instructors, as well as other Assessment Centre staff who are regularly involved in the Role Fitness Test (Entry), conduct regular first aid training, to an appropriate standard, in order to provide an effective response should injury or illness occur. 1.4.176

f. Determine the appropriate level of medical cover for future Role Fitness Test (Entry) (RFT (E)) 2km runs and should determine the appropriate level of training for those Assessment Centre staff conducting future RFT (E) 2km runs (including training on oxygen delivery), in order to safely manage a 1.4.178

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candidate suffering exertional collapse during the RFT (E) 2km run.	
g. Ensure that Wet Bulb Globe Temperature monitor readings are taken and recorded as detailed in Joint Service Publication 375, in order to reduce the risk of climatic injury during Soldier Selection events.	1.4.187
h. Instigate Wet Bulb Globe Temperature monitor training for all appropriate Assessment Centre staff, in order to reduce the risk of climatic injuries to as low as reasonably practicable.	1.4.188
i. Assure the completion of Career and Personal Development and Annual Deficit Training, and the use of logbooks for Physical Training Instructors in Assessment Centres, in order to ensure their technical currency and competency to deliver the Role Fitness Test (Entry).	1.4.195
j. Ensure that Assessment Centre staff are aware of their roles and responsibilities relating to the conduct of the Role Fitness Test (Entry) 2km run, in order to ensure the safe and efficient conduct of the run.	1.4.206
k. Ensure that all candidates, and especially Commonwealth candidates, are given appropriate advice on the clothing to be worn while undertaking the Role Fitness Test (Entry) 2km run in cold weather and should ensure that the safety vehicle is suitably equipped, in order to prevent hypothermia in all candidates.	1.4.137
l. Ensure that there is a robust and effective communication plan for the staff conducting the Role Fitness Test (Entry) 2km run at all Assessment Centres, in order to ensure effective communication between all staff members in the event of an incident or accident.	1.4.217
m. Provide policy regarding the minimum safety equipment to be carried and the use of a safety vehicle during the Role Fitness Test (Entry) 2km run, in order to provide an appropriate safety capability to deal with safety incidents.	1.4.224
n. Ensure that the running route at Assessment Centre (Lichfield) complies with Recruiting Group Standard Operating Instruction 7, in order to ensure that the route is safe.	1.4.232
o. Implement a training program for key Assessment Centre staff in the use of the CASPER system, should its use in incident	1.4.382

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and accident reporting continue, in order to ensure timely and accurate reporting.

- p. Ensure that medical expertise is included during discussions in the Health and Safety and Senior Leadership Team review processes, in order to ensure that a thorough understanding and review of the medical factors is considered. 1.4.403

1.5.10. The Senior Health Advisor (Army) should:

- a. Conduct further research to better understand the potential effects of excessive motivation amongst Commonwealth candidates engaged in the Soldier Selection process, in order to reduce the risk of Exertional Collapse Associated with Sickle Cell Trait to as low as reasonably practicable. 1.4.87

- b. Conduct further research to better understand the potential effects of accumulated mental and physical fatigue amongst candidates engaged in the Soldier Selection process, in order to reduce the risk of Exertional Collapse Associated with Sickle Cell Trait to as low as reasonably practicable. 1.4.92

- c. Conduct further research to better understand the potential effects of dietary supplements on candidates engaged in the Soldier Selection process, in order to reduce the risk of Exertional Collapse Associated with Sickle Cell Trait to as low as reasonably practicable. 1.4.98

PART 1.6

Convening Authority Comments

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PART 1.6 – CONVENING AUTHORITY COMMENTS

Introduction

1.6.1. I convened the Service Inquiry (SI) on 11 December 2019 to investigate the tragic deaths of Mr Kamil Iddrisu and Mr Youngson John Jumbe Nkhoma following their involvement in the Soldier Selection process at Army Assessment Centre (Lichfield) on 17 and 27 November 2019 respectively. Both Mr Iddrisu and Mr Nkhoma became seriously unwell towards the end of their Role Fitness Test (Entry) (RFT (E)) 2km timed runs and they both died shortly afterwards in Good Hope Hospital, Sutton Coldfield.

1.6.2. The SI Panel concluded that both Mr Iddrisu and Mr Nkhoma suffered a rare, pathological, metabolic event known as Exertional Collapse Associated with Sickle Cell Trait (ECAST). ECAST is described in the medical literature as an intensity syndrome which can only occur in those with Sickle Cell Trait (SCT). It is typically caused by unaccustomed, maximal physical exertion over short (several minutes) duration, but very intense, cardiovascular activities (such as military fitness tests), where individuals are highly motivated to give their best.

1.6.3. The SI Panel have submitted their report to me following 15 months of detailed evidence gathering, interviews and analysis. Having reviewed the report, I offer the following key observations.

SCT and ECAST

1.6.4. ECAST is a medical condition that is not yet fully understood. With the Army now relying more heavily on recruitment from Commonwealth countries to meet its recruitment targets, many of which have a higher prevalence of SCT than the UK, more potential recruits with SCT are likely to attempt Soldier Selection and attend other recruitment activities. The prevalence of SCT is also increasing in the UK population therefore, as recruitment from Commonwealth countries increases, more Service personnel will have SCT and suitable mitigations will be required to reduce the risk of ECAST throughout their military careers. This is particularly important during the early stages of recruitment and basic training, where there appears to be the greatest risk. This report has highlighted a number of risk factors for ECAST and it has made several recommendations for risk mitigations and for further research, which need to be fully explored.

1.6.5. Historically, SCT screening has been a topic of controversy. However, the expert-driven approaches of the National Collegiate Athletic Association in the United States (US) and the US military should guide and inform the approach taken by the Ministry of Defence (MOD). Tragically, ECAST deaths in the UK military have occurred both in recruit candidates and in Serving personnel. Therefore, Defence must ensure that short duration, but very intense, cardiovascular and other arduous activities have suitable risk mitigations and medical cover in place both to reduce the risk of ECAST in those with SCT and to rapidly recognise, diagnose and treat the initial exertional collapse in the pre-hospital setting.

1.6.6. The Army has already made good progress in exploring the issues surrounding the introduction of SCT screening, the identification of personnel with SCT, and the consideration of other risk mitigation policies and procedures. However, these risk mitigation strategies must also be accompanied by widespread education and training throughout Defence regarding SCT and ECAST, alongside specific training and equipment for medical personnel.

The RFT (E)

1.6.7. The RFT (E) is a clear example of unaccustomed, maximal physical exertion over a short duration, but very intense, cardiovascular activity in highly motivated individuals. The Army must look at whether asking untrained, and sometimes unconditioned, civilians to undertake such a maximal effort fitness assessment is necessary at this stage of their recruitment journey. Soldier Selection can take place many months before candidates start Basic Training so the basic level of fitness required at Soldier Selection should be carefully considered, alongside the safest, fairest, and most appropriate, reproducible and repeatable way of assessing this.

Soldier Selection

1.6.8. This report has highlighted several safety concerns associated with the governance of the Soldier Selection process at Army Assessment Centres and with the review of previous ECAST-related accidents prior to November 2019. Many of these concerns have already been addressed following the accidents in November 2019 but it is vital that the safety of candidates at all stages of the recruitment process is prioritised.

1.6.9. The contractual relationship between Capita and the MOD, and the relationship between the Army Recruiting and Initial Training Command (ARITC) and Recruiting Group (RG), through the Recruiting Partnering Project, has been examined in this report. Some important deviations from Defence policy have been highlighted and it is vital that these are examined and lessons are learnt so that the more integrated approach that has been beneficial in meeting recruitment targets is also equally beneficial in promoting a shared understanding and alignment of policies, procedures and standards between ARITC and RG. ARITC Recruiting Branch must ensure that the requirements of Defence policies relevant to recruitment activities are clearly understood at all levels within RG.

Incident and Accident Reporting with Defence

1.6.10. It is deeply concerning that the reporting of safety-related incidents and accidents continues to be a concern within Defence. It is critical that the reporting of safety-related incidents and accidents (including near misses) is standardised across all parts of Defence so that timely and meaningful reporting, investigation and trend analysis can occur. This report has highlighted the significant volume of policies relevant to incident and accident reporting that exists across Defence. The various reporting policies, and the occasional contradictory advice between publications, may cause misalignment of policy and practices and must be addressed.

1.6.11. Reporting policies throughout all policy tiers of Defence must be coherent and consistent and they must be clearly understood at all levels throughout the 'whole force', including amongst Defence contractors and partnering organisations. Had previous collapses at Army Assessment Centres been reported to the Defence Accident Investigation Branch and had the death of Mr Iddrisu been reported to the Deputy Chief of the Defence Staff's Duty Officer then the accident involving Mr Nkhoma at Assessment Centre (Lichfield) on 27 November 2019 might have been prevented.

Conclusion

1.6.12. Having reviewed the report in its entirety, I am content that these tragic accidents have been investigated, analysed and reported on thoroughly, accurately and rigorously. I endorse the recommendations contained within it and I look forward to seeing that they have been or will be implemented in order to reduce the likelihood of a similar outcome in the future.

1.6.13. Throughout the duration of the SI, the SI Panel have actively engaged with key stakeholders. It is pleasing to see that many of the recommendation owners have already started, and in some cases completed, important resolution activity.

1.6.14. On behalf of the Defence Safety Authority, I offer my sincere condolences to Mr Iddrisu's and Mr Nkhoma's families, friends and loved ones.

Director General Defence Safety Authority