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Identical letters dated 13 December 2013 from the Secretary-General addressed to the President of the General Assembly and the President of the Security Council

I have the honour to convey herewith the final report of the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic (see annex).

I would be grateful if the present final report, the letter of transmittal and its appendices could be brought to the attention of the Members of the General Assembly and of the Security Council.

(*Signed*) **BAN** Ki-moon

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Annex

Letter of transmittal

Having completed our investigation into the allegations of the use of chemical weapons in the Syrian Arab Republic reported to you by Member States, and further to the report of the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic (hereinafter, the "United Nations Mission") on allegations of the use of the chemical weapons in the Ghouta area of Damascus on 21 August 2013 (A/67/997-S/2013/553), we have the honour to submit the final report of the United Nations Mission.

To date, 16 allegations of separate incidents involving the use of chemical weapons have been reported to the Secretary-General by Member States, including, primarily, the Governments of France, Qatar, the Syrian Arab Republic, the United Kingdom of Great Britain and Northern Ireland and the United States of America. On the basis of the sufficiency and credibility of the information received, the United Nations Mission decided to further investigate the following 7 of the 16 allegations reported to the Secretary-General by Member States: Khan Al Asal, of 19 March 2013; Sheik Maqsood of 13 April 2013; Saraqueb of 29 April 2013; Ghouta of 21 August 2013; Bahhariyeh of 22 August 2013; Jobar of 24 August 2013; and Ashrafiah Sahnaya of 25 August 2013. The United Nations Mission did not receive sufficient or credible information in respect of the alleged incidents in Salquin on 17 October 2012, Homs on 23 December 2012, Darayya on 13 March and 25 April 2013, Otaybah on 19 March 2013, Adra on 24 March and 23 May 2013, Jobar between 12 and 14 April 2013 and Qasr Abu Samrah on 14 May 2013.

On the basis of our analysis of the evidence gathered during our investigation between April and November 2013 and the laboratory results obtained, the conclusion is that chemical weapons have been used in the ongoing conflict between the parties in the Syrian Arab Republic, not only in the Ghouta area of Damascus on 21 August 2013 as concluded in (A/67/997-S/2013/553), but also on a smaller scale in Jobar on 24 August 2013, Saraqueb on 29 April 2013, Ashrafiah Sahnaya on 25 August 2013 and Khan Al Asal on 19 March 2013. This result leaves us with the deepest concern.

We appreciate the indispensable support provided by the United Nations Secretariat, including the Office for Disarmament Affairs, the Office of Legal Affairs, the Department of Safety and Security and the Office of the Joint Special Representative of the United Nations and the League of Arab States for Syria and the innumerable Secretariat officials who have assisted us in Beirut, Damascus, Geneva, Nicosia, The Hague and New York.

We extend our thanks to the Directors-General of the Organization for the Prohibition of Chemical Weapons (OPCW) and the World Health Organization (WHO) for their unfailing support and to all staff who assisted us in our investigation. We also reiterate our gratitude for the efficient and effective assistance provided by the OPCW-designated laboratories in Finland, Germany, Sweden, Switzerland and the Netherlands.

We also wish to thank you, Sir, for the confidence you have placed in us. We have been honoured for the opportunity to serve in this important fact-finding mission.

(*Signed*) Professor Åke **Sellström**
(Head of Mission)

(*Signed*) Mr. Scott **Cairns**
Head of and signing for
the OPCW component)

(*Signed*) Dr. Maurizio **Barbeschi**
(Head of and signing for
the WHO component)

United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic

Final report

Contents

* Appendices are issued in the language of submission.

I. Terms of reference

1. The Secretary-General decided to establish the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic (hereinafter, the "United Nations Mission") based on his authority under General Assembly resolution 42/37 C and Security Council resolution 620 (1988). The purpose of the Mission is to ascertain the facts related to the allegations of use of chemical weapons, to gather relevant data, to undertake the necessary analyses for this purpose and to deliver a report to the Secretary-General.

2. For the purpose of ascertaining the facts related to the allegations of use of chemical weapons, gathering relevant data and undertaking the necessary analyses, the Secretary-General requested the Organization for the Prohibition of Chemical Weapons (hereinafter, the "OPCW") to put its resources at his disposal, including providing a team of experts to conduct fact-finding activities. The Secretary-General similarly requested the World Health Organization (hereinafter, the "WHO") to provide technical support in assessing the public health, clinical and event-specific health aspects of the allegations that have been brought to his attention.

3. The United Nations Mission[1] has conducted its investigation and all related activities in accordance with the terms of reference issued by the Secretary-General to the United Nations Mission, including the above provisions, as well as others on cooperation, methods of work and scope and reporting. In discharging its mandate, the United Nations Mission was guided by the United Nations Guidelines and Procedures for the Timely and Efficient Investigation of Reports of the Possible Use of Chemical and Bacteriological (Biological) or Toxin Weapons (A/44/561) (hereinafter, the Guidelines), and, as appropriate and to the extent applicable, the OPCW provisions as identified in article I(5)(a) of the Supplementary Arrangement to the Agreement concerning the Relationship between the United Nations and the Organization for the Prohibition of Chemical Weapons.

4. Other relevant legal instruments governing the cooperation between the United Nations and OPCW and WHO and guiding the work of the United Nations Mission are set out in appendix 1.

II. Allegations

Khan Al Asal, 19 March 2013

5. In a letter dated 19 March 2013, the Permanent Representative of the Syrian Arab Republic to the United Nations informed the Secretary-General and the President of the Security Council of its allegation that, at 0730 hours on 19 March 2013, armed terrorist groups had fired a rocket from the Kfar De'il area towards Khan Al Asal in the Aleppo governorate. According to the letter, the rocket had travelled approximately 5 kilometres and fell 300 metres away from a Syrian Arab Republic army position. Following its impact, a thick cloud of smoke had left unconscious anyone who had inhaled it. The incident reportedly resulted in the deaths of 25 people and injured more than 110 civilians and soldiers who were taken to hospitals in Aleppo.

[1] For the composition of the United Nations Mission, see appendix 11.

6. In a letter dated 20 March 2013, the Deputy Prime Minister of the Syrian Arab Republic requested the Secretary-General to establish a specialized, impartial independent mission to investigate the alleged incident in the Khan Al Asal area.

7. In a letter dated 21 March 2013, the Permanent Representative of France to the United Nations and the Deputy Permanent Representative of the United Kingdom of Great Britain and Northern Ireland to the United Nations jointly informed the Secretary-General of recent allegations from various sources that chemical weapons had been used in the Syrian Arab Republic, including at Khan Al Asal in Aleppo on 19 March 2013, among other incidents resulting in civilian deaths and serious injuries.

8. In a letter dated 14 June 2013, the Permanent Representative of the United States of America to the United Nations reported to the Secretary-General, inter alia, its updated assessment alleging that the Government of the Syrian Arab Republic had used the chemical warfare agent Sarin in an attack on the Aleppo suburb of Khan Al Asal on 19 March 2013.

9. In response to requests from the Secretary-General for additional information on the basis of appendix I to the Guidelines contained in document A/44/561 with a view to verifying any alleged use of chemical weapons, replies were received from the Syrian Arab Republic on 25 March 2013, from the United Kingdom on 25 March 2013 and from France on 26 March 2013.

Otaybah, 19 March 2013

10. In the aforementioned letter dated 21 March 2013 from the Permanent Representative of France and the Deputy Permanent Representative of the United Kingdom, those Governments informed the Secretary-General of the alleged use of chemical weapons at Otaybah in the vicinity of Damascus, resulting in civilian deaths and serious injuries.

11. In response to requests from the Secretary-General for additional information on the basis of appendix I to the Guidelines with a view to verifying any alleged use of chemical weapons, replies were received from the United Kingdom, on 25 March 2013 and on 23 May 2013, and from France on 26 March 2013.

Homs, 23 December 2012

12. In the aforementioned letter dated 21 March 2013 from the Permanent Representative of France and the Deputy Permanent Representative of the United Kingdom, those Governments informed the Secretary-General of allegations of the use of chemical weapons in Homs on 23 December 2012. The Government of Qatar, in its letter dated 22 March 2013, also reported the alleged use of chemical weapons against unarmed civilians in Homs.

13. In response to requests from the Secretary-General for additional information on the basis of appendix I to the Guidelines with a view to verifying any alleged use of chemical weapons, replies were received from the United Kingdom, on 25 March 2013 and on 23 May 2013, and from France on 26 March 2013.

Darayya, 13 March 2013

14. On 26 March 2013, the Government of the United Kingdom presented information to the Secretary-General pertaining to, inter alia, the alleged use of chemical weapons in Darayya in March 2013. The Government of Qatar, in its letter dated 22 March 2013, also reported the alleged use of chemical weapons against unarmed civilians in Darayya.

Adra, 24 March 2013

15. On 23 May 2013, the Government of the United Kingdom reported to the Secretary-General an allegation of the use of chemical weapons in Adra near Damascus on 24 March 2013.

Darayya, 25 April 2013

16. On 23 May 2013, the Government of the United Kingdom reported to the Secretary-General an allegation of the use of chemical weapons in Darayya near Damascus on 25 April 2013, and subsequently presented information to the Head of Mission.

Saraqueb, 29 April 2013

17. On 23 May 2013, the Government of the United Kingdom reported to the Secretary-General an allegation of the use of chemical weapons at Saraqueb on 29 April 2013. In a letter dated 27 June 2013, the Government of France reported to the Secretary-General that, in the course of consultations held with the Head of Mission in Paris on 4 June 2013, it had shared information in its possession, which, in its view, indicated that Sarin had been used in that incident.

Salquin, 17 October 2012

18. In its aforementioned letter dated 26 March 2013, the Government of France reported the alleged use of chemical weapons at Salquin near the border with Turkey on 17 October 2012.

Sheik Maqsood, 13 April 2013

19. In its aforementioned letter dated 14 June 2013, the Government of the United States of America reported to the Secretary-General that the Government of the Syrian Arab Republic had used the chemical warfare agent Sarin against the opposition in an attack on the Aleppo neighbourhood of Sheik Maqsood on 13 April 2013.

Qasr Abu Samrah, 14 May 2013

20. In its aforementioned letter dated 14 June 2013, the Government of the United States reported to the Secretary-General that the Government of the Syrian Arab Republic had used unspecified chemicals against the opposition in an attack on Qasr Abu Samrah on 14 May 2013.

Adra, 23 May 2013

21. In its aforementioned letter dated 14 June 2013, the Government of the United States reported to the Secretary-General that the Government of the Syrian Arab Republic had used unspecified chemicals against the opposition in an attack on Adra on 23 May 2013.

Jobar, 12-14 April 2013

22. In its aforementioned letter dated 27 June 2013, the Government of France reported to the Secretary-General that, in the course of consultations held with the Head of Mission in Paris on 4 June 2013, it had shared information in its possession pertaining to the alleged use of Sarin in Jobar between 12 and 14 April 2013.

Ghouta, 21 August 2013

23. On 21, 22 and 23 August 2013, multiple Member States reported allegations of the use of chemical weapons in the Ghouta area of Damascus on 21 August 2013 and requested the Secretary-General to instruct the United Nations Mission, then in Damascus, to immediately conduct on-site investigations of the incident.

Bahhariyeh, 22 August 2013

24. In a letter dated 28 August 2013, the Government of the Syrian Arab Republic reported to the Secretary-General that at 2120 hours on 22 August 2013, several soldiers in Bahhariyeh in the eastern Ghouta region had inhaled poison gases and had complained of respiratory and other symptoms, as well as itching and redness of the eyes. Eighteen of them had been immediately taken to Martyr Yusuf Al Azmah Military Hospital to receive emergency care.

Jobar, 24 August 2013

25. In its aforementioned letter dated 28 August 2013, the Government of the Syrian Arab Republic reported to the Secretary-General that at 1100 hours on 24 August 2013, as a group of soldiers had approached a building near the river in Jobar, they had heard a muffled sound and then had smelled a foul and strange odour, whereupon they had experienced severe shortness of breath and blurred vision. Four of them had been immediately taken to Martyr Yusuf Al Azmah Military Hospital to receive emergency care. The Government further reported that in its search of the buildings immediately surrounding the above-mentioned site, it had discovered some materials, equipment and canisters, examination of which had confirmed that they had contained Sarin. Analysis had confirmed that one of the soil samples taken from that site had also been reported by the Syrian Government laboratory to be contaminated with Sarin.

Ashrafiah Sahnaya, 25 August 2013

26. In its aforementioned letter dated 28 August 2013, the Government of the Syrian Arab Republic reported to the Secretary-General that at 1900 hours on 25 August 2013, cylindrical canisters had been fired using a weapon that resembled a catapult at some soldiers in the Ashrafiah Sahnaya area in Damascus Rif. One of the canisters had exploded, emitting a medium-loud sound. A black, foul-smelling smoke had then appeared, causing the soldiers to experience blurred vision and

severe shortness of breath. Five of them had been immediately taken to Martyr Yusuf Al Azmah Hospital to receive emergency care.

III. Chronology of the activities of the United Nations Mission

27. In his letter to the Secretary-General dated 20 March 2013, the Deputy Prime Minister of the Syrian Arab Republic alleged the use of chemical weapons in Khan Al Asal in the Aleppo governorate on 19 March 2013, and requested the Secretary-General to conduct a specialized, impartial and independent investigation of the alleged incident. On 21 March 2013, the Secretary-General established the United Nations Mission based on the authority extended to him by the General Assembly (resolution 42/37 C) and endorsed by the Security Council (resolution 620 (1988)). In a letter received on the same day, the Governments of France and the United Kingdom requested an investigation, using the same mechanism provided for in resolution 42/37 C, into the alleged use of chemical weapons in the two locations of Khan Al Asal in Aleppo and Otaybah in the vicinity of Damascus on 19 March 2013, as well as in Homs on 23 December 2012.

28. On 26 March 2013, the Secretary-General appointed Professor Åke Sellström (Sweden) as the Head of Mission and tasked the United Nations Mission to ascertain the facts related to the allegations of the use of chemical weapons, to gather relevant data and to undertake the necessary analyses for this purpose in accordance with the above-mentioned terms of reference and Guidelines.

29. For the purpose of ascertaining the facts related to the allegations of the use of chemical weapons, gathering relevant data and undertaking the necessary analyses, upon request of the Secretary-General, OPCW put its resources at his disposal.[2] Furthermore, upon the request of the Secretary-General, WHO provided technical support to the United Nations Mission in assessing the public health and the clinical and event-specific health aspects of the allegations that have been brought to his attention.[3]

30. The members of the United Nations Mission assembled in The Hague on 2 April 2013, in preparation for travel to the Syrian Arab Republic. In anticipation of an early agreement on the modalities of cooperation with the Government of the Syrian Arab Republic, the Secretary-General requested the Head of Mission to deploy to Cyprus with an advance team in order to complete the necessary logistical arrangements for expediting their travel to the Syrian Arab Republic to conduct their on-site activities. On 7 April 2013, the advance team deployed to Cyprus and remained there until 12 May 2013.

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[2] For the purposes of the Mission, cooperation between the United Nations and OPCW was guided by paragraph 27 of part XI of the Verification Annex of the Chemical Weapons Convention and the Supplementary Arrangement concerning the Implementation of article II(2)(C) of the United Nations-OPCW Relationship Agreement signed on 20 and 14 September 2012, respectively.

[3] For the purposes of the Mission, cooperation between the United Nations and WHO was guided by the Agreement between the United Nations and WHO adopted by the first World Health Assembly on 10 July 1948 and by the Memorandum of Understanding between WHO and the United Nations concerning WHO support to the Secretary-General's Mechanism for Investigation of the Alleged Use of Chemical, Biological or Toxin Weapons of 31 January 2011.

31. From March to May 2013, in letters from the Secretary-General and the High Representative for Disarmament Affairs, the United Nations consistently conveyed to the Syrian authorities that the Secretary-General had received additional allegations of the use of chemical weapons within the Syrian Arab Republic, and, in accordance with General Assembly resolution 42/37 C, the Secretary-General had to consider all credible allegations brought to his attention by any Member State in order to ensure the integrity and impartiality of the United Nations Mission.

32. Pending agreement on the modalities of the United Nations Mission's deployment to the Syrian Arab Republic and its on-site access in the country, in accordance with the Guidelines, the United Nations Mission continued to monitor developments, collected and analysed information made available by Member States, developed a concept of operations and tools for planning, established criteria for the selection of witnesses and the conduct of interviews and received security and relevant technical training. From April to October 2013, the Head and members of the United Nations Mission travelled to and met with various Government officials and technical experts from France, Germany, the Russian Federation, Sweden, Turkey, the United Kingdom and the United States. From 24 to 28 June, and again from 4 to 6 July 2013, the United Nations Mission also conducted fact-finding activities in Turkey, including conducting interviews and collecting biomedical samples during an autopsy of a deceased victim, which was overseen by members of the United Nations Mission, in relation to the Saraqueb incident of 29 April 2013.

33. At the invitation of the Government of the Syrian Arab Republic, the High Representative for Disarmament Affairs and the Head of Mission visited Damascus on 24 and 25 July 2013 and reached agreement on the way forward with the Deputy Prime Minister, the Minister for Foreign Affairs and the Vice-Minister for Foreign Affairs. Following subsequent consultations at United Nations Headquarters, the modalities of cooperation were agreed upon in an exchange of letters on 13 and 14 August 2013.

34. The United Nations Mission travelled to Damascus on 18 August 2013 and began its fact-finding activities in the Syrian Arab Republic on 19 August 2013 with the understanding that it would conclude its visit within 14 days, unless extended by mutual agreement. The United Nations Mission was intended to simultaneously investigate the reported allegations of the use of chemical weapons in Khan Al Asal, Saraqueb and Sheik Maqsood, which were deemed credible, to discuss other allegations and to visit the related sites in parallel.

35. However, following the tragic events of 21 August 2013, and the receipt of dozens of requests from Member States, the Secretary-General called for the United Nations Mission, already working in Damascus, to investigate the allegation of the use of chemical weapons in the Ghouta area of Damascus on 21 August 2013 as a matter of priority. The Security Council met on the same day and supported the Secretary-General's call for a thorough, impartial and prompt investigation.

36. Consequently, the United Nations Mission refocused its fact-finding efforts in order to immediately investigate the alleged use of chemical weapons in the Ghouta area. Pursuant to the joint understanding reached between the High Representative for Disarmament Affairs and the Syrian Government on 25 August 2013, as well as separate arrangements agreed upon on an ad hoc basis with the other parties to the conflict, a temporary ceasefire was effectively in place for five hours daily from

26 August to 29 August 2013. During this period, the United Nations Mission conducted a wide range of fact-finding activities related to the Ghouta incident.

37. Meanwhile, in a letter dated 28 August 2013, the Deputy Prime Minister of the Syrian Arab Republic informed the Secretary-General of three additional incidents of alleged use of chemical weapons in Bahhariyeh, Jobar and Ashrafiah Sahnaya in the Damascus area on 22, 24 and 25 August 2013, respectively. The Syrian Arab Republic requested that the Secretary-General make use of the United Nations Mission already in the Syrian Arab Republic to investigate these allegations. On 30 August 2013, the United Nations Mission therefore visited Martyr Yusuf Al Azmah Military Hospital in Damascus as part of its evaluation of information provided by the Syrian Arab Republic in its report.

38. The United Nations Mission departed from the Syrian Arab Republic on 31 August 2013. It was understood that it would be allowed to return at a mutually agreed date to resume its fact-finding activities for the pending allegations. In the report of the United Nations Mission on the alleged use of chemical weapons in the Ghouta area of Damascus on 21 August 2013 (A/67/997-S/2013/553), issued by the Secretary-General on 16 September 2013, the United Nations Mission concluded that “chemical weapons have been used in the ongoing conflict between the parties in the Syrian Arab Republic, also against civilians, including children, on a relatively large scale”.

39. The United Nations Mission returned to the Syrian Arab Republic on 25 September 2013 to follow up on and conclude its investigation of pending allegations of the use of chemical weapons in the Syrian Arab Republic reported to the Secretary-General by Member States. From 25 to 29 September 2013, the United Nations Mission conducted fact-finding activities for the most recent allegations relating to Jobar, Bahhariyeh and Ashrafiah Sahnaya, including visiting a military hospital in Damascus where it interviewed patients, doctors and nurses and took blood and DNA samples. In addition, the United Nations Mission concluded its fact-finding activities for the allegations relating to Khan Al Asal, Saraqueb and Sheik Maqsood. Upon completion of its fact-finding activities in the Syrian Arab Republic, the Head of Mission, in consultation with the Syrian Government, established 30 September 2013 as the date of the United Nations Mission’s departure from the Syrian Arab Republic.

IV. Methodological considerations

40. In discharging its duties and conducting its investigation, the United Nations Mission adhered to the Guidelines and Procedures for the conduct of investigations set out in document A/44/561. The United Nations Mission also adhered to the most stringent protocols available and relied on objective criteria and standard questionnaires, as well as the most advanced technologies and standards available for such an investigation, as set out in appendix 2 hereto. In particular, the following procedures provided a strict chain of custody. The retrieval of samples were recorded and witnessed, samples were sealed, detailed documentation was prepared, samples were transported to the preparatory laboratory under the supervision of the members of the United Nations Mission, seals were confirmed and then broken and the samples were representatively subdivided. The re-sealed samples were then distributed to the OPCW-designated laboratories with guidance documents, again

under the same supervision. The laboratories conducted their activities using standardized procedures (including quality assurance and quality control checks) for receiving, storing and analysing samples. The results were then returned under supervision to the United Nations Mission for review. Each transfer of material was accompanied by handover receipts.

41. The most relevant methods for collecting and evaluating the credibility of information for the United Nations Mission's investigation of allegations of the use of chemical weapons are described in part II of its report on the Ghouta incident (A/67/997-S/2013/553). These included, inter alia: the independent assessment and corroboration of background information; the conduct of interviews with survivors and other relevant witnesses; the assessment of the symptoms of survivors; the collection of hair, urine, tissues and blood samples for subsequent analysis; the collection of environmental samples for subsequent analysis; and/or the documentation of munitions and their subcomponents identified by the team.

42. The United Nations Mission did not rely on samples, information and/or investigation reports presented to the United Nations Mission by external sources, including by Governments of Member States, unless the United Nations Mission could independently and unambiguously verify the chain of custody and the credibility of any such information. In this connection, each allegation had to be initially assessed and substantiated by underlying information describing the alleged incident and its effect in sufficient detail. For this purpose, each reporting State was requested to respond to a standard questionnaire, found in appendix 10 hereto, elaborated further to, but on the basis of, the requirements of appendix I to A/44/561.

43. In that connection, the United Nations Mission consulted with various Governments that had reported incidents of alleged use, including the Governments of France, the Syrian Arab Republic, the United Kingdom and the United States, to seek clarification from their experts on the information they provided. Additional information was provided by Germany, the Russian Federation, Sweden and Turkey, as well as by the Independent International Commission of Inquiry for the Syrian Arab Republic established by the United Nations Human Rights Council (hereinafter, the "UNHRC Commission of Inquiry"). The United Nations Mission made use of that information, insofar as it was possible, in its analysis and planning.

44. The United Nations Mission required sufficient or credible information to substantiate each allegation in order to further investigate the alleged incident. Furthermore, taking into account the allowed time and other constraints, the United Nations Mission considered two main factors in deciding whether to conduct an on-site visit: (a) the scientific and probative value of the on-site visit and (b) the risk assessment of conducting such visits in the midst of the ongoing armed conflict in the Syrian Arab Republic. In this connection, the United Nations Mission consulted with the United Nations Designated Security Officer for the Syrian Arab Republic and refrained from certain on-site visits for security reasons.

V. Narrative and results of the United Nations Mission

45. On the basis of the sufficiency and credibility of the information received, the United Nations Mission decided to further investigate the following 7 of the 16 allegations reported to the Secretary-General by Member States: Khan Al Asal of

19 March 2013, Sheik Maqsood of 13 April 2013, Saraqueb of 29 April 2013, Ghouta of 21 August 2013, Bahhariyeh of 22 August 2013, Jobar of 24 August 2013, and Ashrafiah Sahnaya of 25 August 2013. The United Nations Mission did not receive sufficient or credible information in respect of the alleged incidents in Salquin on 17 October 2012, Homs on 23 December 2012, Darayya on 13 March and 25 April 2013, Otaybah on 19 March 2013, Adra on 24 March and 23 May 2013, Jobar between 12 and 14 April 2013, and Qasr Abu Samrah on 14 May 2013.

46. The following summarizes the basic results of the United Nations Mission's investigations. The United Nations Mission notes that the nature and scale of the allegations varied widely, including, inter alia, in respect of the number of alleged victims and survivors, the extent of the alleged use, the alleged means of delivery or dissemination, the quality and quantity of information and the passage of time between the alleged incident and the conduct of the investigation.

Khan Al Asal, 19 March 2013[4]

47. In response to the United Nations Mission's standard questionnaire, the Government of the Syrian Arab Republic provided a relatively detailed picture of the incident alleged in Khan Al Asal.

48. Ultimately, while an on-site visit was not possible due to security reasons, the United Nations Mission conducted thorough interviews with survivors and with military and civilian first-responders from Aleppo who were brought by the Government to Damascus. The United Nations Mission also met with doctors from the Syrian Ministry of Health specializing in emergency medicine.

Narrative

49. Based on the interviews conducted by the members of the United Nations Mission, it can be ascertained that an incident occurred on 19 March at approximately 0700 hours, in the Haret Al Mazar neighbourhood, which consists of a one-story building surrounded by a farming area. The location is close to the shrine of Sheikh Ahmad Al Asali located at the southern part of the Khan Al Asal village in the vicinity of a position held at the time by the armed forces of the Syrian Arab Republic in the Aleppo governorate.

50. During the ongoing shelling in the area, deaths, with no signs of wounds, and persons exhibiting symptoms of intoxication were suddenly observed and reported to survivors and first responders. The interviewed witnesses reported on experiencing or observing the following symptoms: irritation of skin, miosis, impaired vision, foaming from the mouth, weakness, convulsions, shortage of breath and loss of consciousness.

51. One survivor stated that "the air was static and filled with a yellowish-green mist and filled of a strong pungent smell, possibly resembling sulfur".

52. On 20 August 2013, the Syrian Government, in its own investigation report, attributed the death of 20 individuals and the intoxication of 124 survivors to this incident. Six hospitals received alleged victims, including Aleppo University Hospital as the main one.

[4] See also appendix 3.

53. The Syrian Government's report referred to statistics of symptoms communicated from these hospitals including miosis, blurred vision, conjunctivitis, foaming at the mouth, coughing, rhinorrhea, respiratory distress, bronchospasm, nausea, vomiting, cyanosis and headache. Those affected had been given symptomatic treatment with a few patients requiring intensive care.

54. The Syrian report of 20 August 2013 further stated that some of the blood tests conducted had found cholinesterase activity to be reduced. Autopsies had been performed on 14 individuals who had died, including 7 males, 6 females and 1 male child. The report stated the cause of death as "respiratory depression and cardiac failure following the inhalation of a toxic (gas) material".

Weather conditions in Khan Al Asal on 19 March 2013

55. Weather information from Aleppo on the morning of 19 March 2013 show temperatures falling at 0500 hours and rising again at 0800 hours as the sun was coming up (worldweatheronline.com), with 32 to 62 per cent overcast and a north-north-east to east-north-east wind at 3 miles per hour. There was probably little movement of the wind in any direction. Chemicals like Sarin, dispersed in those conditions, would migrate slowly in the direction of the wind.

Information about munitions

56. Due to the deteriorating security situation, the United Nations Mission was not able to conduct an on-site visit to Khan Al Asal and therefore was not in a position to collect primary evidence relating to the number or type of munitions and/or delivery system that was used in the incident.

Information concerning environmental samples

57. Due to the deteriorating security situation, the United Nations Mission was not able to conduct an on-site visit to Khan Al Asal and therefore was not in a position to collect environmental samples. In addition, six months following the incident, the probative value of such samples would be negligible.

58. The Russian Federation presented the United Nations Mission with its own report relying on environmental samples collected by a Russian investigation team, which found remainders of Sarin. The United Nations Mission studied the report but could not independently verify the chain of custody for the sampling and the transport of the samples.

Information concerning symptoms

59. The survivors observed and experienced symptoms such as: irritation of skin, miosis, impaired vision, foaming from the mouth, weakness, convulsions, shortage of breath and loss of consciousness.

Information concerning biomedical samples

60. The United Nations Mission collected blood samples from two survivors in order to use DNA tests to authenticate the blood samples expected to be received from the Syrian Government. The Government could not recover the biomedical samples they had previously collected and the bodies of the deceased victims could not be exhumed for security reasons. No traces or signatures of any chemical

warfare agent were detected in any of the samples collected by the United Nations Mission.

The epidemiological perspective

61. The Khan Al Asal incident was relatively large and as such affected several components of the local society, warranting the application of an epidemiological approach for its assessment. The United Nations Mission applied the standards for epidemiologic determination of cause-and-effect and assessed that an organophosphorous intoxication was the cause of the rapidly onsetting mass intoxication taking place on the morning of the 19 March 2013. Based on its interviews and the assessment of the medical records obtained from five hospitals receiving the alleged victims, the United Nations Mission did not determine any alternative explanations for the symptoms. Furthermore there were no other suggestions as to the cause of the intoxication raised by any of the Member States in their reports brought to the Secretary-General's attention concerning the possible use of chemical weapons in Khan Al Asal.

Saraqueb, 29 April 2013[5]

62. The Saraqueb incident was called to the attention of the Secretary-General by the Governments of France and the United Kingdom, which reported that small amounts of toxic substance had been used.

Narrative

63. A source close to the opposition claimed that, on 29 April 2013, a helicopter had been seen passing above the western part of Saraqueb flying from north to south and that the helicopter allegedly dropped items at three locations. The first point of impact was reportedly in the northern area of the town, the second in the middle of the courtyard of a family house and the third was close to an opposition checkpoint on the roads to Idlib and Aleppo.

64. A trail of white smoke was reported coming down from the helicopter as improvised munitions were allegedly observed being dropped.

65. An improvised device reportedly fell into the courtyard of a private house and allegedly intoxicated some of the family members. The patients were transferred to Shifa Hospital and were treated there for organophosphorous intoxication.

66. One severely intoxicated patient, a female with underlying medical conditions, had later died, whereas the less severely intoxicated patients had all recovered.

Weather conditions in Saraqueb on 29 April 2013

67. Weather information from Idlib on the afternoon the 29 April 2013 shows the temperature to be between 34°C and 33°C at 1600 hours (worldweatheronline.com), with no clouds and a north to north-east wind at 4 to 5 miles per hour. In those conditions, chemicals like Sarin would disperse quite rapidly, especially considering the small volumes allegedly used, while migrating a short distance in the direction of the wind.

[5] See also appendix 4.

Information about munitions

68. The United Nations Mission was not able to conduct an on-site visit and was not able to collect any primary information on munitions.

Information concerning environmental samples

69. The United Nations Mission was not able to conduct an on-site visit and therefore was not able to collect any environmental samples.

70. The French Government presented a report containing results of environmental samples testing positive for Sarin. The United Nations Mission studied the report but could not independently verify the chain of custody for the sampling and the transport of the samples.

Information concerning symptoms

71. One patient was severely intoxicated, allegedly, from close encounter with the munitions used. She arrived at the first clinic in Saraqueb unconscious. She was given cardio-pulmonary resuscitation (CPR) and was intubated and put on oxygen and thereafter received atropine. The patient was transported to Turkey. The patient's health conditions, however, deteriorated and she was declared dead between 2230 and 2245 hours just before arriving at the final hospital in Turkey.

Information concerning biomedical samples

72. During an autopsy that was observed by members of the United Nations Mission, samples of several organs from the deceased woman's body were recovered for subsequent analysis. The results from most of these organs clearly indicated signatures of a previous Sarin exposure.

Sheik Maqsood, 13 April 2013[6]

73. The incident was brought to the attention of the Secretary-General by the Government of the United States, which reported that the Government of the Syrian Arab Republic had used a small amount of chemical warfare agent Sarin against the opposition in an attack on the Aleppo neighbourhood of Sheik Maqsood.

74. According to witness statements provided to the United Nations Mission by the UNHRC Commission of Inquiry, the alleged incident affected 21 persons and caused one death. Victims were allegedly transported to a hospital in Afrin for treatment. The United Nations Mission sought to conduct fact-finding activities pertaining to this incident from the territory of a bordering country, having determined that such an investigation held the prospect of producing additional information. The United Nations Mission was ultimately unable to obtain any such information.

75. The United Nations Mission interviewed Syrian Government officials in Damascus who did not have any information to offer about the alleged incident.

76. In the absence of any further information, the United Nations Mission was unable to draw any conclusions pertaining to this alleged incident.

[6] See also appendix 9.

Ghouta, 21 August 2013[7]

77. The United Nations Mission's full report on the alleged use of chemical weapons in the Ghouta area of Damascus on 21 August 2013, set out in document A/67/997-S/2013/553, forms an integral part of this final report. Since that report was submitted to the Secretary-General on 15 September 2013, the United Nations Mission has received additional analytical results of environmental samples, which are set out in appendix 5 hereto. These results further confirmed the conclusions of the United Nations Mission's Ghouta report.

Bahhariyeh, 22 August 2013[8]

Narrative

78. Based on information gathered from various interviews conducted by the United Nations Mission, it can be ascertained that on 22 August 2013, at around 1700 hours, a group of soldiers were reportedly fighting from two buildings in Bahhariyeh. The alleged attack started with a number of objects being fired at the soldiers, one of which fell about 5 metres away from them. The witnesses stated that there had been no explosion, just the release of some blue-coloured gas with a very bad odour, which had been moved into the soldiers' direction by the wind. The object was collected by one of the soldiers and later seen and assessed by the United Nations Mission.

79. The symptoms of the four alleged victims were described by treating doctors as nausea, vomiting, tearing, bronchial problems and flaccid paralysis. One patient was confused, one was semi-conscious and two patients had bradycardia. In that same afternoon, an additional nine soldiers without any records of previous treatments arrived at the emergency room of Martyr Yusuf Al Azmah Military Hospital. The patients were conscious, with breathing difficulties and the feeling of a tight chest, burning eyes and throat, with some having miosis. A number of the interviewed alleged victims stayed six days in the hospital until they were released. One individual mentioned that he still had some difficulty breathing, and had chest and back pain at the time of the interview.

Weather conditions in Damascus on 22 August 2013

80. Weather information from Damascus on the afternoon the 22 August 2013 shows the temperature to be 33°C at 1600 hours (worldweatheronline.com). There were almost no clouds, with a west-south-west wind at 10 miles per hour. Most chemical weapons spread in those conditions would disperse quite rapidly while migrating a short distance in the direction of the wind.

Information about munitions

81. The United Nations Mission was not able to conduct an on-site visit and was therefore not able to collect any primary information about the munitions used in this incident.

[7] See also appendix 5.
[8] See also appendix 6.

Information concerning environmental samples

82. The United Nations Mission was not able to conduct an on-site visit and was therefore not able to collect any environmental samples.

Information concerning symptoms

83. The most common signs and symptoms reported from the interviewed patients, from treating clinicians and from medical records are the following: shortness of breath, laboured breathing, eye irritation, blurred vision, nausea, headache, fatigue and coughing.

84. The patients were given symptomatic treatment. The average length of stay in the hospital was three days.

Information concerning biomedical samples

85. Blood and urine samples were collected from the most severely intoxicated patients. The analysis results tested negative for any of the chemical warfare agents.

Jobar, 24 August 2013[9]

Narrative

86. Based on interviews conducted by the United Nations Mission, it can be ascertained that, on 24 August 2013, a group of soldiers were tasked to clear some buildings under the control of opposition forces. Around 1100 hours, the intensity of the shooting from the opposition subsided and the soldiers were under the impression that the other side was retreating. Approximately 10 metres away from some soldiers, an improvised explosive device reportedly detonated emitting a low noise and releasing a very bad-smelling gas. A group of 10 soldiers was evacuated in armoured personnel vehicles to the field medical point with breathing difficulties and with, not further specified, strange symptoms. One alleged victim mentioned blurred vision. Four soldiers were severely affected. They were only partially conscious and not able to support themselves. They were treated before being sent to Martyr Yusuf Al Azmah Military Hospital. Another 20 alleged victims came later with similar symptoms, but they were in stable condition and could, after some time, be sent back to their units.

87. At around noon, the admitting physician at the emergency room of the military hospital observed that all four patients complained of a tight chest, wheezing and difficulty breathing and that two patients had saliva coming from the mouth, red eyes with blurred vision and miosis. In addition, the patients were exhausted and disoriented. The patients were washed and given two to three doses of atropine and HI-6 (asoxime chloride) intravenously. One of the patients was unconscious and was transferred to the intensive care unit. The medical records state, however, that the patients were conscious and responsive with restricted pupils and bronchial spasms at the time of admission to the emergency room. A medical doctor reported itchy eyes in the evening after examining the patients.

[9] See also appendix 7.

88. At the hospital, the patients were treated. Two of the soldiers stayed in the hospital for eight days before release. The medical records state that all four alleged victims were granted additional sick leave after release from the hospital.

Weather conditions in Damascus on 24 August 2013

89. Weather information from Damascus at noon on 24 August 2013 shows the temperature to have been 30°C at 1100 hours (worldweatheronline.com). There were almost no clouds, with a west-south-west wind at 10 miles per hour. Sarin spread in those conditions would disperse quite rapidly while migrating a short distance in the direction of the wind.

Information about munitions

90. While the United Nations Mission visited the site, the fragments of the alleged munitions had already been removed. The United Nations Mission therefore has no primary information about the munitions used.

91. Also, the site was compromised by previous demining activities and by visits of representatives of the Syrian Government, who had reportedly moved the remnants of two explosive devices alleged to be the munitions used in the incident. The United Nations Mission visited the storage location and examined the remnants.

Information concerning environmental samples

92. While the United Nations Mission visited the site, it found the site to have been corrupted by mine-clearing activities. As such, there was no probative value in collecting samples.

93. The Syrian Government allegedly recovered soil samples from the impact site that tested positive for Sarin. The United Nations Mission could not verify the chain of custody for this sampling and subsequent analysis.

Information concerning symptoms

94. The interviews with patients and clinicians and the review of medical records revealed that the most common signs and symptoms were shortness of breath, blurred vision, loss of consciousness, headache, nausea, eye irritation, miosis, fatigue and hyper-salivation. The average length of hospitalization was seven days.

Information concerning biomedical samples

95. The United Nations Mission was given four samples reportedly withdrawn by the Syrian Government on 24 August 2013 upon the victims' arrival to the hospital, which were all positive for Sarin exposure.

96. The United Nations Mission collected four blood samples on 28 September 2013, one of which tested positive for Sarin exposure.

97. All samples were subjected to DNA testing to confirm the origin of the presented whole blood samples. The analyses confirmed that the four samples provided by the Syrian Government matched those of the four alleged victims interviewed and sampled.

98. The medical records received from Martyr Yusuf Al Azmah Military Hospital provided corroborating evidence of cholinesterase inhibition indicating Sarin exposure in two of the four patients.

Ashrafiah Sahnaya, 25 August 2013[10]

Narrative

99. Based on interviews conducted by the United Nations Mission, it can be ascertained that there were around 15 military personnel deployed at one of the Government checkpoints controlling entry to rebel-held areas near Ashrafiah Sahnaya in the Damascus Rif. On 25 August 2013, continuous fighting reportedly occurred in the area. At the entrance of Sahnaya next to scattered local houses, the opposition side started to throw objects with a catapult around 1800 hours. At approximately 2000 hours, an object was thrown at a group of five soldiers located in one of the local houses and landed about 10 to 15 metres away. Something with a bad smell was released, but no explosion was heard. There were differing opinions whether there had been no smoke or a colourless smoke. Symptoms such as blurred vision and difficult breathing started to develop in the alleged victims. Forty-five minutes later, they were evacuated by a rescue team to the field medical point and subsequently taken to Martyr Yusuf Al Azmah Military Hospital by ambulance.

100. Blood samples were taken and the patients were treated. The patients were discharged from the hospital after 6 to 10 days.

Weather conditions in Damascus on 25 August 2013

101. Weather information from Damascus in the evening the 25 August 2013 shows temperature to be falling and to be 27°C at 2000 hours (worldweatheronline.com). There were almost no clouds, with a west-south-west wind at 10 miles per hour. Sarin spread in those conditions would disperse quite rapidly while migrating a short distance in the direction of the wind.

Information about munitions

102. The United Nations Mission did not visit the site of the alleged incident and was therefore not in a position to collect primary information concerning the munitions. According to witnesses, a catapult allegedly threw unidentified objects aiming at the military checkpoint.

Information concerning environmental samples

103. The United Nations Mission did not visit the site of the alleged incident and was therefore not in a position to collect environmental samples.

Information concerning symptoms

104. Interviews with survivors and clinicians and medical records revealed that the most severe signs and symptoms were shortness of breath, difficult breathing and eye irritation. This was followed by blurred vision, miosis, loss of consciousness, headache, fatigue and coughing.

[10] See also appendix 8.

Information concerning biomedical samples

105. On 29 September 2013, the United Nations Mission was given five samples allegedly drawn by the Syrian Government on 25 August 2013 upon the arrival of the patients at the hospital.

106. The United Nations Mission drew its own blood samples on 26 and 28 September 2013.

107. All samples were subjected to DNA testing to confirm the origin of the presented whole blood samples. The analyses confirmed that the samples provided by the Syrian Government matched those of the alleged victims interviewed and sampled. The five blood samples drawn on 25 August 2013 all tested positive for Sarin exposure, whereas those drawn on 26 and 28 September tested negative.

VI. Conclusions

108. The United Nations Mission concludes that chemical weapons have been used in the ongoing conflict between the parties in the Syrian Arab Republic.

Ghouta, 21 August 2013

109. The United Nations Mission collected clear and convincing evidence that chemical weapons were used also against civilians, including children, on a relatively large scale in the Ghouta area of Damascus on 21 August 2013.

110. This conclusion was based on the following:

(a) Impacted and exploded surface-to-surface rockets, capable to carry a chemical payload, were found to contain Sarin;

(b) Close to the rocket impact sites, in the area where patients were affected, the environment was found to be contaminated by Sarin;

(c) The epidemiology of over 50 interviews given by survivors and health-care workers provided ample corroboration of the medical and scientific results;

(d) A number of patients/survivors were clearly diagnosed as intoxicated by an organophosphorous compound;

(e) Blood and urine samples from the same patients were found positive for Sarin and Sarin signatures.

Khan Al Asal, 19 March 2013

111. The United Nations Mission collected credible information that corroborates the allegations that chemical weapons were used in Khan Al Asal on 19 March 2013 against soldiers and civilians. However, the release of chemical weapons at the alleged site could not be independently verified in the absence of primary information on delivery systems and of environmental and biomedical samples collected and analysed under the chain of custody.

112. This assessment is based on the following:

(a) The epidemiology, based on witness statements of medical staff and military personnel participating in the rescue operation and on the documentation from the local health sector provided by the Syrian Arab Republic, corroborates the occurrence of a rapidly onsetting mass intoxication by an organophosphorous compound in the morning of the 19 March 2013. There are no other suggestions as to the cause of the intoxication;

(b) Interviews with secondary exposed survivors confirm symptoms of an organophosphorous intoxication;

(c) None of the parties in the Syrian Arab Republic denied the use of chemical weapons in Khan Al Asal. The evaluation of the information provided by the Government of the Syrian Arab Republic as well as by the Governments of France, the Russian Federation, the United Kingdom and the United States indicated that chemical weapons were used in Khan Al Asal.

Jobar, 24 August 2013

113. The United Nations Mission collected evidence consistent with the probable use of chemical weapons in Jobar on 24 August 2013 on a relatively small scale against soldiers. However, in the absence of primary information on the delivery system(s) and environmental samples collected and analysed under the chain of custody, the United Nations Mission could not establish the link between the victims, the alleged event and the alleged site.

114. This assessment is based on the following:

(a) Interviews with survivors and clinicians and medical records confirm symptoms of organophosphorous intoxication;

(b) Blood samples recovered by the Syrian Government on 24 August 2013 and authenticated by the United Nations Mission using DNA techniques tested positive for signatures of Sarin;

(c) One of the four blood samples collected from the same patients by the United Nations Mission on 28 September 2013 tested positive for Sarin.

Saraqueb, 29 April 2013

115. The United Nations Mission collected evidence that suggests that chemical weapons were used in Saraqueb on 29 April 2013 on a small scale, also against civilians. However, in the absence of primary information on the delivery system(s) and environmental samples collected and analysed under the chain of custody, the United Nations Mission could not establish the link between the alleged event, the alleged site and the deceased woman.

116. This assessment is based on the following:

(a) Interviews with treating clinicians corroborating symptoms of organophosphorous intoxication;

(b) Supporting witness statements and medical records substantiating the transfer of a patient from the Shifa Hospital in Saraqueb to a hospital in Turkey;

(c) Samples of several organs from the deceased victim recovered during an autopsy performed in the presence of members of the United Nations Mission tested positive for signatures of Sarin.

Ashrafiah Sahnaya, 25 August 2013

117. The United Nations Mission collected evidence that suggests that chemical weapons were used in Ashrafiah Sahnaya on 25 August 2013 on a small scale against soldiers. However, in the absence of primary information on the delivery system(s) and environmental samples collected and analysed under the chain of custody, and the fact that the samples collected by the United Nations Mission one week and one month after the alleged incident tested negative, the United Nations Mission could not establish the link between the alleged event, the alleged site and the survivors.

118. This assessment is based on the following:

(a) Interviews with survivors and clinicians and medical records confirm symptoms of organophosphorous intoxication;

(b) Blood samples recovered by the Syrian Government on 24 August 2013, authenticated by the United Nations Mission using DNA techniques, tested positive for signatures of Sarin.

Bahhariyeh, 22 August 2013

119. In the absence of any positive blood samples, the United Nations Mission cannot corroborate the allegation that chemical weapons were used in Bahhariyeh on 22 August 2013.

120. This assessment is based on the following:

(a) Blood samples collected by the Syrian Government on 22 August tested negative for any known signatures of chemical weapons;

(b) Blood samples collected by the United Nations Mission on 25 September, tested negative for any known signatures of chemical weapons.

Sheik Maqsood, 13 April 2013

121. In the absence of further information relevant to the incident, the United Nations Mission cannot corroborate the allegation that chemical weapons were used in Sheik Maqsood on 13 April 2013.

122. The United Nations Mission remains deeply concerned that chemical weapons were used in the ongoing conflict between the parties in the Syrian Arabic Republic, which has added yet another dimension to the continued suffering of the Syrian people.

Appendix 1

Relevant legal instruments, guidance and other agreements

1. Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (1925 Geneva Protocol)

2. Guidelines and Procedures for the Timely and Efficient Investigation of Reports of the Possible Use of Chemical and Bacteriological (Biological) or Toxin Weapons (A/44/561)

3. Agreement concerning the Relationship between the United Nations and the Organization for the Prohibition of Chemical Weapons (OPCW) and the Supplementary Arrangement concerning the Implementation of Article II (2) (C) of the United Nations-OPCW Relationship Agreement

4. Agreement between the United Nations and the World Health Organization (WHO) adopted by the World Health Assembly and the Memorandum of Understanding Between WHO and the United Nations Concerning WHO's Support to the Secretary-General's Mechanism for Investigation of the Alleged Use of Chemical, Biological or Toxin Weapons

5. Exchange of letters of 13 and 14 August 2013 between the United Nations and the Syrian Arab Republic setting out the modalities of cooperation to ensure the safe, secure and efficient conduct of the work of the United Nations Mission

Appendix 2

Methodology used during the United Nations Mission

The Mission was guided by the United Nations Guidelines and Procedures for the timely and efficient investigation of reports of the possible use of chemical and bacteriological (biological) or toxin weapons (A/44/561), as well as the modern scientific standards applied by OPCW and WHO for their respective specializations.[a]

The three pillars of modern investigative methodology are:

- Appropriate chain of custody of procedures applied to all collection of evidence.
- Validated methodology used for acquiring and analysing evidence.
- Personnel used must have the appropriate training.

This United Nations Mission collected the following types of evidence: biomedical samples, environmental samples, witness interviews/statements (collected as audio and video records) and documents/photos/videos received from Government or opposition representatives or witnesses.

The following procedures, in particular aimed at ensuring the probatory chain of custody, were applied during the present United Nations Mission:

- All witness statements/interviews were recorded and the recordings were documented as evidence.
- Local medical professionals under the supervision of United Nations inspectors collected all biomedical samples. Inspectors in the United Nations Mission office completed biomedical sample pre-processing.
- All solvent-impregnated sampling wipes were pre-prepared by the United Nations Mission's chemists using analysis-grade solvents and material. Such pre-prepared wipes were sealed (with red frangible seals) in clean vials for use by the field teams. The whole process was recorded on video.
- The collected samples were in the possession of at least one United Nations inspector from the time of collection to the transport back to the United Nations Mission office.
- At the United Nations Mission office, the environmental samples were fully documented, packaged, sealed and packed appropriately for safe transport.
- The integrity of the samples was ensured through tamper-proof seals and/or through their physical possession by a United Nations inspector until the handover to the OPCW laboratory personnel upon arrival in the Netherlands. The handover was documented, photographed and witnessed, where applicable, by Syrian Government representatives.

[a] Paragraph 18 of (A/44/561) stipulates that "As early as the convention on prohibition of chemical weapons enters into force, the Secretary-General should cooperate, as appropriate, with the organs provided for in the convention, in carrying out investigations in accordance with these guidelines and procedures and the relevant provisions of the chemical weapons convention".

- The collection, packaging, sealing and handover of the samples were documented through video and photo records.
- All seals and accompanying documentation were confirmed correct/intact prior to the issuance of handover/takeover receipts.

Table 2.1
OPCW Standard Operating Procedures (SOPs) and Working Instructions (WI) for the investigation of alleged use of chemical weapons applied in the present investigation

1	QDOC/INS/SOP/IAU01:	Standard Operating Procedure for Evidence Collection, Documentation, Chain-of-Custody and Preservation During an Investigation of Alleged Use of Chemical Weapons
2	QDOC/INS/SOP/GG011:	Standard Operating Procedure for Managing Inspection Laptops and Other Confidentiality Support Materials
3	QDOC/LAB/SOP/OSA2:	Standard Operating Procedure for Off-Site Analysis of Authentic Samples
4	QDOC/LAB/WI/CS01:	Handling of Authentic Samples from Inspection Sites and Packing Off-Site Samples at the OPCW Laboratory
5	QDOC/LAB/WI/CS02:	Preparation and Analysis of Control Samples and Corresponding Matrix Blanks at the OPCW Laboratory
6	QDOC/LAB/WI/CS03:	Documentation, Chain of Custody and Confidentiality for Handling Off-Site Samples at the OPCW Laboratory
7	QDOC/LAB/WI/OSA3:	Chain of Custody and Documentation for OPCW Samples On-Site
8	QDOC/LAB/WI/OSA4:	Packing of Off-Site Samples

Epidemiology

Throughout the present United Nations Mission, an epidemiological investigative approach was applied. The epidemiological investigation substantially contributed to the team's overall understanding of the events. Methods for interviews, sampling, and review of documentation followed well-established methodologies developed and enforced by the WHO and in accordance with the Guidelines.

Standards for epidemiologic determination of cause-and-effect were first laid out in a systematic fashion by Hill in 1965.[b] The criteria to be fulfilled can be distilled down to three basic elements:

- There must be a biologically plausible link between the exposure and the outcome.
- There must be a temporal relationship between the exposure and the outcome.
- There must not be any likely alternative explanations for the symptoms.

[b] A. B. Hill, "The Environment and Disease: Association or Causation?", Proceedings of the Royal Society of Medicine, 58 (1965), 295-300.

The epidemiological investigation included a review of all documentation related to an alleged incident, epidemiological description of the incident, interviews with presenting witnesses, health-care workers and first responders, first-hand interviews with survivors, and on-site assessments of symptoms and signs, including assessments of the clinical severity of their syndromes. Further information regarding the treatment and outcomes of the alleged victims were retrieved from medical files and further interviews with treating clinicians. The epidemiological investigation yielded valuable information about the scale of each event, and provided contextual and geographic information that was later cross-checked and corroborated by the environmental sampling teams. This was especially relevant for the investigation of larger events encompassing the many elements of the society affected by the incident, like the Ghouta and Khan Al Asal incidents.

The epidemiological and clinical methodologies adopted, as well as the description of the different types of interviews performed, are described in detail in report A/67/997-S/2013/553.

In most of the investigation, the significant time delay between the alleged event and the conduct of the on-site investigation was a critical factor, which affected the probative value of sampling and analysis.

Analytical procedures

In addition to the procedures described above for securing the chain of custody of collected samples from the site to the OPCW laboratory in The Hague, similar stringent procedures were applied when distributing the samples to the designated laboratories for the analysis of the samples in accordance with the Guidelines.

The United Nations Mission used OPCW-designated laboratories for the analysis of the samples collected. These laboratories are designated by the OPCW for the analysis of authentic samples in accordance with relevant decisions taken by the States parties to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (CWC).

The OPCW-designated laboratories meet the following criteria:

(a) Have established an internationally recognized quality assurance system in accordance with relevant standards (ISO/IEC 17025:2005 or equivalent);

(b) Have obtained accreditation by an internationally recognized accreditation body for the analysis of chemical-warfare agents and related compounds in various types of samples; and

(c) Regularly participate and perform successfully in inter-laboratory proficiency tests.

The OPCW proficiency tests are based on primarily qualitative analysis of test samples with unknown sample composition to determine the presence of essentially any number of possible chemicals relevant to the CWC. The salient features of the test listed below demonstrate it to be one of the most challenging proficiency testing, which requires highly competent analytical skills and stringent quality control.

- Covers a diverse nature of chemicals

- Involves blind testing for an almost infinite number of chemicals in complex matrices
- Does not prescribe a method
- Requires detailed reporting of results
- Allows for only a short timeline
- Involves a zero tolerance for false positives
- Involves a performance rating

Environmental samples

The methods used by the designated laboratories for the analysis of the environmental samples collected by the United Nations Mission are validated in the OPCW proficiency testing and in the accreditation of the laboratories, described above. The laboratories followed their standard operating procedures for sample preparation (extractions, derivatizations, concentration, etc.) followed by analysis utilizing primarily gas chromatography-mass spectrometry (electron impact ionization). Secondary techniques included gas chromatography-atomic emission detection, gas chromatography-mass spectrometry (chemical ionization), liquid chromatography-mass spectrometry, liquid chromatography-tandem mass spectrometry, and/or nuclear magnetic resonance spectroscopy.

Biomedical samples

The methods used by the designated laboratories for the analysis of the biomedical samples collected by the United Nations Mission are currently being evaluated through confidence-building exercises for the analysis of biomedical samples.

For the analysis of biomedical samples, the United Nations Mission used designated laboratories involved in the OPCW confidence-building exercises for biomedical samples.

Biomedical samples were analysed for Sarin signatures, i.e. for free Sarin and its breakdown products, and in addition, for Sarin adducts to proteins available in the human body, mainly cholinesterase and albumin. Protein-bound Sarin was analysed following the established fluoride reactivation sample preparation procedure described by Holland et al, 2008,[c] and van der Meer et al, 2010.[d] The biomedical samples were analysed by each laboratory using standard operating procedures (extractions, derivatizations, concentration, etc.) to prepare the urine samples for analysis. The plasma or blood samples were prepared for analysis using the fluoride regeneration method. Techniques used for the analysis included gas chromatography-high resolution mass spectrometry, gas chromatography-tandem mass spectrometry, liquid chromatography-tandem mass spectrometry and/or gas chromatography-flame photometric detection.

[c] K. E. Holland, et al, “Modifications to the organophosphorus nerve agent-butyrylcholinesterase adduct refluoridation method for retrospective analysis of nerve agent exposures”, Journal of Analytical Toxicology, 32 (2008), 116-124.

[d] J. A. van der Meer, et al, “Comprehensive gas chromatography with Time of Flight MS and large volume introduction for the detection of fluoride-induced regenerated nerve agent in biological samples”, *Journal of Chromatography B*, 878 (2010), 1320-1325.

DNA analysis

Comparative investigations based on DNA analysis were performed by the Netherlands Forensic Institute (NFI), in response to a request made by the United Nations Mission.

A comparative DNA investigation at the NFI was conducted in three successive steps: the DNA analysis, the DNA profile interpretation and, finally, the DNA profile comparison and the statistical evaluation.

The NFI is accredited by the Dutch Accreditation Council according to ISO/IEC 17025 standards.

Staff training

Sampling, interviews and all other collection of evidence was performed by qualified and fully trained inspectors. In addition, staff training was regularly performed and documented in the various subtopics essential for the performance of safe and efficient inspections.

Ethical issues and considerations

In conducting the clinical assessments and detailed interviews, full consideration was given to the privacy and protection of participants. All information was kept confidential and the identity of survivors protected at all times. An identity number was assigned to each survivor and this number was used for the processing of data. The master list with the names of the witnesses was kept secure with the United Nations Mission. Throughout the investigation, the United Nations Mission made all efforts to respect religious values and norms, national customs, and the personal pressures and traumas associated with exposure to conflict.

Appendix 3

Khan Al Asal, 19 March 2013

In a letter dated 19 March 2013, the Syrian Arab Republic reported its allegation that, at 0730 hours on 19 March, armed terrorist groups had fired a rocket from the Kfar De'il area towards Khan Al Asal in the Aleppo governorate. According to the allegation, the rocket travelled approximately 5 kilometres and fell 300 metres away from a Syrian Arab Republic army position. Following its impact, a thick cloud of smoke left unconscious anyone who inhaled it. The incident reportedly resulted in the deaths of 25 people and injured more than 110 civilians and soldiers, who were taken to hospitals in Aleppo.

Other Member States, including France, the United Kingdom of Great Britain and Northern Ireland and the United States also reported allegations that chemical weapons had been used at Khan Al Asal in Aleppo on 19 March 2013, resulting in civilian deaths and serious injuries.

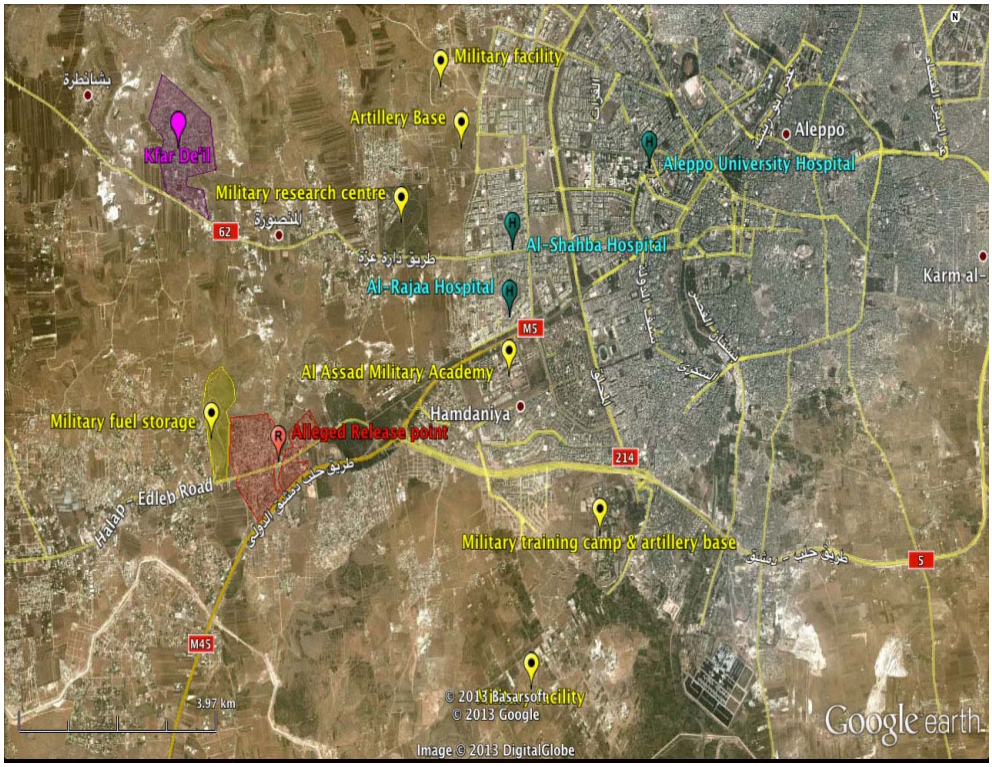
Pending agreement from the Government of the Syrian Arab Republic on the modalities for the proper, safe and efficient conduct of the investigation, from April to August 2013, the Head and members of the United Nations Mission travelled to, and met with, various Government officials and technical experts from France, Germany, the United Kingdom of Great Britain and Northern Ireland and the United States of America. The United Nations Mission also received additional information from the Government of the Syrian Arab Republic on the alleged incident, including a list of names of people killed or injured from the alleged chemical weapon attack. The United Nations Mission also received a video pertaining to the incident and a report from the Government of the Russian Federation, providing the results of its own investigation of the incident.

From 19 to 22 August 2013 and from 25 to 30 September, the United Nations Mission also conducted fact-finding activities in the Syrian Arab Republic, including interviews with civilian survivors, military officers, doctors, and military and civilian responders to the incident. Based on the security assessment of the situation at Khan Al Asal, the United Nations Mission could not conduct on-site activities. Detailed interviews with civilian survivors, military officers, doctors, and military and civilian responders took place from 21 to 22 August 2013 at the Sheraton Hotel in Damascus. In addition, the United Nations Mission collected biomedical samples in Damascus on 22 August 2013 from two alleged victims.

Based on the evaluation of the information provided by the Member States concerned in their reports of alleged use of chemical weapons in Khan Al Asal and during the visits to the respective capitals, and based on the interviews conducted, the United Nations Mission could ascertain the following.

The location of the incident is the Haret Al Mazar neighbourhood close to the shrine of Sheikh Ahmad Al Asali located at the southern part of the Khan Al Asal village in the vicinity of a position held at the time by the armed forces of the Syrian Arab Republic in the Aleppo governorate (see figures 3.1 and 3.2). In the neighbourhood, there are one-story buildings with farming areas around the house. According to witness statements, the incident took place on 19 March 2013 at approximately 0700 hours.

Figure 3.1



The Khan Al Asal area west of Aleppo is indicated in red. This figure also illustrates the location of the Kfar De'il area, as well as some hospitals and some military installations.

Figure 3.2

The impact point (upper yellow pin) can be noted south of the Aleppo-Idlib road. The location of an interviewed witness is illustrated as the lower yellow pin north of the M 45 road. As indicated by the two red pins, most victims were, according to the witness, located south of the Aleppo-Idlib road and west from the release point.

The village of Khan Al Asal was under the control of Syrian Government forces on 19 March 2013. At the time of the incident, there was ongoing shelling with opposition forces located in areas surrounding this village. At about 0700 hours an object (munition) landed near a living quarter approximately 300 metres from a military checkpoint. The munition released gas on its impact. The air stood still and witnesses described a yellowish-green mist in the air and a pungent and strong sulfur-like smell.

The witnesses reported seeing people scratching their faces and bodies. They also observed people lying in the streets, some unconscious, some having convulsions and foaming from the mouth, and some complaining about vision problems. The witnesses also observed dead cattle, dogs, cats and chickens at the site.

Alleged victims were evacuated to six hospitals, namely the al-Raja hospital (25 individuals), the Zahi Azraq public hospital (25 individuals), the Syrian specialized hospital (30 individuals), the Shahba private hospital (6 individuals), the Military Hospital in Aleppo, and the Aleppo University Hospital (63 individuals). After initial treatment, some of the alleged victims were later referred to the Aleppo University Hospital.

Local civilians aided by military personnel rescued and evacuated those affected, since the centrally organized Emergency Response Infrastructure had been disrupted by the ongoing conflict. Witnesses referred to first responders encountering secondary contamination as the rescue effort went on.

According to witness statements, at least one affected family buried their deceased in a family cemetery in Khan Al Asal as “martyrs, without being washed and in the clothes they were wearing”.

Environmental fact-finding activities

Due to the security conditions in the area of the alleged dispersion of chemical weapons, the United Nations Mission was not able to conduct an on-site visit to Khan Al Asal.

Information about munitions

The United Nations Mission received contradicting information as to how chemical weapon agents were delivered in the Khan Al Asal incident. Witness statements collected by the UNHRC Commission of Inquiry, provided to the United Nations Mission, supported the position by the Syrian Arab Republic that a rocket was fired from the neighbourhood. However, according to other witness statements to the UNHRC Commission of Inquiry, an overflying aircraft had dropped an aerial bomb filled with Sarin.

The United Nations Mission was not able to collect any primary information or any “untouched” artifacts relevant to the incident and necessary for an independent verification of the information gathered.

Environmental samples

The United Nations Mission did not conduct an on-site visit the Khan Al Asal site and therefore did not collect any environmental samples.

The United Nations Mission received from the Government of the Russian Federation its report of the results of the analysis of samples obtained from Khan Al Asal from 23 to 25 March 2013, which identified Sarin and Sarin degradation products on metal fragments and in soil samples taken at the site of the incident.

The analysis of the samples was conducted by a laboratory that has established an internationally recognized quality assurance system and performs successfully in the OPCW inter-laboratory proficiency tests. However, after the evaluation of the report, the United Nations Mission could not independently verify the information contained therein, and could not confirm the chain of custody for the sampling and the transport of the samples.

Biomedical fact-finding activities

On 14 August 2013, prior to its deployment to Damascus, the United Nations Mission sent a detailed request for the Syrian Government, which included, inter alia, the plan for the initial meetings, the information needed to advance the on-site data collection, the name of individuals (survivors, witnesses, first responders, health-care personnel, etc.) required for interviews, and the type and nature of samples needed.

On 20 August 2013, the Syrian Government submitted the following information:

i. List with names of 12 civilian and military first responders

ii. List with names of 20 deceased cases

iii. List with names of 124 victims (civilians and soldiers)

iv. Names of 6 referral hospitals

v. List with names of 41 doctors who treated the alleged victims in the different hospitals

vi. List with names of 7 nurses who treated the alleged victims in the different hospitals

vii. Medical reports/records from 5 hospitals

viii. A police report related to the incident

ix. A report from the military police related to the incident

x. Thirteen medical reports from the medical forensic centre describing the cases and the cause of death as a respiratory depression and cardiac failure following the inhalation of toxic material

The information provided through the epidemiological investigation of Khan Al Asal corroborated what had been provided to the Mission from a number of sources. An in-depth epidemiological investigation focused on the medical response to the alleged victims and on the etiology via the use of clinical and laboratory diagnostic tools. During this investigation, the Mission was able to ascertain that the cases had been exposed through both direct exposure to the alleged device but also through secondary contamination. This information was consistent with the range of severities seen in the cluster of cases. The medical care provided to the alleged victims, and in particular to the deceased case, was consistent with the syndrome reported, and the etiology found.

Table 3.1 below illustrates the number of victims that what was communicated to the United Nations Mission on different occasions.

Table 3.1
Number of victims encountered in the Khan Al Asal incident reported by the Syrian Arabic Republic

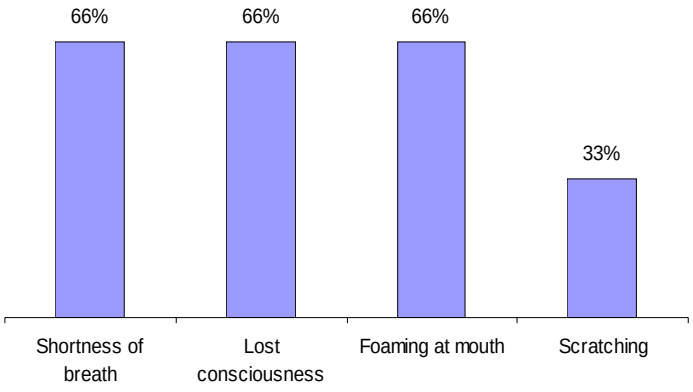
	Allegation 20 March 2013	Ministry of Health report 19 March 2013	Reply to consolidated questions 25 March 2013	Government 20 August 2013
Civilian victim			119	107
Soldier victim			17	17
Total victims	**110**	**134**	**136**	**124**
Civilian deceased			19*	19
Soldiers deceased			1	1
Total deceased	**25**	**25**	**20**	**20**

* Two names were repeated.

Interview with survivors

The United Nations Mission conducted interviews with three survivors that participated in the rescue operation. They described the symptoms observed when helping the alleged victims, which included shortness of breath, vision problems and loss of consciousness. The three interviewees also described their own symptoms, which indicated that they were intoxicated by secondary contamination and ended up in a hospital (see chart 3.1).

Chart 3.1
Signs and symptoms of patients according to the patient interview



Interviews with clinicians

No treating clinicians were made available for interviews at the time of the investigation, when the United Nations Mission was present in Damascus.

Medical records

On the 19 March 2013, the Ministry of Health of the Syrian Arab Republic issued a statement informing that there was “a missile containing chemical products killing 25 civilian and military people and injuring 134 others. There are 14 people in a critical state and receiving intensive care at 6 Aleppo hospitals. It has been noticed that hospitalized people are suffering confusion, pupil constriction, neurological symptoms, tachycardia, dyspnea, rhonchi and rales in the pulmonary fields, and general debility. The laboratory tests of the injured showed reduced efficacy of cholinesterase enzyme in the plasma.”

According to the report handed over to the United Nations Mission on 20 August 2013 in Damascus, including medical records from five hospitals, the symptoms observed among alleged victims at various hospitals included miosis, blurred vision, conjunctivitis, foaming at mouth, coughing, rhinorrhea, respiratory distress, bronchospasm, nausea, vomiting, cyanosis and headache.

The same report indicated that the alleged victims had been generally treated with antibiotics, hydrocortisone, atropine and an oxime. The cases had varied between

mild and severe. Some patients had been given oxygen and several had required intensive care. Admitted and treated patients had stayed between two days and two weeks in the hospitals. Miosis had been reported to last for several weeks.

Biomedical samples

Biomedical samples of interest to the United Nations Mission include blood, urine and hair samples of alleged victims. Arriving in Damascus five months after the incident, such sampling was not deemed meaningful by the United Nations Mission because no remainder of any signature of Sarin could be expected. The team was open, however, to receiving any biomedical samples previously collected by the Syrian Government, which the United Nations Mission would authenticate through DNA tests.

For this purpose blood samples and corresponding DNA samples were collected from two civilians who were allegedly exposed to secondary contamination. The samples were processed and shipped to designated laboratories for analysis, according to the methodology presented in Appendix 2. No traces or signatures of any chemical warfare agent were detected in any of these samples.

No biomedical samples were handed over to the United Nations Mission by the Syrian Government.

Appendix 4

Saraqueb, 29 April 2013

On 23 May 2013, the Government of the United Kingdom of Great Britain and Northern Ireland reported to the Secretary-General an allegation of the use of chemical weapons at Saraqueb on 29 April 2013. In a letter dated 27 June 2013, the Government of France reported to the Secretary-General that, in the course of consultations held with the Head of Mission in Paris on 4 June 2013, it had shared information in its possession, which, in their view, indicated that Sarin had been used in that incident.

Pending agreement from the Government of the Syrian Arab Republic on the modalities for the proper, safe and efficient conduct of the investigation, the United Nations Mission conducted fact-finding activities in Turkey from 24 to 28 June 2013 and from 4 to 6 July 2013 in accordance with the relevant provisions of the Guidelines.

From 24 to 28 June the United Nations Mission interviewed treating doctors from Syria and from Turkey and a source close to the opposition. During the second visit to Turkey, the United Nations Mission visited a clinical laboratory of the Ministry of Health in Ankara and a forensic laboratory of the Ministry of Justice. In addition, the United Nations Mission observed the autopsy of a deceased alleged victim at the hospital in Reyhanli, Hatay Province, and recovered tissue samples for subsequent analysis.

The source close to the opposition claimed that, on 29 April 2013, a helicopter was seen passing above the western part of Saraqueb flying from north to south and that the helicopter allegedly dropped items at three locations (see figures 4.1 and 4.2). The first point of impact was reportedly in the northern area of the town (location A), the second in the middle of the courtyard of a family house (location B), and the third was close to an opposition checkpoint on the roads to Idlib and Aleppo (location C).

Figure 4.1

This figure shows an overview of the town of Saraqueb. The three alleged locations for impact (locations A, B and C) are indicated.

Figure 4.2

This figure shows the alleged impact site, location B, in higher magnification.

A trail of white smoke reportedly came down from the helicopter as improvised munitions were allegedly observed being dropped.

The same source claimed that an improvised device fell into the courtyard of a private house (location B) and allegedly intoxicated some of the family members. The patients were transferred to the Shifa Hospital and were treated for organophosphorous intoxication. The information provided by the above-mentioned source could not be independently verified by the United Nations Mission.

Based on the interviews with the treating doctor from the Shifa Hospital, the United Nations Mission ascertained that at around 1640 hours he was called to the Accident and Emergency Department in order to attend to two patients (a 52-year-old woman and her daughter-in-law, who was pregnant). Initially the 52-year-old patient, allegedly more severely intoxicated, was unconscious and foaming at the mouth. She was intubated, supported by oxygen and repeatedly given 1-mg doses of atropine. The other patient was confused and disoriented, and went unconscious.

Six additional patients arrived at Shifa Hospital from the neighbourhood of location B. They were conscious, but agitated and with small pupils. Two additional patients of the Free Syrian Army (FSA) arrived from location C. All of these patients recovered relatively quickly after treatment with a small amount of atropine. One of the paramedics showed symptoms of secondary intoxication.

The treating doctor at Shifa Hospital reported that a relative tried to bury a tear gas-type canister under soil. This relative developed symptoms (dyspnea, nausea, vomiting and constricted pupils) within 15 minutes and was admitted to the Hassan Hospital. The patient was treated with atropine for 30 minutes, his condition improved and he was released from the hospital. The United Nations Mission did not establish the provenance of the individual and could not link it to any of the locations of alleged use.

In spite of the atropine treatment received, the 52-year-old woman’s health condition deteriorated considerably while she was at the Shifa Hospital and it was

decided to send her to a hospital in Turkey. The daughter-in-law recovered after 15 to 20 minutes of atropine treatment, however, it was later decided to also send her to Turkey.

At 1845 hours an ambulance with the 52-year-old woman arrived at a Syrian border hospital. A medical officer referred the patient straight to the border, in view of receiving treatment at Reyhanli Hospital in the Hatay Province, Turkey, however, entry into Turkey was denied out of concerns of contamination. The ambulance, accordingly, returned to the Syrian border hospital.

The other patient, the daughter-in-law, arrived at 1930 hours at the border hospital. According to the medical officer, she could walk, but had nausea and was vomiting. She spoke slowly and was confused. At 2045 hours both patients returned to the Turkish border and were eventually allowed to enter Turkey at around 2200 hours. Eleven additional persons — four additional alleged victims and their relatives — crossed the border at that time.

Access to Turkey was granted after the 112 Rescue Service in Hatay, the Turkish Ministry of Health and the Governor of Hatay Province were informed. The vehicles transporting the alleged victims and their relatives were escorted by the Turkish Rescue Service, and measures were taken at the hospital to receive Syrian patients allegedly exposed to chemical weapons.

Environmental fact-finding activities

Information about munitions

Based on the information gathered by the United Nations Mission from the source close to the opposition, the Saraqueb incident was atypical for an event involving alleged use of chemical weapons. The munitions allegedly used could hold only as little as 200 ml of a toxic chemical. Allegedly tear gas and chemical weapon munitions were used in parallel. The core of the device allegedly used was a cinder block (building material of cement) with round holes. These holes could, allegedly, serve to “secure” small hand grenades from exploding. As the cinder block hit the ground, the handles of the grenades would become activated and discharged. Some of the hand grenade-type munitions allegedly contained tear gas, whereas other grenades were filled with Sarin.

The United Nations Mission was not able to conduct an on-site visit and was therefore not able to collect any primary information on munitions. The information gathered from the interviews with the source close to the opposition could not be corroborated by the United Nations Mission.

Information concerning environmental samples

The United Nations Mission did not conduct on-site activities at Saraqueb and was therefore unable to collect any environmental samples connected with this site.

Biomedical fact-finding activities

The main elements of a biomedical investigation included interviews with survivors, biomedical sampling, interviews with treating clinicians and a review of medical records. In the special circumstances of the Saraqueb investigation, interviews with treating clinicians and sampling were conducted in a neighbouring country (Turkey).

Interviews with survivors

No survivors were interviewed.

Interviews with clinicians

Patients were examined on three occasions. Patients were first observed and treated at Shifa and Hassan hospitals, then observed and treated at the border hospital during transit to Turkey, and finally again examined and diagnosed at the receiving hospital in Reyhanli in Hatay Province, Turkey.

Primary receiving hospitals in Saraqueb between 1640 and 1845 hours

The primary hospitals Shifa and Hassan received 11 patients in total complaining about signs of intoxication. The table 4.1 below depicts the degree of severity of intoxication ascertained by the United Nations Mission based on the symptoms described by the clinicians.

Table 4.1
Classification of patients based on the severity of the symptoms

Level of intoxication	Mild	Moderate	Severe
Number of patients	9	1	1

The nine patients with mild symptoms complained about confusion, were agitated and had small pupils. Some of these patients were treated with atropine and recovered relatively quickly. Others seemed to have recovered spontaneously within a short period of time. All of the patients with mild symptoms recovered after treatment at the primary hospital. It is impossible to assess how many of these patients had actually been exposed to an organophosphorous compound or to tear gas, or belonged to the “worried well” group, i.e. alleged patients with minimal or no exposure to a chemical agent who sought medical care out of fear of exposure.

One patient showed symptoms judged to be moderate. This patient, a pregnant female, recovered after 15 to 20 minutes of atropine treatment. The United Nations Mission gathered that the patient later gave birth to a healthy child.

The severely intoxicated 52-year-old woman arrived at the clinic unconscious. She was given CPR and was thereafter intubated and put on oxygen. She was repeatedly given doses of 1 mg atropine. According to the medical doctor, the patient’s health conditions deteriorated considerably and it was decided to send her to Turkey.

Transiting Hospital at Turkish border between 1845 and 2045 hours

The severely intoxicated 52-year-old woman arrived at the transiting hospital intubated and on oxygen. Her skin was red, and her heart rate was from 108 to 110 bpm. The tube was removed and she was given an oxygen mask. According to the medical doctor, the patient had broncho constriction and edema-filled lungs with a wheezing and rales-like sound. The medical doctor recalled that her blood pressure was 100 over 70. Her heart rate was 108 bpm and the oxygen saturation of the blood was 98 per cent.

The patient was on saline and had an oxygen mask, and was given 12 injections of atropine (1 mg each). There was some improvement of the miosis and the patient remained unconscious but breathing spontaneously.

The moderately intoxicated patient arrived at the border hospital at 1930 hours. According to the examining doctor, the patient was conscious and could walk, but had nausea and was vomiting. She spoke slowly and appeared to be confused. The oxygen saturation of her blood was 93 per cent.

Some of the patients with mild symptoms were also transiting at the border hospital. There was no mention of their condition.

Hospital in Reyhanli, Hatay Province, Turkey

A total of 12 persons arrived at Reyhanli Hospital, including five patients allegedly intoxicated with chemical weapons. They did not provide any medical records or referrals from the Syrian hospitals. The severely intoxicated patient was declared dead between 2230 and 2245 hours, before arriving to the hospital, by a Turkish doctor of the Rescue Service escorting the patient from the border.

The hospital proceeded to the decontamination of 12 persons, comprising 5 patients and 7 relatives, as well as of the corpse.

The examining doctor (an anesthesiologist) interviewed by the United Nations Mission did not observe symptoms to suggest an exposure to toxic chemicals. The patients were examined and had their lungs X-rayed. The moderately and mildly intoxicated patients seemed fit at a first brief control. Blood samples were taken by hospital personnel and were sent to the Turkish Ministry of Health for further analysis.

The cholinesterase activity of the blood withdrawn from the deceased patient was 1,084 U/L (the normal range is 5,100-11,700 U/L).

Biomedical samples

The hospital in Reyhanli was notified that the victim was potentially exposed to chemical weapons. The regional prosecutor’s office requested that the body be placed securely in the hospital morgue until the potential risks to others had been identified. The body was placed under guard of the hospital security. Blood samples were taken and sent to a laboratory of the Ministry of Health in Ankara for analysis.

During the second visit to Turkey, a member of the United Nations Mission conducted a review of the body in Reyhanli Hospital along with representatives from the regional prosecutor’s office. The body appeared to be in good condition, however, it was noted that the body was previously autopsied. The medical doctors of the hospital explained that it was related to an administrative mistake and the procedure was not completed.

During an autopsy performed on 4 July 2013, which was observed by members of the United Nations Mission, samples of several organs from the deceased woman’s body were recovered by the chief regional pathologist. Members of the medical staff from the hospital were also present.

Samples from 12 different organs and tissues were collected and split into four sets (three sets taken by the United Nations Mission, and one set retained by Turkish

officials). The entire collection of samples was video- and audio-recorded by the United Nations Mission, as well as by the regional prosecutor's office. The samples were packed and shipped under chain-of-custody conditions to designated laboratories.

The samples were also sent by the United Nations Mission for DNA tests to a forensic laboratory in order to authenticate the provenance of the organs.

Results

Using videos allegedly taken throughout the sequence of events described to the United Nations Mission during the interviews with the treating physicians, the corpse autopsied at the Reyhanli Hospital was positively identified as the "52-year-old woman". The United Nations Mission compared the DNA of tissues taken from her intact body, skin and breast fat with the DNA of her internal organs, and accordingly confirmed the true identity of all organs and tissues sampled.

The results of the biomedical samples of several organs from the deceased woman indicated signatures of a previous Sarin exposure (table 4.2). A sample is considered positive, when either the Sarin metabolite isopropyl methylphosphonic acid (iPMPA) or the fluoride reactivation product of IMPA (Sarin) is detected at three times above base line level.

Some organ/tissue samples were only found positive by one of the laboratories, however, the overall pattern was positive. Therefore, no third laboratory analysis was conducted.

Table 4.2
Summary table of laboratory results for biomedical samples taken from one deceased individual

SN	Sample	Laboratory 1 Sarin and its metabolites	Laboratory 2 Sarin and its metabolites
1	Hair	Positive	Positive
2	Kidney	Positive	Positive
3	Skin	Positive	Positive
4	Blood	Positive	Positive
5	Liver	Positive	Positive
6	Breast fat	Positive	
7	Muscle	Positive	
8	Bronchus	Positive	Positive
9	Lung	Positive	Positive
10	Eye	Positive	
11	Brain	Positive	Positive
12	Heart	Positive	

Note: Identification is positive when either the Sarin metabolite isopropyl methylphosphonic acid (IMPA) or the fluoride reactivation product of IMPA (Sarin) is detected.

The United Nations Mission received from the Government of France the report of the results of the analysis of biomedical samples obtained by the French Government in relation to the Saraqueb incident on 29 April 2013. This report identified Sarin signatures and Sarin degradation products in biomedical samples taken in connection with the incident.

The analysis was conducted by a laboratory with adequate analytical capabilities, i.e. that had established an internationally recognized quality assurance system and that participated and performed successfully in inter-laboratory proficiency tests. However, after the evaluation of the report, the United Nations Mission could not independently verify the information contained therein, and could not confirm the chain of custody for the sampling and the transport of the samples.

The Turkish authorities shared the results of their own investigation with the United Nations Mission. The analysis of the deceased patient's blood by the forensic laboratory of the Turkish Ministry of Justice showed identifiable levels of several pharmacological compounds.

The laboratory also attempted to analyse the samples for chemical warfare agents, however, the methods applied were not adequate for this purpose, therefore the results were not conclusive.

Appendix 5

Ghouta, 21 August 2013: Final laboratory results

The final laboratory results on environmental samples from Ghouta (Moadamiyah and Zamalka) are published below (see table 5.1). The results further support the conclusion of the earlier report (A/67/997-S/2013/553), improving the consistency between the results of the two laboratories.

Table 5.1
Detailed analysis results for environmental samples taken in Moadamiyah on 26 August 2013 and Zamalka on 28 and 29 August 2013

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
1	26/08/2013	01SLS	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate	Soil sample taken from one impact point in a house in Moadamiyah
2	26/08/2013	07SDS **DCM ex**	None	None	None	None	None	Diisopropyl methylphosphonate	Fragment piece of rocket taken from the floor of the outside terrace in the house adjacent to the impact point
		07SDS **Water ex**	None	None	None	None	None	None	
3	26/08/2013	08SDS **DCM ex**	None	None	None	None	None	Diisopropyl methylphosphonate	Fragment from ordnance taken from the floor of the outside terrace in the house adjacent to the impact point
		08SDS **Water ex**	None	None	None	None	Yes iPMPA	Diisopropyl methylphosphonate Hexafluoro phosphate Hexamethylenetetramine	

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
4	26/08/2013	02SDS	None	None	None	None	None	None	Pieces of fabric taken from one bed sheet and one carpet on the floor, in the living room of the apartment at the impact point in Moadamiyah
5	26/08/2013	03WPS	None	None	None	None	None	Hexamethylenetetramine	A dichloromethane wipe sample taken from the floor of the first room in the basement of the apartment at the impact point in Moadamiyah
6	26/08/2013	04WPS	None	None	None	None	None	Hexamethylenetetramine	A methanol wipe sample taken from the floor of the first room in the basement of the apartment at the impact point in Moadamiyah
7	26/08/2013	05WPS	None	None	None	None	None	Hexamethylenetetramine	A dichloromethane wipe sample taken from the floor, the edge of the wall and the wall of the second room in the basement of the apartment at the impact point in Moadamiyah

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
8	26/08/2013	06WPS	None	None	None	None	None	None	A methanol wipe sample taken from the floor, the edge of the wall and the wall of the second room in the basement of the apartment at the impact point in Moadamiyah
9	26/08/2013	09WPS	None	None	None	None	None	Diisopropyl methylphosphonate Hexamethylenetetramine	A dichloromethane wipe sample taken from a ceramic tile floor in the bedroom where victims were allegedly affected with toxic chemicals
10	26/08/2013	10WPS	None	None	None	None	None	None	A methanol wipe sample taken from the sole of a slipper. The slipper was worn at the time of the incident by a witness who was helping in the bedroom where victims were allegedly affected with toxic chemicals
11	26/08/2013	12SDS	None	None	None	None	None	None	Pieces of fabric taken from one pillow. One of the victims allegedly affected with toxic chemicals was lying on the bed using this pillow.

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
12	26/08/2013	11SDS	None	Yes iPMPA and MPA	Diisopropyl dimethylpyro-phosphonate	None	None	None	A head scarf of a victim allegedly affected with toxic chemicals who was wearing it at the time of the alleged exposure.
13	26/08/2013	13SDS	None	None	None	None	None	None	Pieces of fabric taken from the outer and the inner liners of a mattress. The mattress was in the bedroom of the ground floor apartment where one victim was sleeping at the time of the alleged exposure.
14	28/08/2013	01SDS **DCM ex**	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Ethyl isopropyl methylphosphonate Hexamethylenetetramine	A fragment from the rocket found on the roof of one house nearby the impact point
		01SDS **Water ex**	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Hexafluoro phosphate Hexamethylenetetramine	

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
15	28/08/2013	06WPS	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Hexamethylenetetramine	A dichloromethane wipe sample taken from a metal piece (fragment from the rocket) found on the roof of a house nearby the impact point
16	28/08/2013	03WPS	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	GB (1)	None	Diisopropyl methylphosphonate Isopropyl methyl methylphosphonate Hexamethylenetetramine	A methanol wipe sample taken from a metal piece (rocket fragment) found on the roof of a house nearby the impact point
17	28/08/2013	02SLS	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Diisopropyl dimethylpyro-phosphonate Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Ethyl isopropyl methylphosphonate Isopropyl methyl methylphosphonate Isopropyl propyl methylphosphonate Trinitrotoluene Trinitro triazine Hexamethylenetetramine	Rubble taken from the impact point on the roof of the building

	Sampling date	Sample code		Result laboratory 1			Result laboratory 2			Description of the sample
				Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
18	28/08/2013	07WPS		None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	GB (1)	None	Diisopropyl methylphosphonate Hexamethylenetetramine	A dichloromethane wipe sample taken from the inner tube of the rocket warhead one floor below the roof (impact point)
19	28/08/2013	04SDS	**DCM ex**	GB	None	Diisopropyl methylphosphonate Hexamethylenetetramine	GB	None	Diisopropyl methylphosphonate Ethyl isopropyl methylphosphonate Hexamethylenetetramine	A metal fragment of the ordnance taken next to the impact point on the roof of the building
			Water ex	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine Methylphosphonofluoridic acid	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Hexafluorophosphate Hexamethylentetramine	
20	28/08/2013	05SDS	**DCM ex**	GB	None	Diisopropyl methylphosphonate Hexamethylenetetramine	GB	None	Diisopropyl methylphosphonate Hexamethylenetetramine	Metal ring of the ordnance taken next to the impact point on the roof of the building
			Water ex	None	Yes iPMPA	Diisopropyl methylphosphonate Methylphosphonofluoridic acid Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Hexafluoro phosphate Methylphosphonofluoridic acid Hexamethylentetramine	

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
21	28/08/2013	09SLS	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Diisopropyl dimethylpyro-phosphonate Hexamethylenetetramine	GB (1)	None	Diisopropyl methylphosphonate Ethyl isopropyl methylphosphonate Isopropyl methyl methylphosphonate Hexamethylenetetramine	Soil sample taken from the underground nearby the head of the rocket
22	28/08/2013	10WPS	None	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	GB	None	Diisopropyl methylphosphonate Diisopropyl dimethylpyrophosphonate Ethyl isopropyl methylphosphonate Hexamethylenetetramine	A dichloromethane wipe sample taken from rocket body
23	28/08/2013	11WPS	GB	Yes iPMPA	Diisopropyl methylphosphonate Diisopropyl dimethylphosphonate Methylphosphonofluoridic acid Hexamethylenetetramine	GB	None	Diisopropyl methylphosphonate Isopropyl methyl methylphosphonate Dimethyl fluorophosphates Methyl methylphosphonofluoridate Dimethyl methylphosphonate Hexamethylenetetramine	A methanol wipe sample taken from a metal fragment from the rocket, giving a reading on LCD 3.3, found near the rocket and the impact point.

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
24	28/08/2013	08SLS	GB	Yes iPMPA	Diisopropyl methylphosphonate Diisopropyl dimethylpyro-phosphonate	GB (1)	None	Diisopropyl methylphosphonate Ethyl isopropyl methylphosphonate Isopropyl methyl methylphosphonate Hexamethylenetetramine	Soil sample taken from the upper part of the ground on the head of the rocket
25	28/08/2013	12SDS **DCM ex**	GB	None	Diisopropyl methylphosphonate Hexamethylenetetramine	GB (2)	None	Diisopropyl methylphosphonate Ethyl isopropyl methylphosphonate Isopropyl propyl methylphosphonate Diisopropyl dimethylpyrophosphonate Hexamethylenetetramine	Metal bolt removed from rocket head combined with paint rust scratched from the surface surrounding the bolt.
		12SDS **Water ex**	None	Yes iPMPA	Diisopropyl methylphosphonate Methylphosphonofluoridic acid Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Hexafluoro phosphate Methylphosphonofluoridic acid Hexamethylenetetramine	

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
26	29/08/2013	01SDS **DCM ex**	GB	None	Diisopropyl methylphosphonate Hexamethylenetetramine	GB (2)	None	Diisopropyl methylphosphonate Diisopropyl dimethylpyrophosphonate Hexamethylenetetramine	Metal fragment of the ordnance
		01SDS **Water ex**	GB	Yes iPMPA	Diisopropyl methylphosphonate Methylphosphonofluoridic acid Hexamethylenetetramine	None	Yes iPMPA and MPA	Diisopropyl methylphosphonate Hexafluoro phosphate Methylphosphonofluoridic acid Trinitro triazine Hexamethylenetetramine	
27	29/08/2013	03WPS	GB	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	GB	None	Diisopropyl methylphosphonate Diisopropyl dimethylpyrophosphonate Hexamethylenetetramine	A dichloromethane wipe sample taken from the inside surface part of the window in the kitchen
28	29/08/2013	04SDS	GB	None	Diisopropyl methylphosphonate Hexamethylenetetramine	GB (2)	None	Diisopropyl methylphosphonate Hexamethylenetetramine	Rubber gasket from window

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
29	29/08/2013	02SLS	GB	Yes iPMPA	Diisopropyl methylphosphonate Isopropyl propyl methylphosphonate Diisopropyl dimethylpyro-phosphonate Hexamethylenetetramine	GB	None	Ethyl isopropylmethylphosphonate Isopropyl methyl methylphosphonate Hexamethylenetetramine	A soil sample taken from the balcony floor
30	29/08/2013	05SLS	GB	Yes iPMPA	Diisopropyl methylphosphonate Hexamethylenetetramine	GB (2)	None	Diisopropyl methylphosphonate Diisopropyl dimethylpyrophosphonate Hexamethylenetetramine	A soil sample taken from the corner of the balcony
31	25/08/2013	01BLB	None	None	None	None	None	None	DCM solvent blank used by the team during the sample collection
32	25/08/2013	02BLB	None	None	None	None	None	None	MeOH solvent blank used by the team during the sample collection
33	25/08/2013	01WPB	None	None	None	None	None	None	Blank wipe with dichloromethane prepared in team office
34	25/08/2013	02WPB	None	None	None	None	None	None	Blank wipe with dichloromethane prepared in team office

	Sampling date	Sample code	Result laboratory 1			Result laboratory 2			Description of the sample
			Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	Chemical weapon agent	Degradation and/or by-products	Other interesting chemicals	
35	25/08/2013	03WPB	None	None	None	None	None	None	Blank wipe with methanol prepared in team office
36	25/08/2013	04WPB	None	None	None	None	None	None	Blank wipe with methanol prepared in team office
37		10	None	None	None	None	None	None	Hair
38		17	None	None	None	None	None	None	Hair
39		36	None	None	None	None	None	None	Hair
40		38	None	None	None	None	None	None	Hair, taken from Surv ID B113, see Appendix 8, Ashrafiah
41		Soil	None	None	None	None	None	None	Blank and control samples prepared by the OPCW laboratory
42		Soil	None	None	Diisopropyl ethylphosphonate*	None	None	Diisopropyl ethylphosphonate*	Blank and control samples prepared by the OPCW laboratory

iPMPA = isopropyl methylphosphonic acid
MeOH = methanol
MPA = methylphosphonic acid
DCM = dichloromethane
ex = extraction

* Diisopropyl ethylphosphonate was used by the OPCW laboratory as control spike
(1) Trace level concentration
(2) High level concentration

Metal fragment samples were first extracted in the laboratory with dichloromethane (Sigma-Aldrich, Lot# STBC5402V, 1 litre). After the solvent was evaporated they were extracted with water (Carl Roth, Lot# 917987, 1 litre).

Appendix 6

Bahhariyeh, 22 August 2013

On 28 August 2013, the Government of the Syrian Arab Republic reported to the Secretary-General that at 2120 hours on 22 August 2013, several soldiers in Bahhariyeh in the eastern Ghouta region had inhaled poisonous gases and complained of respiratory and other symptoms, as well as itching and redness of the eyes. Eighteen of them were immediately taken to Martyr Yusuf Al Azmah Military Hospital to receive emergency care.

Based on information gathered from interviews conducted by the United Nations Mission in Damascus on 25 September 2013, it can be ascertained that, on 22 August 2013 at around 1700 hours, a group of soldiers were reportedly fighting from a building in Bahhariyeh (see figures 6.1 and 6.2). The alleged attack, believed to be a distraction, started shortly before a number of objects were fired at them, one of which fell about 5 metres away from the soldiers. The witnesses said that there was no explosion from this munition, just the release of some blue-coloured gas with a very bad odour, which was moved into the soldiers' direction by the wind. The gas cloud formed with a width of 3 to 4 metres and a height of about 5 metres. The object, a munition, was collected by one of the soldiers and later seen and assessed by the United Nations Mission.

Figure 6.1

An overview of Bahhariyeh. The site of the alleged incident is marked by a red pin.

The United Nations Mission interviewed an NBC officer of the Syrian Army who arrived 20 minutes after the event bringing more gas masks for the soldiers. He stated that he did not recognize the type of smoke encountered.

Figure 6.2

The Bahhariyeh site in larger magnification. The site of the alleged incident is marked with a red pin.

Four soldiers interviewed by the United Nations Mission had symptoms that started to develop after about 3 to 5 minutes after exposure. They were sent via the commanders' office to the airport's medical point, where they arrived at around 1800 hours. Two more serious cases of the four alleged victims were decontaminated at the commander's office. The symptoms of the alleged victims described by a treating doctor included nausea, vomiting, tearing, bronchial problems, flaccid paralysis and confusion. One patient was semi-conscious and two patients had bradycardia. They were given anti-vomit medication and fluids. Only one patient was given an unknown dose of atropine. Three of the patients were transported to Martyr Yusuf Al Azmah Military Hospital by ambulance, and one by car. Protective measures taken at the medical point only included surgical masks and gloves, because the personnel were not informed about special requirements.

On the same day, 10 additional soldiers without any records of previous treatments arrived at the emergency room of Martyr Yusuf Al Azmah Military Hospital. The patients were conscious, with breathing difficulties, the feeling of a tight chest, and burning eyes and throat, with some having miosis. According to a treating doctor, they were given intravenous fluids and oxygen, some received atropine, everyone took a shower and the clothes were replaced. The interviewees mention intramuscular and intravenous injections at the medical point and at the hospital. After about 40 minutes, they were transferred from the emergency room to other departments in the hospital.

A number of the interviewed alleged victims stayed 6 days in the hospital until they were released. One individual mentioned he still had some difficulty breathing, and chest and back pain at the time of the interview.

Environmental findings

Information about munitions

The Bahhariyeh area was still contested at the time of the visit (25 to 30 September 2013). The United Nations Mission was therefore not able to conduct an on-site visit.

The Syrian Government presented some fragments allegedly associated with the munitions used in the incident (see figure 6.3).

The most significant fragment was a cylindrical metal piece, which corresponded with the inner container or sleeve of a Riot Control Agent canister or grenade as seen in the picture below. It presented clear signs of having been exposed to a combustion process, showing burned, dust-like residues of its original contents, indicating a pyrotechnical functioning.

Figure 6.3

A picture of the munition fragment shown to the United Nations Mission, allegedly collected following the Bahhariyeh incident.

Information concerning environmental samples

The information collected on the Bahhariyeh incident did not indicate the need to conduct a site visit. The improvised device allegedly used and its effect did not

indicate the use of chemical weapons, therefore, the outcome of a site visit and of eventual environmental sampling was not expected to add significant information to the investigation, considering the high risk this would have involved.

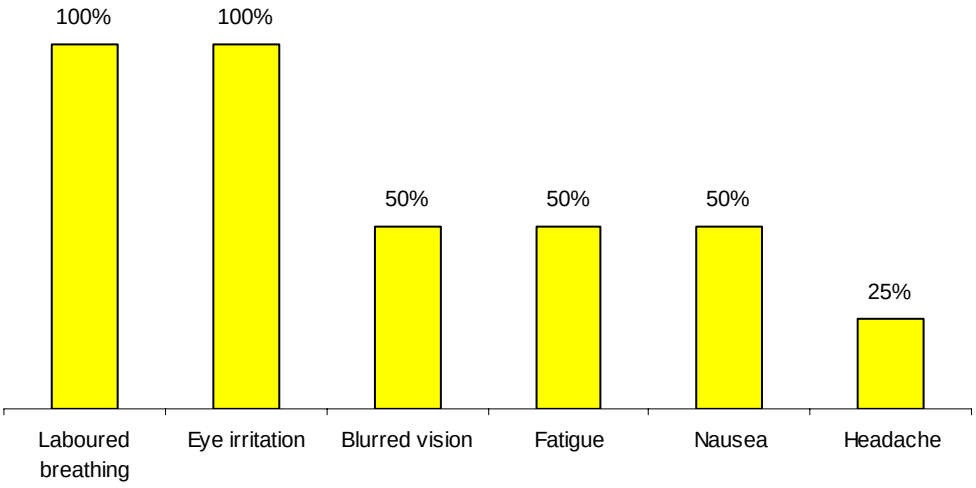
Biomedical fact-finding activities

The main elements of the biomedical investigation included interviews with survivors, biomedical sampling, interviews with treating clinicians and a review of medical records. The interview and the sampling were conducted at the Martyr Yusuf Al Azmah Military Hospital in Damascus on 28 September 2013.

Interviews with survivors

Detailed interviews were conducted with four patients available from a total of fourteen patients. Clinical, epidemiological and environmental information was obtained from them. All cases were male, with an average age of 27.5 years (ranging from 25 to 31 years). The most common signs and symptoms described by patients included shortness of breath/laboured breathing (100 per cent); eye irritation (100 per cent); blurred vision, nausea and fatigue (50 per cent); and headache (25 per cent) (see chart below).

Chart 6.1
Signs and symptoms of patients according to the patient interview



According to the patients, objects were fired at them during a military attack. The patients told the United Nations Mission that the objects released a blue smoke with a bizarre odour. The patients described that they had difficulty breathing, eye irritation, blurred vision, general weakness, nausea and headache.

The patients told the United Nations Mission that they were transported by a military vehicle to a field medical point where they received first aid and atropine. Subsequently, they were transported by ambulance to Martyr Yusuf Al Azmah Military Hospital. One patient stated that he was transported by private car. The four patients described the treatment provided at the hospital with injections, eye droplets and oxygen.

Interviews with clinicians

Detailed interviews were conducted with three clinicians available (the medical doctor of the field medical point and two doctors of Martyr Yusuf Al Azmah Military Hospital).

The most common signs described by the clinicians among patients brought both to the field medical point and the hospital were laboured breathing, eye irritation, blurred vision and fatigue. At Martyr Yusuf Al Azmah Military Hospital, the patients were decontaminated and examined by doctors of the emergency department, followed by examination by a senior doctor working in a specialized inpatient department.

The United Nations Mission also interviewed the senior doctor who said that the patients were treated with atropine, HI-6, oxygen and fluids. He noted that the severity of intoxication varied between the alleged victims, however, all patients were admitted at the hospital. According to the senior doctor, the patients spent an average of three days in the hospital. No signs of secondary contamination were reported to the United Nations Mission.

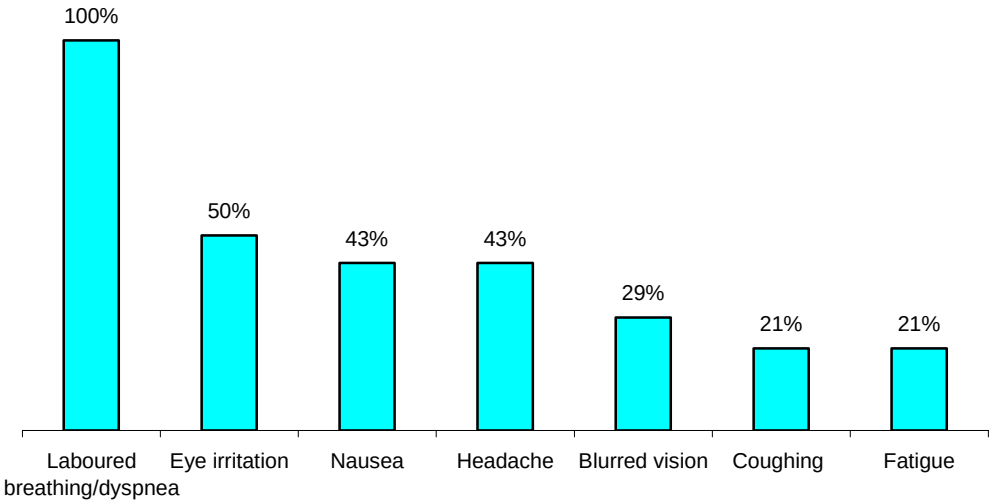
Medical records

The United Nations Mission received copies of medical records of all patients presented to Martyr Yusuf Al Azmah Military Hospital. The records were reviewed and analysed for demographics, clinical presentation, and treatment by an Arabic-speaking physician member of the team.

All cases were male, with an average age of 29.4 years (ranging from 26 to 31 years). The most common signs and symptoms documented included shortness of breath/laboured breathing (100 per cent), eye irritation (50 per cent), nausea and headache (43 per cent), blurred vision (29 per cent), and fatigue and coughing (21 per cent). The full range of signs and symptoms are presented in chart 6.2.

According to the records, all patients received atropine, HI-6, oxygen therapy and fluids treatment, although dosages were not consistently recorded. The medical records show that in two cases the values of acetyl cholinesterase in total blood and plasma are below the normal values. The average stay in the hospital was three days.

Chart 6.2
Signs and symptoms of patients according to the medical records



Biomedical samples

Biomedical sampling was performed on 28 and 29 September 2013 in the Martyr Yusuf Al Azmah Military Hospital by a Syrian nurse under the supervision of the United Nations Mission. Blood samples were collected from the four patients, as well as DNA swipes from their mouths.

On 29 September 2013, the United Nations Mission received from the Syrian Government 16 whole blood samples taken by hospital personnel during hospitalization of the alleged victims.

All samples were subjected to DNA testing to confirm the origin of the presented whole blood samples. The results of analyses are presented below (table 6.1). When indicated to the United Nations Mission, the whole blood sampling date is mentioned in the table.

Table 6.1
Summary table of symptoms and laboratory results for Bahhariyeh

SN	Surv ID	Result laboratory 2	Result laboratory 3	Signs and symptoms												Other information
		Plasma	Plasma	Lab Br/ Dysp	Eye Ir	Ex Lac	Bl Vis	Ex Sal	Coug	Naus	Vom	Conv	Loss Con	Disor	Mios	
1	018[1]	Neg	Neg	Yes	Yes		Yes									Difficulty to move, dry mouth Sample taken 28/09/13
2	030[2]	Neg	Neg	Yes			Yes			Yes						Difficulty to move, dry mouth, burning face Sample taken 28/09/13
3	032[3]	Neg	Neg	Yes	Yes	Yes	Yes			Yes						Difficulty to move, dry mouth, burning face, loose joints Sample taken 29/09/13
4	027[4]	Neg	Neg													Sample taken 29/09/13
		Whole blood	**Whole blood**													
5	1[2]	Neg	Neg													WB taken 22/08/2013, same as 030
6	2[4]	Neg	Neg													WB, same as 027
7	3[5]	Neg	Neg													WB
8	4[3]	Neg	Neg													WB taken 22/08/2013, same as 032

SN	Surv ID	Result laboratory 2	Result laboratory 3	Signs and symptoms												Other information
		Whole blood	Whole blood	Lab Br/ Dysp	Eye Ir	Ex Lac	Bl Vis	Ex Sal	Coug	Naus	Vom	Conv	Loss Con	Disor	Mios	
9	5[6]	Neg	Neg													WB taken 22/08/2013
10	7[7]	Neg	Neg													WB
11	8[1]	Neg	Neg													WB
12	9[7]	Neg	Neg													WB
13	10[8]	Neg	Neg													WB
14	12[8]	Neg	Neg													WB
15	13[8]	Neg	Neg													WB
16	14[4]	Neg	Neg													WB
17	26[1]	Neg	Neg													WB
18	27[8]	Neg	Neg													WB
19	28[1]	NA	Neg													WB
20	29[1]	Neg	Neg													WB

Bl Vis = Blurred Vision
Conv = Convulsions
Coug = Coughing
Disor = Disorientation

Ex Lac = Excessive Lacrimation
Ex Sal = Excessive Salivation
Eye Ir = Eye Irritation
Lab Br/Dysp = Laboured Breathing/Dyspnea

Loss Con = Loss of Consciousness
Mios = Miosis
NA = not available, no reportable chemicals found, poor recovery of internal standard indicate high LOD for Sarin
Naus = Nausea

Neg = Negative
Pos = Positive

Surv ID = survivor

WB = whole blood sample, not taken by investigation team

SN = Serial Number
Vomi = Vomiting

SurvID[number]: indicates source of DNA samples

DNA testing of the received whole blood samples and the blood samples taken in the presence of members of the United Nations Mission showed that several whole blood samples originated from the same person, but were marked as collected from different individuals by the Government representatives, as follows:

- Sample 18 (taken by the United Nations Mission) matched samples 8, 26, 28 and 29 (whole blood samples provided by the Syrian Government).
- Sample 17 (taken by the United Nations Mission) matched samples 2 and 14 (whole blood samples provided by the Syrian Government).
- Samples 10, 12 and 27 matched one person, sample 13 matched one person and contained additional DNA from a second unknown person (whole blood samples provided by the Syrian Government).
- Samples 7 and 9 were from the same person, but were marked as from two individuals (whole blood samples provided by the Syrian Government).
- Sample 5 contained DNA from two individuals (whole blood samples provided by the Syrian Government).

Accordingly, while a total of 16 whole blood samples were allegedly linked to the incident in Bahhariyeh by the Syrian Government, the DNA testing revealed that the 16 samples originated from only 9 individuals, if the mixed DNA sample was considered, or 8, if it was neglected.

Table 6.2
Results of biomedical testing, Bahhariyeh

	Laboratory 2				Laboratory 3			
	Plasma	**%**	**Whole blood**	**%**	**Plasma**	**%**	**Whole blood**	**%**
Positive	0	0	0	0	0	0	0	0
Negative	4	100	8	100	4	100	8	100
Total	**4**		**8**		**4**		**8**	

Note: *Whole blood samples were taken by hospital personnel during hospitalization of the alleged victims and were handed over to the United Nations Mission by representatives of the Syrian Government on 29 September 2013. When indicated to the United Nations Mission, the whole blood sampling date is mentioned in the above table.*

All 20 blood samples analysed (16 provided by the Government and 4 collected by the United Nations Mission) tested negative for Sarin or Sarin signatures.

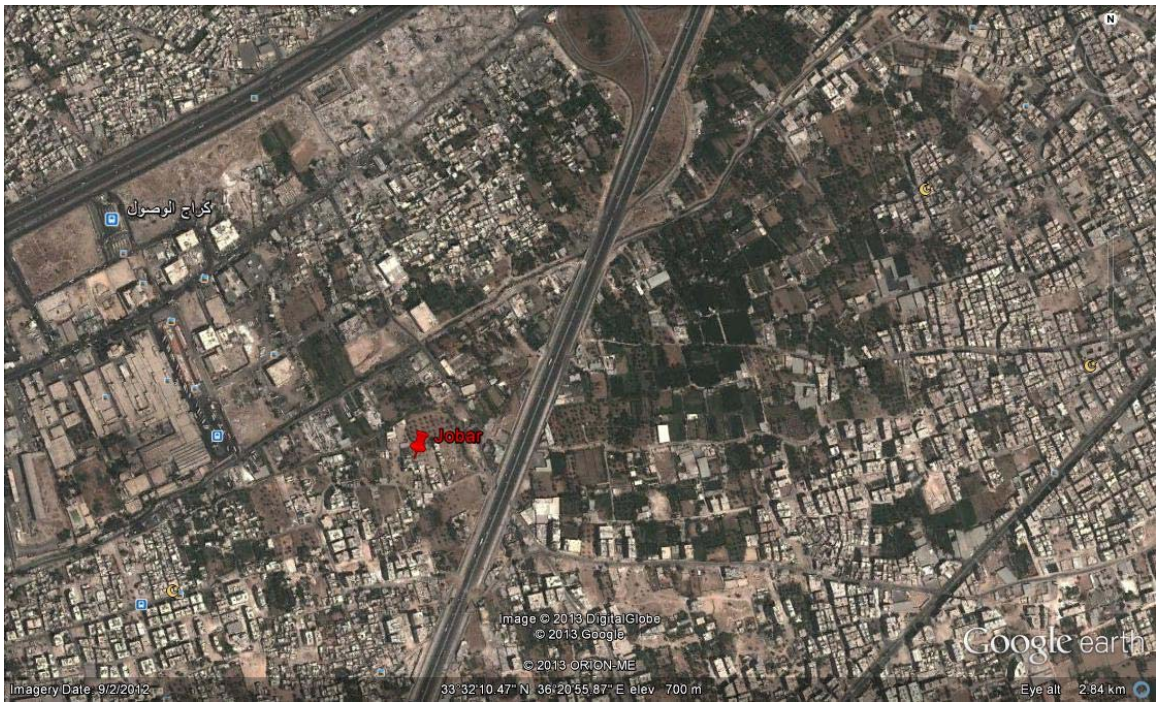
Appendix 7

Jobar, 24 August 2013

On 28 August 2013, the Government of the Syrian Arab Republic reported to the Secretary-General that at 1100 hours on 24 August 2013, as a group of soldiers approached a building near the river in Jobar, they heard a muffled sound and then smelled a foul and strange odour, whereupon they experienced severe shortness of breath and blurred vision. Four of them were immediately taken to Martyr Yusuf Al Azmah Military Hospital to receive emergency care. The Government further reported that in its search of the buildings immediately surrounding the above-mentioned site, it discovered some materials, equipment and canisters, examination of which indicated that they contained Sarin.

Based on interviews conducted by the United Nations Mission with military commanders, soldiers, clinicians and nurses, it can be ascertained that, on 24 August 2013, a group of soldiers were tasked to clear some buildings near the river in Jobar under the control of opposition forces (see figures 7.1 and 7.2). At around 1100 hours, the intensity of the shooting from the opposition subsided and the soldiers were under the impression that the other side was retreating. Approximately 10 metres away from some soldiers, an improvised explosive device (IED) reportedly detonated with a low noise, releasing a badly smelling gas.

Figure 7.1



Illustrates an overview of the Jobar area in Damascus. A red pin indicates the site of the alleged incident.

A group of 10 soldiers was evacuated in armoured personnel vehicles to the field medical point with breathing difficulties, blurred vision and with strange symptoms not further specified. Four soldiers were severely affected. They were only partially

conscious and not able to support themselves. They were treated with intravenous fluids and oxygen before being sent to Martyr Yusuf Al Azmah Military Hospital. Another 20 alleged victims arrived later at the same hospital with similar symptoms, but they were in stable condition and were, after some time, sent back to their units.

Figure 7.2

This figure illustrates the building complex in Jobar, Damascus, where the alleged incident took place.

At around noon, the admitting physician at the emergency room of the military hospital diagnosed that all four patients complained of a tight chest, wheezing and difficulty breathing and that two patients had hypersalivation, red eyes with blurred vision and miosis. In addition, the patients were exhausted and disoriented. The patients were washed and given two to three doses of atropine and HI-6 intravenously. One of the patients was reportedly unconscious and was transferred to the intensive care unit. The medical records state, however, that the patients were conscious and responsive with restricted pupils and bronchial spasms at the time of admission to the emergency room. A medical doctor reported itchy eyes in the evening after examining the patients.

At the military hospital, the admitted soldiers received additional intravenous and intramuscular injections and bronchial inhalers to assist the breathing. Two of the soldiers stayed in the hospital for eight days before release. The medical records state that all four alleged victims were granted additional sick leave after release from the hospital.

Environmental fact-finding activities

The security situation in the Jobar area on the 29 September 2013 allowed the United Nations Mission to visit the site. Preparations for the site visit included a reconnaissance visit by representatives of the Syrian Government, videoing the site with sealed United Nations equipment. Preparations for the site visit also involved negotiations with the opposition and careful risk assessment.

At the alleged location of the incident the United Nations Mission concluded that the site had been corrupted by one or several bulldozers performing mine-clearing activities. Therefore the exact location of the impact of the alleged device could not be determined. Furthermore, the United Nations Mission did not find any fragments of munitions at the site.

Information about munitions

The Syrian authorities provided the remnants of two IEDs allegedly used to disperse the chemical agent during the incident in Jobar on 24 August 2013, which were collected from the site of the incident by one Syrian officer.

One of the IEDs showed signs of having undergone a complete detonation. The second was relatively intact due to partial detonation, thus enabling a study of its characteristics.

The containers observed and photographed by the United Nations Mission (see figures 7.3, 7.4 and 7.5) were made of steel sheeting, with a thickness of 1 millimetre, bent and welded together until obtaining its final shape and dimensions. Their surfaces did not receive any form of painting or coating and both presented signs of superficial corrosion.

Figure 7.3

Shows the partially exploded IED allegedly recovered at the site of the incident in Jobar, Damascus.

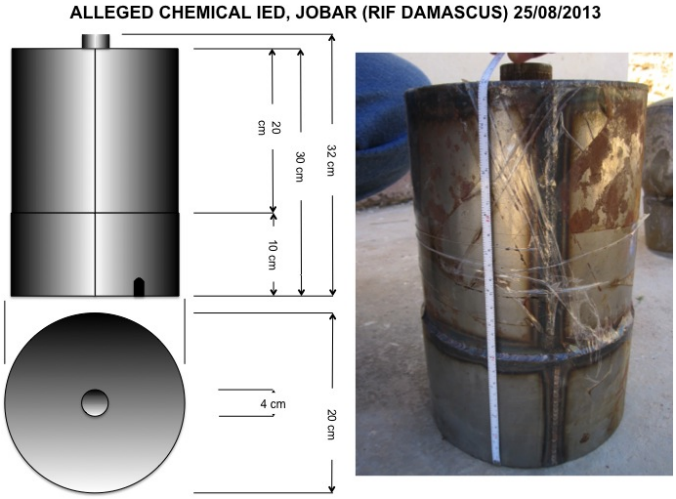
Figure 7.4

Shows the inside of the partially exploded IED allegedly recovered at the site of the incident in Jobar, Damascus.

Figure 7.5

Shows the fire train from the partially exploded IED allegedly recovered at the site of the incident in Jobar, Damascus.

Figure 7.6



This figure shows the intact IED and its measurements. The munition allegedly used in Jobar, Damascus, should have a similar construction and similar measurements.

The United Nations Mission was also presented with two metal canisters discovered by Government soldiers during the offensive operations in Jobar on 25 August 2013 in the immediate aftermath of the incident and in close vicinity of the site of the alleged incident. These presented similar characteristics with the IEDs claimed to have been used to disperse the chemical agent in the Jobar incident on 25 August 2013 (see figure 7.6 above).

Welding seams were made by manual electric welding at a subindustrial standard, although with considerable care and quality of final manufacture, indicating a high degree of expertise with the process.

From the partially detonated device presented and the recovered firing train, it was possible to establish the volume available for internal fill to approximately 4 litres.

From the remainders of the partially exploded device, it was possible to establish that a detonator and a coiling of the detonating cord, acting as a booster, composed the fire train, electrically initiated (see figure 7.5 above).

The United Nations Mission, however, could not independently verify the information received, therefore, it did not establish the provenance of the IEDs and could not link them to the location of the alleged use.

Information concerning environmental samples

While the United Nations Mission visited the site, it found the site to have been corrupted by mine-clearing activities. As such, there was no probative value in collecting samples.

The Syrian Government allegedly recovered soil samples from the impact site that tested positive for Sarin. The United Nations Mission could not verify the chain of custody for this sampling and subsequent analysis.

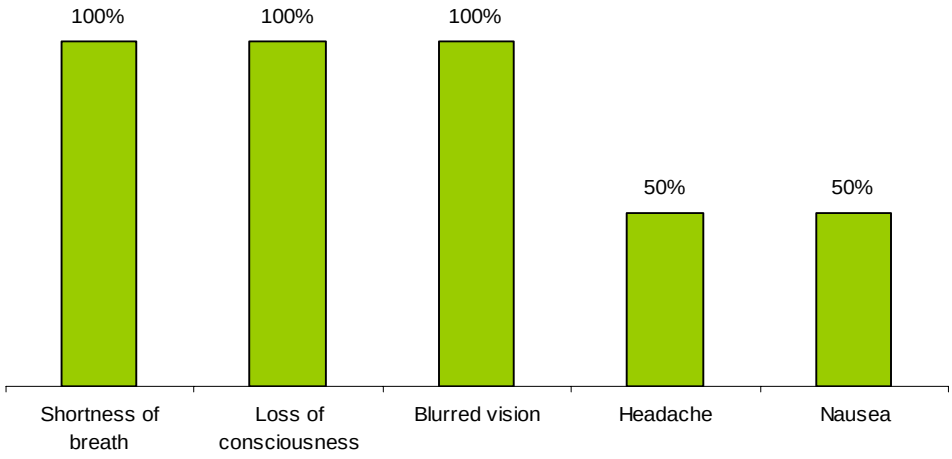
Biomedical fact-finding activities

The main elements of the biomedical investigation included interviews with survivors, biomedical sampling, interviews with treating clinicians and nurses, and a review of medical records. The interviews and the sampling were conducted at Martyr Yusuf Al Azmah Military Hospital in Damascus on 26 September 2013.

Interviews with survivors

Detailed interviews were conducted with two patients available. Clinical, epidemiological and environmental information was obtained from them. Both cases were male, 24 and 28 years old respectively. The most common signs and symptoms reported by patients included shortness of breath (100 per cent), blurred vision (100 per cent), loss of consciousness (100 per cent), and headache and nausea (50 per cent). Both patients reported that they developed symptoms following an alleged military strike. The distribution of symptoms according to patient's interviews is illustrated in chart 7.1.

Chart 7.1
Signs and symptoms of patients according to the patient interview



According to the patients, an improvised explosive device detonated with a low noise, releasing a badly smelling gas. The patients described that within a short time they had difficulty breathing, blurred vision, loss of consciousness, headache and nausea.

The patients told the United Nations Mission that they were transported by a military vehicle to a field medical point. They described being treated with fluids and oxygen, and stated that they were subsequently transferred by ambulance to Martyr Yusuf Al Azmah Military Hospital. They described the treatment provided at the hospital with injections, eye droplets and oxygen.

Interviews with clinicians and nurses

Detailed interviews were conducted with two clinicians available (the medical doctor of the field medical point and a doctor of Martyr Yusuf Al Azmah Military Hospital) and a nurse who attended to the cases for the initial triage at the emergency room. The most common signs described by the clinicians among patients brought both to the field medical point and to the hospital were laboured breathing, eye irritation, miosis, blurred vision, fatigue and hypersalivation.

According to the doctor of the field medical point, the patients received first aid and atropine and were transported by ambulance to Martyr Yusuf Al Azmah Military Hospital. The nurse responsible for the initial triage at the emergency room oriented the patient to a medical unit of the emergency department.

The admitting physician at the emergency room of the military hospital told the United Nations Mission that all four patients complained of a tight chest, wheezing and difficulty breathing, and that two patients had hypersalivation, red eyes with blurred vision and miosis. In addition, the patients were exhausted and disoriented. According to a senior doctor from a specialized inpatient section of the hospital called upon to support the examination, the patients showed a range of severity of symptoms. They were decontaminated and given two to three doses of atropine and HI-6 intravenously. According to the senior doctor, the patients spent an average of seven days in the hospital.

No signs of secondary contamination were reported to the United Nations Mission.

Medical records

The United Nations Mission received copies of the medical records of the four patients admitted to Martyr Yusuf Al Azmah Military Hospital. The records were reviewed and analysed for demographics, clinical presentation and treatment by an Arabic-speaking physician member of the team.

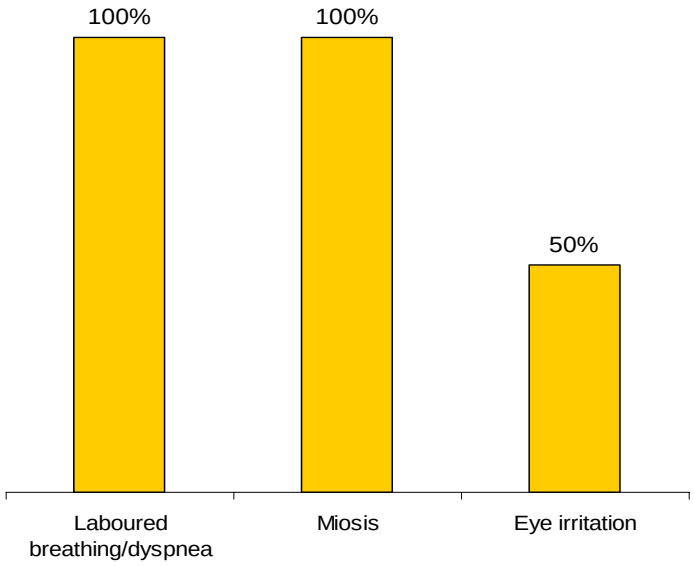
All cases were male, with an average age of 26 years (ranging from 23 to 28 years). The most common signs and symptoms documented included shortness of breath/laboured breathing (100 per cent), miosis (100 per cent), and eye irritation (50 per cent) (see chart 7.2).

The medical records state that the patients were conscious and responsive with restricted pupils and bronchial spasms at the time of admission to the emergency room. A medical doctor reported itchy eyes in the evening after examining the patients.

All patients received atropine, HI-6, steroids, oxygen therapy and fluids treatment, although dosages were not consistently recorded. The medical records revealed that 50 per cent of the cases showed acetyl cholinesterase values below normal in total blood and plasma.

The medical records indicate that the average length of stay in the hospital was 7 days and that all four patients were granted additional sick leave after release from hospital.

Chart 7.2
Signs and symptoms of patients according to the medical records



Biomedical samples

Biomedical sampling was performed on 26 and 28 September 2013 in Martyr Yusuf Al Azmah Military Hospital by a Syrian nurse under the supervision of the United Nations Mission. Blood samples were collected from the four patients, as well as DNA swipes from their mouths.

On 29 September 2013, the United Nations Mission also received from the Syrian Government whole blood samples taken by hospital personnel during the hospitalization of the alleged victims on 24 August 2013.

All samples were subjected to DNA testing to confirm the origin of the presented samples of whole blood. The analyses proved that the four provided whole blood samples matched those of the four alleged victims interviewed and sampled.

Table 7.1
Summary table of symptoms and laboratory results for Jobar

SN	Surv ID	Result laboratory 2	Result laboratory 3	Signs and symptoms												Other information
		Whole blood	Whole blood	Lab Br/ Dysp	Eye Ir	Ex Lac	Bl Vis	Ex Sal	Coug	Naus	Vom	Conv	Loss Con	Disor	Mios	
1	B115	Neg	Neg	Yes	Yes					Yes	Yes		Yes			Sample taken 26/09/13
2	B116	Pos	Pos	Yes	Yes		Yes			Yes	Yes		Yes			Severe headache Sample taken 26/09/13
3	B117	Neg	Neg	Yes	Yes		Yes			Yes	Yes		Yes			Headache Sample taken 26/09/13
4	019	Neg	Neg	Yes	Yes		Yes						Yes			Severe headache Sample taken 28/09/13
		Whole blood	**Whole blood**													
5	20	Pos	Pos													WB, same as B115

SN	Surv ID	Result laboratory 2	Result laboratory 3	Signs and symptoms												Other information
		Whole blood	Whole blood	Lab Br/ Dysp	Eye Ir	Ex Lac	Bl Vis	Ex Sal	Coug	Naus	Vom	Conv	Loss Con	Disor	Mios	
6	21	Pos	Pos													WB taken 31/08/2013, same as 019
7	22	Pos	Pos													WB, same as B116
8	23	Pos	Pos													WB, same as B117

Bl Vis = Blurred Vision
Conv = Convulsions
Coug = Coughing
Disor = Disorientation
Ex Lac = Excessive Lacrimation
Ex Sal = Excessive Salivation
Eye Ir = Eye Irritation
Lab Br/Dysp = Laboured Breathing/Dyspnea
LOD = Limit of Detection
Loss Con = Loss of Consciousness
Mios = Miosis
Naus = Nausea
Neg = Negative
Pos = Positive
Surv ID = survivor
WB = whole blood sample, not taken by IT
SN = Serial Number
Vomi = Vomiting

Table 7.2
Results of biomedical testing, Jobar

	Laboratory 2				Laboratory 3			
	Plasma	%	Whole blood	%	Plasma	%	Whole blood	%
Positive	1	25	4	100	1	25	4	100
Negative	3	75	0	0	3	75	0	0
Total	**4**		**4**		**4**		**4**	

All samples allegedly withdrawn by the Syrian Government on 24 August 2013 tested positive for Sarin signatures. Of the four samples collected by the United Nations Mission on 26 and 28 September 2013, i.e. one month after the alleged incident, one tested positive for Sarin signatures. The rest were negative.

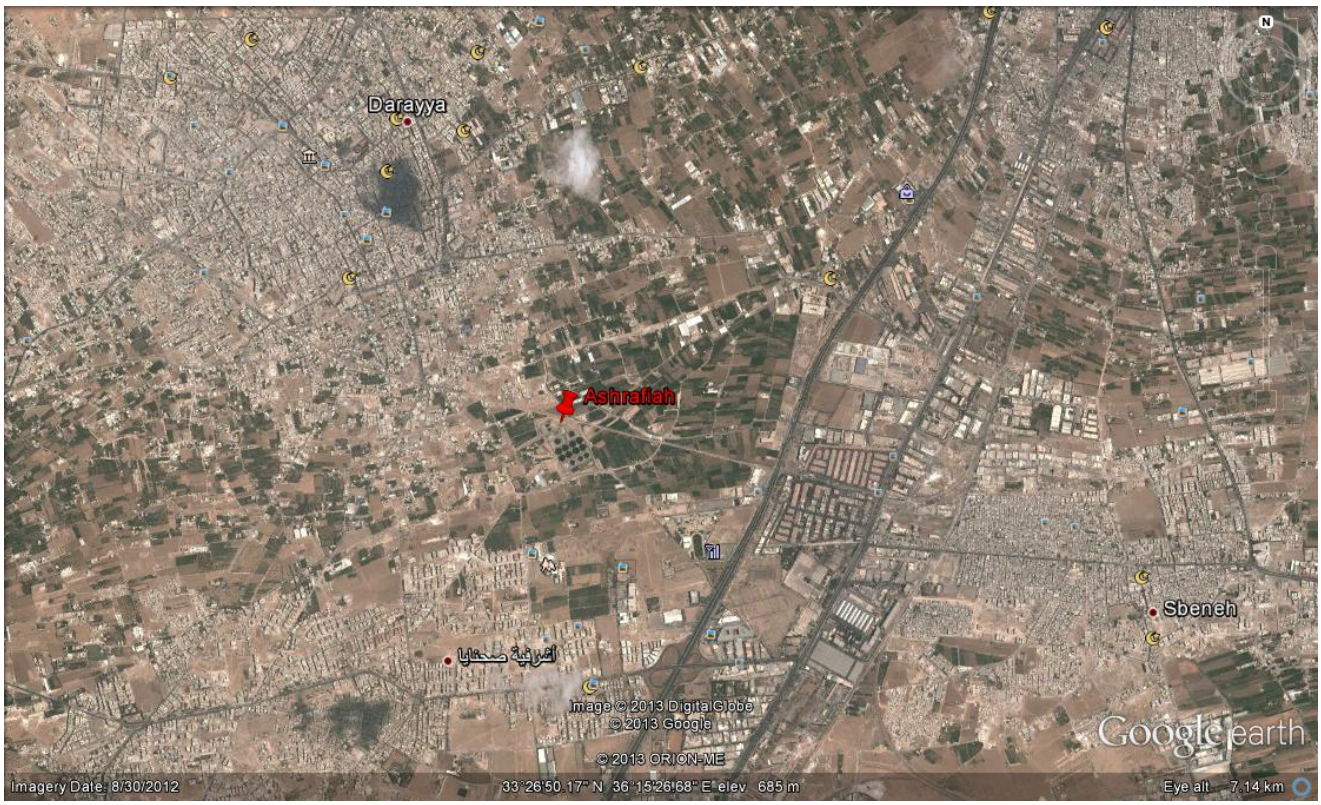
Appendix 8

Ashrafiah Sahnaya, 25 August 2013

On 28 August 2013, the Government of the Syrian Arab Republic reported to the Secretary-General that at 1900 hours on 25 August 2013, cylindrical canisters were fired using a weapon that resembled a catapult at some soldiers in the Ashrafiah Sahnaya area in Damascus Rif. One of the canisters had exploded, emitting a sound of medium loudness. A black, foul-smelling smoke had then appeared, causing the soldiers blurred vision and severe shortness of breath. Five of them had been immediately taken to Martyr Yusuf Al Azmah Military Hospital to receive emergency care.

Based on interviews conducted by the United Nations Mission, it can be ascertained that there were around 15 military personnel deployed at one of the Government checkpoints controlling entry into rebel-held areas near Ashrafiah Sahnaya in the Damascus Rif (see figures 8.1 and 8.2). On 25 August 2013, continuous fighting reportedly occurred in the area. At the entrance of Sahnaya next to scattered local houses, the opposition side started to throw objects with a catapult at around 1800 hours. At approximately 2000 hours, an object was thrown at a group of five soldiers located in one of the local houses and landed about 10 to 15 metres away. A badly smelling gas was released, but no explosion was heard.

Figure 8.1



This figure gives an overview of the Ashrafiah Sahnaya area in Damascus. The site for the alleged incident is indicated with a red pin.

Figure 8.2

In an enlargement, this figure illustrates the site where the alleged use was indicated. In particular the proximity of the site to the sewage plant is illustrated.

There are differing opinions among the interviewed alleged victims whether there was no smoke or a colourless smoke. Symptoms like blurred vision and difficulty with breathing started to develop in the alleged victims. Forty-five minutes later, they were evacuated by a rescue team to the field medical point, and subsequently taken to the Martyr Yusuf Al Azmah Military Hospital by ambulance.

At the hospital the soldiers were washed and changed into disposable clothes before entering the emergency room. Hospital personnel took blood samples, and the patients were treated with atropine and HI-6. Eye drops and bronchial inhalers were administered. The patients were discharged from the hospital after 6 to 10 days.

Environmental fact-finding activities

Information about munitions

Due to the security situation, the United Nations Mission did not visit the site of the alleged incident and was, therefore, not in a position to collect primary information concerning the munitions.

Information on environmental samples

The United Nations Mission did not visit the site of the alleged incident and was, therefore, not in a position to collect environmental samples.

Biomedical fact-finding activities

The main elements of the biomedical investigation included interviews with survivors, biomedical sampling, interviews with treating clinicians and a review of medical records.

This incident was investigated on two occasions. On 30 August, the alleged victims were interviewed and blood samples, hair samples and urine were collected from one patient. The United Nations Mission again investigated the incident on 25 September 2013. Both these investigations were performed at Martyr Yusuf Al Azmah Military Hospital.

Interviews with survivors

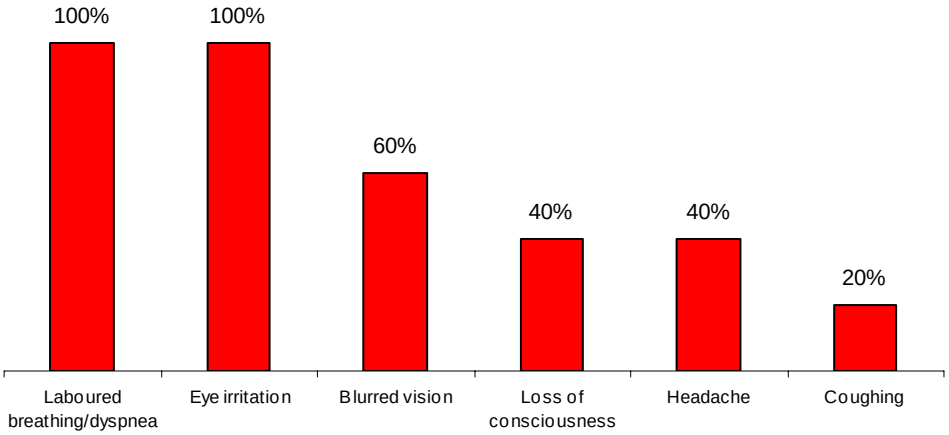
On 30 August 2013, five days after the incident, five patients were interviewed about the alleged incident.

A brief bedside interview in a ward was done with all five individuals enquiring into the initial incident and sequence of events. The interviewees appeared to be in good health without any obvious discomfort or clinical manifestation. They all described the time of incident, the impact site, the number of soldiers present and their role at the site of the incident. The patients described the object and provided details regarding the colour and/or smell of the gas released. They also described the symptoms experienced and their progression, evacuation and the medical treatment received.

Based on the interviews and its evaluation of the cases, the United Nations Mission selected the two most severe cases for sampling.

On 25 September 2013, detailed interviews were conducted with four patients available. Further clinical, epidemiological and environmental information was obtained from them. All cases were male, with an average age of 23 years (ranging from 21 to 25 years). The most common signs and symptoms described to the United Nations Mission by patients included shortness of breath/laboured breathing (100 per cent), eye irritation (100 per cent), blurred vision (60 per cent), loss of consciousness (40 per cent), headache (40 per cent) and coughing (20 per cent) (see chart 8.1).

Chart 8.1
Signs and symptoms of patients according to the patient interview



All interviewees described a military attack with cylindrical canisters fired at them, followed by a bizarre odour without any smoke. They also described a common range of symptoms, including shortness of breath, eye irritation, blurred vision, general weakness, and eventual loss of consciousness, headache and coughing.

The patients told the United Nations Mission that they were transported by a military vehicle to a field medical point and described treatment with injections, eye droplets and oxygen. Thereafter they were transported by ambulance to Martyr Yusuf Al Azmah Military Hospital.

Interviews with clinicians

Detailed interviews were conducted on 25 August 2013 with the doctor on duty at the hospital, who was a specialist in internal medicine and the supervisor of the Emergency Room. According to the doctor, the most common signs among patients were laboured breathing, eye irritation, miosis, blurred vision and fatigue. The doctor stated that the patients respectively received first aid and atropine at the field medical point, and were treated with atropine, HI-6, oxygen therapy and fluids in Martyr Yusuf Al Azmah Military Hospital. He described a range of severity of symptoms and stated that all cases required admission.

According to the doctor, the patients were discharged from the hospital after 6 to 10 days.

No signs of secondary contamination were reported.

Medical records

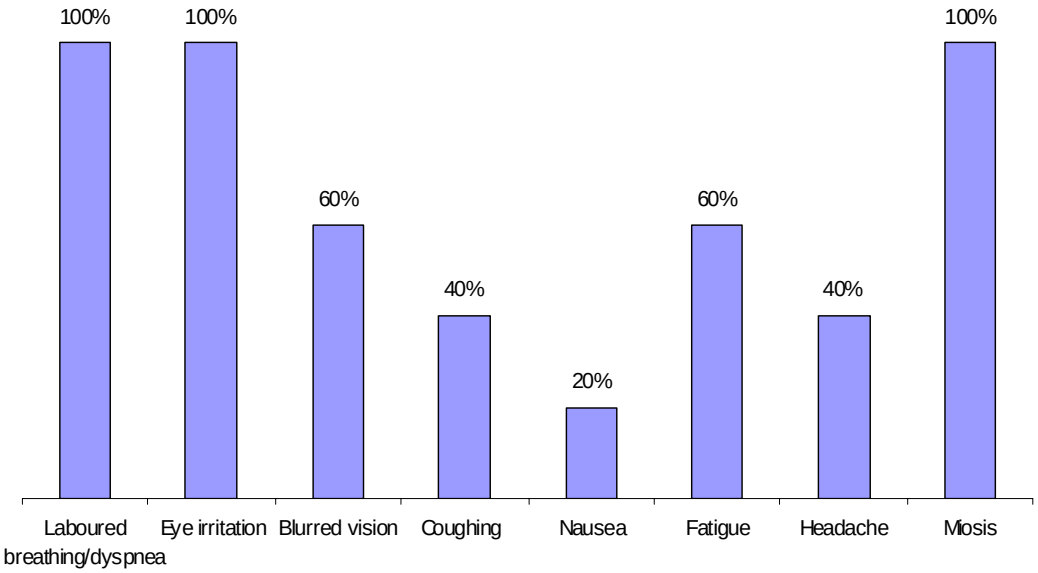
The United Nations Mission received copies of the medical records of the four patients admitted at Martyr Yusuf Al Azmah Military Hospital. The records were reviewed and analysed for demographics, clinical presentation and treatment by an Arabic-speaking physician member of the team.

All cases were male, with an average age of 23 years (ranging from 21 to 25 years). The most common signs and symptoms documented included shortness of breath/laboured breathing, eye irritation, miosis (100 per cent); blurred vision and fatigue (60 per cent); coughing and headache (40 per cent); and nausea (20 per cent).

The medical records indicated that all patients had received atropine, HI-6, oxygen therapy and fluids treatment, although dosages were not consistently recorded.

According to the medical records, in three cases the values of acetyl cholinesterase in total blood and plasma were below normal values. The full range of signs and symptoms are presented in chart 8.2 below.

Chart 8.2
Signs and symptoms according to the medical records



Biomedical samples

Biomedical sampling was performed on 30 August 2013 on selected patients in the Martyr Yusuf Al Azmah Military Hospital by hospital personnel under the supervision of the United Nations Mission. Due to technical problems during the sampling, only one blood sample was recovered.

Biomedical sampling was also performed on 25 September 2013 in the Martyr Yusuf Al Azmah Military Hospital by hospital personnel under the supervision of the United Nations Mission. Blood samples were collected from three of the five patients admitted in the hospital on 25 August 2013, as well as DNA swipes from the mouths of two of the five patients.

On 29 September 2013, the United Nations Mission received from the Syrian Government whole blood samples taken by hospital personnel during the hospitalization of the five alleged victims.

All samples were subjected to DNA testing to confirm the origin of the whole blood samples. The analyses proved that the three provided whole blood samples matched those of the three alleged victims interviewed and sampled.

Table 8.1
Summary table of laboratory results and symptoms for Ashrafiah Sahnaya

SN	Surv ID	Result laboratory 2	Result laboratory 3	Signs and symptoms											Other information
		Plasma	Plasma	Lab Br/ Dysp	Eye Ir	Ex Lac	Bl Vis	Ex Sal	Coug	Naus	Vom	Conv	Loss Con	Disor	Mios	
1	017	Neg	Neg	Yes	Yes		Yes		Yes				Yes			Headache Sample taken 25/09/13
2	B113	Neg	Neg	Yes	Yes	Yes										Headache (Samples taken 30/08/13, urine and hair samples also negative)
3	B114	Neg	Neg													Sample taken 25/09/13
		Whole blood	**Whole blood**													
4	15	NA	Pos													WB, same as B113
5	17	Pos	Pos													WB
6	18	NA	Pos													WB, same as 017
7	19	NA	Pos													WB
8	25	Pos	Pos													WB, same as B114

Bl Vis = Blurred Vision
Conv = Convulsions
Coug = Coughing
Disor = Disorientation
Ex Lac = Excessive Lacrimation
Ex Sal = Excessive Salivation
Eye Ir = Eye Irritation
Lab Br/Dysp = Laboured Breathing/Dyspnea
Loss Con = Loss of Consciousness
Mios = Miosis
NA = not available, no reportable chemicals found, poor recovery of internal standard indicate high LOD for Sarin
Naus = Nausea
Neg = Negative
Pos = Positive
Surv ID = survivor
WB = whole blood sample, not taken by IT
SN = Serial Number
Vomi = Vomiting

Table 8.2
Results of biomedical testing, Ashrafiah Sahnaya

	Laboratory 2				Laboratory 3			
	Plasma	**%**	**Whole blood**	**%**	**Plasma**	**%**	**Whole blood**	**%**
Positive	0	0	2	40	0	0	5	100
Negative	3	100			3	100	0	0
Total samples	**3**	**-**	**5***	**-**	**3**	**-**	**5**	**-**

* Because of technical problems, no analysis results are available for the remaining three samples.

All samples allegedly withdrawn by the Syrian Government on 25 August 2013 tested positive for Sarin signatures. Blood and hair samples withdrawn by the United Nations Mission on 30 August 2013 tested negative, as did samples withdrawn by the United Nations Mission on 25 September 2013. DNA tests verified that the same victims were sampled by the Syrian Government and the United Nations Mission.

Appendix 9

Sheik Maqsood, 13 April 2013

On 14 June 2013, the Government of the United States reported to the Secretary-General that the Government of the Syrian Arab Republic had used the chemical warfare agent Sarin against the opposition in an attack on the Aleppo neighbourhood of Sheik Maqsood on 13 April 2013.

According to witness statements provided to the United Nations Mission by the UNHRC Commission of Inquiry, the alleged incident affected 21 persons and caused one death. The victims were allegedly transported to a hospital in Afrin for treatment.

The United Nations Mission sought to conduct fact-finding activities pertaining to this incident from the territory of a bordering country, having determined that such an investigation held the prospect of producing additional information. However, the United Nations Mission was ultimately unable to reach alleged witnesses and obtain any such information.

From 19 to 22 August 2013, the United Nations Mission interviewed Syrian Government officials in Damascus on the incident, including in relation to military activities in the alleged area at the time of the incident, the alleged munitions used and especially military helicopters or airplane overflights at the time of the incident. The Syrian Government officials stated that they did not have any information to offer on that alleged incident.

In the absence of any further information and with no prospect of finding further information, the United Nations Mission was, therefore, unable to finalize the investigation of this allegation and to draw any conclusions pertaining to this alleged incident.

Appendix 10

Standard questionnaire provided to reporting States on the basis of the requirements of appendix I of A/44/561

1. General information and narrative about the incident, e.g. place, date, time, area, numbers affected, initial response by rescuers, mode of transport to hospital/clinics, subsequent evolution of incident.

2. Detailed information about the incident site:

(a) General map of the area, including topography

(b) GPS coordinates of impact site(s)

(c) GPS coordinates of launch site(s)

(d) Detailed map of impact site(s). Please include location of bodies of deceased persons and animals on map, where possible.

(e) Details of meteorological conditions at time of incident, e.g. temperature, wind speed and direction, precipitation, humidity

3. Copies of statements from the following:

(a) Survivors of the incident (civilian and military)

(b) Local rescuers (civilian and military)

(c) Uninjured primary witnesses

(d) Treating emergency medical personnel (first responders)

(e) Treating medical staff in emergency department(s), clinic(s) and inpatient wards(s)/intensive care unit(s)

4. Names and locations of treating health facilities (hospitals and clinics):

(a) Names of patients treated by health facility

(b) Names of patients referred by each health facility

5. Medical records from all patients presenting to hospital, including those who subsequently died. As far as possible, medical records should include:

(a) Time and date of admission

(b) History of presenting illness

(c) Symptoms and signs

(d) Pulse oximetry recordings, if taken

(e) Results of relevant laboratory investigations, e.g. toxicological screening, arterial blood gases, clinical chemistry, hematology, bacteriology, etc.

(f) Results of other relevant investigations, e.g. X-rays

(g) Treatment provided, including pharmacological and supportive

(h) Discharge diagnosis (for survivors)

(i) Cause of death (for deceased)

(j) Date of discharge or death

(k) Death certificates for deceased

6. Forensic evidence and reports:

(a) Post-mortem report for each of the deceased

(b) Results of laboratory tests on samples taken from deceased, e.g. organ tissue, hair, clothing

(c) Video and photographic images

(d) Video and photographic evidence taken by witnesses

7. Results of laboratory tests on environmental samples:

(a) Soil

(b) Air

(c) Water

(d) Fragments of munitions

(e) Concrete/rock, including from potentially contaminated structures

(f) Fur from dead animals

8. Media and other reports:

(a) Video and photographic images taken by State Media

(b) Video and photographic evidence taken by witnesses

(c) Newspaper reports

9. Other questions

(a) Summary information:

(i) Number of cases

(ii) Number of deaths

(iii) Number of patients admitted to hospital

(iv) Average length of stay in hospital

(v) 3 main discharge diagnoses

(vi) 3 main causes of death

(b) Were any cases admitted after 19 March. If so, when?

(c) Was there evidence of secondary contamination? If yes, among whom?

(d) What was the impact site used for prior to the incident?

(e) Are there industrial or agricultural installations present in or around the area of the incident?

(f) Further information on clinical presentations, in particular presence of muscle fasciculation, muscle spasms, seizures, irritation of the eyes, miosis, increased secretions or other symptoms

Appendix 11

Composition of the United Nations Mission

Sellström, Åke
Head of Mission

Cairns, Scott
Head of OPCW Component

Barbeschi, Maurizio
Head of WHO Component

Barrek, Sami
Bartenbach, Sandra
Bullar, Gurcharn Singh
Cefai, David
Cekovic, Boban
Cheong, Stanley
Majali, Ishaq
McLeay, Jesse
Quadri, Arshad
Radivojsa, Ilja
Terzic, Oliver
Wagner, Jan

Brennan, Rick
Elmi, Mohamed
Gmach, Sabri
Martinez Lopez, José