REGULATION 28: REPORT TO PREVENT FUTURE DEATHS (1)

*NOTE: This form is to be used **after** an inquest.*

	REGULATION 28 REPORT TO PREVENT FUTURE DEATHS **THIS REPORT IS BEING SENT TO:** 1. **Royal United Hospitals Bath NHS Foundation Trust** 2. [redacted] **Daughter of the Deceased** 3. **Care Quality Commission** 4. **Bath & North East Somerset Clinical Commissioning Group** 5. **Chief Coroner**
1	**CORONER** I am Dr. Peter Harrowing, LLM, Assistant Coroner, for the coroner Area of Avon
2	**CORONER'S LEGAL POWERS** I make this report under paragraph 7, Schedule 5, of the Coroners and Justice Act 2009 and Regulations 28 and 29 of the Coroners (Investigations) Regulations 2013.
3	**INVESTIGATION and INQUEST** On 30th July 2015 I commenced an investigation into the death of Mr. Terence brooks age 68 years. The investigation concluded at the end of the inquest on 9th February 2016. The conclusion of the jury was that the medical cause of death was I(a) Legionella pneumophila pneumonia; I(b) Neutropenic sepsis; I(c) Acute myeloid leukaemia (treated with chemotherapy) and the conclusion as to the death was that "The deceased was fatally infected with legionella contracted from the William Budd Ward due to a malfunctioning water supply and distribution system, which had subsequently tested positive for Legionella"
4	**CIRCUMSTANCES OF THE DEATH** From around January 2014 Mr. Brooks was diagnosed with low grade non-Hodgkin's lymphoma. He was under the care of the consultant haematologist at the Royal United Hospitals Bath NHS Foundation Trust (the 'hospital') and a 'watch and wait' approach was adopted. Although no treatment was provided at that time he remained under regular review at the hospital. In April 2015 Mr. Brooks attended the hospital for an out-patient appointment when blood tests showed he had anaemia. He also reported experiencing drenching sweats, tiredness and breathlessness on minimal exertion. He underwent a bone marrow trephine biopsy and later it was confirmed he was suffering with acute myeloid leukaemia which was unrelated to his lymphoma. On 5th May 2015 Mr. Brooks was admitted to the William Budd ward of the hospital with symptoms of a chest infection. Following admission the diagnosis of acute myeloid leukaemia was confirmed and he was commenced on standard first-line remission induction chemotherapy. As a result of the chemotherapy Mr. Brooks inevitably became neutropenic and he had a long period of pancytopenia. By 18th June 2015 his neutrophil count had recovered and Mr. brooks was feeling better and he was discharged home on 23rd June 2015. On 24th June 2015 he returned to hospital for a bone marrow biopsy which was later reported as showing incomplete remission from the chemotherapy. Therefore it was necessary for him to undergo further chemotherapy and he was re-admitted to the William Budd ward of the hospital on 29th June 2015. Between 23rd June 2015 and 29th June 2015 Mr. Brooks visited his own home, as well as that of his daughter and also a friend. In addition he visited two public houses. Following his readmission to hospital and commencement of further chemotherapy he

spiked a temperature on 9th July 2015. A stool sample was reported as positive for Clostridium difficile and blood cultures revealed E.coli and Enterobacter cloacae. He remained on broad spectrum antibiotics.

Owing to worsening chest symptoms Mr. Brooks underwent a CT scan of his chest on 13th July 2015 which showed marked consolidation in the lungs. On 18th July 2015 a urine sample was sent for testing for Legionella which was reported on 20th July 2015 as being positive. Alternative antibiotics were commenced but Mr. Brooks died on 23rd July 2015.

Public Health England were notified of the Legionella infection by the hospital. Public Health England in turn notified the Health & Safety Executive. Numerous water samples from William Budd ward and its annex were tested for the presence of Legionella of which a number were reported as being positive including some being positive for Legionella serotype 1 as well as serotypes 2 - 14. Water samples from some of the locations visited by the deceased between 23rd and 29th June 2015 were also tested and reported as being negative for Legionella. None of the water samples from the ward reported as being positive grew the same subgroup of serotype 1 as found in samples from the deceased.

The Health & Safety Executive visited the hospital and found deficiencies in the water system and on 28th August 2015 they issued an Improvement Notice. During the course of their inspection the HSE were made aware of a hitherto unknown recirculating pump on the water system of William Budd ward which had failed. This had resulted in lower water temperatures in the hot water system than that required to suppress the growth of Legionella. The HSE also identified the schematics of the water system for the ward were out of date and that the scheme in place for the regular monitoring of the efficacy of legionella control measures did not encompass the localised loops of pipework to the William Budd annex.

The hospital conducted its own internal investigation and root cause analysis. They concluded that since the same subgroup of Legionella serotype 1 had not been found in the water samples as had been found in samples from the deceased then the William Budd ward was not the source of the infection.

5 **CORONER'S CONCERNS**

During the course of the Inquest the evidence revealed matters giving rise to concern. In my opinion there is a risk that future deaths will occur unless action is taken. In the circumstances it is my statutory duty to report to you.

The **MATTERS OF CONCERN** are as follows. –

(1) Those who conducted the investigation and root cause analysis on the part of the hospital did not appreciate that notwithstanding the absence of the specific subgroup of Legionella serotype 1 in the water samples from the ward as compared to samples from the deceased that this was not conclusive as to the ward not being the source of the infection.
(2) There was a lack of understanding on the part of the hospital as to how to interpret the results of the microbiological analysis of the water samples and the limitations of testing including the meaning of any results obtained, the reliability which may be placed on those results and any conclusions which may be drawn from those results.
(3) As a result of this lack of understanding the hospital misinterpreted the results and conducted their investigation and root cause analysis on a false premise which led them to conclude erroneously that the William Budd ward was not the source of the Legionella infection.
(4) The hospital, although responding promptly to the infection, had no procedure in place detailing how the investigation of the cause of a legionella infection should be undertaken.
(5) The hospital should put in place an approved procedure for the investigation of any future outbreaks of Legionella infection should they occur. This procedure should describe and define clearly *inter alia* the nature, limitations and interpretation of the results of any microbiological testing undertaken.
(6) The responsibility for putting such a procedure in place should be that of the Director of Infection Prevention and Control who, in drafting the procedure, should seek the support and guidance of appropriate professionals including Public Health

	England and the Health Safety Executive
6	**ACTION SHOULD BE TAKEN** In my opinion action should be taken to prevent future deaths and I believe your organisation has the power to take such action.
7	**YOUR RESPONSE** You are under a duty to respond to this report within 56 days of the date of this report, namely by 8th April 2016. I, the coroner, may extend the period. Your response must contain details of action taken or proposed to be taken, setting out the timetable for action. Otherwise you must explain why no action is proposed.
8	**COPIES and PUBLICATION** I have sent a copy of my report to [redacted] daughter of the deceased, the Care Quality Commission, and the Bath & North East Somerset Clinical Commissioning Group. I shall send a copy of your response to [redacted] the Care Quality Commission and the Bath & North East Somerset Clinical Commissioning Group. I have sent a copy of my report to the Chief Coroner. I am also under a duty to send the Chief Coroner a copy of your response. The Chief Coroner may publish either or both in a complete or redacted or summary form. He may send a copy of this report to any person who he believes may find it useful or of interest. You may make representations to me, the coroner, at the time of your response, about the release or the publication of your response by the Chief Coroner.
9	**12th February 2016** **Assistant Coroner**