Review of Governance Arrangements, Structures and Systems for the Prevention and Control of Healthcare Associated Infections in the Betsi Cadwaladr University Health Board

Report by Professor Brian I. Duerden CBE, BSc, MD, FRCPath, FRCPE  
Emeritus Professor of Medical Microbiology, Cardiff University

Background
This review of governance arrangements, structures and systems for the prevention and control of healthcare associated infections was commissioned by the Betsi Cadwaladr University Health Board (BCUHB) following an outbreak of *Clostridium difficile* infection (CDI) at one of its main hospitals, Ysbyty Glan Clwyd (YGC), in January – May 2013. The core outbreak period when numbers of cases exceeded the background numbers was from mid-February to late March. The total number of cases at YGC from January to May 2013 was 96 of which 15 were in January, 16 in February and 37 in March.

The overall numbers and rates of CDI cases at BCUHB were higher than in most other Welsh Health Boards in the years prior to this outbreak. There had been a 20% reduction in the number of cases in 2011 but this reduction had not been sustained in 2012 when there had been an increase in numbers to the previous background level. There were similar concerns about the number and rates of bacteraemias (bloodstream infections) caused by methicillin-resistant *Staphylococcus aureus* (MRSA) which were also higher than the all-Wales average and had not reduced in line with the targets set. There had been a focus on MRSA infections in particular during 2012 but the rising trend in numbers of CDI cases had caused concerns to be raised by the Infection Control Team (ICT) in July 2012 but an emergency meeting to discuss these concerns and the actions taken was not held until January 2013.

The outbreak of CDI at YGC in early 2013 was investigated by a team from Public Health Wales (PHW) which presented its report to the Chief Medical Officer, Welsh Government, on 20 May 2013. The recommendations for actions by BCUHB Board included:

- The Board must give greater priority to control of infection …and ensure… that the safety of patients is not compromised.
- A review of governance arrangements must be undertaken as a matter of urgency….
- The review must include the process of ‘performance meetings/reviews' with the Clinical Programme Groups……
• The Board must be assured the Health Board wide policies for all aspects of infection prevention and control are implemented in full and understood by all healthcare staff.
• The Board must demonstrate within 60 days progress in the implementation of planned changes to infection prevention and control structures….including resolving the lead Infection Control Doctor role.

This independent external review was commissioned as part of the BCUHB response to these recommendations to help advise the Board on the changes needed to improve the governance and delivery of the Board’s infection prevention and control service.

The purpose of this review is not to repeat or re-visit the details of the CDI outbreak which were presented in the report by Public Health Wales but look to the arrangements that need to be put in place to ensure an improved service for the future.

**Terms of Reference**
The terms of reference set out by BCUHB for this review are:

**Objectives**

• To advise on how the organisational and governance arrangements for preventing healthcare associated infections (HCAI) may have contributed to an excess of these infections in BCUHB.
• To report on the epidemiology of the C. difficile infection across BCUHB area, including mortality rates since 2010;
• To advise on how organisational structures and governance arrangements, in relation to both clinical and non-clinical services, can be improved to support effective infection prevention and control, minimising occurrences and developing a culture of zero tolerance;
• To advise on specific issues related to preventing Clostridium difficile infection (CDI) and how BCUHB can minimise risk of these infections including compliance with HB policies, procedures and care pathways, medical engagement in IPC and antimicrobial prescribing;
• To advise the Health Board on implementing processes that support consistent compliance with best practice guidance on recording and reporting of mortality arising from all HCAI, including national reporting systems.

*We wish to have a report for the Board by the end of July 2013. This will be available to the public.*

**Review process**
This review was conducted in six stages.

1. A review of documents provided by BCUHB comprising minutes of the Board and committees relevant to HCAI prevention and control, reports on aspects of HCAI, policies and protocols relating to the prevention and control of HCAI, and the Outbreak Report prepared by Public Health Wales for the Chief Medical Officer for Wales.
a. Public Health Wales: *Clostridium difficile* infection at Ysbyty Glan Clwyd: Final report to the Chief Medical Officer for Wales
b. Health Inspectorate Wales and Wales Audit Office: An Overview of Governance Arrangements at BetsiCadwaladrUniversity Health Board
c. Minutes and Annual Reports 2010-11 and 2011-12 of the Improving Prevention and Control of Infection Sub-committee.
d. Minutes of the BCU Health Board and Reports to the Board relating to Infection Prevention and Control 2012-13.
e. Minutes of the Quality and Safety Committee 2012-13.
f. Notes of Hospital Management Team meetings in East, Central and West, 2012-13.
g. Action log in response to the Public Health Wales report.
h. Age standardised rates of *Clostridium difficile* in hospital inpatients aged 2 and over in Health Boards in Wales from April 2012 to March 2013.
i. Internal Rapid review of the recording and reporting of deaths where reference to *Clostridium difficile* infection has been included as part of death certification.
j. *C. difficile* RCA Templates (live patients; deceased).
k. *C. difficile* integrated care pathway.
l. *C. difficile* Treatment recommendations.
m. Major outbreak reporting and control procedure.
o. *C. difficile* protocol.
p. Hand hygiene protocol.
q. SBAR – 9 month evaluation of *C. difficile* RCAs.
r. Summary chart for management of *C. difficile* diarrhoea ver2.
s. BCUHB *C. difficile* report 31 January 2013
u. Updated Infection Performance template April 2013
v. Policy Yellow 5: Management of patients with known or suspected infections or communicable diseases.

2. A 2-day visit to Wrexham Maelor and YGC on June 10th & 11th to meet senior managers, Board members and interview key clinical staff face to face or by video or teleconference:
a. Executive steering group –Dr Martin Duerden (Acting Medical Director), Mr Andrew Jones (Executive Director of Public Health), Mrs Reena Cartmell (Acting Director of Nursing, following the resignation and vacating of the Director of Nursing position by Mrs Jill Galvani. effective 2nd March 2013 – 31st May 2013) and Mrs Grace Lewis-Parry (Director of Governance and Communications).
b. Mr Geoff Lang (Acting Chief Executive)
c. Dr Chris Cefai & Ms Janet Purton (Infection Control Team, Wrexham Maelor)
d. Ms Hilary Stevens, Independent Board Member (by telephone)
e. Mr Jon Falcus, Operational Site Manager, Wrexham Maelor.
f. Ward Sisters Tracey Harris and Kirsty Millar, Wrexham Maelor
g. Ms Heather Piggott, Assistant Nurse Director with delegated responsibility for Infection Prevention & Control. (HP, ADN)
h. Dr Nick Looker (Consultant Medical Microbiologist and Infection Control Doctor, YGC) and Mr David Casey (Acting Infection Control Lead, BCUHB)
i. Dr Brian Tehan (Assistant Medical Director and Patient Safety Lead, YGC)
j. Infection Control Nursing Team Central (YGC)
k. Ward Sisters Lisa Morris and Jayne Scott (YGC), Kelly Jones and Michelle Rondell (Video from Wrexham Maelor)
l. Dr Darcy (Consultant Medical Microbiologist and Infection Control Doctor, Ysbyty Gwynedd) and Ms Sue Carter (Infection Control Nurse, YG) – West ICT (Videoconference)
m. Ms Ellen Greer (Operational Site Manager, YGC)
n. Prof Merfyn Jones, Chair, BCUHB
o. Matrons Alix Buckley, Josie Wray, Janet Garnett, Jan Weatherhead and Sandra Robinson Clarke (YGC)
p. Rebecca Weston (Antimicrobial Pharmacist, YGC)

3. Further teleconference and face-to-face meetings
   a. Dr Lyndon Miles (Board Vice-chair)
b. Angela Hopkins (newly appointed Director of Nursing, with effect from 1st June 2013)
c. Dr M Kumwenda (Physician, YGC)
d. Public Health Wales team responsible for the Outbreak Report (11 July 2013)
e. Ms Tracey Gauci, Nursing Officer, Department for Health, Social Services and Children, Welsh Government (1 August 2013; after the first draft report)

4. Preparation of a draft report.
5. A second visit to BCUHB to discuss the draft report.
6. Preparation of the final report.

Infection Prevention and Control arrangements after establishment of BCUHB

The aim for the new Board was to establish a single and unified Infection Prevention and Control (IP&C) service covering the whole of the Board’s healthcare establishments. Previously there had been three independent IP&C services with teams that comprised an Infection Control Doctor (Consultant Medical Microbiologist; ICD) and a number of Infection Control Nurses (ICN) based in each of the three major hospitals. There was an Infection Control Committee (ICC) based at each of those hospitals organising the service to the hospital and surrounding community hospitals, nursing/care homes (where applicable and possible) and primary care.

With the creation of a single service, the individual ICCs were disbanded. However, the single unified service did not have clear line of organisation and leadership. There was a lack of cohesion over management responsibilities, accountability and assurance lines.

The ultimate responsibility for patient safety, including the provision of an effective IP&C service that minimises the risk of HCAI is with the Chief Executive of any NHS organisation, with oversight by and assurance to the Chair and the Board. As required by NHS Wales, the Director of Nursing had (and has) executive responsibility for IP&C in BCUHB. The Director of Nursing in post at that time had four Assistant Directors of Nursing and for operational purposes, the responsibility for IP&C was delegated to one of the Assistant Directors of
Nursing, (HP, ADN) who was an experienced senior nurse manager but had no background, experience or expertise in IP&C as a specialty. Therefore, she was dependent upon the professional support of the ICDs and senior ICNs to provide this expertise.

The line management for the ICN team across BCUHB (but operationally still based as individual teams in the three main hospitals) was initially placed within the Pathology CPG, alongside Medical Microbiology and other Pathology services (although the Microbiology Laboratories at YGC and YG are part of Public Health Wales which is responsible for the laboratory management and employs the staff, including the Consultant Medical Microbiologists). This did not prove to be a suitable or appropriate arrangement and in 2012, line management for the ICN teams transferred to be the direct responsibility of the Assistant Director of Nursing, but by this time, the ICN team at YGC, in particular, had been subjected to financial savings, vacant posts had been deleted and the number of ICNs had been reduced from 7 to 4 (including 1 secondee from another CPG on a short-term basis).

**Infection Control Doctors (ICDs)**

Furthermore, there was failure to agree on ICD organisation and leadership. The three ICDs for the three sites, each with responsibility for one main hospital, continued with their roles as pre-merger. Although the executive management considered the need to appoint a single lead ICD for the BCUHB IP&C service, none of the existing ICDs felt able to accept this unspecified appointment which would have been in addition to their existing responsibilities and duties. Instead, they attempted to work as a triumvirate, but this did not provide the single medical leadership and management required for an effective service. Moreover, it did not provide the medical profile for IP&C with the CPGs because there was no medical leadership at the equivalent level to the Chiefs of Staff of the CPGs.

It is understandable that none of the 3 ICDs was prepared to take on the BCUHB lead ICD role in addition to their existing local duties or to relinquish those duties and leave a serious gap in the service at local level (in the 3 sites). The lead ICD role for BCUHB should be regarded as at least a 50% wte post distinct from the ICD roles in the 3 sites. They did not consider that there was sufficient manpower in the Consultant Medical Microbiologist/ICD establishment to take on the role. Whereas this was not an unreasonable view, it left an unacceptable gap in the medical leadership of IP&C.

The Consultant Medical Microbiologists at two of the sites are employed by Public Health Wales which provides the Microbiology laboratory service. It has been suggested that, as PHW staff, it might not be appropriate for them to take on the lead ICD responsibility for BCUHB. I do not believe that this is a reasonable interpretation of the relationship between PHW staff and the Board’s Medical Microbiology and Infection Prevention and Control needs. As the Consultant Medical Microbiologists providing services to the Board, they could be expected to take on any of the leadership roles in Microbiology and/or Infection Prevention and Control either at local sites (as they do) or for the Board as a whole. There are numerous precedents for PHW, or the former PHLS or Health Protection Agency, staff in England and Wales taking such leadership roles for their Trusts or Boards.

**Management, accountability and assurance**

The upward lines of management accountability and Board assurance were combined and somewhat confused in the way the organisation was set up. There was a lack of distinction
between line management and accountability on the one hand and Board assurance on the other. There was also an extended line of personal accountability above the most senior IP&C professional (i.e., the one with professional expertise in IP&C) before reaching the Chief Executive and Board.

The Assistant Director of Nursing (HP, ADN) was managerially responsible for the IP&C service and was the professional and line manager for the ICNs. However, she did not have professional training or expertise in IP&C and depended upon the advice and information from a team that was short staffed, low in morale and under interim leadership itself.

The IP&C service reported to and was responsible to the Improving Infection Prevention & Control sub-committee of the BCUH Board’s Quality and Safety Committee through the Assistant Director of Nursing. This key Board committee is an assurance committee for Quality and Safety, not a management committee. As the Improving IP&C sub-committee was the only IP&C committee in the BCUHB structure, it was essentially a hybrid committee with both management and assurance roles but established primarily in assurance mode; i.e., it had a management role but reported to an assurance committee. From a review of the minutes and reports of the sub-committee and its parent committee, neither function appears to have been fulfilled adequately.

The Assistant Director of Nursing (HP, ADN) with delegated responsibility for IP&C did not chair the Improving IP&C sub-committee. This was chaired by the then Director of Nursing, and this was the first point at which the responsible executive came into the IP&C structure. The reporting line at the sub-committee was from the Assistant Director of Nursing (HP, ADN) supported by the interim lead ICN to the then Director of Nursing as both Chair of the sub-committee who reported in assurance terms to the Board’s Quality and Safety committee and in management terms to the Chief Executive.

The ICD input at this level was provided by the locality ICDs in turn, depending on where the sub-committee meeting was being held. The ICDs had no BCUHB-wide responsibility or authority and this meant there was a weakness in the co-ordination of the medical input to IP&C at this level.

The 3 ICDs and the senior ICNs had created an “Infection Control Executive” (ICE) but this was a misnomer. It had no authority within the BCUHB structure and no line management responsibilities for the IP&C staff or for reporting to the Assistant Director of Nursing (HP, ADN) and the Improving IP&C sub-committee. Their aim was to provide co-ordination between the 3 IP&C teams in terms of policies and procedures and to provide mutual support.

Thus the line management accountability and Board assurance, as well as lacking clarity of purpose and responsibility was unduly long above and beyond the level where the training, expertise and experience in IP&C existed, i.e., with the interim lead ICN and the ICDs. Information and advice was being increasingly “filtered” through individuals and committees who did not have the expertise in interpretation of IP&C matters and it is not, therefore, surprising that the Board was receiving unreasonably complacent assurance that HCAI was under control and that the Board did not need to have any concerns.

This view was not consistent with the facts on the incidence and rates of MRSA bacteraemias and *C. difficile* infection which had been consistently high in BCUHB.
compared with elsewhere in the comparable Health Boards in Wales or comparable NHS Trusts in England.

**Local committees**
The standing down of the local ICC committees in the 3 sites after the merger left a serious gap in the management of IP&C services. Their role was not filled by the Improving IP&C sub-committee which was the only IP&C committee in BCUHB. It was not an appropriate forum from which to run the IP&C services in the 3 sites, each with its own main hospital, several community hospitals and primary care to deal with. It meant that there was no local forum to link the IP&C team with their local clinicians (medical and nursing) and managers. The lack of manpower in the IP&C teams, particularly at YGC, also reduced the level of support that was given to local community hospitals and primary care.

**Clinical management in BCUHB**
The principle behind the management of clinical services across BCUHB was clinical leadership through CPGs, each of which had a Chief of Staff (in essence a specialty “medical director”). The CPGs were responsible for the delivery of the clinical services in their specialties across the whole of BCUHB.

As with IP&C, this initially left a gap in the clinical management and co-ordination at local level. This was addressed by the appointment of an Associate Medical Director and Assistant Director of Nursing for each Hospital, and eventually, in April 2013, by the appointment of a Senior Site Manager to complete the triumvirate in each hospital. The Senior Site Manager post was only established in April 2013 around the time of the *C. difficile* infection outbreak at YGC which had exposed weaknesses in the IP&C and clinical management structures.

At the same time it was agreed that each site should re-establish an IP&C committee to deal with issues at local level and manage the local IP&C service. Membership is to include the ICT (medical and nursing), other clinicians representing the CPGs, the Assistant Medical Director, Assistant Director of Nursing and the Senior Site Manager. This recognises that local actions and co-ordination are required to deliver IP&C.

**Surveillance of key HCAI**
The national priorities are determined by the Welsh Government; these include MRSA and MSSA bacteraemia, *C. difficile* infection and surgical site infections (orthopaedic and Caesarian section). The national programme requires Health Boards to report their numbers of cases of these HCAI though a system run by Public Health Wales.

However, it is essential for effective IP&C to have a surveillance system that operates from ward/unit to CPG (or Directorate equivalent) to senior management (Director of Nursing as accountable executive, Medical Director and Chief Executive) and then on to national surveillance. It is an accepted premise that “if you cannot count it, you cannot manage it”, and this is an underlying principle and purpose of surveillance – to provide a system of measurement to drive improvement (ie, a reduction in numbers of cases of HCAI in this case).
Surveillance of HCAI in BCUHB

Surveillance in BCUHB should operate at four levels of escalation:

• Each ward/unit needs to have a regular (monthly) report showing what its numbers and rates of the key HCAIs are; the discussion of these figures and decisions on any actions required should be standing agenda items at ward/unit meetings alongside audit data on hand hygiene, environmental cleanliness, IV line care and antimicrobial stewardship.

• Similarly, each CPG needs the same information brought together for each of the specialties within the group. Again, discussion of these figures and any necessary actions should be standing agenda items at CPG board meetings. The lead ICD and ICN for BCUHB should attend CPG Board meetings for these items to ensure appropriate expert input to the discussions and to ensure that appropriate priority is given to IP&C actions. In this way, the IP&C lead doctor and nurse would be acting at levels of responsibility and authority equivalent to the Chiefs of Staff of the CGPs.

• At BCUHB level, an operational (management-led) IP&C committee should receive the surveillance data and the audit returns for the whole BCUHB organisation in a timely manner and assess the need for any actions, either immediate or strategic. This should be an expert group comprising the ICD and ICN leads, representatives from the ICTs of each site, senior clinical (medical and nursing) and facilities & estates representatives, and should be chaired by the Director of Nursing as the responsible executive.

• Finally this comprehensive and amalgamated data for the whole of BCUHB would be reported to the Board through its Quality and Safety committee and be the basis of the reports to Public Health Wales under the Welsh HCAI surveillance programme.

• The BCUHB IP&C committee would also be the route through which the need to report outbreaks and deaths as required by the Welsh Government should be determined.

The current system in place in BCUHB does not provide these levels of action and assurance. Monthly reports are produced but they are complicated to follow and it is not clear at what levels they are reviewed and assessed for action. Wards have access to their data and are responsible for their audits, but it is difficult to see a clear link between the audit and infection data and a route by which appropriate action is ensured. The assembly of data at BCUHB level provides the data for the national surveillance scheme but the system of reporting to the Board through the Improving IP&C sub-committee has led to a falsely complacent approach to the numbers and rates of HCAI. It does not seem to have been made clear at Board level that although numbers of CDI, in particular, had come down in 2011, they had not continued to fall in 2012 and BCUHB had the highest rates of equivalent Health Boards in Wales.

ICN establishment

The core of the ICT in any healthcare organisation is the group of ICNs, a cadre of nurses who have specialised in IP&C and have postgraduate training and qualifications (eg, diploma or MSc) in IP&C. They provide most of the hands-on activity of the ICT which is usually led jointly by the senior ICN and the ICD (Consultant Medical Microbiologist).
When BCUHB was established, there were differences in the numbers of ICNs in the ICTs of the three sites. The YGC (Central) team was the largest but provided a wider service.

During the period when the ICN teams were under the management of the Pathology CPG, the number of ICNs at YGC was reduced to the lowest common denominator across BCUHB. Staff who left were not replaced as part of an efficiency (cost-cutting) programme aimed at bringing that part of the BCUHB into financial balance during a time of considerable financial pressures within the organisation. An original establishment of 7 ICNs was reduced to 4, including one nurse seconded from another CPG who was a welcome and enthusiastic addition to the team but was not trained or qualified in IP&C and could not be regarded as a trainee because the secondment was relatively short-term and she would be returning to her “home” specialty.

The reduced capacity in the YGC ICT was further compromised during the CDI outbreak in early 2013. Because of the lack of sufficient single room availability, a cohort ward was established. This was an appropriate measure and a significant part of the outbreak control plan. However, it required most of the time and available input from the ICNs to establish the specialist nursing needed for the cohort ward and this meant that there was even less time for the support work they would normally be expected to provide to IP&C in the other areas of the hospital.

Furthermore, the YGC team lost, for the most part, the day to day input and expertise of its most senior ICN. Within the BCUHB establishment, a post was designated as the lead ICN for the whole of BCUHB, with the intention that this would, in time be filled by the recruitment of a Nurse Consultant, or similar leading expert, in IP&C. However, this appointment was not made and on an interim basis whilst awaiting completion of the organisational change process and appointments in the team, one of the most senior ICNs in BCUHB, who was the lead ICN at YGC, was nominally made lead ICN for BCUHB. This post was essentially a full-time post and took up most of his time, taking him out of his lead role at YGC, although his main base continued to be at YGC. However, because of the nature of the role the postholder was not in a position to provide the strategic leadership required of this post. This was also the only IP&C professional with any responsibility for BCUHB-wide activities and, in the absence of an ICD at that level, was the only professional support for the Assistant Director of Nursing (HP, ADN).

As a result, there was a lack of support for leadership, management and strategic planning in IP&C across BCUHB.

There was also a loss of senior leadership in the YGC ICT and coupled with the reduction in numbers of ICNs in the ICT, the IP&C service inevitably deteriorated. There was inadequate ability to release ward staff to receive IP&C training, less provision and interpretation of surveillance data on key infections and inadequate contribution to the oversight of key IP&C audits (hand hygiene, environmental cleaning, IV line care etc) and their linkage to infection rates. Failures in IP&C training, including mandatory training, was noted in several IP&C reports during 2012 but there was no indication of what was being done to rectify the situation. Furthermore, there was no IP&C service from the ICN team outside normal office hours. This is an issue not only for this Health Board, but with the increasing pressure and need to provide extended clinical services, the risks of infection and the need to provide
IP&C support are present throughout the period of clinical activity mean that IP&C service provision should match that of other clinical specialties.

Antimicrobial stewardship

It has become recognised over the last decade or more that prudent use of antibiotics and the wider issues of antimicrobial stewardship are essential in all areas of clinical practise with two main aims – a reduction in the selective pressures for antibiotic resistant bacteria that are major causes of HCAI and as part of the general IP&C package of activities. Exposure to antibiotic treatment is is one of the main precipitating factors in C. difficile infection and has also been shown to be a risk factor in MRSA infection. In both England and Wales NHS organisations are required to have antimicrobial prescribing policies in place that cover both the selection of antimicrobial agents for particular clinical conditions and the proper approach to prescribing, including the recording of the reason for the prescription, designated early review dates (especially where there is a need to look to switch from IV to oral administration), review of prescriptions by consultants at the earliest ward round opportunity after a patient’s admission, and a clear stop date on the prescription. The application of the policy should be subject to regular audit.

However, there appears to have been slow adoption of a consistent and appropriate single unified antimicrobial prescribing policy in BCUHB and the IP&C reports regularly recorded a lack of implementation and reluctance by consultant staff to agree to such a policy. BCUHB has the highest use of antibiotics amongst equivalent Welsh Health Boards which indicates an inadequate approach to antimicrobial stewardship, particularly given the case mix of patients attending the hospital.

Throughout the UK, there has been a programme of specialist post-graduate training for pharmacists specialising in antimicrobial prescribing and most NHS Trusts in England and Health Boards in Wales have appointed an Antimicrobial Pharmacist to provide expert support to the antimicrobial stewardship programme. The responsibilities of the antimicrobial pharmacists are to work with the Consultant Microbiologist(s) and other clinicians in developing the antimicrobial prescribing policies, to lead the pharmacist input to the review and oversight of prescriptions, working with the ward pharmacists to ensure proper implementation of the policies, and leadership of an audit programme for antimicrobial prescribing that should involve the ward pharmacists and, particularly, the medical staff on the wards who are prescribing the antibiotics.

Progress with antimicrobial stewardship has not been as rapid as would have been hoped in getting policies agreed and implemented and in establishing an audit programme. Since the creation of BCUHB, a great deal of time has been spent in trying to bring the policies of the former components together into a single, consistent policy for antimicrobial prescribing. This has taken up a lot of the time of the antimicrobial pharmacist and the IP&C reports indicate that a single policy is yet to be implemented in several clinical specialties. Partly as a result of this, the ward pharmacists do not have a consistent role or approach to monitoring and guiding the implementation of the policy and there is no programme of clinical audits of antimicrobial prescribing involving the junior medical staff. The only audit data produced is that required for the national surveillance of antimicrobial usage across Wales as part of the Public Health Wales programme.
Root Cause Analysis (RCA)

BCUHB does have in place a system for Root Cause Analysis following outbreaks or serious incidents and/or deaths relating to HCAI but it is not consistent with best practice guidance on conducting RCAs and has not produced the required outcome of identifying root causes for the infection occurrences that can be addressed by improvements in clinical practice. The RCA process should be multidisciplinary (nursing, medical, pharmacy, facilities and estates staff as appropriate for the case), but although this is the stated intention at BCUHB, it does not happen consistently and there are numerous references in the “dashboard” reports of a failure of medical staff in particular to be engaged in the process.

The RCAs appear to have been primarily an exercise by the nursing staff in the CPGs, initiated by the ICTs, although the protocols for RCAs on deceased and living patients who have had CDI quite rightly set out a multi-disciplinary approach in which the CPG Chiefs of Staff and medical consultants have a key role in ensuring medical input, but it is clear that this did not happen consistently or reliably. The outcome of the RCAs did result in recommendations for improved practice over most of the period reviewed, but these were not always acted upon within or across the CPGs.

An SBAR report was produced in February 2013 in which the results of the RCAs conducted between April and December 2013 were reviewed. According to the protocols in place, 114 RCAs should have been conducted in the period, but compliance was only 63% across BCUHB. Moreover, there were numerous gaps in the material recorded. This SBAR highlighted the issues raised in the RCAs relating to clinical care (eg, failure to implement the agreed CDI care pathway), diagnosis, prompt isolation and implementation of antimicrobial prescribing guidelines. The recommendations in this SBAR were appropriate, but this type of review of the RCA findings should have been a regular activity so that the basic purpose of the RCAs could function, ie,

- Identify the underlying issues – the Root Causes
- Identify any failures in clinical care
- Analyse the results from RCAs to identify common factors
- Implement changes in practice to address the Root Causes identified.

This was not being done.

C. difficile typing

Only a limited number of C. difficile isolates, mostly from the patients in the outbreak at YGC, have been sent to the reference laboratory for ribotyping. It is difficult, therefore, to gain an overall indication of the impact of different ribotypes on the epidemiology of CDI across BCUHB. However, the typing that has been done indicates that some but by no means all cases have been caused by strains of ribotype 027 that has caused major problems in England, Canada, the USA and elsewhere during the 2000-10 decade. As now in most places in the UK, the typing of BCUHB isolates shows some possible linkages but also that a variety of strains are circulating in the population and are causing the infections in vulnerable patients with risk factors and may cause linked cases when infection prevention and control measures are less than optimal. This means that the general management of risk factors, particularly the rigorous implementation of antimicrobial stewardship, is of key importance in reducing the risk of CDI in this patient population.
Facilities and accommodation

One of the most important actions in controlling the potential spread of infectious diseases, including MRSA and *C. difficile* infections is the prompt recognition of an infected patient who might be a risk for transmission of infection to others and isolation of that patient, preferably in a single room or, if the number of cases exceeds the capacity of single rooms, then in a cohort ward where patients with the same infection are nursed together. Many NHS hospitals have fewer single rooms than would be ideal and there is often pressure on those single rooms for various clinical needs as well as the isolation of infected patients.

There is limited single room accommodation in all the BCUHB hospitals but the recent focus has been on the issue at YGC where the CDI outbreak occurred earlier in 2013. The lack of single rooms has been exacerbated by two local factors – the extensive re-building and refurbishment ongoing at the YGC site, and the change of use of some former single clinical rooms to other purposes over recent years. This had been raised during 2012 (July) by the ICT at YGC, mainly because of concerns at the inability to get prompt isolation of patients with CDI. However, there was some delay in addressing the issue and it was not until January 2013 that an emergency meeting was called to address the issue of increasing numbers of cases and the lack of isolation capacity. As the outbreak then occurred on top of the already high number of cases, the solution adopted with good reason was to create a cohort ward for patients with CDI. This was an integral part of the outbreak control plan. Once the outbreak had been brought under control, the plan was to return that ward to its more general clinical use but with the facility to re-establish it quickly as a cohort ward should the need arise.

*C. difficile* outbreak at YGC – what went wrong?

Many inter-related issues, most of which have been discussed above, came together to make a CDI outbreak a significant risk in BCUHB, and in YGC in particular. It is well recognised that when there are weaknesses in a system, infection is one of the first challenges that will expose those weaknesses. In terms of the CDI outbreak at YGC:

- It occurred on top of an overall incidence of CDI that was higher than in comparable Health Boards, was not reducing (in 2012), but was not recognised as a significant issue within the management of BCUHB and was not brought to the attention of the Board until the outbreak.
- The population served by BCUHB is a high risk population with a high proportion of elderly residents with multiple co-morbidities – but its age-adjusted population rates of CDI were still high in comparison with others.
- Antibiotic usage in BCUHB was high and this is a major risk factor for CDI
  - There was slow progress with antimicrobial stewardship and
  - Failure to agree and implement single BCUHB-wide antimicrobial prescribing guidelines, although the three former guidelines were in continued use.
- There was a weak IP&C management structure
  - and a failure to recognise the risk indicated by the high background rate of CDI from the information which was being presented at the Board.
- There was a lack of IP&C leadership
  - especially in the failure to appoint a lead ICD
  - and depending on an interim lead ICN
and reporting through an Assistant Director of Nursing who did not have a background in IP&C.

- The number of specialist IP&C staff had been reduced, particularly at YGC, resulting in
  - Inadequate training provided for ward staff
  - Reduced support for ward IP&C activities
  - Reduced input to audit activities on wards
  - Withdrawal of IP&C support for community hospitals and primary care.

- There was a lack of single room isolation facilities and delays in isolating patients with diarrhoea that might be infectious, including potential CDI cases.
- There was a failure to respond in a timely manner to concerns about isolation capacity and infection risks raised by the ICT in 2012.
- The way in which HCAI matters were reported to the Board from the Improving IP&C sub-committee through the Quality and Safety Committee led to false assurance and complacency.
- IP&C appears to have had a low priority at senior executive level and in the clinical management system through the CPGs. There has been a general finding that:
  - there were not thought to be serious issues with infection rates
  - antimicrobial stewardship and the implementation of prescribing guidelines did not have a high priority

- Local systems for IP&C in the three sites had been disbanded so there was no coordinating system or forum in any of the three main hospitals.

**Review of the approach to Death Certification in CDI cases**

There is a clear difference across BCUHB in the approach to death certification in patients who have had CDI and in whom it may have contributed to their death.

In an outbreak situation, there has been a general finding over the past 20 years that the immediate mortality is likely to be around 10%, with the CDI being a major factor in the death of these patients. Furthermore, when all-cause mortality is assessed after 1, 2 or 3 months, the mortality rate in the cohort of patients who have had CDI can reach around 40% (or more in some outbreaks). In many of these patients, the main cause of death will have been their other underlying conditions, but it is clear that CDI is a significant factor in hastening the death of many of these patients and should be considered as a contributory cause.

This was the reasoning behind guidance from the CMOs in England and Wales over the past 6-8 years that doctors should seriously assess the contribution of HCAI such as CDI to the death of any patient who has had such an infection and include it on the death certificate when it is considered clinically to have made a contribution.

In BCUHB there have been three issues relating to certification and reporting of deaths in which CDI has been implicated:

- Having a sufficiently high level of awareness of the potential contribution of CDI to death.
- A marked difference between the death certification practices in the West and Central/East sites of the Board’s area relating to different approaches by the coroners of those areas.
• Reporting of CDI-associated deaths to the Welsh Government.

1. The need to consider the potential contribution of CDI to a patient’s death depends upon the profile of HCAI, and CDI in particular, amongst clinicians, and there is evidence from other IP&C issues that HCAI was not seen to have a high profile in the BCUHB CPGs.

2. The approach to death certification in the West and central/East sites of BCUHB shows an interesting and unusual divergence in coroner’s practice. The approach in the West appears to be similar to that in most of England and Wales. The decision on cause of death and contributory causes is generally made by the clinician certifying the death; the coroner receives the certificate and will only query it if they have some specific reason. In the Central/East sites, however, it appears that when a clinician thinks that CDI may have had a role in causing the death of a patient, the coroner is consulted before a decision on the certification is made and the coroner generally orders a post mortem examination to confirm the involvement of CDI in causing the death. That approach will identify those cases where severe CDI is the primary cause of death, because there will be evidence of the acute pathology of CDI at autopsy. However, it is likely to underestimate considerably the cases in which CDI is a contributory factor when the infection has made the patient more vulnerable to succumbing to their underlying medical condition(s). The figures for deaths caused by CDI in the West and Central/East sites show that the likelihood of this being the case. Despite the number of cases of CDI in Central/East, particularly at YGC, the number of deaths recorded as being due to CDI is much less than in the West site (YG).

3. There have been delays and omissions in reporting CDI-associated deaths to the Welsh Government. This is irrespective of the differences in death certification between West and Central/East sites. This was probably a further consequence of the inherent weaknesses in the management and accountability line for the governance of reporting of SUIs.

Role of Public Health Wales (PHW)

PHW has the responsibility for the national surveillance programme in Wales and for providing advice and guidance on public health matters, in this case the investigation and management of HCAI. They collate and analyse the returns on the specified HCAI (MRSA bacteraemia, CDI etc) from the Health Boards in Wales. They are also called in to investigate specific outbreaks of infections and infectious diseases, including HCAI outbreaks. In the case of outbreaks such as the CDI outbreak at YGC, they can be asked to investigate either by the Health Board or instructed to do so by the CMO for Wales. However, their role has not been to take proactive or pre-emptive interventions on the basis of their collated surveillance data.

PHW has also produced and promulgated guidance on the prevention and control of HCAI, and CDI in particular, and on antimicrobial stewardship. This guidance was drawn from its own data and expertise and from guidance produced by the Department of Health (England), the Scottish Government. And the European Centre for Disease Control (ECDC). There was no lack of official guidance on the prevention and control of CDI. In relation to the CDI figures and rates at BCUHB, PHW received the board-wide data from BCUHB and collated it into its all-Wales data which showed the comparative rates in all the Welsh Health Boards. Although
this showed that BCUHB had the highest rates for CDI amongst comparable Boards, it was not considered to be the role of PHW to take this up with BCUHB. They did not make any approach to BCUHB on the basis that the CDI numbers and rates were the highest in Wales, as were their antimicrobial prescribing data which indicated poor compliance with antimicrobial stewardship guidance.

When it was realised that a significant outbreak of CDI was occurring in BCUHB, specifically at YGC, a PHW team was asked to investigate and advise on the outbreak by the CMO for Wales. This resulted in the report to CMO for Wales in May 2013. The trigger for this intervention was a cluster of reports of deaths in which CDI was implicated from BCUHB, specifically from YGC. These reports are automatically referred to the officers of the Welsh Government Health Department and when the number of deaths from YGC and their relationship with an outbreak was recognised, CMO asked PHW to undertake an investigation of the outbreak and the general incidence of CDI in BCUHB during that period. The overall incidence of CDI in BCUHB had also been noted by the Welsh Government and had been raised with BCUHB in their 6-monthly performance review meeting.

**Recommendations**

This review shows that the prevention and control of HCAI requires significantly increased attention and priority throughout BCUHB, from individual wards and units through to the Executive Team and the Board itself (ie, from ward to Board and Board to Ward). The profile of IP&C needs to be enhanced across all clinical areas; the Chief Executive has ultimate responsibility for patient safety and senior managers need to ensure that IP&C is a priority objective throughout the management structure.

The Board needs to have a reliable system of assurance in relation to the numbers and rates of HCAI in BCUHB and the performance of the IP&C service supported by expert interpretation and advice.

**Board governance**

- The Board should receive regular reports on numbers and rates of key HCAI (MRSA, CDI etc) with interpretation of trends and benchmarking against equivalent Boards in Wales and large Trusts in England.
- An Independent Member should have specific responsibility for the oversight of IP&C matters.
- The assurance reporting line through the Board’s Quality and Safety Committee should be distinct from the management line of responsibility and accountability for IP&C. The current system in which the Improving Infection Prevention and Control (sub) committee is a sub-committee of the Quality and Safety Committee, which is an assurance committee, is not appropriate.
- An appropriate governance system would be for the IP&C service to be managed through a BCUHB IP&C Committee chaired by the accountable executive (the Director of Nursing) [see below] with Board reports made by the Director of Nursing to the Quality and Safety Committee and on to the Board.
The Quality and Safety Committee should be expected to give detailed scrutiny to the information (surveillance, audit, and management data) to inform the Board but the Board itself should be clear about its own responsibilities to review HCAI issues and should not devolve that responsibility to the Quality and Safety Committee.

Management
The newly appointed Director of Nursing, as the accountable executive, should take direct personal responsibility for the IP&C service with support from IP&C professionals appointed to lead roles across BCUHB. These key lead professionals with BCUHB with responsibilities should be:

- **Lead Infection Control Nurse** (full-time post) with post-graduate qualifications in IP&C and significant experience of working in the field in a large NHS organisation. This could be an appointment at either Assistant Director of Nursing (IP&C) or Nurse Consultant level; the BCUHB executive team prefer the Assistant Director of Nursing approach and I fully endorse this approach.
  - The Assistant Director of Nursing (IP&C) would be accountable to the Director of Nursing, would provide professional expertise in IP&C and would be responsible for managing the IP&C nursing service.
- **Lead Infection Control Doctor.** This will need an increase in the current Consultant Medical Microbiologist establishment as the post requires at least a 50% wte commitment. For most NHS bodies of equivalent size, this would be essentially a full-time post but with the dispersed nature of the clinical services in BCUHB across the three sites and the need for local ICD input, the role of the Lead ICD may not be full-time and may be linked to other Consultant Medical Microbiologist responsibilities.
  - However, the Lead ICD should not also have the lead ICD responsibilities in one of the sites.
- **Lead Antimicrobial Pharmacist.** The importance of antimicrobial stewardship and the need for implementation of BCUHB antimicrobial prescribing policies requires the appointment of a Lead Antimicrobial Pharmacist. As with the Lead ICD, this may not need to be a full-time role and may be linked with other pharmacy duties. This could include antimicrobial pharmacist duties in one of the sites but each site should have a full-time antimicrobial pharmacist who is not distracted by BCUHB-wide duties.
  - Responsibilities of the Lead Antimicrobial Pharmacist would be to coordinate the development, implementation and audit of BCUHB antimicrobial prescribing policies, working with the Consultant Medical Microbiologists and the lead clinicians for antimicrobial prescribing in the CPGs.

The Director of Nursing, Assistant Director of Nursing (IPC), Lead ICD and Lead Antimicrobial Pharmacist would form the Operational Team responsible for IP&C in BCUHB.

Infection Prevention and Control Committee
The Operational Team would need to operate through a BCUHB IP&C Committee whose membership should include:

- Nursing and medical representation from the IP&C teams in each site.
• Representation from the CPGs which should be the clinician with lead responsibility for IP&C on the CPG board (a restructuring of the CPGs into a smaller number would make this aspect of the IP&C committee less cumbersome).
• Representatives from Estates and Facilities management.

**Role of Site management and CPGs**

The management structure in BCUHB is divided between local (site) responsibilities and overall management of clinical services by the CPGs. This requires clarity in the line of accountability and the responsibilities for IP&C. Both have important roles and responsibilities.

**Site management**

During the last year, site management has been re-established at the three site hospitals with the appointment of Associate Medical Directors, Assistant Directors of Nursing and, within the last few months, Senior Site Managers. Much of IP&C has its application in the sites where care is provided and, therefore, needs a strong organisation at each site. This has been recognised at BCUHB in recent months with the re-establishment of local IP&C committees by the Acting Director of Nursing. These are key elements in the IP&C service with local responsibilities. At present, they do not have an effective BCUHB-wide structure to support them with a firm commitment to the implementation of policies, procedures and protocols. The recommendation for a BCUHB IP&C Committee (above) will provide an appropriate structure for the local committees to work within.

The constitution of the local IP&C committee should comprise the local ICD and lead ICN, the site management triumvirate, clinical representation and the head of estates and facilities.

The site IP&C committees should be responsible for the operational aspects of the IP&C service in their site. They should determine actions necessary for IP&C, institute and manage measures for the control of outbreaks that may (in fact will) occur. They should also ensure the delivery of the training programmes for all the staff of the site so that all receive appropriate initial training on appointment with updates required at regular intervals. The provision of the training and the maintenance of training records should be a local responsibility although the overall content of the training programmes will have been set by the BCUHB Committee.

**CPG responsibilities**

IP&C is also an important responsibility within the CPGs that are the management lines for the clinical services (for example; cancer, women’s, children’s, medicine). Each CPG should appoint amongst the lead clinicians on its board, one who takes lead responsibility for IP&C. The CPG should have IP&C issues, ie, numbers and rates of key infections in their clinical areas, audits of policy implementation, antimicrobial stewardship and all aspect of antimicrobial prescribing and IP&C training of its staff, as standing items on their agendas. The CPGs are responsible for the implementation of BCUHB policies, procedures and protocols for IP&C and antimicrobial stewardship and for ensuring that their staff do what is expected of them and for having an audit system in place to show that implementation and compliance are effective.
The Lead ICD and Assistant Director of Nursing should liaise directly with the CPG IP&C leads and should attend CPG board meetings regularly for the IP&C agenda items to help maintain consistency of delivery across the clinical services provided by the CPGs.

**Staffing and function of local ICTs**

Each local ICT in the sites will be led by an ICD and lead ICN, with sufficient ICNs to deliver the required service. The precise numbers of ICNs required for each site is beyond the scope of this review but it is clear that the reduction in numbers of ICNs at YGC was linked to a reduction in IP&C services to below what is described here as necessary. The ICT provides the expertise and knowledge of IPC, surveillance etc.

- **Link nurses.** Some parts of BCUHB have had a link nurse system in which a nurse in each ward team has designated IP&C responsibilities and provides a direct link with the ICT. The link nurses need protected, dedicated time to undertake these duties. YGC used to have such a system but it is reported that it was abandoned because the ICT did not feel able to provide the necessary support and due to a lack of clinical engagement and representation. This should be re-examined to decide whether link nurses should be re-instated or whether the responsibilities should be placed directly on the ward sisters and matrons.

The functions of the local ICT should comprise:

- Outbreak investigation and management.
- Ensuring that the surveillance system links the laboratory data and clinical information and that all cases of infection are properly recorded and reported into the local surveillance system that feeds into the BCUHB surveillance and the reporting mechanism to PHW.
- Advising ward staff on the investigation and management of patients with infection and those who may have been exposed to infection.
- Supporting the implementation of IP&C policies and procedures, care bundles etc.
- Supporting the ward IP&C audit programme and collating the results for the site.
- Making a major contribution to the IP&C training programmes for clinical and non-clinical staff.

**Ward responsibilities**

Each ward should receive, each month, its own figures for key HCAI numbers with historical data over previous months for comparison. These are often provided in the form of Statistical Process Control (SPC) Charts which provide a clear visual representation of the ward’s progress. These should be reviewed by the ward multidisciplinary clinical teams under the guidance of the ward sister or matron, with input from the ICT as needed, at a monthly ward or unit meeting. The ward audit data should be reviewed alongside the infection data. This should form the basis of monitoring and sustaining the actions necessary to reduce the risk of infection.
Antimicrobial stewardship

It is clear from reports and staff interviews that there has been slow and inconsistent development and implementation of antimicrobial prescribing policies in BCUHB.

BCUHB should quickly complete and promulgate the Board-wide policy for antimicrobial prescribing with two main components:

1. Selection of antimicrobial agents for specific clinical situations.
2. Appropriate prescribing principles including
   - Recording the reason for prescribing
   - Indicating an early review date (first consultant ward round and not more than 48 hours after admission)
   - Review of IV antibiotics after 48 hours with a view to switching to oral administration
   - Setting a stop date at 5 or 7 days with a positive medical decision being made for continuation beyond the stop date.

The lead antimicrobial pharmacist should work with the consultant Medical Microbiologists and representative clinicians from the CPGs to complete the policy as a matter of urgency.

CPG responsibility

The CPGs are responsible for the implementation of the policies by their medical staff and the main responsibility is with the consultant medical staff to ensure their teams implement them.

Audit

An audit programme based on the antimicrobial prescribing policy should be applied across all clinical specialties. The audits should be co-ordinated by the antimicrobial pharmacists supported by the consultant Medical Microbiologists who lead on antimicrobial treatment in the sites, but the responsibility for doing the audits should be with the clinical teams. It is particularly useful for junior medical staff to undertake the audits of antimicrobial prescribing because they are the ones who are doing the initial prescribing.

Appraisal

Implementation of antimicrobial stewardship and prescribing policies should be part of the annual appraisal of all medical staff, both junior staff and, in particular, consultants who have the overall responsibility for the treatment of their patients.

Personal responsibility

The phrase “infection prevention and control is everyone’s responsibility” means exactly what it says. All clinical and non-clinical staff have a personal responsibility for their own standards and activities. All staff must be included in policies such as hand hygiene and be part of the audits.

All clinical staff have a wide range of responsibilities. They should attend for training to develop and maintain their skills and competences. The management structure should ensure that the training is provided and that staff have the time to attend the required training sessions. The attendance of staff at training programmes should be monitored either
through the local IP&C committees or the CPGs; either can be effective provided that the training records are monitored and collated at local level and reported to the BCUHB IP&C Committee so that management has oversight and the Board can be assured.

For those clinical staff who are subject to job plans, appraisals and personal performance reviews, IP&C should be an integral part of the appraisal and review. This should include numbers and rates of infection, audit returns for IP&C and, for medical staff in particular, compliance with antimicrobial stewardship policies.

Public Health Wales
The role of PHW in relation to actions following their collation and analysis of surveillance data should be reviewed. The Welsh Government, NHS Wales and the Health Boards should consider whether it would be a greater benefit to public health if PHW were required to intervene when the surveillance data indicate that a particular Health Board (or individual hospital) has results outwith the expected parameters. Such an intervention at BCUHB could have alerted the Board at an earlier stage that their figures and rates were higher than peer comparators and that this indicated a need for some more detailed attention to IP&C with the support of PHW expertise.

Death Certification
There are clear differences in the approach to death certification in patients who have died with or following CDI between West and Central/East sites. The pre-certification involvement of the coroner in the Central/East sites will certainly have the result that CDI is recorded as a contributory cause in fewer deaths than if this was done on the basis of clinical assessment. This is an unusual situation and is not consistent with what happens in the rest of Wales and most of England. This role of the coroner, as well as being unusual, would not be consistent with the new "medical examiner" role that will be introduced shortly.

The expectation of central government officers and agencies for certification of deaths when HCAI (including CDI) is implicated would be that the decision to include the infection on the death certificate is made by the clinician responsible for the patient's care before death, with advice from the ICD/Consultant Medical Microbiologist and, additionally, from the Histopathologist when there has been a post-mortem examination. Deaths in which CDI or other HCAI is implicated in either part of the death certificate are incidents relating to deaths linked to medical practice and should be referred to the coroner who may wish to make further inquiries, but this is not prior to the medical certification of the death.

This anomaly in the Central/East sites should be reviewed as a matter of urgency by the Health Board, Welsh Government, PHW and the coroner's office with a view to implementing a consistent approach to death certification in CDI and other HCAI cases in Wales.

Epidemiological investigation of CDI in BCUHB
An investigation of the epidemiology of CDI in all three sites of BCUHB is beyond the scope of this review but should be undertaken to understand the current and recent background pattern of infection and the outcomes. It should cover cases of CDI that occurred over the past 2 years (2011 and 2012) and with methodology similar to that used by the PHW team.
that investigated the 2013 outbreak at YGC although a detailed case note review may not feasible but the pattern of cases can be established without detailed reading of the notes. BCUHB should seek the help of PHW in conducting this investigation which is needed to show where and in which patient groups the occurrence of CDI is most significant.

**C. difficile ribotyping**

The ribotyping of *C. difficile* isolates from cases has not been done routinely at BCUHB. It is not expected that *C. difficile* will be isolated and sent for typing in all cases but it should be done more frequently and specifically in cases that result in major surgery or death and when there may be linkage between cases in time and place may indicate cross-infection. When isolates appear indistinguishable by basic ribotyping, further specific genotyping (eg, whole genome sequencing) methods should be applied.

**Root Cause Analysis**

The current approach to RCA is inadequate. The system should be reviewed and the staff who do it should be given further training in RCA methodology. The analysis should focus on outcome, ie, what root causes can be identified and whether these should lead to a change in clinical practice.

The RCAs should be completed in a timely way (eg, by setting a limit of 5 or 7 working days for completion). The result of each RCA should be reported to the local IP&C committee (for any action related to the locality) and to the appropriate CPG board (for any action related to clinical practice). The RCA results and any actions should then be reported to the BCUHB IP&C committee. The IP&C executive team should ensure that the RCAs are being done properly and in a timely manner.

Ideally, an RCA should be done for each case of CDI but this may not be feasible with the current number of cases but this is now being done in several Trusts in England. In the current circumstances, RCA should, as a minimum, be done on all cases of moderate to severe disease, all cases where the patient subsequently dies, and all cases that are probably linked in place and time.

There should be a collation and review of RCA results at (currently) quarterly intervals to identify common or recurrent factors (as in the February 2013 report) and take appropriate actions.

The completed version of this Report was delivered electronically to BCUHB Executives on 2nd August 2013, final corrections and amendments on accuracy were completed by 11th August 2013.